

Equity in Child Survival, Health, and Nutrition 1



Strategies to improve health coverage and narrow the equity gap in child survival, health, and nutrition

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Implementation of innovative strategies to improve coverage of evidence-based interventions, especially in the most marginalised populations, is a key focus of policy makers and planners aiming to improve child survival, health, and nutrition. We present a three-step approach to improvement of the effective coverage of essential interventions. First, we identify four different intervention delivery channels—ie, clinical or curative, outreach, community-based preventive or promotional, and legislative or mass media. Second, we classify which interventions' deliveries can be improved or changed within their channel or by switching to another channel. Finally, we do a meta-review of both published and unpublished reviews to examine the evidence for a range of strategies designed to overcome supply and demand bottlenecks to effective coverage of interventions that improve child survival, health, and nutrition. Although knowledge gaps exist, several strategies show promise for improving coverage of effective interventions—and, in some cases, health outcomes in children—including expanded roles for lay health workers, task shifting, reduction of financial barriers, increases in human-resource availability and geographical access, and use of the private sector. Policy makers and planners should be informed of this evidence as they choose strategies in which to invest their scarce resources.

Introduction

Over the past two decades child mortality has decreased by 35% and maternal mortality by 34%.^{1,2} These improvements can be attributed mostly to the increased coverage of highly cost-effective preventive and curative interventions. For example, increased coverage of measles vaccination resulted in a 92% reduction in measles mortality between 2000 and 2008 in sub-Saharan Africa, the worst affected region worldwide.³ Estimates suggest that most of the 7·6 million deaths from all causes in children younger than 5 years in 2010 could be averted by increasing coverage of proven, low-cost interventions.¹

Improving access to and use of these interventions, especially in the world's poorest people, requires identification and overcoming of entrenched bottlenecks. Weak health systems—typically characterised by insufficient numbers of health workers, poorly functioning supply chains, and low-quality care—and financial, social, structural, and cultural barriers to services and interventions are common in the poorest settings and the most marginalised and isolated subnational populations.

Several different approaches have been developed to identify such coverage impediments. UNICEF and the World Bank have been working with other partners to systematically assess bottlenecks on the basis of influential work by Tanahashi⁴ and Piot,⁵ who developed coverage models for the assessment of health services, and, in the case of Piot, tuberculosis control. Both researchers recognised that the gap between the efficacy and effectiveness of public health interventions related to the existence of critical bottlenecks (panel).

In this Series paper, we summarise the necessary steps for identification and analysis of the bottlenecks

that prevent interventions from reaching poor people in low-income and middle-income countries and subsequently identify evidence-based strategies and innovations to overcome these issues. This assessment was crucial to inform the design of the equity-focused approach to health and nutrition programming that is modelled and tested in the accompanying Series paper by Carrera and colleagues.⁶

Identification of the main delivery channels

One of the first steps in identification of bottlenecks is to delineate the main ways in which health interventions are delivered. Kerber and colleagues⁷ reviewed roughly 190 essential maternal and child health interventions and proposed that they could be packaged into eight sets and delivered through three main channels: clinical and curative services, outreach services, and community-based preventive and health promotion services. We propose that the use of legislative mechanisms and mass media is a fourth possible delivery channel. The distribution of interventions across these delivery channels is dependent upon the extent of discretionary action—ie, the extent to which the response can be carried out at a population versus an individual level—needed, ranging from very low (eg, for legislation and mass media) to high (clinical and curative channels; table 1).

Interventions that necessitate little discretionary action require less specific information and do not vary widely in their delivery. Public health examples include immunisation and distribution of supplements. Such interventions can be delivered through established channels—eg, mass campaigns, in which a set of rules or

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This is the first in a Series of two papers about equity in child survival, health, and nutrition

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Panel: Identification of bottlenecks

UNICEF and the World Bank have been working with other organisations to systematically analyse and address health system bottlenecks to the delivery of key health, nutrition, HIV/AIDS, tuberculosis, malaria, and water and sanitation interventions. The approach organises interventions into three service delivery modes, which are distinct approaches for delivery of health-care services. Within each mode, interventions are grouped into four subpackages on the basis of their similarity, delivery mode, and beneficiaries. The crucial assumption for subpackages is that interventions delivered via the same delivery mode and for similar beneficiaries share similar bottlenecks. For example, if a shortage of skilled health personnel is a problem for immunisation activities, then the same problem probably exists for vitamin A supplementation since both interventions are usually delivered by the same type of health worker. The grouping of interventions into subpackages is used only for bottleneck analysis, and only one tracer intervention is analysed for each subpackage. This approach recognises that a few critical implementation bottlenecks exist that compromise the full effect of efficacious interventions.

Availability

The availability of crucial health system inputs—eg, drugs, vaccines, supplies, human resources. This information is usually obtained from stock registers, personnel information systems, and facility surveys.

Accessibility

The conditions determining physical access to health services, including the presence of trained human resources at community level, the number of villages reached at least monthly by outreach services, and the time taken to reach a facility providing basic and emergency obstetric and neonatal care services.

Utilisation

The first use of multicontact services—eg, first antenatal contact or tuberculosis immunisation. Household surveys and service statistics reported at facilities are the main sources of information. Financial, cultural, social, and structural factors prevent people from using available services.

Continuity

The extent of achievement of the full course of contact or intervention necessary to be fully effective—eg, the proportion of women receiving four antenatal contacts. Data come from administrative and household surveys.

Effective coverage

An amalgamation of both utilisation and quality, effective coverage is defined as a minimum amount of inputs and processes that are expected to produce desired health effects when used by individuals or applied to the population at large. In some cases, effective coverage is assessed as the proportion of timely continuous use coverage with high-quality inputs, because low-quality inputs are not expected to deliver the desired result. Demographic and health surveys, facility surveys, and expert opinion are frequent sources of these data.

operating procedures can be specified and then delivered in a standardised manner. They can be delivered by non-state suppliers because they can be monitored and subjected to quality control.

Interventions that necessitate many discretionary actions require the provider to have specific and often unique information for each client interaction for effectiveness. Examples of discretionary actions include clinical consultations or the provision of specific health prevention advice.

Investigators doing bottleneck analyses select a so-called tracer intervention for one of the packages of interventions that is delivered through a particular delivery channel. The tracer is used as a proxy to measure bottlenecks for other interventions that are delivered in a similar way. For example, indicators that assess the availability, accessibility, utilisation, continuity, and effective coverage of the treatment of pneumonia can be used as a proxy for identification of bottlenecks that affect other curative and clinical services—eg, treatment of malaria or diarrhoea—because the specific nature of each delivery channel tends to give rise to common bottlenecks across interventions. In this example, an absence of skilled health workers, poor quality of care, and financial, geographical, and cultural barriers to access are consistent impediments to uptake of curative and clinical services. For the community-based preventive and promotive delivery channel, poor availability in underserved areas and inconsistent quality are the usual types of bottleneck. However, each context has its own specific pattern.

Overcoming bottlenecks

Identification of strategies to overcome bottlenecks for the poor and marginalised within each delivery channel is the next step (table 2). The most common set of strategies aims to improve the delivery channel to address the various supply, demand, and quality challenges. Examples include strategies to improve distribution of health workers in underserved areas and strengthen supervision to enhance quality of care.

In some cases, changing the way interventions are delivered within the same channel to overcome a bottleneck is possible. For example, a shortage of skilled health workers can be overcome by shifting tasks traditionally done by doctors to nurses or clinical assistants. Use of clinical assistants to perform caesarean sections, as has been done in Mozambique,⁸ is one example of so-called task shifting.

Some interventions can be moved from one delivery channel to another that has fewer barriers preventing reaching the marginalised. One of the most common bottlenecks for clinical or curative services is the shortage of skilled health workers in marginalised areas and the expense associated with the building and maintenance of physical infrastructure. Shifting of the delivery of interventions from clinical settings to the community can be an effective way to overcome the issue in the short term while other strategies concurrently address the bottleneck within the clinical services delivery channel. Shifting the delivery of immunisation, micronutrients, and bednets from clinical services to outreach services to reach remote areas during so-called child health days is an example of this strategy.

We examined the evidence for the effects of all strategies to overcome bottlenecks on coverage of effective interventions for child health, and, consequently, child health outcomes.

	Legislation or mass media	Outreach services	Community-based preventive and promotional services	Clinical and curative services
Examples of interventions	Fortification of foods; anti-tobacco legislation; food labelling; transport policy; mass media (alone)	Immunisation; vitamin A supplementation	Community management of illness; infant-feeding counselling; social marketing	Treatment of common illnesses; growth monitoring; counselling
Common bottlenecks	Absence of political will; poor enforcement of regulations	Insufficient supplies; prohibitive transport costs	Minimum availability to most vulnerable; low quality	Insufficient number of health workers; low quality; financial, cultural, and geographical barriers to access

The amount of discretionary action needed for each delivery channel increases from low to high from left to right.

Table 1: Delivery channels, examples of interventions, and common bottlenecks

	Shift to another delivery channel	Shift within delivery channel	Improve delivery channel
Description	Deliver the intervention through a channel that works better	Change how interventions are delivered within channel	Improve efficiency and capacity of the channel
Potential strategies	Improved community-based provision of preventive, promotional, and curative services; outreach campaigns; integrated child health days as a method of service delivery instead of routine facility settings; social marketing to change mode of delivery and uptake of products; structural interventions to replace individual counselling and behaviour change	Task shifting between cadres of health workers; expanded use of outreach services; public-private partnerships; franchising	Increasing availability of human resources and geographical access: return of migrant workers or retired staff to remote areas; hardship allowances (housing and school); retention and benefits or incentives to return; recruitment and selection of trainees from underserved areas Lowering of financial barriers to access: reduction or elimination of user fees; community-based insurance; social insurance schemes; cash transfers; vouchers Improvement of continuity of care: performance-based incentives or bonuses; remuneration (salaries); defaulter tracking Improvement of quality of care: audits or feedback or supervision; dissemination of provider education materials or job aids; reminders or refresher training; group processes or team problem solving or peer review; accreditation or regulation of private providers; community scorecards; public reporting of performance data Promote demand for interventions: individual or group education or knowledge-transfer interventions; branding

Table 2: Strategies to improve service delivery and reduce bottlenecks

Search strategy and selection criteria

We searched Medline, Google Scholar, and the Cochrane Database of Systematic Reviews for papers published in English between Jan 1, 2000, and Nov 30, 2011, that examined each of the strategies listed in table 2. The appendix lists all search terms used. We explored peer-reviewed and so-called grey literature and identified additional reviews via their reference lists. We used a two-step inclusion process: screening on the basis of references and abstracts and screening on the basis of the full text. Individual researchers reviewed the evidence for specific topics, and the compiled published work about each topic was then reviewed by at least one other researcher knowledgeable about the subject.

Papers that qualified for inclusion were systematic reviews that used transparent criteria to exclude papers not meeting an explicit benchmark, narrative reviews that purposively sampled the scientific literature on the basis of topical criteria, and qualitative reviews in which structured searches of databases were done to identify relevant reports, transparent methods were used, and quality of the articles studied was critically examined.

Analysis

If the quality of a review had been assessed previously, we retained the authors' assessment, irrespective of differences in methods. Evidence from the remaining

reviews was classified as high, moderate, or low quality according to study design, study limitations, consistency, and directness—ie, the four key components of the GRADE (Grading of Recommendations Assessment, Development and Evaluation) criteria, a systematic approach used to establish the quality of evidence and strength of recommendations.⁹ We classified effect sizes as small (<10%), moderate (10–25%), or large (>25%). However, for several reasons, this classification was not always possible. First, the specific strategies for overcoming bottlenecks reviewed were rarely used in isolation, complicating efforts to disaggregate effects. Second, implementation of strategies was not uniform, making it difficult to compare their effects in different settings. Finally, many reviews examined several outcomes and did not include quantifications of all effect sizes.

We also classified the contributing studies on the basis of whether they were done in low-income and middle-income countries or in high-income countries. For several strategies, we were unable to identify reviews of studies in low-income and middle-income countries; in such instances, we examined relevant reports from high-income countries with emphasis on studies of rural or marginalised populations.

Few reviews or studies specifically assessed the role of strategies for overcoming bottlenecks in narrowing

See Online for appendix

disparities either in access to essential interventions or in child survival, health, and nutrition outcomes. Consequently, unless otherwise stated, the findings presented assess the effect of strategies on overall health inputs or outcomes, or the health-care system in general rather than their effect on marginalised or poor populations specifically.

The appendix lists findings related to various strategies to improve service delivery and reduce bottlenecks for the poor and marginalised.

Lay health workers

Robust evidence shows that delivery of several key interventions can be safely and effectively transferred from clinical services (ie, provided by qualified health professionals) to community health workers. For example, training of traditional birth attendants and other community-based workers to dispense simple immediate preventive and curative actions for neonate care, including neonatal resuscitation and injectable antibiotics, has significantly reduced stillbirths and perinatal mortality in various settings.^{10,11} Additional evidence¹²⁻¹⁴ suggests that community health workers can effectively provide treatments and care to reduce morbidity and mortality perinatally and in under 5s. More recent evidence^{15,16} for the effect of community-based malaria treatment on child health outcomes suggests a reduction in malaria prevalence and a fall in under-5 mortality when combined with delivery of insecticide-treated nets and antimalarial chemoprophylaxis.¹⁷ Key issues to consider relate to planning, training, and deployment of these workers, attraction and retention, and performance management.¹⁶

Outreach campaigns and child health days

Transference of interventions that necessitate little discretionary action—such as immunisation and vitamin A supplementation—from clinical services to large-scale campaigns is also an effective way to boost coverage, although most studies examine only short-term effects.¹⁸ These campaigns are regularly used by low-income and middle-income countries to deliver key child survival interventions more efficiently, overcome coverage bottlenecks such as distance to health clinics, and improve equity of coverage by targeting groups most at risk of missing out on these services.

Supportive factors in successful intervention-shifting initiatives are important and include selection of appropriate candidates for training, allocation of sufficient resources for supplies and equipment, insurance of suitable training and supervision, and linking of community-based activities with facilities to manage complications and serious illnesses.¹²

Child health days—biannual events when packages of health interventions, frequently including vitamin A supplements, immunisations, insecticide-treated nets, and deworming medicines, are delivered to children—

seem to achieve greater coverage than do stand-alone campaigns, particularly in previously low-coverage countries.¹⁹ In the countries studied, child health days also improved the manner in which key child survival interventions were delivered through enhanced supervision and health-worker performance, and motivation and mobilisation of additional resources (eg, funds, fuels, vehicles). In turn, these advances translated into coverage gains. However, child health days also have the potential to weaken primary health-care services.¹⁹

Social marketing

Some evidence^{20,21} suggests that mass media campaigns addressing both one-off and episodic behaviours can directly and indirectly produce positive changes or prevent negative changes in health-related behaviours across large populations, and thereby can substitute for individual counselling. Concurrent supply availability and access to key services are crucial to persuade individuals motivated by media messages to act on them. Grilli and colleagues²² concluded that mass media can have a positive effect on the use of health services and that more information is needed about whether mass media can increase use in populations with the greatest need. Evidence is moderate for the effect of mass media on immunisation coverage, HIV prevention, and use of oral rehydration therapy, but weaker for breastfeeding. The three reviews²⁰⁻²² of social marketing emphasised the importance of an integrated package that includes mass media, training of health-care providers, and outreach to patients. Reviews that examined the effects of social marketing showed positive effects on promotion of awareness and use of insecticide-treated nets²³ and adoption of recommended practices for dengue prevention.²⁴ However, the studies examined were of low quality.

Structural interventions to change behaviours

A growing body of evidence underscores the effectiveness of structural interventions, especially when combined with media campaigns, in changing of behaviours—eg, mandatory fortification of foods, restrictions in smoking, and use of taxation or subsidies.²⁵ Gupta and coworkers²⁶ reviewed policies, programmes, and transformational processes that aim to change the social, economic, political, or environmental factors that affect HIV risk and vulnerability. They reported that interventions, including needle exchange programmes or condom provision to sex workers, are promising approaches to reduce susceptibility to HIV infection. However, they also emphasised that the success of these structural programmes (particularly in improvement of health outcomes) is difficult to ascertain because of confounding factors and can vary by context and population group. A subsequent review had similar conclusions.²⁷

Furthermore, unless these types of strategies are designed to be pro-poor, they run the risk of widening

disparities within countries. Studies in Guatemala and Thailand suggest that village-level fortification is feasible and can have a positive effect on the poorest, rural, indigenous populations with the highest burden of nutritional deficiencies.²⁸ The efficacy of legislative and regulatory strategies to foster behaviour change in countries with weak governance and fragmented regulatory systems is debated.

Task shifting

Task shifting is an innovation that can reduce coverage bottlenecks and support equity by transferring tasks typically done by qualified health and nutritional providers to less qualified people. This strategy has the potential to both improve the efficiency and expand the capacity of the delivery channel.^{29–31} A review³² of four African studies showed that nurses and medical assistants could provide some obstetric services, including caesarean deliveries, cost effectively. Another multicountry study³⁰ showed that health workers with shorter training in assessment, classification, and management of routine childhood illnesses, and counselling of caregivers, were as effective as those with longer training.³⁰

Increased use of outreach services

More intensive and extensive use of outreach services is another strategy to change how interventions are delivered within channels. Studies³³ show that increasing the number of locations (eg, health posts and schools) offering immunisation services can lead to moderate-to-high gains in coverage.

Additionally, provision of specialist outreach services can substantially improve access without compromising the quality of care, and might improve the skills and morale of the health workers in remote settings.³⁴ However, few studies have compared the cost of outreach with that of referral care, especially for rural communities, and we identified no studies from low-income and middle-income countries.

Private service providers

Subcontracting of services, such as obstetric care, maintenance of health services, and administration, to private sector providers is another strategy that could reduce bottlenecks associated with geographical access, particularly for isolated districts.^{35–37} However, these findings should be interpreted with caution. Most of the studies we reviewed about this topic were of low quality, and the estimated effects of use of private sector providers to increase access varied greatly.³⁵ Little is known about the system-wide effects of subcontracting, which could be positive or negative.³⁶ Evidence for the effect of franchising—ie, establishment of a contractual arrangement between a health service provider and a franchise organisation—is weak and shows mixed effects in poor and disadvantaged populations.²³

Human resource availability and geographical access

Little rigorous evidence is available for strategies that change selection and training conditions to favour rural or underserved settings, with published work restricted largely to observational studies.³⁸ Factors associated with an increased likelihood of practising in a rural area include being from a rural area,^{39–42} having a spouse from a rural area,^{41,42} male sex,⁴¹ and stated intent to practise in a rural area at the time of enrolment.⁴¹ Recruitment and training for rural practice, provider incentives, compulsory service, scholarships, and improved working and living conditions are additional promising strategies to overcome bottlenecks associated with geographical access and availability of human resources, particularly in rural settings. Such strategies are most likely to be effective if they are bundled together.³⁸ Programmes that provide reasonable benefits and support might be more costly than compulsory service without incentives but maximise the likelihood of effective service.^{43,44} Evidence, albeit sparse, suggests that combining strategies can be very effective.^{38,40} Additionally, geographical access to facilities can be an important determinant of use.⁴⁵ One review⁴⁶ of large-scale, comprehensive primary health-care initiatives showed that establishment of a network of primary-care facilities can have an important effect on increasing coverage in underserved rural populations in particular.

Reduction or elimination of user fees

Reduction or elimination of user fees increases use of curative services and facility-based deliveries, although the effect sizes vary from low to high, depending on study site and outcome examined.^{37,47,48} Equity also seems to improve, with the greatest increases in access noted in households from the poorest quintiles.⁴⁸ However, quality of care can be negatively affected by several factors. These include difficulties in meeting increased demand and in provision of drugs to more patients, poor staff morale, decreasing health service revenues, and the creation of unofficial fees to replace user fees.⁴⁸

Community-based and social health insurance

Community-based insurance can reduce out-of-pocket expenses and increase access, although the effect sizes are small. In Africa, when obstetric services are covered by insurance, the frequency of facility-based deliveries increases.³⁷ Community-based insurance does not seem to improve equity^{47,49} and has not been implemented at scale.

Evidence for social insurance schemes is weak and mainly from high-income countries.⁵⁰ Such initiatives seem to improve coverage in some but not all instances,⁵⁰ although substantial increases in access to facility-based births have been noted in low-income and middle-income countries.³⁷

Cash transfers and vouchers

Cash transfers are an effective way to increase use of health and nutrition services and have moderate effect sizes depending on the indicator.^{37,51,52} In a 2011 review,⁵² Forde and colleagues concluded that cash transfers have clear effects on health outcomes, particularly morbidity, and on some longer-term outcomes, such as stunting and anaemia.⁵² Despite the quality of some studies, reviewers noted that disentangling of the effects of different programme components (especially non-cash components) was difficult.⁵¹ Furthermore, little evidence is available outside Latin America and south Asia. Some evidence^{37,53} suggests that vouchers, which are distributed free or at low cost, provide an entitlement to a good or service, and then reimburse the facilities or providers, can substantially improve use and quality of services and reduce care-seeking delays.

Improving continuity of care

Evidence for continuity of care is weak and limited to high-income settings, but shows that performance-based incentives have short-term positive effects on immunisation rates.⁵⁴ These incentives also have a positive effect on coordination of care,⁵⁵ but no discernible effect on equity.⁵⁶ Willis-Shattuck and colleagues⁵⁷ concluded from their review that financial incentives alone are insufficient to motivate health workers in low-income and middle-income countries.

The effect of provider payment methods on continuity has been examined. A review examined studies from high-income countries and reported that a fee-for-service approach resulted in greater compliance with recommended well-child visits than did capitation payments.⁵⁸ Additionally, moderate-quality evidence shows that defaulter tracking—reminder and recall strategies in particular—effectively increases routine childhood immunisation rates in high-income countries.^{59,60}

Improving quality of care

Audit and feedback strategies prompt providers to modify their assessment and management practices when these practices are not consistent with accepted guidelines. Although few studies have been done in low-income and middle-income countries, reported effect sizes range from small to moderate for improved provider practices^{61–63} and are large for drug management⁶⁴ and perinatal and intrapartum mortality.^{64,65}

Increased supervision is another strategy used to improve health-worker performance in low-income and middle-income countries and has moderate-to-large effects.⁶⁴ This evidence is difficult to summarise, however, because of the absence of a standard definition of the supervisory function and variation in implementation and outcomes studied.⁶⁶

Dissemination of education materials or job aids about improved provider performance has little or no effect on provider practices, especially when implemented as a

single strategy.^{62,64,67,68} Similarly, evidence for refresher training for emergency care is weak and inconclusive.⁶⁹ Evidence relating to group processes or team problem-solving efforts and peer review is limited to two reviews, which report a moderate effect on drug use⁶⁴ and reduced length of hospital stays,⁴⁴ respectively.

Accreditation and regulation are used to improve the quality of care supplied by private sector providers. Although evidence is mixed in low-income and middle-income countries, regulation seems to be a particularly effective strategy to improve the availability of essential drugs, limit the supply of harmful drugs and unregistered products, and control the misuse of drugs.^{23,64} Shah and coworkers' review⁷⁰ of interventions designed to improve the quality of health services provided by informal private providers (ie, providers who have not received training in allopathic medicine) concluded that market-based approaches that change the incentives or accountability of providers (eg, franchising or regulatory approaches) can improve provider behaviours, but that training alone is less successful. The only evidence for the effect of community monitoring strategies (including community scorecards and public reporting of performance data) on improved quality of care is weak and from a high-income setting.⁷¹

Fostering demand

Individual or group education or knowledge-transfer interventions (eg, counselling, training, and education) applied to specific services or practices, such as breastfeeding and complementary feeding, can greatly improve coverage. For example, in rural south Asian settings with high rates of home deliveries, engagement of communities through the use of community health workers increased early breastfeeding,⁷² health-care seeking for neonatal morbidity,⁷³ and institutional deliveries.³⁷ Similarly, engagement of women's groups had a positive effect on neonatal mortality⁷² and a possible positive effect on maternal mortality,⁷³ mostly through an increase in use of formal health facilities.

So-called public health branding—ie, the relation between consumers and products, services, or lifestyles—is another promising strategy, but better evidence is needed to establish the specific benefits.²³

Discussion

We present an innovative framework for use by policy makers and planners for classification of strategies as they work to improve the availability of interventions for disadvantaged populations. We also provide an overview of the evidence for the different types of strategies that have been used to overcome barriers. The collation and review of such information is important for policy makers and planners choosing the strategies in which to invest their scarce resources.

Our review has several limitations. First, because of the diversity of strategies incorporated and the restricted

quality of the evidence, we did a meta-review rather than a systematic review. For example, because many of these strategies relate to changes in aspects including health systems, human resources, and mass communication, they are either not amenable to randomised or controlled trials, or such trials have not been done. Thus, we used a more restricted quality appraisal and synthesis approach across the reviews than would have been used in a systematic review. However, our rigorous methods ensured that our search of both published and unpublished reviews was thorough. That said, we might have missed some papers that were not available in the databases searched.

Second, because our work is largely based on the results of published studies, our findings, like those of many reviews, might be overly reliant on sources that disproportionately report positive findings. Third, we reviewed only work published from 2000 onwards. However, the reviews that we have cited include studies dating further back, expanding the evidence base for our work. Fourth, our findings depend on the quality of the findings, and thus the quality of analysis, of the reviews included. Finally, some included studies overlap between the included reviews, which might heighten the effect of the results of these studies on our overall findings and conclusions.

The reviews of strategies that we included were of high quality and had only minor deficiencies. However, the primary research reviewed was often of low-to-moderate quality, particularly that done in low-income and middle-income countries. The poor quality might partly be due to the challenge of accurate and efficient measurement of whether poor people are accessing services and also the complexity and expense of field trials of intricate health system interventions. Thus, substantial gaps remain in the knowledge base, particularly with respect to effects on equity in low-income and middle-income settings.

Four of our findings stand out. First, the evidence supports strategies that shift interventions from one delivery channel to another and those that shift how services are delivered within channels. In particular, the findings about the use of community workers to diagnose and treat common infectious diseases in neonates and under 5s are robust, with consistent improvements in various settings.¹⁰⁻¹⁷ Additionally, shifting of delivery of a range of services from doctors to nurse practitioners, or from health workers to lay providers (who have received only short periods of formal training), can effectively expand coverage without jeopardising children's survival, health, and nutrition.²⁹⁻³² These findings are particularly important in view of the absence of robust evidence for interventions that aim to improve the distribution and retention of health professionals in rural areas, and are in line with the principle that services should be delivered at the lowest effective level of care. Scale-up of the use of cadres of health workers with less formal training and lay health workers should therefore receive greater attention

in frameworks that aim to overcome health system bottlenecks. However, to promote the sustainability of these programmes, attention should also be paid to ensuring that these workers are not overburdened and that the workload demanded of them does not jeopardise their ability to continue other income-generating activities.

Second, some evidence, albeit scarce, shows that strategies that use the private sector to provide services can be effective.³⁵⁻³⁷ In view of the importance of this sector in many low-income and middle-income countries, these approaches could be worth pursuing, especially when concurrent efforts are made via accreditation or regulation to ensure that these providers deliver effective, efficient, and equitable health care.^{23,64,70} This related stewardship function of the government is crucial, particularly to assuage any concerns about use of the private sector.

Third, strategies that reduce financial barriers to access can have an important role in increasing the use of interventions. Although many relevant studies are of low quality, cash transfers, vouchers, and reduction or elimination of user fees show particular promise in improvement of access to facility-based services for marginalised populations.^{37,47,48,51-53} Care should be taken to ensure that these strategies do not have a negative effect on the quality of services provided.

Finally, demand barriers are as important and challenging as supply bottlenecks, yet less systematic research has been done about them.⁷⁴ Even high-income countries continue to face substantial challenges on the demand side, with the poorest and most marginalised groups finding it difficult to access health care because of the interplay of social, economic, cultural, and political barriers. Further investigation into the effectiveness of strategies to increase demand is needed to ensure more equitable public health interventions and approaches.

Supply and demand factors are dynamically inter-related and can directly affect each other. For example, when a service is culturally unacceptable or inappropriate, costs too much, or is challenging or discriminatory to access, community members will often not seek care. Similarly, when a service does not meet expectations, users will not value it enough to return for care or promote it to others. By contrast, when a service has high demand, the health system (supply side) is encouraged to improve. For example, when use is high and health staff feel appreciated, delivery of more sessions by the health service becomes cost effective.

We focused our review on discrete strategies that address specific bottlenecks and did not address the broader social determinants that lead to unequal health outcomes. Such determinants were the focus of a 2008 major WHO Commission⁷⁵ and a 2011 conference in Brazil,⁷⁶ both of which made a series of recommendations; many of these recommendations were addressed to sectors outside health but some addressed how the health sector can reduce disparities and improve access and

coverage for the poor. The strategies that we recommend are complementary to those of the Commission.

Equity-focused approaches

The structure of national health systems in many countries continues to direct most resources away from the poorest,⁷⁷ despite early evidence that pro-poor strategies can have important effects on coverage in underserved populations and equity in use across income groups.^{46,78} Unless the bottlenecks faced by poor and marginalised people in access to and use of health interventions and services are explicitly addressed, inequities will probably worsen as more expensive and elaborate interventions are introduced.⁷⁹ We believe that our overview provides a broad summary of relevant information for health planners and policy makers that seek to reduce inequities and accelerate progress towards the health Millennium Development Goals and other commitments to children.

Only some of the reviews that we identified had an equity focus and measured the differential effect of interventions on improvement of coverage and the health and nutrition of different population groups. For example, reviews that considered strategies' effects on equity and found promising pro-poor effects included those assessing expanded roles for community health workers,^{10,11,16} task shifting,^{31,32} the expanded use of private service providers,^{23,34} strategies to reduce financial barriers to access,³⁷ and strategies to increase human-resource availability and geographical access.^{38,39,43} The other paper in this Series⁶ builds on our recommendations and uses data from 15 low-income and middle-income countries to describe how a UNICEF modelling team developed and applied a model that simulates the potential effect of implementation of the most promising of these strategies in the context of an equity-based approach to health and nutrition programming.⁶

Contributors

MC conceptualised the paper. ND, AS, and NB did all searches and selected studies. MC, AS, ND, NB, and DA drafted the paper.

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Conflicts of interest

We declare that we have no conflicts of interest.

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