5 Standards for Better Human Capital

Main messages

- Quality standards are the backbone of delivery of services in health care and education. Without them, investments leak away in poor implementation. In health care, 60 percent of deaths in low- and middle-income countries stem from conditions that could be prevented or treated with high-quality care. Compliance with standards in areas from supply chains to staffing depends on strong quality infrastructure.
- Early standards shape lifelong success. The first thousand days of life set the foundation for a child's learning and health. Every US$1 invested in nutrition and stimulation in early childhood yields up to US$13 in later returns, through better school performance and higher productivity. Standards for prenatal care, early learning, and teacher-pupil ratios lock in these gains.
- Countries should start where they are, then raise the bar. Setting overly ambitious standards too soon can exclude poor people. When their standards match their capacity to enforce them, countries expand coverage faster and learn by doing. As countries' capacity to comply with them grows, standards can—and should—rise. This adaptive path explains how Viet Nam moved from performing below the average for Organisation for Economic Co-operation and Development (OECD) member countries regarding scores on the OECD's Programme for International Student Assessment (PISA) to the top PISA performance in less than a decade.
- Process standards save lives. Simple checklists for hospitals to follow reduced mortality by 47 percent. Standardized clinical guidelines and monitoring tools boost equity and innovation, especially in systems in which poor people are most at risk from low-quality care.
- Teachers are the most powerful standard in education. When teaching quality is raised, learning follows. In Brazil's state of Ceará, clear standards for teacher practice and literacy benchmarks helped nearly every child read by grade 2, lifting the state's scores on Brazil's National Education Quality Index from 3.2 to 7.7 in less than two decades.
- What gets measured gets improved. Global learning assessments like PISA have jolted countries into action—from Germany, where reforms after its 2000 "PISA shock" lifted student scores above the OECD average, to Peru, where a similar wake-up call spurred sweeping reforms to programs for teacher development and to curriculums.

A reproducibility package is available for this book in the Reproducible Research Repository at https://reproducibility.worldbank.org/catalog/389.

The link between policies and standards for health care and education

Health and education are essential for human development and inclusive growth.[1] The foundation of human capital is established during early childhood, when most of the brain's neural connections are formed. Missing out on investments in early childhood is very difficult and costly to compensate for later in childhood or adolescence.[2] The return on investment in human capital is greatest in a child's early years.[3] Such early investment starts with health, through prenatal care, cognitive stimulation, and nutrition, which are crucial for brain development and future learning. Standards in early childhood lay a key foundation for success in school and later life. Although human capital also develops through work, this Report does not address standards in labor markets.[4]

Governments in developing countries face the immense challenge of providing their large populations with access to health care and schooling. Given these countries' limited institutional capacity and financial resources, the key trade-off is between high standards and low levels of access or low standards and high levels of access. At low levels of income, giving villagers access to even bare-minimum services in health and education has high marginal returns. On the other hand, certain interventions cannot be downgraded if they are to have the expected impact. For instance, immunization must reach a critical minimum coverage in a population to achieve or maintain control of infectious diseases. Similarly, as patient volumes increase, so does treatment quality in hospitals, to such a degree that this relationship has led to standards on minimum patient volumes.[5]

There are important links between policies and standards in both health and education. Interventions to improve children's health can improve their educational outcomes effectively and vice versa. For instance, a deworming program in Kenya significantly increased school attendance.[6] More generally, health interventions such as those related to nutrition and sanitation directly increase children's ability to learn and therefore improve educational outcomes. School nutrition programs, such as the Tawana Pakistan Project,[7] not only address malnutrition but also increase school enrollment as well as improve children's ability to pay attention in school. Relatedly, education leads to better health. School feeding programs promote healthy eating habits among children. Educating children about handwashing reduces the incidence of disease.

The world's unfinished agenda for human capital development

While progress in both health and education reached unprecedented levels in the late twentieth century, it remains incomplete and unevenly shared. Thanks to improvements in medicine and public health, life expectancy in low-income countries today is much higher than it was in Organisation for Economic Co-operation and Development (OECD) member countries when they were at similar levels of GDP per capita.[8] Nonetheless, while life expectancy in high-income countries reached 80 years in 2023, in low-income countries it is only 65 years.[9] Poor and rural households in low- and middle-income countries continue to face high rates of infectious disease; reproductive, maternal, infant, and child health disorders; and malnutrition, which translate into a high burden of disease.[10]

Access to education has expanded widely, with primary school enrollment in low-income and lower-middle-income countries having reached 81 percent and 87 percent, respectively.[11] Yet learning outcomes remain a challenge, with many children failing to meet minimum standards of

proficiency in reading and mathematics. The share of children unable to read a simple text by age 10 (so-called learning poverty) stands at 91 percent in low-income countries and 60 percent in lower-middle-income countries. In upper-middle-income countries and high-income countries, learning outcomes remain unsatisfactory, with indexes of learning poverty in the two country groups at 29 percent and 8 percent, respectively.[12]

Improvements in health have been more apparent in mortality rates than in morbidity rates, while improvements in education have been much more significant in regard to enrollment rates than in regard to learning outcomes.

Standards for health and education

Standards can be used to enhance outcomes related to human capital, such as reducing morbidity and mortality, ensuring proper physical growth of children, and improving reading skills. These outcomes rely on quality inputs (such as supplies, infrastructure, and staffing) and processes (such as clinical protocols and teaching methods). Countries can choose to adopt, adapt, or align with international standards developed by organizations like the World Health Organization (WHO) and the United Nations Educational, Scientific and Cultural Organization (UNESCO) to fit their local contexts. International standards for best practices carry more influence in health care than in education, for which it is more important to adapt to local circumstances.

The importance of standards related to human capital is clear in regulations such as caps on class size, measurement systems like standardized tests, and protocols like checklists for surgical procedures used daily worldwide. Standards set acceptable levels of quality and practice in licensing teachers and medical professionals; accrediting schools, diagnostic laboratories, and hospitals; and establishing quality requirements for learning or medicines. Standardized measures are crucial for monitoring performance, benchmarking best practices, and enabling comparative analysis.

Most standards for inputs into and processes for human capital are examples of minimum quality standards (such as teacher or doctor qualifications or minimum requirements for staffing). Others are compatibility standards, including certification credentials. Measurement standards include disability-adjusted life years (DALYs) in health and learning-adjusted years of schooling[13] in education, which serve as benchmarks for evaluating improvements in outcomes.

This Report posits that countries reach desired human capital outcomes when standards for individual countries are set based on those countries' ability to comply with them. As a country's capacity grows, standards should be updated, as discussed in chapter 2. Compliance with standards for health and education services builds trust in the systems associated with those standards, which then increases demand for both types of services.

The importance of complementary policies

Standards are just one tool, however, in the policy toolbox. To achieve desired outcomes, interventions may sometimes require other policy instruments, such as incentives and training. Standards ensure that interventions are implemented as designed, but the wrong set of interventions will fail to produce desired outcomes even when the right standards are used.

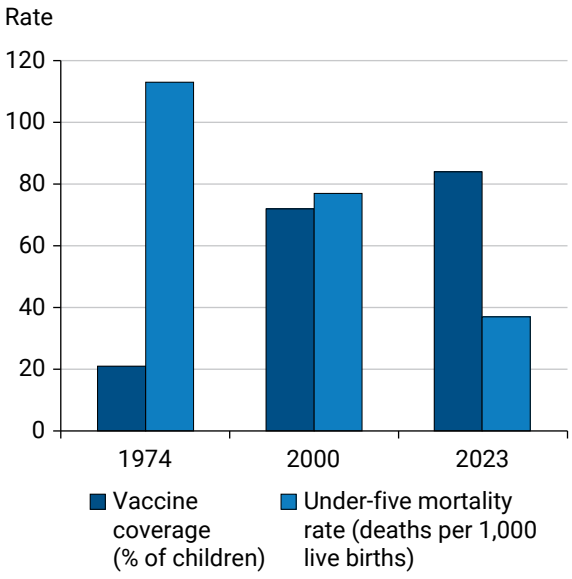
The WHO Essential Programme on Immunization illustrates how standards can achieve desired outcomes.[14] Vaccination coverage—that is, the percentage of a population that needs to be vaccinated to achieve herd immunity—varies by disease

(for example, it is 95 percent for measles and 80 percent for polio).[15] This minimum share of the population that must be vaccinated to achieve herd immunity is a standard, and so are quality standards to ensure that vaccines are effective. While vaccination campaigns can save lives, adherence to standards ensures that enough people get immunized during a campaign and that quality vaccines and vaccination methods are used.

The Essential Programme on Immunization, which initially focused on six major infectious diseases, has expanded its reach and integrated newer vaccines, supported since 2000 by Gavi, the Vaccine Alliance. Expanded vaccination coverage has led to a decline in deaths of very young children (refer to figure 5.1). Some have estimated that the program has contributed to a 40 percent decline in the death rate of children under the age of five.[16] In the case of this program, compliance with standards led to a successful implementation of the intervention, which in turn reduced mortality, the intended outcome.

A recent study of teacher qualifications in Pakistan offers a contrasting example.[17] In 2016, Pakistan changed its practices for recruiting teachers for the public sector by introducing nationwide standardized testing and requiring a passing score for candidates for teaching positions, aiming to promote merit-based hiring. The change in hiring practices resulted in new teachers being more qualified (refer to figure 5.2, panel a). Teachers hired after the reform were significantly more likely to hold postgraduate degrees, with female teachers more likely to have majored in science. However, despite the hiring of more qualified teachers, classroom practices and outcomes of student learning did not improve and, in fact, actually declined (refer to figure 5.2, panel b).

Figure 5.1 Expanded vaccination coverage has led to a decline in deaths of very young children

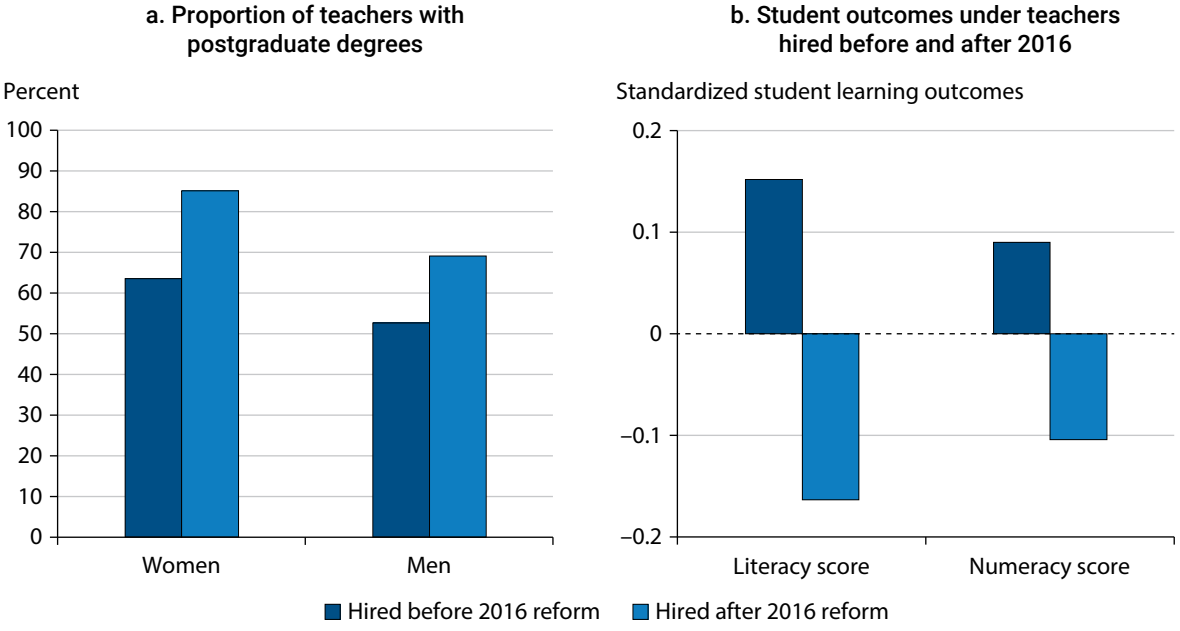


Sources: WDR 2025 team estimate using data from Mirza et al. 2025 for vaccine coverage in 1974. Data on vaccine coverage for 2000 and 2023, as well as data on the under-five mortality rate for 1974, 2000, and 2023, are from WDI (World Development Indicators) (dashboard), World Bank, Washington, DC, https://datatopics.worldbank.org/world-development-indicators/.

Note: "Vaccine coverage" is the percentage of children receiving the vaccine for diphtheria, pertussis, and tetanus, which is a good proxy for the percentage of children receiving a wider range of vaccines. "Under-five mortality rate" is the number of children younger than five that died per 1,000 live births.

These findings highlight the limitations of using standards. While changing hiring practices improved teacher qualifications as intended, higher hiring standards alone were insufficient to improve the overall quality of education. What was missing were complementary efforts to improve how teachers teach and ensure they teach effectively.

Figure 5.2 Raising teacher qualifications is not enough to improve student outcomes: Evaluating standards for hiring teachers in Pakistan



Source: Asad and Fatima 2025.

Note: Panel a reports the percentage of teachers with postgraduate degrees before and after a 2016 policy change (refer to chapter text). Panel b reports outcomes of student learning as measured by standardized test scores in the areas of literacy and numeracy before and after the policy change. A standardized test score of zero is equal to the average.

Adopting standards to improve quality in the health sector

The medical community adopts standards to ensure the quality of medical services provided and build trust between medical personnel and patients, which is essential for increasing demand for public or private health services. Reliable public enforcement of these standards can lead to expanded health coverage and better health outcomes. The discussion that follows explores the use of standards in selected examples from the field of health care, highlighting the difference between the quality of inputs and processes and their impact on outcomes.

Quality standards for health inputs

Inputs into health care include physical facilities (such as hospitals, clinics, and health centers), other physical support (such as equipment, medicines, and vaccinations), and certified medical providers (such as doctors and nurses).

Standards for a country's supply of medicine: Essential Medicines Lists

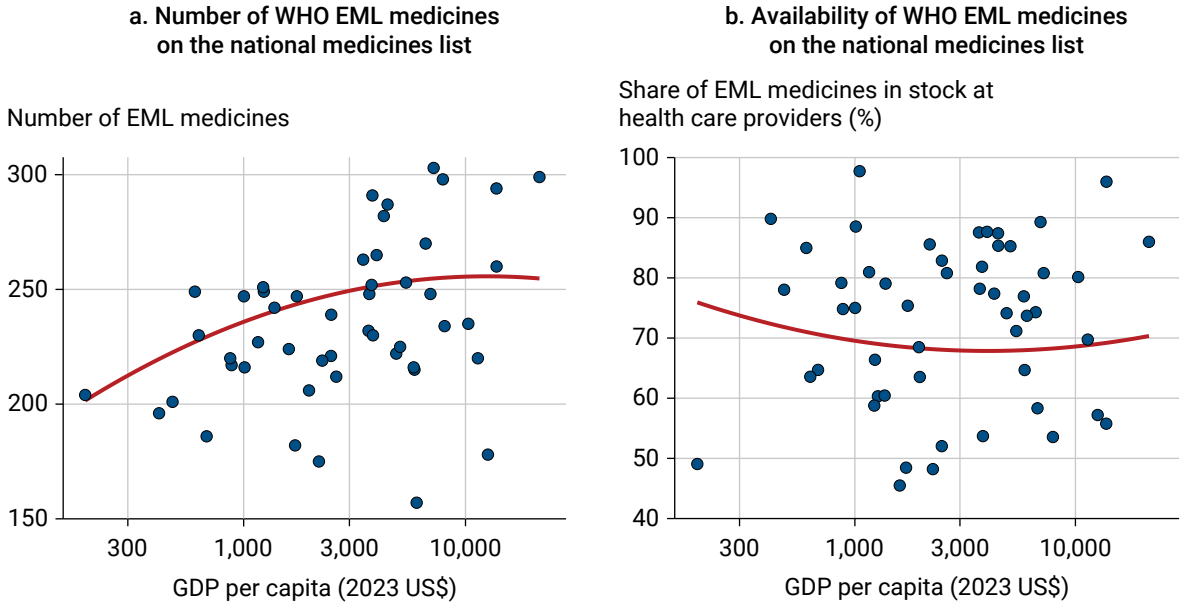
To guide countries in deciding which medicines to make a priority in regard to their health care needs, WHO has published and regularly updated a Model List of Essential Medicines (EML) since 1977.[18] From 186 medicines in the first list, the number had expanded to 502 medicines by 2023.

WHO chooses medicines for inclusion on the list based on their safety, effectiveness, and cost. Updating the list is a continuous process, in keeping with changes in epidemiological conditions and pharmaceutical progress.

The EML has been instrumental in improving access to essential medicines and has shaped national health policies by encouraging many low- and middle-income countries to develop their own national medicines lists (NMLs). More than 150 countries, mostly lower income, have developed NMLs, based on the EML, to reflect their specific health priorities and resource availability. By developing an NML, a country commits to procuring the medicines on the list and ensuring that they will be available in its health care facilities.

Figure 5.3 tests whether NMLs follow the conceptual framework discussed in chapter 2 (refer to figure 2.5). According to the framework, countries should adapt NMLs not only based on their health needs, but also on their capacities to enforce them. As the ability to procure the medicines included on NMLs increases—that is, as countries' compliance capacity (proxied by income per capita) increases—countries should include more medicines from the EML on their NMLs. This is precisely what panel a of figure 5.3 shows is happening. As countries' income per capita increases, the number of medicines from the EML on countries' NMLs also increases (refer to figure 5.3, panel a). Furthermore, the overall number of medicines (both from the EML and others) on a country's NML increases as the country's income

Figure 5.3 Countries create national medicines lists according to their compliance capacity



Sources: Panel a: WDR 2025 team using data from Global Essential Medicines (dashboard), World Health Organization, https://global.essentialmeds.org/dashboard/countries; Persaud et al. 2019. Panel b: Oldfield et al. 2025; World Health Organization/Health Action International Project on Medicine Prices and Availability (portal), World Health Organization, https://www.who.int/teams/health-product-and-policy-standards/medicines-selection-ip-and-affordability/who-hai-project-medicine-prices-and-availability.

Note: Panel a shows the number of medicines from the World Health Organization (WHO) Essential Medicines List (EML) that are included on countries' national medicines lists. Panel b shows the share of those medicines in stock at countries' health care providers.

per capita increases.[19] The NML is adapted in such a way as to minimize the compliance gap, that is, the difference between full and actual availability of medicines listed on the NML. As shown in panel b of figure 5.3, the compliance gap is consistent across countries of different income levels.

Medicines listed on a country's NML should be available and affordable to all patients in that country who need them.[20] Medicines on NMLs tend to be more available, on average, than medicines not on NMLs.[21] Even so, availability of medicines on NMLs remains suboptimal.[22] Left to its own devices, the market for medicines would not provide enough affordable drugs to meet public health needs. Narrow profit margins discourage manufacturers from producing essential drugs in quantities sufficient to meet those needs, while nonessential drugs for symptomatic relief of trivial conditions have high profit margins. NMLs thus assure markets for essential drugs and thereby provide the pharmaceutical industry with incentives to increase production of those drugs while accepting a lower price in exchange for a wider consumer base.

Minimum standards for qualifications for doctors and nurses

Countries and others often use the doctor-to-population ratio as a standard at the national, regional, and local levels to measure ease of access to health care services among various populations, whether urban or rural, affluent or poor. One important aspect the ratio misses, however, is the qualifications of medical personnel (including doctors, nurses, pharmacists, and laboratory technicians).[23] National accreditation agencies set national quality standards to validate the credentials of medical personnel. WHO plays a key role by creating global standards for medical education at the undergraduate, postgraduate, and continuing professional development levels and by certifying national accreditation agencies through the World Federation for Medical Education (WFME) Recognition Programme.

International recognition of skills is essential for medical schools and graduates seeking both national and international certification, and it can help rebalance the global labor market. High- and upper-middle-income countries require migrants with skills appropriate for meeting the demands of the health care market.[24] Indeed, global demand for health care workers is projected to rise significantly by 2030, potentially causing a shortage of millions.[25] Meanwhile, low- and lower-middle-income countries have excess health care workers. But merely shifting workers from lower- to higher-income countries will not resolve the issue, because those workers may not have the necessary skills or certifications.[26]

Global Skill Partnerships (GSPs) are a promising policy tool for addressing this problem.[27] In these partnerships, firms and governments in workers' destination and origin countries jointly implement training programs and share the costs of worker training and mobility. Training mainly occurs in origin countries, with a portion of graduates emigrating to destination countries through formal channels and the rest entering domestic labor markets. This dual-track model allows countries on both sides of the exchange to share the economic gains from training and mobility. To date, most existing GSPs have been small-scale pilots, with a few exceptions. Australia-Pacific Technical College has trained and certified more than 20,000 students since 2007 from 14 Pacific Island countries in five main sectors, with 8 percent of graduates migrating to Australia.[28] A skill mobility program similar to GSPs is Germany's Triple Win program, established in 2013. Since its launch, the program has placed more than 6,000 registered nurses in Germany from different countries.[29]

Minimum quality standards for medicines and vaccinations

One of WHO's functions is to develop standards for medicines and vaccines to ensure they are safe and effective and meet quality requirements. The process for fulfilling this function includes many elements, such as prequalification, quality assurance, guidelines for inspecting pharmaceutical manufacturing facilities, and monitoring for counterfeit or substandard products and medicines.[30]

Developing countries have complex issues involving drug safety. Given differences between developed and developing countries in health systems, disease patterns, and marketed drugs, health authorities in the latter cannot simply adopt and implement standards from the former.[31] It is essential that developing countries have a functioning quality infrastructure to monitor their pharmaceutical supply chains and enforce standards. Pharmaceutical standards and regulatory systems across the developing world remain fragile, uneven, and highly dependent on aid and technical support from international donors.[32] The trade and consumption of substandard medicines remain too common (refer to box 5.1).

Box 5.1 The high cost of substandard medicines and missing quality infrastructure

Cough syrup contaminated with diethylene glycol is a recurring hazard. The first mass poisoning from diethylene glycol occurred in the United States in 1937, when the compound was used as a solvent in cough syrup at a time when toxicity testing was not mandatory. The result: 105 deaths, including 34 children. The tragedy catalyzed sweeping reforms to the 1938 Federal Food, Drug, and Cosmetic Act, with a strong emphasis on safety. The United States has not since experienced another mass poisoning from diethylene glycol.[a]

But the problem persists in developing countries. In 2022, 66 child deaths in The Gambia led the World Health Organization (WHO) to issue a global alert[b] and flag 20 contaminated cough syrups.[c] The deaths were traced to an Indian manufacturer. Indian authorities halted production, investigated the plant involved, and found serious violations of the country's Good Manufacturing Practices.[d] The government's position was that the incident reflected a single firm's compliance failure, not a systemic weakness in regulation. Nevertheless, it quickly introduced safeguards—ensuring that plants in India meet standards recommended by WHO and requiring mandatory preexport testing and certification from accredited laboratories—to strengthen quality assurance for medicines bound for international markets. Smaller firms were given more time to comply with the safeguards, but after 24 people died in India in 2025

(Box continues next page)

Box 5.1 The high cost of substandard medicines and missing quality infrastructure *(continued)*

as a result of consuming locally produced cough syrup contaminated with diethylene glycol, India refused drugmakers' requests to extend the deadline, requiring them to upgrade their manufacturing facilities to international standards by the year's end.[e]

Preventing additional occurrences of such incidents requires robust national quality infrastructure: accredited upstream and downstream laboratories for quality control, postmarketing surveillance, and meaningful penalties for quality failures.[f] In the absence of global compulsory enforcement, countries must enforce their own standards. Developing countries like The Gambia need external technical and financial support to build verification capacity.

Source: WDR 2025 team.

a. Thakur and Reddy Thikkavarapu (2022).
b. Saied et al. (2023).
c. Dutt (2023).
d. Saied et al. (2023).
e. Eglovitch (2025).
f. Nallathambi and Cadwallader (2024).

Gender gaps in standards for medicines and vaccinations

Standard setting for medicines and vaccinations is also addressing a long-standing gender gap in health. Standard dosages in medicine have long failed to take gender differences into account.[33] Many medicines and vaccines are administered in gender-neutral doses even though women and men are biologically different. For example, the influenza vaccine has one dose for both genders, even though women develop higher levels of antibodies[34] and are more likely than men to experience adverse drug reactions.[35]

Historically, women have been underrepresented in medical trials for developing drugs and vaccines, which has implications for the safety and efficacy of the drugs and vaccines developed. Cardiovascular disease has been the leading cause of death among women in the United States since 1989. Yet women represented only 25 percent of participants in 31 landmark trials for drugs treating congestive heart failure between 1987 and 2012. Risk prediction models developed for men often miss warning signs of the risk of heart attacks in women. Preventive measures that reduce the risk of heart attack developed for men may be less effective for women. For example, while aspirin has been found to be effective in preventing a first heart attack, studies have found that it may be ineffective or even harmful in women.[36] In the United States, 80 percent of the drugs withdrawn from the

market by the US Food and Drug Administration (FDA) were banned because they were found to have had adverse effects on women.[37]

In recent years, progress has been made in Australia, the United States, and the European Union. For example, in 2016, the US National Institutes of Health (NIH) required that data from studies it funded be disaggregated and analyzed by sex, unless there was a compelling reason not to do so.[38] As of 2021, women accounted for about half of all clinical research supported by the NIH, expanding consideration of sex in research designs, analysis, and reporting from preclinical studies to clinical interventions.[39] Between 2016 and 2024, the share of adverse events in the United States reported by women fell by 1 percentage point.[40]

Standards for health care processes

High-quality health care is the right care delivered at the right time, in a coordinated way, in response to the needs and preferences of patients, while minimizing harm and resource waste. Unfortunately, there is substantial evidence that the quality of care in many lower-middle-income countries is low, especially for those who are poor.[41] Applying process standards can help push provision of health care to higher levels of quality.

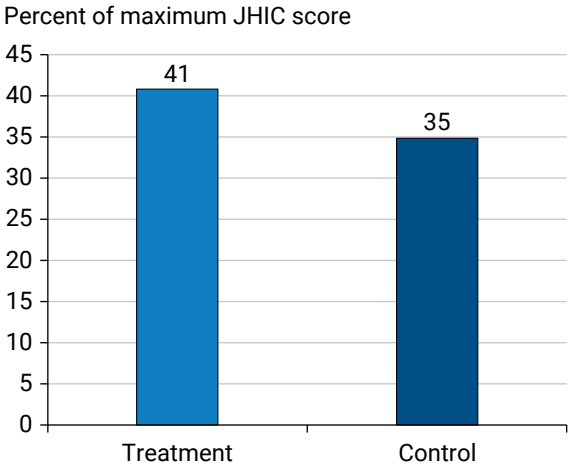
The checklist: Process standard for treating patients

One notable example of a process standard that reduces medical errors is the use of checklists to ensure that health personnel follow vital steps during complicated medical processes. Adherence to standards of this type has been associated with improved patient outcomes across a wide range of diseases, including heart failure, breast cancer, and pneumonia.[42] Standardizing treatment of childhood illnesses in communities and health facilities through an approach known as Integrated Management of Childhood Illness, which includes clinical algorithms, is associated with reduced childhood mortality when used at scale.[43]

Inspired by air pilots' checklists, WHO and a team of researchers developed the Safe Surgery Checklist to address common lapses in safety during surgery and prepare for uncommon complications.[44] The checklist is not intended to be comprehensive and is meant to be adapted to local conditions for health care. It was tested in 2008 in eight hospitals around the world.[45] Assessment results showed that in hospitals that introduced the checklist, the rate of complications fell by 36 percent and deaths fell by 47 percent.[46] WHO recommends the use of surgical safety checklists, requiring that hospital teams make certain that a patient's known allergies are checked before surgical procedures and that instruments, needles, and sponges are counted after procedures to make sure none are left inside patients.[47] Studies have shown that such checklists have reduced the rate of surgical complications, including mortality.[48]

In Kenya, between 2013 and 2015, the World Bank and the Ministry of Health developed a new regulatory mechanism for both public and private providers of health care. This was coupled with an impact evaluation to assess the effects of the new mechanism, involving a randomized controlled trial of 1,348 health facilities across three Kenyan counties, categorized into 273 distinct health markets. The project implemented a standardized inspection protocol, the Joint Health Inspection Checklist, for evaluating a facility's compliance with safety protocols. The health markets were randomly assigned to high-probability inspections with enforcement of safety standards (treated) and low-probability inspections (control).[49] Enforcement of standards successfully increased compliance with measures for patient safety in both public and private facilities, increased trust in public health care and patient safety, and

Figure 5.4 Process standards such as checklists improve health care quality



Source: Bedoya et al. 2023.

Note: The figure shows the estimated increase in patient safety (that is, compliance with safety protocols) in Kenya after implementation of the Joint Health Inspection Checklist (JHIC) to measure compliance with safety protocols. "Treatment" refers to health care markets that were randomly selected to be inspected. "Control" refers to health care markets that were not. The difference between scores among the treatment and control groups is statistically significant at the 1 percent level.

improved delivery of health care while maintaining access to care. Treated facilities scored on average 41 percent of the maximum score, compared with 35 percent in control facilities (refer to figure 5.4).

Standards for accountability and monitoring systems in health care

WHO provides countries with frameworks and tools for developing their national quality infrastructures covering various aspects of service delivery of health care, such as those related to staffing, equipment, and clinical protocols. It also gives countries guidance for developing frameworks that ensure safety, quality, and efficacy of medical devices and medicines.[50] For example, it publishes guides such as *Global Standards for Quality Health-Care Services for Adolescents* (2015)[51] and *Standards for Improving Quality of Maternal and Newborn Care in Health Facilities* (2016).[52]

The International Organization for Standardization (ISO) issues standards for the quality of medical devices and laboratories. For example, ISO 13485 specifies requirements for medical devices, ensuring consistent design, development, production, and delivery. Many countries require compliance with this standard as a prerequisite for regulatory approval.[53] ISO 15189 specifies requirements for quality and competence of medical laboratories.[54] At the country level, national regulatory agencies help enforce ISO standards. For example, in the United States, the FDA approves and regulates medical devices.[55]

Standards for best practice established by WHO are voluntary. Countries that adopt or adapt them must find ways to enforce them, working with their medical communities. For example, although WHO sets quality standards for drugs, the countries where the drugs are produced are responsible for enforcing these standards. This requires capacity in importing countries to verify drug quality. Because most low-income countries import their medicines and have limited verification capacity, it behooves producer countries to enforce quality standards to ensure safety.

Viet Nam's strategy for setting up a quality infrastructure for medicine provides a good example. In 2009, the country launched a National Center of Drug Information and Adverse Drug Reactions Monitoring (in its Ministry of Health), responsible for pharmacovigilance. The center collects, analyzes, and evaluates reports on adverse events received from health care professionals, national public health programs, and pharmaceutical companies (which are required to submit Periodic Safety Update Reports); updates the country's pharmacovigilance database; and assesses and

communicates drug-related risks. External technical assistance has helped the country develop a strong and comprehensive pharmacovigilance system and detect problems with drug quality. The system has largely met the minimum WHO requirements for a functional pharmacovigilance center.[56]

Standards for measuring health

Together with incentives, quality standards—when enforced—can lead to better health outcomes. Collection of data on health outcomes is essential for measuring the actual impact of increased quality throughout a country's health system. Given the focus of this Report on early childhood development, one especially important outcome metric is WHO's standards for child growth, which pediatricians around the world use to measure children's early physical growth against a sample of children. This metric allows health care workers to assess whether a child's growth is on track. Detecting faltering growth early on is of vital importance to reversing any tendency toward stunting by providing remedial nutrition in time.

The WHO Global Health Estimates present comprehensive and comparable time series data from 2000 onward on health-related outcomes, including life expectancy, healthy life expectancy, mortality, and morbidity, as well as burdens of diseases at the global, regional, and country levels, disaggregated by age, sex, and cause.[57] The calculation of these indicators is made possible by the 11th version of the International Classification of Diseases (ICD-11), which standardizes, by means of codes, the diagnosis of diseases and causes of death globally. The coding of diseases and treatments across hospitals has helped improve diagnosis and treatment. ICD-11 also allows data on disease morbidity and mortality to be compared across different regions and countries and across time. The disease statistics it generates are fundamental to global health, including research on health services, health payment systems, and health planning.[58]

Focusing on mortality rates alone does not adequately capture the burden of disease. The DALY is a measurement standard that combines healthy life years lost because of premature mortality resulting from particular diseases with those lost because of disability.[59] DALYs help policy makers identify priority health issues by quantifying the burden imposed by different diseases. For example, in low-income countries infectious diseases such as malaria and tuberculosis cause major loss of health, so focusing resources on these is particularly cost-effective.[60] Also, the use of DALYs has been critical in showing that some tropical diseases and mental health conditions are highly disabling even if they are not a major cause of premature mortality.

The applicability of the DALY has been criticized, however.[61] One concern, acknowledged by its creators, is the lack of representativeness of the weights used for various diseases, owing to survey limitations.[62] Nonetheless, the DALY remains the dominant summary measure of health used by key global health actors including WHO, the *Lancet* family of journals, and the Gates Foundation, which makes funding decisions based on the DALY.[63]

Transitioning to higher health care standards: The case of "barefoot doctors" in China

By ensuring the quality of and building trust in medical services, standards are a useful tool for improving health care outcomes. For standards to be most effective, however, the setting of standards in each country should follow the conceptual framework presented in chapter 2. In addition, standards need to be used in a flexible way and updated over time as economies develop and situations change.

Consider the case of the "barefoot doctors" in China, an adaptive, phased approach to standard setting that allowed a country's health care system to grow. Between 1950 and 1985, China reduced mortality far more than did other developing countries with comparable levels of income.[64] Before 1949, the prevalence of infectious diseases, such as typhoid fever, cholera, and tuberculosis, and premature deaths in China was high, as were mortality rates (the crude death rate was 30–40 per thousand people, and infant mortality was 200 per thousand live births), and life expectancy was 32 years.[65] By 1978, at the beginning of China's reform and opening-up process, although its GDP per capita was US$156, its life expectancy had already increased to 63 years, exceeding the average level in lower-middle-income countries by 10 years.[66]

In the mid-1960s, China had 730 million people, with 80 percent of the populace living in rural areas. Meanwhile, only 31 percent of health care professionals resided in rural areas; the rest lived in urban areas.[67] Recognizing that it had far too few conventionally trained medical personnel to serve its enormous rural population, in 1965 China shifted its health policy to focus decisively on rural areas.[68] Resources were reallocated to train and provide a paramedic—popularly called a "barefoot doctor"—in each village. Meanwhile, all Chinese universities, including medical schools, discontinued enrollment of full-time students.[69]

The term "barefoot doctor" is really a misnomer, because the medical personnel trained under the program were neither barefoot nor doctors, but rather (as noted) paramedics: local farmers given short, intensive training to provide basic care and public health services in their own communities.[70] The name "barefoot" originated from farmers' treasuring their sole pair of shoes too much to wear them in the muddy fields where they worked. Because these medically trained peasants split their time between working in the fields and caring for patients, they were often running between one and the other with muddy feet.[71] At the program's height, in 1975, there were approximately 1.6 million barefoot doctors.[72]

Instead of receiving the standard instruction in anatomy, physiology, biochemistry, and pharmacology, the barefoot doctors relied on a manual that was practical and results oriented. It focused on disease prevention, diagnosis of common symptoms, disease treatment, traditional Chinese herbal medicine, acupuncture, family planning and birth attendance, women's and children's diseases, and first aid. Barefoot doctors carried a medical box containing a syringe, a stethoscope, a few gauze pads, and a few medicine tablets to use in providing their fellow peasants with primary health care.[73] At the time, WHO praised the model for providing the greatest benefits with the least investment.[74]

It is difficult to assess how much of China's health improvement during the program's existence can be attributed to the barefoot doctors. On the one hand, the trend in the country toward improvements in health predated the launch of the training and deployment of barefoot doctors.[75] On the other hand, the program rebalanced resources and thereby helped close the gap between urban and rural areas in access to health care.[76]

As China's system matured, the country gradually raised its standards, in 1984 requiring barefoot doctors to pass a new set of professional tests to become "village doctors." In 1985, about 1.25 million barefoot doctors took the nationwide tests; 50 percent passed and received formal certificates as village doctors. Recent records suggest that there are about 910,000 certified village doctors in China.[77]

Adopting standards to improve quality in the education sector

Standards for public education articulate the essential knowledge, skills, and abilities students should acquire as a result of the education they receive. Although student learning is a core goal of education, the success of an education system depends upon the adherence to quality standards in two critical areas: inputs (infrastructure, teachers, curriculum) and processes (pedagogy, leadership, accountability). Effective standard setting in these areas increases the chance of delivering higher-quality education services, facilitates comparability across time and space, and enables coherent policy making and targeted improvements in the education sector. If complied with, standards also create trust in the sector and increase demand for education services, increasing school attendance and improving learning outcomes.

In contrast to what is the case in the health sector, international standards play less of a role in education. Notwithstanding some universal minimum standards in education (minimum proficiency in reading and mathematics), local context largely determines what children need to learn. The main agency tasked with setting and enforcing international standards in education is UNESCO. To date, UNESCO's standard-setting instruments have included 43 conventions defining rules, 37 recommendations to influence the development of national laws and practices, and 14 declarations of universal principles.[78] For example, as part of Sustainable Development Goal 4.1.1, UNESCO monitors the percentage of children and youth achieving minimum proficiency in reading and mathematics at three stages (grades 2–3, the end of primary school, and the end of lower-secondary school).

Bolivia's 2010 educational reform (Law 70, "Avelino Siñani–Elizardo Pérez," named after two historic Bolivian educators) well illustrates how curriculums can be adapted to local contexts. The reform built on earlier reforms in 1988 and 1994 designed to promote intercultural and bilingual education. It replaced the country's traditional curriculum, which often marginalized indigenous knowledge, with one that incorporated local cultural knowledge and practices and reinforced the involvement of communities and local authorities in school management and educational decision-making.[79] Since being implemented, the reform has led to increased access to education, particularly among indigenous children, and higher attendance rates among students.[80]

Quality standards for educational inputs

Educational inputs encompass all foundational resources required for delivering quality education, including elements of the physical learning environment, teacher qualifications, and curriculum.

Standards for infrastructure and the physical learning environment

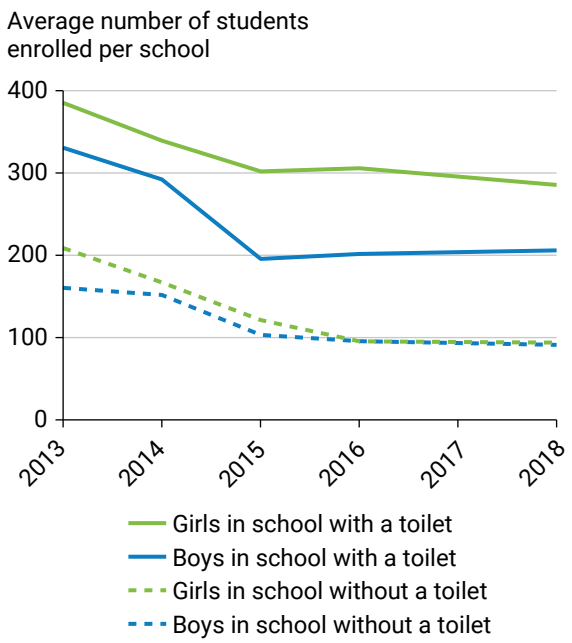
Physical learning environments such as buildings[81] and classrooms are essential for effective education. They directly influence students' safety, comfort, and ability to learn.[82] Ensuring that schools meet minimum standards for infrastructure is vital for reducing inequalities and providing students with safe, supportive learning spaces.[83]

As is the case with curriculums, international standards for physical facilities need to be adapted to local conditions. Traditional buildings may suit the local climate best, although some minimum standards are necessary. For example, the availability of hygienic toilets is critical for encouraging attendance, particularly among girls. The lack of sanitation facilities for girls is known to discourage their school attendance. School latrine

construction significantly increases enrollment of pubescent girls, especially when sex-specific latrines are provided.[84] Yet worldwide, 28 percent of schools lack basic sanitation services, affecting 539 million children.[85]

Interventions to improve sanitation clearly affect student learning. For example, in 1999, India launched the School Sanitation and Hygiene Education program to set standards for sanitation facilities in the country's schools. In 2003, India's government increased financial support for the standards, which led to a significant rise in the construction of school latrines.[86] From 2006 to 2023, the proportion of schools in India with basic sanitation services (improved, usable, single-sex toilets) nearly doubled, from 44 percent to 84 percent.[87] Similarly, in Pakistan, enrollment is higher in schools with toilets (refer to figure 5.5).

Figure 5.5 In Pakistan, enrollment is higher in schools with toilets



Source: Adapted from Gillani 2021.

Standards for teacher qualifications

Teachers are the most important input into school learning.[88] Standards for teaching staff focus on three interconnected areas: attendance, qualifications (discussed here), and pedagogic skills (discussed in "Standards for educational processes" later in the chapter).

Qualification standards guide teacher recruitment. Examples include formal credentials for teaching (as mandated in Chile, Jamaica, and Panama); standardized testing for teacher selection (as performed in Brazil and Colombia);[89] teacher certification and performance assessment (as in the United States);[90] and comprehensive initial training coupled with rigorous selection (as in Singapore). Africa, through the African Continental Teacher Qualification Framework, promotes harmonization of qualifications across countries,[91] an important step; implementation, however, will require external support and resources (for further information on hiring standards in the public sector, refer to chapter 7).

Although necessary, teacher qualifications alone are not sufficient to guarantee student learning. Standards in regard to teaching methods and expectations for instructional quality are essential to achieve learning, and policies regarding teachers' salaries and benefits are crucial to motivate and attract teachers.

Standards set by curriculums

School curriculums outline learning objectives and minimum competencies students should reach at each stage of their education. They are crucial for coordinating instructional materials, teacher practices, professional development, and assessment. They also guide the selection of standards and targets. Education policy often ignores noncognitive skills. Curriculums should cover both cognitive as well as noncognitive skills.

Countries worldwide use curriculum standards to improve their education systems. In France, for example, these standards define grade-level benchmarks. In Singapore, curriculum reforms are paired with in-service training. The national curriculum in Viet Nam emphasizes grade-level competencies rather than rote memorization. In countries with decentralized education systems, such as Brazil and India, national standards enable localities to adapt curriculums to reflect linguistic and cultural diversity.

In many developing countries, curriculums are out of sync with the actual learning taking place. When the pace of instruction set by a curriculum outpaces their pace of learning, students cannot keep up.[92] Learning is cumulative. Failing to master foundational skills, such as reading, early on will cause children to fall behind and struggle to catch up.[93]

Interventions aimed at narrowing the gap between curriculums and student achievements have generally produced positive outcomes. In India, "learning camps" have resulted in higher language scores (refer to box 5.2). Similar programs have led to significant improvements in student outcomes across various settings, including Chile[94] and the United States,[95] prompting the adoption of similar interventions that have reached at least one million students across 12 African countries.[96]

Box 5.2 Setting the right level of curriculum standards in India and Sub-Saharan Africa

India's national assessment program is designed to reflect grade-level learning outcomes from the national curriculum framework. Findings from national assessments often reveal a disconnect between intended and attained learning, pointing to gaps in implementation of the framework, such as uneven teacher preparation or limited instructional time.

Teaching at the Right Level (TaRL), developed by Pratham, a nongovernmental organization in India, aims to build foundational skills in mathematics and reading among all children before the end of primary school. The idea is to meet children where they are and teach them at their level, regardless of age or grade. Focusing on gaps in children's learning, rather than following an overly ambitious uniform curriculum, has led to significant learning gains. Notably, six randomized evaluations in seven Indian states have shown that the TaRL approach is consistently effective when implemented systematically and has led to some of the largest gains in learning, rigorously measured, in the education literature.[a] "Learning camps" in Uttar Pradesh doubled the number of children who could read a paragraph or story.[b] TaRL in Haryana resulted in a significant increase in language scores, but not in mathematics scores.[c] TaRL has been extended to 16 countries in Sub-Saharan Africa.[d] More than 60 million students in Africa and India have benefited.[e]

Source: WDR 2025 team.

a. Banerjee et al. (2007, 2010, 2016); J-PAL (2022).
b. Banerjee et al. (2016); J-PAL (2022).
c. Banerjee et al. (2016).
d. For more information, refer to TaRL (Teaching at the Right Level) Africa (dashboard), https://teachingattherightlevel.org/.
e. J-PAL (2022).

Other reforms should accompany reforms to curriculums. In India, Pakistan, and Tanzania, school improvement programs did not accompany reforms of curriculum standards, resulting in a continuation of low levels of achievement.[97]

Like national education policy, curriculums have tended to overlook the importance of noncognitive skills (such as motivation, perseverance, and self-regulation).[98] Multiple studies have shown that cognitive and noncognitive skills are mutually reinforcing and that both boost academic performance.[99] International assessments such as PISA are increasingly looking at noncognitive outcomes, thus helping governments pay attention to this relatively new area of focus.

Standards for educational processes

Educational processes involve the methods and practices used to deliver and evaluate education, such as teaching methods and monitoring systems.

Pedagogical standards and teacher professionalism

The most effective interventions to improve student learning depend on teachers. Therefore, more attention should be given not only to what teachers know, but also to what they do in the classroom.[100] Pedagogical knowledge involves skills in implementing instructional strategies, planning lessons, using student-focused teaching methods, and techniques for classroom management. Standards establish clear expectations for teachers in these areas. Although data on pedagogy are limited, the existing information reveals concerning gaps. In studies in Kenya and Tanzania, for instance, fewer than two-thirds of teachers could answer questions related to pedagogy, and in Mozambique, only 15 percent could. A study conducted in Bihar, India, found that many teachers with sufficient knowledge of the content they were teaching nonetheless struggled to explain concepts clearly. Teaching often requires, among other things, breaking tasks into steps for learners. Yet in another study, whereas nearly 80 percent of teachers could correctly solve a long division problem, only 11 percent could perform all the steps correctly.[101] Standard-driven interventions, such as structured programs in pedagogy—including detailed lesson plans, training, and coaching for teachers—have been estimated to improve student language and mathematics scores by the equivalent of nine months and six months of learning, respectively.[102]

Standards for accountability and monitoring systems in education

Various countries are implementing mechanisms for monitoring and evaluation to assess compliance with standards and guide continuous improvement. These mechanisms vary in structure and scope but share a common purpose: to promote transparency, inform decision-making, and ensure that students receive quality education.[103]

Ireland's accountability and monitoring system, for instance, focuses on a self-evaluation framework for schools that serves as both a quality assurance tool and a mechanism for improvement. Schools gather and analyze data, such as student achievement scores, classroom observations, and stakeholder feedback, and then publish reports and develop improvement plans for addressing identified priorities. External inspectors evaluate the quality of the self-evaluation process itself, thereby reinforcing accountability. This reciprocal relationship ensures that schools receive support while also being held responsible for meeting national standards.[104]

Rwanda has established an accountability and monitoring system that creates a feedback loop among data, standards, and improvement planning. The Rwanda Basic Education Board (REB) regularly conducts school audits in partnership with education officials in school districts, evaluating key areas of school performance, including teacher deployment, classroom conditions, and student achievement. As part of this effort, Rwanda has developed an education management information system to collect school-level data across various indicators aligned with the country's strategic plans and quality standards for the education sector. Schools identified as underperforming or not meeting minimum standards may be made a priority for teacher redeployment, investment in infrastructure, or targeted capacity-building initiatives. The board also offers technical guidance and support to schools and districts in using data from the education management information system for local planning and efforts to improve schools, further fostering a culture of data use.[105]

Standards for measuring education outcomes

Monitoring outcomes of student learning (through learning assessments) is essential for understanding how well education systems meet their goals. Measuring results related to education processes, including student enrollment, attendance, learning achievements, and development of cognitive and noncognitive skills, is key to knowing where things stand, where they are headed, and what actions can make a difference. Measuring learning outcomes reveals the extent and nature of learning challenges, helping countries plan more effectively, including setting realistic objectives with feasible strategies and allocations.[106]

PISA offers a salient example of a global educational measurement standard. Because it does not rely on any single national curriculum, PISA serves as a strong diagnostic tool for assessing whether countries' education systems develop the skills needed for participation in modern economies and societies. Since its launch in 2000, PISA has been conducted in 102 countries about every three years. It has proven to be an effective metric for comparing education systems across countries, a task that was previously thought to be impossible.[107] In many countries, PISA results have catalyzed review and updating of education standards across several areas, not only in curriculum content, but also in professional development for teachers, frameworks for student assessment, and system-level accountability (refer to box 5.3).

Other international assessments, such as the Trends in International Mathematics and Science Study (TIMSS) and the Progress in International Reading Literacy Study (PIRLS), are more explicitly aligned with curriculum-based learning and provide insight into how well students have mastered content typically taught in school. Since 1995, TIMSS has assessed mathematics and science in grades 4 and 8 every five years, covering 64 countries in 2023. PIRLS, initiated in 2001 and implemented in 57 countries in 2021, focuses on reading comprehension in grade 4 and is administered every four years. Assessments of this type have proven useful around the world for monitoring learning outcomes and for informing processes for curriculum review, revisions to textbooks, and instructional guidance for teachers.

A variety of regional assessment programs have emerged to complement global assessments and provide context-sensitive measures of student learning. In Latin America, the UNESCO-led Regional Comparative and Explanatory Study assesses foundational skills using regionally developed benchmarks, and its findings have informed curriculum alignment and equity discussions in the region. In Sub-Saharan Africa, assessments such as those under the Programme d'analyse des systèmes éducatifs de la CONFEMEN [Conférence des Ministres de l'Éducation des États et Gouvernements de

Box 5.3 Educational reforms spurred by PISA shocks

A "PISA shock" occurs when disappointing PISA results in a country generate outrage in the media and lead to subsequent educational reform. PISA—the Programme for International Student Assessment—offers an international test that measures 15-year-old students' ability to apply knowledge and skills in reading, mathematics, and science to real-world contexts.[a]

The first PISA results in 2000 showed that students in Germany had performed below the average for member countries of the Organisation for Economic Co-operation and Development (OECD), sparking public debate and leading to pressure for educational reforms. Further scrutiny of the results revealed that socioeconomic status and social background were largely related to educational success or failure in German schools.[b] Following educational reforms to address these factors, German students' scores in reading, mathematics, and science significantly increased, surpassing the OECD average, and by 2015, the impact of socioeconomic background on student scores had decreased.[c]

Peru experienced its own PISA shock in 2012, when front-page news announced that the country's PISA results had ranked it last among countries completing the assessment. The country's low test scores led the government to recognize Peru's immense learning challenge, and it embarked on a course of educational investment and reforms. The reforms had three pillars: (1) meritocratic reform of teachers' careers, including coaching; (2) revising the curriculum; and (3) use of data from learning assessments for school planning.[d] The reforms had a sizable impact on the country's PISA scores.

Conversely, in 2012, Viet Nam drew worldwide attention with its strong showing on PISA. Among PISA participants from low- and middle-income countries, those from Viet Nam outperformed those from many high-income countries. The country's 2012 PISA scores in mathematics and reading (511 and 508, respectively) were one standard deviation higher than those in neighboring—and wealthier—Indonesia (which scored 375 and 396, respectively).[e] Possible explanations include the large Vietnamese population that is out of school (inflating the relative performance of students who participate in the assessment), coaching of students, and possibly greater motivation among students. Analysis by Dang et al. (2023), however, suggests that these factors explain at most 30 percent of Viet Nam's strong PISA performance. In 2015, 2018, and 2022, Viet Nam's scores were again comparable with the OECD average.

PISA is controversial and is frequently criticized. Assessment at 15 years of age is perceived by some to be late, and PISA measures educational accomplishment only among children who are in school, thereby not capturing the full extent of a country's education challenge. More than 100 academics around the world called for a moratorium on PISA in 2014.[f] Although Finland initially scored high in mathematics, it later discovered that its students were entering college unprepared in the subject, calling into question the validity of the country's PISA

(Box continues next page)

Box 5.3 Educational reforms spurred by PISA shocks *(continued)*

results.[g] Despite these perceived weaknesses, PISA remains valuable as a global metric of learning outcomes.

Between 2000 and 2012, most countries' PISA scores improved. Since 2012, however, test scores have trended downward in most countries, especially high-income countries, a situation aggravated by the COVID-19 pandemic.[h] The drop has been noted as coinciding with the arrival of smartphones and social media in teenagers' lives.[i] Test scores in the United Kingdom increased by 6.4 percent after the vast majority of schools in that country banned phones.[j]

Source: WDR 2025 team.

a. OECD (2024).
b. Waldow (2009).
c. Davoli and Entorf (2018).
d. Saavedra and Gutierrez (2020).
e. Dang et al. (2023).
f. Strauss (2019).
g. Loveless (2013).
h. OECD (2022).
i. OECD (2024).
j. Beland and Murphy (2016). Although the United Kingdom does not yet have a national ban, more than 90 percent of its schools have banned mobile phones, and there is a call for a nationwide statute (Adams 2025).

la Francophonie] (Education Systems Analysis Program of the Conference of Ministries of Education of French-Speaking States and Governments) and the Southern and Eastern Africa Consortium for Monitoring Educational Quality (SACMEQ) offer valuable information on literacy and numeracy in primary education, and assessment results have been used to raise awareness about foundational learning and factors linked to student learning. In Asia and the Pacific, the Southeast Asia Primary Learning Metrics and the Pacific Islands Literacy and Numeracy Assessment support cross-country benchmarking and help align national frameworks with shared regional learning goals.[108] These regional assessments add more locally relevant content than PISA while preserving comparability within and across countries in the region.

Transitioning to better education standards: The case of Ceará, Brazil

A country seeking to raise its education standards may ponder where to begin. Pritchett and colleagues (2022) suggest five actions to accelerate progress in learning: (1) commit to universal, early foundational learning; (2) measure learning regularly, reliably, and relevantly; (3) align systems around learning commitments; (4) support teaching; and (5) adapt what you adopt as you implement.[109] The last piece of guidance resonates with the conceptual framework in chapter 2 and is especially relevant in regard to setting flexible standards in education that are raised periodically as countries progress toward better-quality services.

The state of Ceará in Brazil demonstrates how systemwide standards, benchmarks, and monitoring

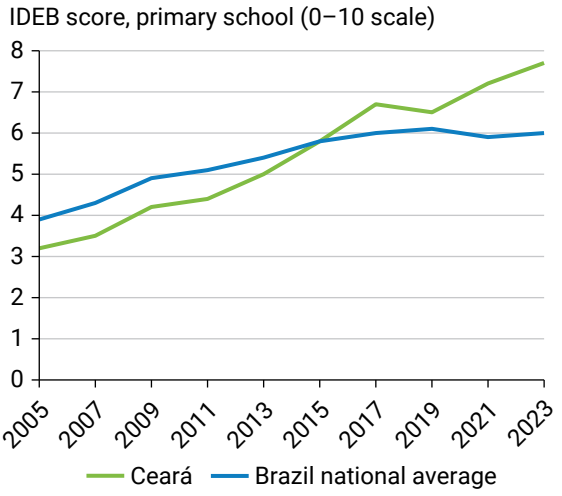
of outcomes of student learning can lead to significant improvements in education. The first phase of education reforms in the state (1997–2000) successfully increased school enrollment but did not improve learning. In response, Ceará's education authorities launched a reform strategy based on clear standards for foundational learning. The state established benchmarks requiring all students to be literate by the end of grade 2, aligning this goal with curriculum standards and expectations for teachers. These learning benchmarks have become performance targets for municipalities, supported by legal measures and funding mechanisms.

Ceará integrated the goals of its education reforms with updates to systemwide standards, including curricular reforms that focused on basic literacy and numeracy, professional development for teachers aligned with new instructional methods, and regular state-level assessments to track student progress. Municipalities both received autonomy and were subject to accountability. Although the reforms promoted local adaptation of implementation strategies, meeting state benchmarks for literacy and numeracy became a requirement for accessing additional state funds available through an incentive scheme based on tax transfers.

Monitoring of results was thorough and systematic. Ceará implemented a statewide program of large-scale assessments (Sistema Permanente de Avaliação da Educação Básica do Ceará [Permanent Evaluation System of Ceará Basic Education], or SPAECE), conducted annually, to evaluate student performance against the standards that the state's education authorities had established. Results were published, enabling public recognition of progress and peer comparison across municipalities. High-performing municipalities received financial rewards and public acknowledgment, generating strong positive incentives for ongoing improvement. SPAECE releases an educational quality score (Índice de Desenvolvimento da Educação Básica [National Education Quality Index], or IDEB) that allows authorities to monitor progress.

The reforms have had a lasting impact. Over two decades, Ceará achieved nearly universal literacy by the end of grade 2, surpassing national averages and becoming a model for other Brazilian states. Its IDEB score rose from 3.2 in 2005 to 7.7 in 2023 (refer to figure 5.6). Ceará's success can be credited to consistent alignment among its standards (defining what students must learn), benchmarks (measurable goals and targets), and guidelines (technical support offered to municipalities and recommended teaching strategies backed by evidence).[110] Its experience highlights the importance of clear learning standards, ongoing monitoring, and targeted support in fostering improvements in foundational learning, especially in decentralized systems.

Figure 5.6 Reform of education policy in Ceará, Brazil, successfully boosted the quality of education in the state



Source: WDR 2025 team elaboration using data from Instituto Nacional de Estudos e Pesquisas Educacionais Anísio Teixeira [Anísio Teixeira National Institute of Educational Studies and Research], http://ideb.inep.gov.br/resultado/home.seam?cid=321762.

Note: The figure reports IDEB scores among primary school children in Ceará and in Brazil (including Ceará) as a whole. IDEB = Índice de Desenvolvimento da Educação Básica [National Education Quality Index] (a measure of education quality).

Recommendations for better standards related to human capital

Standards regarding human capital, when carefully set and systematically enforced, help build trust in service delivery. Their effectiveness depends on how they are designed, implemented, monitored, and maintained. Developing countries should set standards for health and education practically, aligned with their needs and resources, making access for the widest population the initial priority, then improving standards on inputs and processes. In environments with limited resources, high standards may not be achievable at scale; instead they might be rationed to benefit only the privileged.

No matter how high a country's standards are, they will not be effective without proper compliance and supportive policies, especially incentives to motivate those personnel directly responsible for meeting the standards. The most well-equipped hospitals and schools staffed with highly qualified personnel will still struggle to achieve high-quality outcomes if doctors and teachers fail to show up.

Recommendations for health policy

National health standards adapted from WHO global standards need to be set realistically, according to each country's resources and enforcement capacity, and adjusted periodically. A phased approach to setting health standards, beginning with modest targets and adjusting those targets as the health system expands, has proven to be cost-effective, as global vaccination campaigns have demonstrated. In particular, if lower standards can boost access to medical services on a large scale, they tend to enhance the overall welfare of a country's population more than higher standards that only a select few can meet, as China's experience with "barefoot doctors" illustrates.

Enforcement is of the highest priority in the health sector on account of the significant and even tragic consequences of compliance failures. Pharmaceutical standards and regulatory systems across the world remain fragile, inconsistent, and heavily reliant on aid and technical support from international donors.[111] The risk of compliance failure in the production, distribution, and trade of drugs and medical equipment remains all too high. Countries need to invest in quality infrastructure for medicines, as shown by the strategy Viet Nam pursued. Regional agreements could help offset the costs of infrastructure investments. Alternatively, countries could choose to import only from manufacturers certified by WHO or trusted drug regulators, such as those in the European Union and the United States.

Monitoring the availability and quality of health services at the local level is critical to enforcing health standards countrywide. Simple basic monitoring systems that do not require extensive administrative work should be implemented, ideally integrated into digital platforms for near-real-time monitoring and analysis. Kenya, for example, is adopting standardized protocols for inspection aimed at evaluating facilities' compliance with safety standards. The African Development Bank developed the Strategy for Quality Health Infrastructure in Africa 2022–2030, including assistance to enhance connectivity of information and communications technology and to strengthen national health information systems (as well as to support innovations in delivery of health services).[112]

Recommendations for education policy

Strong political commitment at the highest level is essential to ensure that standards-based education reforms lead to successful learning outcomes. Sustained political support ensures resources adequate to support reforms and can motivate a country's education system to act on reforms. Regular reporting of and broad dissemination of

information on progress are crucial for maintaining public support and motivating teachers and school authorities. As discussed in the chapter, both Germany and Peru initiated investments in and reforms of education following widely circulated PISA results that revealed relatively poor performance.

Think globally, act locally. Although global standards offer useful reference points, local adaptation is critical for relevance, legitimacy, and equity. When adapting standards, it is important to recognize the diverse starting points and learning needs of different populations. Creating space for adaptation while using global benchmarks as scaffolding can help national educational systems stay both ambitious and realistic. This involves aligning international benchmarks with national curriculums and adjusting standards to fit classroom realities, modifying learning targets as needed. It also means ensuring that equity and inclusion are integrated into standards, by, for example, incorporating meeting students at their level, as exemplified by India's TaRL program. Including culturally relevant content in curriculums, providing materials in multiple languages, making accommodations for disabilities, and improving gender-sensitive infrastructure and teaching practices are also essential. For example, Bolivia's 2010 educational reform promoted intercultural and bilingual education, replacing the traditional curriculum with one that incorporates indigenous knowledge and practices.

Standards should be revised periodically and refined through feedback loops. Accountability systems monitor adherence to educational standards and provide feedback at various levels of education systems for ongoing improvement, as demonstrated by steps taken by Ireland and Rwanda. Effective frameworks for monitoring and quality assurance are essential for aligning educational inputs, processes, and outcomes with policy goals. By systematically collecting and analyzing data on factors such as school infrastructure, teacher deployment, instructional quality, and outcomes of student learning, such frameworks help identify gaps, guide resource allocation, and support evidence-based decision-making.

Standards alone are not enough; they need to be embedded within a broader framework for implementation, as exemplified by reforms in Ceará, Brazil, over the last few decades. Programs should encompass teacher training, curriculum-linked materials, sustained opportunities for professional development, targeted funding, and testing and monitoring. Notably, financial support should be structured to reflect both the costs of achieving basic educational conditions and the incentives needed to motivate continuous improvement.

Notes

1. Filmer et al. (2022); Sen (1999).
2. Cunha and Heckman (2007).
3. Heckman (2008).
4. For more on labor market standards, refer to chapter 8 of the 2013 *World Development Report* on jobs (World Bank 2012).
5. For example, refer to the Leapfrog Group's standards for hospitals (Leapfrog Group 2020).
6. Miguel and Kremer (2004).
7. Badruddin et al. (2008).
8. Deaton (2013).
9. Based on 2019 data from World Development Indicators (dashboard), World Bank, https://datatopics.worldbank.org/world-development-indicators/.
10. Based on estimates of disease burden by cause, age, sex, country, and region, 2000–21. Refer to Global Health Estimates (dashboard), World Health Organization, https://www.who.int/data/global-health-estimates.
11. Based on the data for the most recent year available (2018 for low-income countries and lower-middle-income countries) from World Development Indicators (dashboard), World Bank, https://datatopics.worldbank.org/world-development-indicators/.
12. Refer to World Bank (2021). Percentages are based on 2019 data from World Development Indicators (dashboard), World Bank, https://datatopics.worldbank.org/world-development-indicators/.
13. Angrist et al. (2020).

14. The Essential Programme on Immunization was launched in 1974, building on the global momentum of countries' efforts to eradicate smallpox. It was then known as the Expanded Programme on Immunization. Refer to Essential Programme on Immunization (dashboard), World Health Organization, https://www.who.int/teams/immunization-vaccines-and-biologicals/essential-programme-on-immunization/.
15. WHO (2020).
16. Mirza et al. (2025).
17. Asad and Fatima (2025).
18. WHO (1977).
19. Based on data from Global Essential Medicines (dashboard), World Health Organization, https://global.essentialmeds.org/dashboard/countries; Persaud et al. (2019). Refer to GlobalEssentialMedicinesDatabase.xlsx dataset, Figshare, March 7, 2019, https://figshare.com/articles/dataset/GlobalEssentialMedicinesDatabase_xlsx/7814246?file=14541080.
20. Hogerzeil (2004).
21. Based on data from Oldfield et al. (2025); WHO/Health Action International Project on Medicine Prices and Availability (portal), WHO, https://www.who.int/teams/health-product-and-policy-standards/medicines-selection-ip-and-affordability/who-hai-project-medicine-prices-and-availability.
22. Mean availability of the lowest-price generic drug at public health care clinics is estimated at 46.1 percent in low-income countries, 47.4 percent in lower-middle-income countries, and 40.4 percent in upper-middle-income countries. Availability is relatively better in the private sector, at 71.4 percent, 64.4 percent, and 65.8 percent, respectively (Oldfield et al. 2025).
23. The other quality variable is clinical practice standards, discussed later in the chapter.
24. World Bank (2023b).
25. Liu et al. (2017).
26. Acosta et al. (2025).
27. Acosta et al. (2025).
28. Acosta et al. (2025).
29. Acosta et al. (2025).
30. Bharali et al. (2025).
31. Nguyen et al. (2018).
32. Pezzola and Sweet (2016).
33. Criado Perez (2019).
34. Klein and Pekosz (2014).
35. Criado Perez (2019).
36. Criado Perez (2019).
37. GAO (2001). Between 2004 and 2024, more than 14 million adverse drug reactions were recorded in the United States among women compared with 9 million among men, according to data from FDA Adverse Event Reporting System (FAERS) (public dashboard), Food and Drug Administration, United States, https://fis.fda.gov/sense/app/95239e26-e0be-42d9-a960-9a5f7f1c25ee/sheet/7a47a261-d58b-4203-a8aa-6d3021737452/state/analysis. The FAERS database includes information on adverse-event and medical-error reports submitted to the FDA.
38. Criado Perez (2019).
39. ORWH (2021).
40. Data according to FDA Adverse Event Reporting System (public dashboard), Food and Drug Administration, United States, https://fis.fda.gov/sense/app/95239e26-e0be-42d9-a960-9a5f7f1c25ee/sheet/7a47a261-d58b-4203-a8aa-6d3021737452/state/analysis.
41. de Walque et al. (2022); Kruk et al. (2018).
42. Grimshaw and Russell (1993); Murad (2017).
43. Gera et al. (2016).
44. For example, refer to WHO (2009).
45. Four hospitals were in developing countries: Prince Hamza Hospital (Amman, Jordan), St. Stephen's Hospital (New Delhi), Philippines General Hospital (Manila), and St. Francis Designated District Hospital (Ifakara, Tanzania). Four were in high-income countries: Toronto General Hospital (Canada), Auckland City Hospital (New Zealand), St. Mary's Hospital (London), and University of Washington Medical Center (Seattle) (Gawande 2010).
46. Gawande (2010).
47. Sullenberger and Zaslow (2009).
48. Haynes et al. (2009); Qaiser et al. (2024).
49. Technically, there were two different treated groups, one for which inspection results were disclosed publicly and one for which they were not. For details refer to Bedoya et al. (2023).
50. For more information, refer to Medical Devices (dashboard), Health Topics, World Health Organization, https://www.who.int/health-topics/medical-devices#tab=tab_1.
51. WHO (2015).
52. WHO (2016).
53. For more information, refer to ISO (2020).
54. For more information, refer to ISO (2022).
55. For more information, refer to FDA (2024).
56. Nguyen et al. (2018).
57. Global Health Estimates (dashboard), World Health Organization, https://www.who.int/data/global-health-estimates.
58. Harrison et al. (2021).
59. World Bank (1993).
60. Lee (2025).
61. Parks (2014).
62. Salomon et al. (2012).
63. Mundel (2018).
64. Prescott and Jamison (1985).
65. World Bank (1984).
66. World Bank, World Development Indicators (dashboard), https://datatopics.worldbank.org/world-development-indicators/.
67. Fu (2025).
68. Mao's "June 26 Directive" in 1965 stated, "In medical and health work, put the stress on the rural areas" (World Bank 1984).
69. Fu (2025).
70. Pickowicz (1971).
71. Chang (1993).
72. World Bank (1984).
73. Fu (2025).
74. Fu (2025).
75. Filmer et al. (2000); Jack and Lewis (2009).

76. Fu (2025).
77. Fu (2025); Yiwen (2017).
78. Legal Affairs: Standard-Setting (dashboard), Office of International Standards and Legal Affairs, United Nations Educational, Scientific and Cultural Organization, https://www.unesco.org/en/legal-affairs/standard-setting?hub=66535.
79. UIL (2023).
80. Fonseca (2024). Data from the 2021 National Voluntary Report show that between 2015 and 2019, the attendance rate of the school-age population (ages 4–17) rose from 86.0 percent to 90.8 percent (Fonseca 2024).
81. For building standards, refer to chapter 6.
82. Barret et al. (2019).
83. Cuesta et al. (2016); Espinosa Andrada et al. (2024).
84. Adukia (2017).
85. JMP (2022).
86. Adukia (2017).
87. JMP (2022).
88. Schleicher (2018).
89. Mateo-Berganza Díaz and Lim (2022).
90. Fischer et al. (2022).
91. AUC (2019).
92. Pritchett and Beatty (2015).
93. World Bank (2018).
94. Cabezas et al. (2011).
95. Nickow et al. (2020).
96. J-PAL (2022).
97. GEEAP (2023); World Bank (2023a).
98. García (2014).
99. Malanchini et al. (2024).
100. World Bank (2018).
101. Béteille and Evans (2021).
102. Béteille and Evans (2021). This estimate is based on a meta-analysis of language arts outcomes from 18 studies of programs in Cambodia, Costa Rica, India, Kenya, Liberia, Mali, the Philippines, South Africa, and Uganda. For details, refer to Snilstveit et al. (2015).
103. Luna-Bazaldua et al. (2025).
104. EACEA (2024).
105. Luna-Bazaldua et al. (2025).
106. Saavedra (2019).
107. Gomendio (2023).
108. Luna-Bazaldua et al. (2025).
109. Pritchett et al. (2022).
110. Loureiro et al. (2020).
111. Pezzola and Sweet (2016).
112. AfDB (2022).

References

Acosta, Pablo Ariel, Çaglar Özden, Jeremy Lebow, Limon Rodriguez, and Evelina Dahlgren. 2025. *Global Skill Partnerships for Migration: Preparing Tomorrow's Workers for Home and Abroad*. World Bank. https://hdl.handle.net/10986/42780.

Adams, Richard. 2025. "More Than 90% of Schools in England Ban Mobile Phone Use, Survey Shows." *Guardian: Schools* (blog), April 10. https://www.theguardian.com/education/2025/apr/10/majority-of-schools-in-england-ban-mobile-phone-use-survey-shows.

Adukia, Anjali. 2017. "Sanitation and Education." *American Economic Journal: Applied Economics* 9 (2): 23–59.

AfDB (African Development Bank). 2022. "African Development Bank Group Approves Historic Health Infrastructure Strategy." Press Release, February 28. https://www.afdb.org/en/news-and-events/press-releases/african-development-bank-group-approves-historic-health-infrastructure-strategy-49610.

Angrist, Noam, David K. Evans, Deon Filmer, Rachel Glennerster, F. Halsey Rogers, and Shwetlena Sabarwal. 2020. "How to Improve Education Outcomes Most Efficiently? A Comparison of 150 Interventions Using the New Learning-Adjusted Years of Schooling Metric." Policy Research Working Paper 9450, World Bank. https://hdl.handle.net/10986/34658.

Asad, Saher, and Freeha Fatima. 2025. "Better Educated or Better Educators? The Effects of Hiring Standards on Teacher and Student Outcomes in Pakistan." World Bank. http://dx.doi.org/10.2139/ssrn.5674963.

AUC (African Union Commission). 2019. "African Teacher Qualification Framework: For Teacher Quality, Comparability and International Mobility." Education Division, Department of Human Resources, Science and Technology, African Union Commission. https://teachertaskforce.org/sites/default/files/2020-09/Continental%20Teacher%20Qualification%20Framework_EN.pdf.

Badruddin, Salma Halai, Ajmal Agha, Habib Peermohamed, Ghazala Rafique, Kausar S. Khan, and Gregory Pappas. 2008. "Tawana Project: School Nutrition Program in Pakistan, Its Success, Bottlenecks, and Lessons Learned." *Asia Pacific Journal of Clinical Nutrition* 17 (Supplement 1): 357–60.

Banerjee, Abhijit Vinayak, Rukmini Banerji, James Berry, et al. 2016. "Mainstreaming an Effective Intervention: Evidence from Randomized Evaluations of 'Teaching at the Right Level' in India." NBER Working Paper 22746 (October), National Bureau of Economic Research. https://www.nber.org/papers/w22746.

Banerjee, Abhijit Vinayak, Rukmini Banerji, Esther Duflo, Rachel Glennerster, and Stuti Khemani. 2010. "Pitfalls of Participatory Programs: Evidence from a Randomized Evaluation in Education in India." *American Economic Journal: Economic Policy* 2 (1): 1–30.

Banerjee, Abhijit Vinayak, Shawn Cole, Esther Duflo, and Leigh L. Linden. 2007. "Remedying Education: Evidence from Two Randomized Experiments in India." *Quarterly Journal of Economics* 122 (3): 1235–64.

Barrett, Peter, Alberto Treves, Tigran Shmis, Diego Ambasz, and Maria Ustinova. 2019. "The Impact of School Infrastructure on Learning: A Synthesis of the Evidence." International Development in Focus Series, World Bank. http://hdl.handle.net/10986/30920.

Bedoya, Guadalupe, Jishnu Das, and Amy Dolinger. 2023. "Randomized Regulation: The Impact of Minimum Quality Standards on Health Markets." NBER Working Paper 31203 (May), National Bureau of Economic Research.

Beland, Louis-Philippe, and Richard Murphy. 2016. "Ill Communication: Technology, Distraction, and Student Performance." *Labour Economics* 41 (August): 61–76.

Béteille, Tara, and David K. Evans. 2021. "Successful Teachers, Successful Students: Recruiting and Supporting Society's Most Crucial Profession." World Bank Policy Approach to Teachers, World Bank. http://documents.worldbank.org/curated/en/235831548858735497.

Bharali, Ipchita, Osondu Ogbuoji, and Gavin Yamey. 2025. "Setting Norms and Standards in Global Health: Challenges and Opportunities." Background paper prepared for *World Development Report 2025: Standards for Development*, World Bank. https://www.worldbank.org/en/publication/wdr2025/brief/world-development-report-2025-background-papers.

Cabezas, Verónica, José I. Cuesta, and Francisco A. Gallego. 2011. "Effects of Short-Term Tutoring on Cognitive and Non-Cognitive Skills: Evidence from a Randomized Evaluation in Chile." Working Paper, Pontificia Universidad Católica de Chile. https://www.povertyactionlab.org/sites/default/files/research-paper/493%20-%20short-term%20tutoring%20May2011.pdf.

Chang, Jung. 1993. *Wild Swans: Three Daughters of China*. HarperCollins.

Criado Perez, Caroline. 2019. *Invisible Women: Data Bias in a World Designed for Men*. Abrams Press.

Cuesta, Ana, Paul William Glewwe, and Bruna Krause. 2016. "School Infrastructure and Educational Outcomes: A Literature Review, with Special Reference to Latin America." *Economía* 17 (1): 95–130.

Cunha, Flavio, and James J. Heckman. 2007. "The Technology of Skill Formation." *American Economic Review* 97 (2): 31–47.

Dang, Hai-Anh H., Paul William Glewwe, Jongwook Li, and Khoa Vu. 2023. "What Explains Vietnam's Exceptional Performance in Education Relative to Other Countries? Analysis of the 2012, 2015, and 2018 PISA Data." *Economics of Education Review* 96 (October), 102434.

Davoli, Maddalena, and Horst Entorf. 2018. "The PISA Shock, Socioeconomic Inequality, and School Reforms in Germany." IZA Policy Paper 140 (August), Institute of Labor Economics. https://docs.iza.org/pp140.pdf.

Deaton, Angus S. 2013. *The Great Escape: Health, Wealth, and the Origins of Inequality*. Princeton University Press.

de Walque, Damien, Eeshani Kandpal, Adam Wagstaff, et al. 2022. *Improving Effective Coverage in Health: Do Financial Incentives Work?* Policy Research Report. World Bank.

Dutt, Anonna. 2023. "Toxic Syrups: WHO Probe Flags 20 Products in India, Indonesia." *Indian Express*, June 20. https://indianexpress.com/article/india/toxic-syrups-who-probe-flags-20-products-in-india-indonesia-8673447/.

EACEA (European Education and Culture Executive Agency, European Union). 2024. "Quality Assurance." *Eurydice: Ireland*, October 17. https://eurydice.eacea.ec.europa.eu/eurypedia/ireland/quality-assurance.

Eglovitch, Joanne S. 2025. "WHO Raises Alert Over DEG-Contaminated Cough Syrups in India." *Regulatory Focus,* October 13. https://www.raps.org/news-and-articles/news-articles/2025/10/who-raises-alert-over-deg-contaminated-cough-syrup.

Espinosa Andrade, Alejandra, León Padilla, and Sarah J. Carrington. 2024. "Educational Spaces: The Relation Between School Infrastructure and Learning Outcomes." *Heliyon* 10 (19), e38361.

FDA (Food and Drug Administration, United States). 2024. "Overview of Device Regulation." January 31, FDA. https://www.fda.gov/medical-devices/device-advice-comprehensive-regulatory-assistance/overview-device-regulation.

Filmer, Deon, Roberta V. Gatti, Halsey Rogers, Nikola Spatafora, and Drilona Emrullahu. 2022. "Education and Health." In *How to Achieve Inclusive Growth*, edited by Valerie Cerra, Barry Eichengreen, Asmaa El-Ganainy, and Martin Schindler. Oxford University Press.

Filmer, Deon, Jeffrey S. Hammer, and Lant H. Pritchett. 2000. "Weak Links in the Chain: A Diagnosis of Health Policy in Poor Countries." *World Bank Research Observer* 15 (2): 199–224.

Fischer, Adrienne, Ben Erwin, Damion Pechota, and Eric Syverson. 2022. "50-State Comparison: Teacher Recruitment and Retention." December 21, Education Commission of the States. https://www.ecs.org/50-state-comparison-teacher-recruitment-and-retention-2022-2/.

Fonseca, Pedro. 2024. "Government Policies for Education in Bolivia." December, Broken Chalk.

Fu, Jun. 2025. *China's Pathways to Prosperity: Abductive Reflections on Reforms and Opening-Up*. Peking University Press; Palgrave Macmillan.

GAO (Government Accountability Office, United States). 2001. "Drugs Withdrawn from Market." Report GAO-01-286R (January 19), GAO. https://www.gao.gov/assets/gao-01-286r.pdf.

García, Emma. 2014. "The Need to Address Noncognitive Skills in the Education Policy Agenda." EPI Briefing Paper 386 (December 2), Economic Policy Institute.

Gawande, Atul. 2010. *The Checklist Manifesto: How to Get Things Right*. Metropolitan Books.

GEEAP (Global Education Evidence Advisory Panel). 2023. "Cost-Effective Approaches to Improve Global Learning: What Does Recent Evidence Tell Us Are 'Smart Buys' for Improving Learning in Low- and Middle-Income Countries?" May, GEEAP, World Bank. https://documents1.worldbank.org/curated/en/099420106132331608/pdf/IDU0977f73d7022b1047770980c0c5a14598eef8.pdf.

Gera, Tarun, Dheeraj Shah, Paul Garner, Marty Richardson, and Harshpal S. Sachdev. 2016. "Integrated Management of Childhood Illness (IMCI) Strategy for Children Under Five." *Cochrane Database of Systematic Reviews* 6 (June 22), CD010123.

Gillani, Abbas A. 2021. "The Association Between Presence of Sanitation Facilities and School Enrolment in Pakistan." *World Development Perspectives* 21 (March), 100289.

Gomendio, Montse. 2023. "PISA: Mission Failure." *Education Next* 23 (2). https://www.educationnext.org/journal/vol-23-no-2/.

Grimshaw, Jeremy M., and Ian T. Russell. 1993. "Effect of Clinical Guidelines on Medical Practice: A Systematic Review of Rigorous Evaluations." *Lancet* 342 (8883): 1317–22.

Harrison, James E., Stefanie Weber, Robert Jakob, and Christopher G. Chute. 2021. "ICD-11: An International Classification of Diseases for the Twenty-First Century." *BMC Medical Informatics and Decision Making* 21 (Supplement 6): 206.

Haynes, Alex B., Thomas G. Weiser, William R. Berry, et al. 2009. "A Surgical Safety Checklist to Reduce Morbidity and Mortality in a Global Population." *New England Journal of Medicine* 360 (5): 491–99.

Heckman, James J. 2008. "Schools, Skills, and Synapses." *Economic Inquiry* 46 (3): 289–324.

Hogerzeil, Hans V. 2004. "The Concept of Essential Medicines: Lessons for Rich Countries." *BMJ* 329 (7475): 1169–72.

ISO (International Organization for Standardization). 2020. "ISO 13485:2016: Medical Devices: Quality Management Systems, Requirements for Regulatory Purposes." Edition 3 (March 2016), reviewed and confirmed, 2020, ISO. https://www.iso.org/standard/59752.html.

ISO (International Organization for Standardization). 2022. "ISO 15189:2022: Medical Laboratories: Requirements for Quality and Competence." Edition 4 (December), ISO. https://www.iso.org/standard/76677.html.

Jack, William, and Maureen Lewis. 2009. "Health Investments and Economic Growth: Macroeconomic Evidence and Microeconomic Foundations." Policy Research Working Paper 4877, World Bank.

JMP (World Health Organization–United Nations Children's Fund Joint Monitoring Programme for Water Supply and Sanitation). 2022. "Progress on Drinking Water, Sanitation, and Hygiene in Schools: 2000–2021 Data Update." June 22, United Nations Children's Fund and World Health Organization.

J-PAL (Abdul Latif Jameel Poverty Action Lab). 2022. "Teaching at the Right Level to Improve Learning." Case Study (August), J-PAL, Massachusetts Institute of Technology. https://www.povertyactionlab.org/case-study/teaching-right-level-improve-learning.

Klein, Sabra L., and Andrew Pekosz. 2014. "Sex-Based Biology and the Rational Design of Influenza Vaccination Strategies." *Journal of Infectious Diseases* 209 (Supplement 3): S114–S119.

Kruk, Margaret E., Anna D. Gage, Naima T. Joseph, Goodarz Danaei, Sebastián García-Saisó, and Joshua A. Salomon. 2018. "Mortality Due to Low-Quality Health Systems in the Universal Health Coverage Era: A Systematic Analysis of Amenable Deaths in 137 Countries." *Lancet* 392 (10160): 2203–12.

Leapfrog Group. 2020. "Safety in Numbers: Hospital Performance on Leapfrog's Surgical Volume Standard Based on Results of the 2019 Leapfrog Hospital Survey." Leapfrog Group. https://www.leapfroggroup.org/sites/default/files/Files/Leapfrog%20Report%20on%20Safe%20Surgical%20Volumes%202020.pdf.

Lee, Sarah. 2025. "DALYs in Practice: Real-World Applications." *NumberAnalytics* (blog), June 17. https://www.numberanalytics.com/blog/dalys-in-practice-real-world-applications.

Liu, Jenny X., Yevgeniy Goryakin, Akiko Maeda, Tim Bruckner, and Richard Scheffler. 2017. "Global Health Workforce Labor Market Projections for 2030." *Human Resources for Health* 15 (February), 11.

Loureiro, Andre, Louisee Cruz, Ildo Lautharte, and David K. Evans. 2020. "The State of Ceará in Brazil Is a Role Model for Reducing Learning Poverty." World Bank. https://hdl.handle.net/10986/34156.

Loveless, Tom. 2013. "International Tests Are Not All the Same." *Brookings Research* (blog), January 9. https://www.brookings.edu/articles/international-tests-are-not-all-the-same/.

Luna-Bazaldua, Diego, Amber Gove, Nicolas Acevedo-Rebolledo, Maria-Helene Cloutier, and Xiaoyan Liang. 2025. "The Roles of Standards in Education and Training." Background paper prepared for *World Development Report 2025: Standards for Development*, World Bank. https://www.worldbank.org/en/publication/wdr2025/brief/world-development-report-2025-background-papers.

Malanchini, Margherita, Andrea G. Allegrini, Michel G. Nivard, et al. 2024. "Genetic Associations Between Non-Cognitive Skills and Academic Achievement Over Development." *Nature Human Behaviour* 8 (October): 2034–46.

Mateo-Berganza Díaz, María Mercedes, and JungKyu Rhys Lim, eds. 2022. "The Power of Curriculum to Transform Education: How Education Systems Incorporate 21st Century Skills to Prepare Students for Today's Challenges." Technical Note IDB-TN-02516 (July), Inter-American Development Bank. https://doi.org/10.18235/0004360.

Miguel, Edward, and Michael R. Kremer. 2004. "Worms: Identifying Impacts on Education and Health in the Presence of Treatment Externalities." *Econometrica* 72 (1): 159–217.

Mirza, Imran, Ephrem Tekle Lemango, and Ann Lindstrand. 2025. "Expanded Programme on

Immunization (EPI): A Legacy of 50 Years and the Road Ahead." *Vaccines* 13 (6): 649.
Mundel, Trevor. 2018. "How Do You Decide What to Invest In?" Gates Foundation: *Ideas* (blog), June 25. https://www.gatesfoundation.org/ideas/articles/how-do-you-decide-what-to-invest-in.
Murad, M. Hassan. 2017. "Clinical Practice Guidelines: A Primer on Development and Dissemination." *Mayo Clinic Proceedings* 92 (3): 423–33.
Nallathambi, Kavitha, and Amy B. Cadwallader. 2024. "How Should Regulators and Manufacturers Prevent Avoidable Deaths of Children from Contaminated Cough Syrup?" *AMA Journal of Ethics* 26 (4): E289–E294.
Nguyen, Khac-Dung, Phuong-Thuy Nguyen, Hoang-Anh Nguyen, et al. 2018. "Overview of Pharmacovigilance System in Vietnam: Lessons Learned in a Resource-Restricted Country." *Drug Safety* 41 (2): 151–59. https://link.springer.com/article/10.1007/s40264-017-0598-y.
Nickow, Andre, Philip Kouropoulos, and Vincent Quan. 2020. "The Impressive Effects of Tutoring on PreK–12 Learning: A Systematic Review and Meta-Analysis of the Experimental Evidence." NBER Working Paper 27476 (July), National Bureau of Economic Research. https://www.nber.org/papers/w27476.
OECD (Organisation for Economic Co-operation and Development). 2022. *The State of Learning Equity in Education*. Vol. 1 of *PISA 2022 Results*. OECD. https://www.oecd.org/en/publications/pisa-2022-results-volume-i_53f23881-en.html.
OECD (Organisation for Economic Co-operation and Development). 2024. "Managing Screentime: How to Protect and Equip Students Against Distraction." PISA in Focus 124 (May), OECD. https://www.oecd.org/content/dam/oecd/en/publications/reports/2024/05/managing-screen-time_023f2390/7c225af4-en.pdf.
Oldfield, Lachlan, Jonathan Pen, Ardalan Mirzaei, and Rebeka Moles. 2025. "Prices, Availability, and Affordability of Adult Medicines in 54 Low-Income and Middle-Income Countries: Evidence Based on a Secondary Analysis." *Lancet Global Health* 13 (1): E50–E58.
ORWH (Office of Research on Women's Health). 2021. "Including Women and Minorities in Clinical Research Background." March 25, ORWH, National Institutes of Health, US Department of Health and Human Services.
Parks, Rachel. 2014. "Perspectives: The Rise, Critique, and Persistence of the DALY in Global Health." *Columbia University Journal of Global Health* 4 (1): 28–32.
Persaud, Nav, Maggie Jiang, Roha Shaikh, et al. 2019. "Comparison of Essential Medicines Lists in 137 Countries." *Bulletin of the World Health Organization* 97 (6): 394–404.
Pezzola, Anthony, and Cassandra M. Sweet. 2016. "Global Pharmaceutical Regulation: The Challenge of Integration for Developing States." Globalization and Health 12 (December), 85. https://globalizationandhealth.biomedcentral.com/articles/10.1186/s12992-016-0208-2.
Pickowicz, Paul G. 1971. "Barefoot Doctors in China: People, Politics, and Paramedicine." *Eastern Horizon* 11 (5): 25–38.
Prescott, Nicholas M., and Dean T. Jamison. 1985. "The Distribution and Impact of Health Resource Availability in China." *International Journal of Health Planning and Management* 1 (1): 45–56.
Pritchett, Lant H., and Amanda Beatty. 2015. "Slow Down, You're Going Too Fast: Matching Curricula to Student Skill Levels." *International Journal of Educational Development* 40 (January): 276–88.
Pritchett, Lant, Kirsty Newman, and Jason Silberstein. 2022. "Focus to Flourish: Five Actions to Accelerate Progress in Learning." Research on Improving Systems of Education, Blavatnik School of Government, University of Oxford. https://riseprogramme.org/sites/default/files/2022-12/RISE_5_Actions_Policy_Paper.pdf.
Qaiser, Shehrbano, Maham Noman, Muhammad Sheharyar Khan, Umer Waseem Ahmed, and Aamna Arif. 2024. "The Role of WHO Surgical Checklists in Reducing Postoperative Adverse Outcomes: A Systematic Review." *Cureus* 16 (10): e70923.
Saavedra, Jaime. 2019. "Measuring Learning to Avoid 'Flying Blind.'" *Education for Global Development* (blog), January 10. https://blogs.worldbank.org/en/education/measuring-learning-avoid-flying-blind.
Saavedra, Jaime, and Marcella Gutierrez. 2020. "Peru: A Wholesale Reform Fueled by an Obsession with Learning and Equity." In *Audacious Education Purposes: How Governments Transform the Goals of Education Systems*, edited by Fernando M. Reimers. Springer. https://link.springer.com/chapter/10.1007/978-3-030-41882-3_6.
Saied, AbdulRahman A., Asmaa A. Metwally, and Kuldeep Dhama. 2023. "Gambian Children's Deaths Due to Contaminated Cough Syrups Are a Mutual Responsibility." *International Journal of Surgery* 109 (2): 115–16.
Salomon, Joshua A., Theo Vos, Daniel R. Hogan, et al. 2012. "Common Values in Assessing Health Outcomes from Disease and Injury: Disability Weights Measurement Study for the Global Burden of Disease Study 2010." *Lancet* 380 (9859): 2129–43.
Schleicher, Andreas. 2018. *Valuing Our Teachers and Raising Their Status: How Communities Can Help*. International Summit on the Teaching Profession Series. OECD. http://dx.doi.org/10.1787/9789264292697-en.
Sen, Amartya K. 1999. *Development as Freedom*. Oxford University Press.
Snilstveit, Birte, Jennifer Stevenson, Daniel Phillips, et al. 2015. *Interventions for Improving Learning Outcomes and Access to Education in Low- and Middle-Income Countries*. 3ie Systematic Review 24 (December). International Initiative for Impact Evaluation. https://www.3ieimpact.org/evidence-hub/publications/systematic-reviews/interventions-improving-learning-outcomes-and-access.
Strauss, Valerie. 2019. "Expert: How PISA Created an Illusion of Education Quality and Marketed It to the World." *Answer Sheet: Perspective* (blog), December 3.

https://www.washingtonpost.com/education/2019/12/03/expert-how-pisa-created-an-illusion-education-quality-marketed-it-world/.
Sullenberger, Chesley B., III, and Jeffrey Zaslow. 2009. *Highest Duty: My Search for What Really Matters*. HarperCollins.
Thakur, Dinesh Singh, and Prashant Reddy Thikkavarapu. 2022. *The Truth Pill: The Myth of Drug Regulation in India*. Simon and Schuster.
UIL (United Nations Educational, Scientific and Cultural Organization Institute for Lifelong Learning). 2023. "Bolivia: Education Law 'Avelino Siñani–Elizardo Pérez' Issued in 2010." *Article* (blog), May 23. https://www.uil.unesco.org/en/articles/bolivia-education-law-avelino-sinani-elizardo-perez-issued-2010.
Waldow, Florian. 2009. "What PISA Did and Did Not Do: Germany After the 'PISA-Shock.'" *European Educational Research Journal* 8 (3): 476–83.
WHO (World Health Organization). 1977. "The Selection of Essential Drugs." Report of a WHO Expert Committee, WHO Technical Report 615, WHO.
WHO (World Health Organization). 2009. "Surgical Safety Checklist." Rev. (January), WHO. https://www.who.int/docs/default-source/patient-safety/9789241598590-eng-checklist.pdf.
WHO (World Health Organization). 2015. *Global Standards for Quality Health-Care Services for Adolescents: A Guide to Implement a Standards-Driven Approach to Improve the Quality of Health-Care Services for Adolescents*. WHO.
WHO (World Health Organization). 2016. *Standards for Improving Quality of Maternal and Newborn Care in Health Facilities*. WHO.
WHO (World Health Organization). 2020. "Coronavirus Disease (COVID-19): Herd Immunity, Lockdowns, and COVID-19." *Questions and Answers* (blog), December 31. https://www.who.int/news-room/questions-and-answers/item/herd-immunity-lockdowns-and-covid-19.
World Bank. 1984. "The Barefoot Doctor: Training, Role, and Future." PHN Technical Note GEN 19, Population, Health, and Nutrition Department, World Bank.
World Bank. 1993. *World Development Report 1993: Investing in Health*. World Bank; Oxford University Press.
World Bank. 2012. *World Development Report 2013: Jobs*. World Bank.
World Bank. 2018. *World Development Report 2018: Learning to Realize Education's Promise*. World Bank.
World Bank. 2021. "What Is Learning Poverty?" *Brief* (blog), April 28. https://www.worldbank.org/en/topic/education/brief/what-is-learning-poverty.
World Bank. 2023a. "Strengthening Basic Education System and Improving Learning Outcomes in Tanzania." World Bank Policy Note for Tanzania-Mainland (August 31), World Bank. http://documents.worldbank.org/curated/en/099092523030514417.
World Bank. 2023b. *World Development Report 2023: Migrants, Refugees, and Societies*. World Bank.
Yiwen, Cai. 2017. "Why China's Modern Barefoot Doctors Are Walking Away." *Sixth Tone: Features* (blog), April 8. https://www.sixthtone.com/news/2154.