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# Improving the efficiency in spending for health: A systematic review of evidence

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ABSTRACT

*Background:* Addressing inefficiencies in the way healthcare is financed has been identified as an important source of fiscal space for health systems. The WHO, for example, has argued that up to 40% of resources spent in health are wasted. Which reforms to focus on, their impact on fiscal space, and their feasibility have seldom been documented, however. The aim of this paper is to synthesise the evidence on these points, ascertaining the extent of fiscal space that has, to date, been created by implementing reforms aimed at addressing inefficiencies in health financing.

*Methods:* systematic review of peer-reviewed literature in global databases (Medline, Embase, Global Health, Econlit, Africa-Wide information, Web of Science Core Collection and SciELO citation index). 20 articles were included for narrative analysis. Data extracted included: type of study; countries where the reform was implemented; the specific inefficiency discussed; the specific reform to tackle inefficiency; the efficiency indicator used; the baseline information given; the impact of the reform on health spending; and the feasibility and timing of the reform.

*Findings:* Inefficiencies in health financing exist across the world, and reforms to address these remain important. Yet the empirical evidence on savings that can be created through addressing these inefficiencies is limited, mixed, and suggests that potential savings are more modest than indicated by the WHO. The feasibility of these reforms is seldom documented. The process of implementation of these reforms is similarly poorly documented, although the available evidence suggests that it takes three to ten years for these efficiency-enhancing health financing reforms to translate into actual results.

*Interpretation:* Further research is needed to understand how to translate identified inefficiencies in the way healthcare is financed into additional fiscal space. Engaging with the political economy of designing and implementing these reforms will be key. Rooting fiscal space analysis projections in country-specific analysis of inefficiencies is also key, as the expectations of financial savings will otherwise be unrealistic.

## Introduction

The resources allocated to health in low- and middle-income countries (LMICs) are insufficient (WHO, 2020). Economic growth has been identified as the most promising source of additional fiscal space for health (Kurowski et al., 2021) (see Table 1 for definition of key concepts used). However, since the WHO, 2010 World Health Report, which claimed that 20% to 40% of spending in health was inefficiently spent (WHO, 2010), improving the efficiency of spending as a means of generating fiscal space has attracted substantial policy attention. As a result, how to improve technical efficiency (i.e. how to maximise output for a given level of inputs) and allocative efficiency (i.e. how to increase outputs through a better distribution and composition of inputs) has been a focus of country level policy analysis aimed at creating additional fiscal space. Ministries of Health and national level purchasing agencies are frequently advised to address inefficiencies, particularly as they relate to drugs and human resources (World Bank, 2017).

Our paper sought to synthesise the evidence on the savings that could be realised through implementation of health financing reforms aimed at addressing inefficiencies, and thereby determine whether the evidence base is sufficient to justify such policy interest in efficiency savings as a source of fiscal space for health.

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**Table 1**
Definition of terms and concepts.

| Term | Definition |
|---|---|
| Technical efficiency | This is where a given output is produced with the least inputs (i.e., minimising wastage).[11] It is also known as operational efficiency. |
| Allocative efficiency | Refers to how different resource inputs are combined to produce a mix of different outputs.[12] An operation is said to be allocatively efficient where the pattern of output matches the pattern of demand.[11] |
| Fiscal space | Defined as the availability of budgetary room that allows a government to provide resources for a desired purpose without any prejudice to the sustainability of a government's financial position.[13] |
| Leakages | Defined as the proportion of resources intended for identified beneficiaries that does not reach them.[14] Estimating leakages involves quantifying how much the intended beneficiaries received versus how much they should have received as given by resources earmarked for them.[14] |

Zeng et al. have looked at studies linking efficiency analysis and fiscal space but have only included studies from LMICs and focused on articles that explicitly linked efficiency reforms to fiscal space (Zeng et al., 2020). Our review was not limited to LMICs and sought to integrate any evidence on health financing inefficiencies, whether explicitly linked to fiscal space or not. Health financing inefficiencies were defined as inefficiencies related to the way revenue is raised, resources pooled and purchasing organised. Purchasing was defined in broad terms, including the way in which pooled resources are used to pay providers and how pooled resources are used to purchase commodities such as medicines. This analysis was followed by a review of the available literature which suggested that four key domains led to the most substantial inefficiencies of spending: (i) medicines and supplies, as in LMICs medicines account for between 20% to 60% of all health expenditures and 18% in HICs (WorldBank, 2017); (ii) human resource for health, which constitute the largest share of Ministry of Health budgets; (iii) leakages in spending, and (iv) administrative costs associated with fragmented health financing schemes (Zeng et al., 2020). The choice of these four areas was supported by an initial analysis of which inefficiencies, if addressed, could create financial savings (see Fig. 1 – conceptual framework).

As a result, the article sets out to answer three major questions. First, what are the specific reforms within these four domains that can address inefficient processes and lead to reduced expenditure for the same level of output? Second, by how much do these actions/reforms affect spending patterns within the health systems? Third, what evidence is available on the feasibility and time required to implement these reforms?

## Methods

### *Search strategy*

In February 2021, we searched Medline, Embase, Global Health, Econlit, Africa-Wide information, Web of Science Core Collection and SciELO citation index. There were no date or language restrictions. A draft search strategy was developed by an experienced information

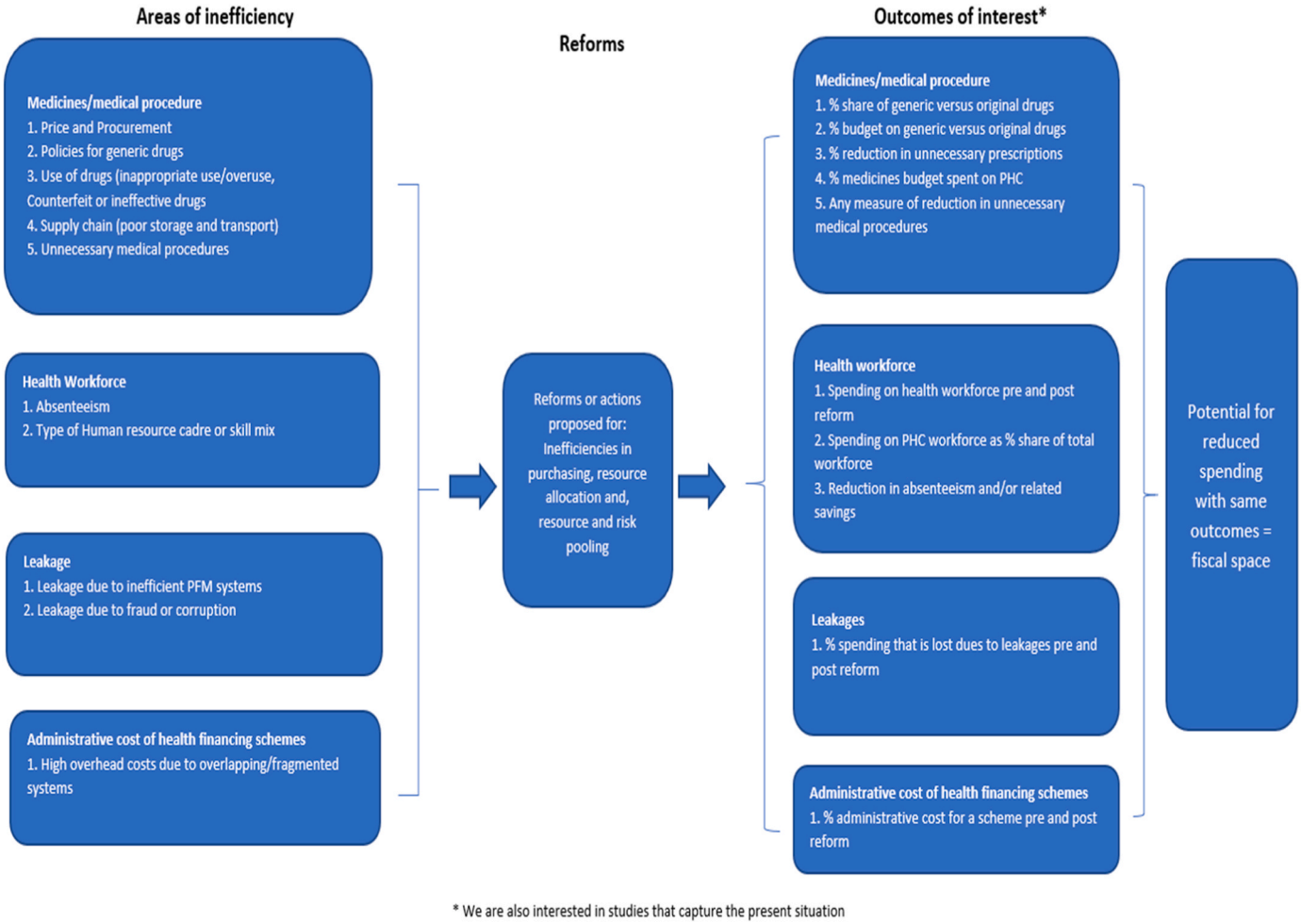


**Fig. 1.** Conceptual framework to analyse inefficiencies, reforms, and efficiency savings.

specialist. We used the following keywords: "health financing," "efficiency," "savings, "resource allocation," cost effective," "inefficiency," and "value for money." (A full search strategy is shown in Supplemental Material).

*Inclusion criteria*

We included studies that: were published since 2000; were from any and multiple countries; discussed reforms targeting inefficiencies related to revenue raising mechanism, pooling resources and risks, or purchasing; quantified efficiency gains that led to similar or improved outcomes and provided baseline information related to the eligible reforms and outcomes; and presented a clear description of the relationship between a specific health reform or policy and eligible outcomes such as cost savings in medicines, leakages, human resources for health, and administrative costs of fragmented health financing schemes. Finally, we included studies that described the feasibility or timing required to implement a reform in the selected domains.

*Exclusion criteria*

We excluded articles that: did not discuss reforms focused on health financing inefficiencies; documented solely cost-effectiveness for a particular health intervention or specific disease; documented efficiency gains in terms of general health outcomes and not in terms of cost savings; focused solely on costing studies without any reference to health reforms and cost savings; and were published before the year 2000. We exclude studies published prior to 2000 because particular attention to this field of studies dates from the 2010 World Health Report and we wanted to capture contemporary research on efficiency that may have informed this focus.

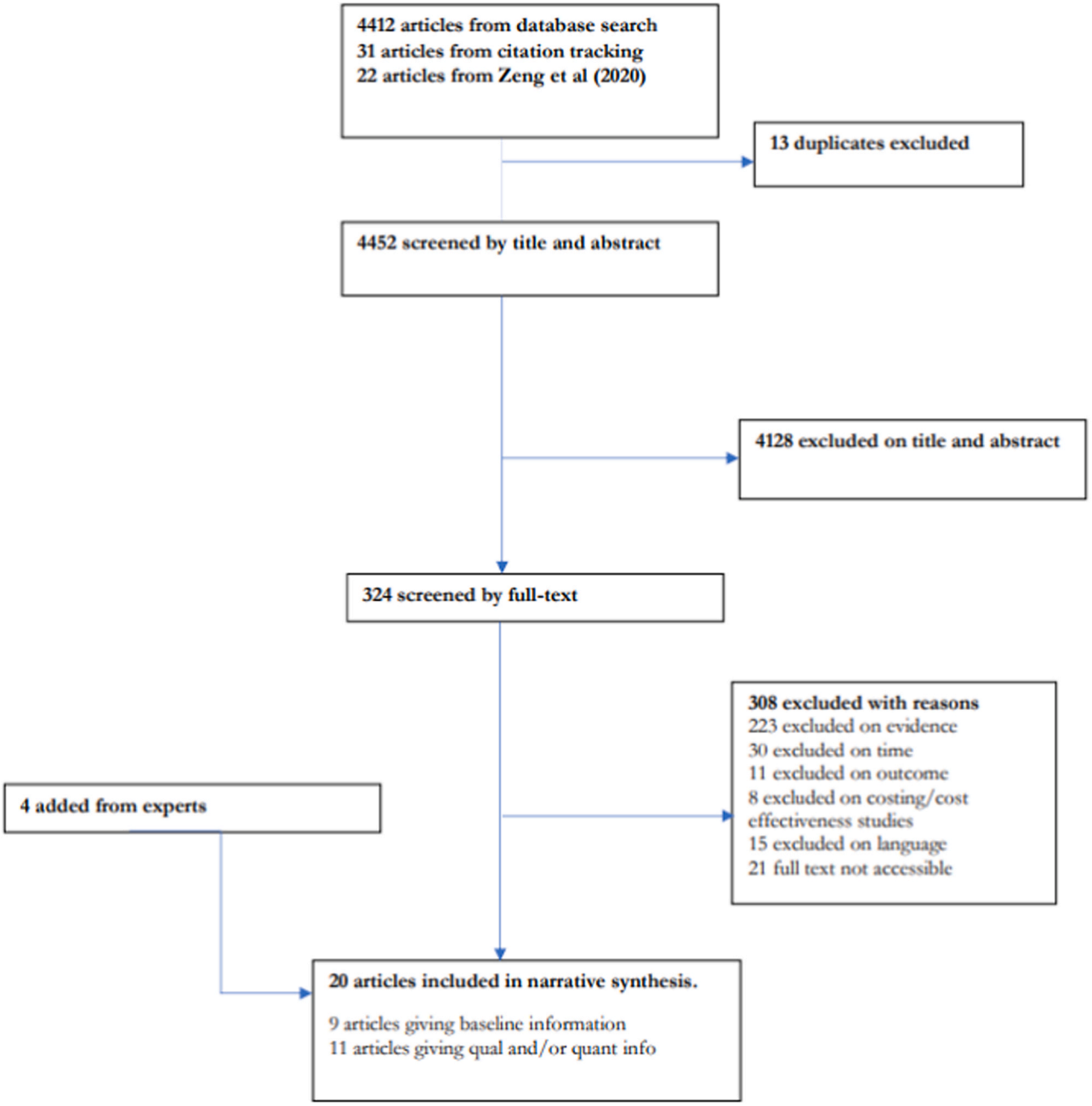


**Fig. 2.** PRISMA diagram.

*Data extraction*

Data were extracted to an excel spreadsheet and included: Full citation information; type of study; countries where the reform was implemented; the specific inefficiency discussed; the specific reform to tackle inefficiency; the efficiency indicator used; the baseline information given; the impact of the reform on health spending; and the feasibility and timing of the reform.

## Results

We obtained 4412 articles from our database search, 31 articles from citation tracking and 22 articles from Zeng et al. (2020). After removal of duplicates (13), we screened 4452 articles by title and abstract, and excluded 4128. 324 articles were screened by full text. 308 were excluded for various reasons: 223 because there was no evidence provided to support the conclusions, 30 because they were published prior to 2000, 11 because the outcome presented documented efficiency gains but did not provide any cost saving information, 8 because the studies focused solely on costing or cost effectiveness analysis with no mention of potential savings, 15 were excluded as not published in English, and 21 because the full texts were not accessible. After consultation with experts in this field, we identified an additional 4 reports to be included in the review. As a result, we included 20 articles and reports (Belay and Tandon, 2015; Chansa et al., 2008; Fischer, 2003; Gauthier, 2009; Gragnolati and Bredenkamp, 2007; Kelley, 2009; Kutzin and Jakab, 2010; Mitenbergs et al., 2014; Nundoochan, 2020; OECD, 2017, 2020; Okem and Cakar, 2015; Okwero, 2010; Puig and Ortun, 2003; Tandon, 2010; Thomson, 2010; Woolhandler, 2003; WorldBank, 2017; Yip and Hafez, 2015; Yip et al., 2012) for narrative synthesis. Fig. 2 below shows the study selection process and Table 2 presents each of the selected studies.

Eleven of the included articles (Belay and Tandon, 2015; Chansa et al., 2008; Gragnolati and Bredenkamp, 2007; Kutzin and Jakab, 2010; Mitenbergs et al., 2012; OECD, 2017; Okem and Cakar, 2015; Puig and Ortun, 2003; WorldBank, 2017; Yip and Hafez, 2015; Yip et al., 2012) gave some qualitative and/or quantitative evidence about the actual change resulting from some efficiency reform, while nine (Belay and Tandon, 2015; Fischer, 2003; Gauthier, 2009; Kelley, 2009; Nundoochan, 2020; OECD, 2020; Okwero, 2010; Thomson, 2010; Woolhandler, 2003) only gave baseline information (see Table 3 below). Thirteen studies presented evidence in the domains of medicines, seven on leakages, six on human resources for health, five on administrative costs of health financing schemes and four on (budget allocation to) primary healthcare. Some of these studies gave evidence from multiple countries and in multiple domains of interest. Publication dates ranged from 2003 to 2020. 40% of studies discussed countries in Africa, 35% in Europe, 30% in Asia, 25% in North America while other studies were from OECD countries or had a combination of high income and low-income countries.

Four of the included studies presented some evidence on allocative efficiency while all studies discussed technical efficiency. Twelve studies provided some quantitative evidence on the impact of health reforms, five discussed feasibility and/or timing of reforms while others only gave some baseline information.

*Inefficiencies*

*Technical inefficiencies in purchasing health services, commodities and supplies*

Table 3 summarises the inefficiencies identified in the included studies. Of the 11 studies giving qualitative or quantitative evidence, all but one discussed inefficiency in purchasing health services. Areas of inefficiencies were poor procurement procedures, high cost of pharmaceuticals, high public expenditure on drugs, under-utilisation of generic medicines, irrational drug use, high cost of purchasing PHC services,

**Table 2**
Selected studies.

| Author (publication year) | Countries | Region | Type of study | Domain |
|---|---|---|---|---|
| Nundoochan (2020) | Mauritius | Africa | Journal Article | HRH |
| Kutzin and Jakab (2010) | Kyrgyzstan | Asia | Report | PHC |
| Gragnolati and Bredenkamp (2007) | Kosovo, Albania, Macedonia, Bosnia and Herzegovina, Serbia, Montenegro | Europe | Working paper | Medicines |
| Puig-Junoy and Ortun (2003) | Spain | Europe | Journal article | Budget allocation to PHC |
| Okwero et al. (2010) | Uganda | Africa | Working paper | Leakages |
| OECD (2020) | LMICs | Global | Report | Budget allocation to PHC |
| | OECD countries | Global | Report | Medicines |
| | OECD countries | Global | Report | HRH |
| Thomson et al. (2010)[6] | Estonia | Europe | Report | Admin cost of Health financing (HF) schemes |
| Gauthier and Wane (2009) | Chad | Africa | Working paper | Leakages |
| | Chad | Africa | Working paper | Medicines |
| Tandon and Cashin (2010)[8] | Uganda | Africa | Discussion paper | Leakages |
| Woolhandler et al. (2003) | USA | North America | Journal article | Admin cost of HF schemes |
| | Canada | North America | Journal article | Admin cost of HF schemes |
| | Germany, Netherlands, Australia | Europe and Australia | Journal article | Admin cost of HF schemes |
| Kelley (2009) | USA | North America | White paper | Medicines |
| | USA | North America | White paper | Leakages |
| Fischer and Avorn (2003) | USA | North America | Journal article | Medicines |
| World Bank (2017) | LMICS and HICs | Global | Background paper | Medicines |
| | LMICS and HICs | Global | Background paper | HRH |
| | LMICS and HICs | Global | Background paper | Leakages |
| | LMICS and HICs | Global | Background paper | Admin cost of HF schemes |
| Yip and Hafez (2015) | Mexico | North America | Report | Admin cost of HF schemes |
| OECD (2017) | OECD countries | Europe | Report | Leakages |
| | OECD countries | Europe | Report | Admin cost of HF schemes |
| Chansa et al. (2008) | Zambia | Africa | Journal article | Medicines |
| Belay and Tandon (2015) | Nepal | Asia | Discussion paper | HRH |

(*continued on next page*)

**Table 2** (*continued*)

| Author (publication year) | Countries | Region | Type of study | Domain |
|---|---|---|---|---|
| Okem and Cakar (2015) | Turkey | Europe | Systematic review | Medicines |
| Mitenbergs et al. (2014) | Latvia | Europe | Journal article | Medicines |
| Yip et al. (2012) | China | Asia | Literature review | Medicines |

HRH: Human Resource for Health HR: Human Resources MoH: Ministry of Health PHC: Primary Healthcare OECD: Organisation for Economic Co-operation and Development RHDs: Regional Health Delegations.

limited competition among distributors of pharmaceutical products, inefficient cadre mix of health workers, absenteeism of health workers and leakages (including those arising due to corruption and waste).

*Medicines.* High price of pharmaceuticals and high public expenditure on drugs were identified as major inefficiencies in Montenegro, Macedonia, Latvia, Turkey, Nepal, and Zambia. Under-utilisation of generic medicines was reported in the United States of America (USA), where in 49 Medicaid programmes, 6.1% of expenditure could have been saved from using generics (Fischer, 2003). Variation in prices of the same medicines also existed across LMICs, as selected generics were five to 17 times above international reference prices, while originator brands were almost 30% higher (World Bank, 2017). Moreover, the quantity of antibiotics and opioids prescribed per day varied more than three and four-fold respectively across OECD countries (OECD, 2020).

*Health resource for health.* Two studies identified absenteeism of health workers as an inefficiency. In Nepal, 13% of facilities report being understaffed due to staff absenteeism (Belay and Tandon, 2015), while another study from Uganda reports that 37% of health workers were absent from work on an average day, costing government 37% of wage expenditure on PHC in the 2005/06 fiscal year (Okwero, 2010). In OECD countries, 76% of doctors and 79% of nurses reported being over-skilled for daily tasks while 51% of doctors and 43% of nurses reported being under-skilled (OECD, 2020).

*Leakages.* Six of the studies giving baseline information only and two of the studies giving quantitative evidence on the actual impact of reforms discussed leakages in the health sector. Okwero et al. (2010) and Tandon and Cashin (2010) report how in Uganda, 13% of health sector spending was lost due to waste (Okwero, 2010; Tandon, 2010). A considerable amount (14%) of funds also did not reach health facilities and questionable expenditures amounted to between 2% and 5% of total government spending on health (Okwero, 2010). Two other studies had previously identified these issues and showed that a large portion of funds did not get to lower level entities (Gauthier, 2009; Tandon, 2010). In the USA, fraud was estimated to reach 10% of annual healthcare spending in 2007 (Kelley, 2009). A study reported this value as between 3% and 10% for LMICs and HICs (World Bank, 2017). Unnecessary medical procedures and medicines, corruption, fraud, avoidable adverse events, and medical errors were causes of leakages identified in the health sector.

*Technical inefficiencies in pooling resources and risks*

Five studies discussed inefficiencies in pooling resources and risks. Specific inefficiencies included decentralisation and fragmentation of health insurance funds (Bredenkamp and Gragnolati, 2008); high overhead costs from small insurance pools (World Bank, 2017); fragmentation of aid coordination (Yip and Hafez, 2015); operational planning of hospitals and donor procurement (Yip and Hafez, 2015); high administrative costs of health institutions (OECD, 2017); and fragmentation of payment systems (Kutzin and Jakab, 2010).

*Administrative cost of health financing schemes, and other administrative costs.* Three studies discussed high overhead costs of health insurance funds and health institutions as an inefficiency. One study reported that fragmentation of health insurance schemes led to administrative costs to the tune of 10.8% of total health expenditure in 2011 in Mexico (Yip and Hafez, 2015). Across OECD countries, administrative costs of private health insurance schemes ranged from 9% of spending in Australia to more than 30% in Spain, the United Kingdom and Austria (OECD, 2017). The third study (World Bank, 2017) simply recognises that there is a consensus forming that small pools are inefficient in terms of high administrative costs and can be inequitable if better coverage is offered to one part of the population as a result.

*Allocative inefficiencies in resource allocation*

PHC has been recognised as an allocatively efficient way of spending resources (Hanson, 2022). Three of the included studies discussed low budget allocation to PHC providers as compared to higher level services as an allocative inefficiency (Chansa et al., 2008; Kutzin and Jakab, 2010; Yip et al., 2012). Budget allocation for PHC varied across countries and regions. In Spain it amounted to 30% of total public expenditure (Puig and Ortun, 2003), 54% in LMICs and 60% in low-income countries (OECD, 2020). Inadequate resource allocation to PHC was also reported in China, Zambia and Kyrgyzstan (Chansa et al., 2008; Kutzin and Jakab, 2010; Yip et al., 2012).

*Reforms*

Table 3 provides a summary of reforms proposed to address inefficiencies in purchasing. These included supply-side measures such as price controls, positive lists, pre-approval for expensive drugs, competitive and transparent procurement (Bredenkamp and Gragnolati, 2008), bulk procurement, volume controls and strategic procurement (Yip et al., 2012). Others included establishing a purchaser-provider split (Okem and Cakar, 2015), moving away from a local procurement model towards a centralised model (Belay and Tandon, 2015), splitting tenders and a zero-profit drug policy (Belay and Tandon, 2015), in which mark-ups of medicines were removed to reduce the incentive for unnecessary prescription by providers (World Bank, 2017). Other demand-side measures to tackle inefficiencies in purchasing included co-payment for prescription drugs and budget or quota restrictions for physicians (Bredenkamp and Gragnolati, 2007), performance-based financing to deal with absenteeism and supplier-induced demand (Okem and Cakar, 2015; Belay and Tandon, 2015), and initiatives to improve provider and patient knowledge about generics (World Bank, 2017).

Reforms proposed for inefficiencies in pooling resources and risks centred around pooling of health financing schemes and included: increased monitoring of administrative costs, defined ceilings and efficiency targets (OECD, 2017), and e-solutions to optimise hospital staff and limit use of temporary staff (OECD, 2017). Reforms to increase allocation of resources to PHC included increasing government funds for PHC (Yip et al., 2012), establishing a single sector policy for coordination and disbursement of all health sector funds (Chansa et al., 2008).

*Impact of reforms on cost savings*

Ten studies quantified the impact of reforms in terms of actual or potential cost savings (Bredenkamp and Gragnolati, 2008; Okem and Cakar, 2015; Mitenbergs et al., 2014; Belay and Tandon, 2015; Chansa et al., 2008; World Bank, 2017; Yip, 2015; Puig and Ortun, 2003; Kutzin and Jakab, 2010; OECD, 2017). Bredenkamp and Gragnolati (2008) reported about 30% reduction in pharmaceutical expenditure in Macedonia and Montenegro due to supply and demand side reforms

**Table 3**
Selected studies providing quantitative or qualitative information on reforms tackling inefficiency.

| Author (publication year) | Countries | Region | Type of study | Type of efficiency | Efficiency assessment method | Domain of cost savings | Inefficiency discussed | Reforms | Impact of reform on health expenditure | Feasibility of reform | Timing of reform |
|---|---|---|---|---|---|---|---|---|---|---|---|
| Puig-Junoy and Ortun (2003) | Spain | Europe | Journal article | TE | Quantitative | PHC | - Inefficiency in purchasing PHC services from providers | Contracting PHC services | In 1996, average primary care contract purchased health services at a cost that if reduced to 92% of its observed level, would not affect level of output. | NA | Initiated in 1990 |
| Bredenkamp and Gragnolati (2008) | Kosovo, Albania, Macedonia FYR, Bosnia and Herzegovina, Serbia and Montenegro | Europe | Working paper | TE | Quantitative | Medicines | - High mark-ups on drugs at the pharmacy level.<br>-Decentralisation and fragmentation of HIFs. | - Supply-side mechanisms (e.g., price controls, positive lists, pre-approval for expensive drugs, competitive procurement, and volume controls).<br>- Demand-side mechanisms (e.g., co-payment for prescription drugs, and budget or quota restrictions for physicians)<br>- Optimising staff mix by moving from an input to output-based hospital payment method. E.g., global budgeting and case-based financing based on DRG's.<br>- Sophisticated pharmaceutical information system that links HIFs to pharmacies and allows for adequate expenditure monitoring.<br>- HIFs should limit reimbursement to the lowest generic equivalent, where higher cost brands are preferred by the consumer or provider. | - 31% Reduction of drugs costs within two years in Montenegro's HIF.<br>- 30% decline in pharmaceutical expenditures in Macedonia. | NA | NA |
| Mitenbergs et al. (2014) | Latvia | Europe | Journal article | TE | Quantitative and qualitative | Medicines | - High price of pharmaceuticals<br>- Under-utilisation of generics | - Rationalising pharmaceutical care, hence the only pharmaceutical in a reference group is the | - Savings of about LVL3.7 million (€5.3 million) in 2012. | Reforms believed to limit patient choice hence, not well received by pharmaceutical | Initiated in 2012 |

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**Table 3** (*continued*)

| Author (publication year) | Countries | Region | Type of study | Type of efficiency | Efficiency assessment method | Domain of cost savings | Inefficiency discussed | Reforms | Impact of reform on health expenditure | Feasibility of reform | Timing of reform |
|---|---|---|---|---|---|---|---|---|---|---|---|
| | | | | | | | | one with the cheapest price. | | companies and medical professionals. | |
| Okem and Cakar (2015) | Turkey | Europe | Systematic review | TE | Quantitative and qualitative | Medicines | High price of pharmaceuticals | - Purchaser-provider split. MOH's role restructured from provision to planning and stewardship<br>- Improving PHC, expanding family medicine.<br>- Increased financial and administrative autonomy for public hospitals.<br>- PBF and capitation payments to family physicians. | Share of public expenditure on pharmaceuticals in GDP decreased after 2003 until 2009: 2003, 1.5%; 2004, 1.4%; 2005-2007, 1.3%; 2008, 1.4%; 2009, 1.6%. | Achievements were not evenly distributed across regions. (no reasons given as to why) | Reforms were initiated in 2003 and implemented over 10 years. |
| Belay and Tandon (2015) | Nepal | Asia | Discussion paper | TE | Quantitative | HRH | Absenteeism of health workers (13% of facilities report being understaffed due to staff absenteeism) | - PBF<br>- Strategic purchasing | Potential gain of addressing absenteeism is equivalent to increasing government budget for health by at least 1.6%. | NA | NA |
| Belay and Tandon (2015) | Nepal | Asia | Discussion paper | TE | Quantitative | Medicines | Higher prices in local medicines procurement as compared to a central model of procurement. (This is due to inaccurate cost estimates of pharmaceuticals and unannounced cost estimates in bid documents) | - Moving away from local procurement<br>- Splitting tenders | - Moving away from local procurement could result in significant savings as prices of local procurement on average are 300% > than central procurement<br>- Splitting tenders could have saved an equivalent of > 18% of value of pharmaceuticals. | NA | NA |
| Yip et al. (2012) | China | Asia | Literature review | TE | Qualitative | Medicines | Irrational drug use (e.g., counterfeit drugs, over prescription of antibiotics, and intravenous injections) | - Province-based competitive-bidding system for pharmaceuticals.<br>- National essential medicine list based on disease burden, safety and clinical efficacy, affordability, past use patterns, and availability of supply.<br>- Bulk procurement for provinces<br>- Zero-profit drug | NA | - Reforms were widely accepted, but media reports widespread corruption in bidding process which allows providers to continue receiving kickbacks.<br>- Making it to the essential list, especially for traditional Chinese medicines, is not clearly based on cost-effectiveness.<br>- Inadequate quality | 3-year reform plan launched in 2009 |

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**Table 3** (*continued*)

| Author (publication year) | Countries | Region | Type of study | Type of efficiency | Efficiency assessment method | Domain of cost savings | Inefficiency discussed | Reforms | Impact of reform on health expenditure | Feasibility of reform | Timing of reform |
|---|---|---|---|---|---|---|---|---|---|---|---|
| | | | | | | | | policy<br>- Price ceilings for drugs on essential list.<br>- Local SHI programmes must provide higher reimbursement for listed drugs than for non-listed drugs. | | control of medicines has allowed companies producing low quality drugs to win bids.<br>- Despite the zero-profit drug policy, income of providers is still linked with drug prescription. The policy has led to losses for providers, hence low motivation for work.<br>- Ineffective enforcement of drug-delivery contracts has led to shortages. | |
| Yip et al. (2012) | China | Asia | Literature review | AE | Qualitative | PHC | Inadequate resource allocation to PHC providers. | - Government increased funding per head by 10% to PHC providers. | NA | Shortage of HRH in China. | 3-year reform plan launched in 2009 |
| Chansa et al. (2008) | Zambia | Africa | Journal article | TE | Quantitative and qualitative | Medicines | High public expenditure on drugs | Single sector policy and expenditure programme, under government leadership. Reliance on government procedures for disbursing all funds | - The share of government funds to drugs declined from an average of 21.1% between 1990 and 1992, to 2.7% in 2005.<br>- Donor funding for drugs has been higher than government spending during the SWAp implementation period. | Decrease in productivity of hospitals due to inadequate support for cost items such as HRH, drugs, and capital development during the SWAp implementation period. | SWAp was initiated in 1993. (results of the evaluation in this study ranges from 1990-2006) |
| Chansa et al. (2008) | Zambia | Africa | Journal article | AE | Quantitative and qualitative | PHC | Low budget allocation to PHC | Single sector policy and expenditure programme, under government leadership. Reliance on government procedures for disbursing all funds | Pre-reform, an average of 31% of the total government health budget was allocated to provinces and districts compared with an average of 55% between 1996 and 2005. | Failure of districts and hospitals to improve service delivery due to the ceilings on expenditures drugs and capital development. | SWAp was initiated in 1993. (results of the evaluation in this study ranges from 1990-2006) |
| World Bank (2017) | LMICs and HICs | Global | Report | TE | Quantitative | Medicines | - Irrational use of drugs, suggesting that globally less than 50% of patients receive appropriate medication<br>- Variation in price of same medicine. (Selected generics in LMICs were 5 | - Proposed reforms include an essential medicines list that used generics to the maximum.<br>- Greater transparency of medicine | Estimates of the proportional cost savings from switching from specific brand name to generic medicines include 51% in Pakistan and | - Implementing these policies is easier in the public sector than in the private sector where if regulations exist, they are difficult to enforce.<br>- Low market penetration | NA |

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| Author (publication year) | Countries | Region | Type of study | Type of efficiency | Efficiency assessment method | Domain of cost savings | Inefficiency discussed | Reforms | Impact of reform on health expenditure | Feasibility of reform | Timing of reform |
|---|---|---|---|---|---|---|---|---|---|---|---|
| | | | | | | | to 17 times above international reference price while originators brands were almost 30% higher). | procurement, so that countries pay the right price and corruption is eliminated<br>- Better monitoring of medicine safety and quality.<br>- Eliminating incentives for over-prescription, such as separating prescribing from sales.<br>- Improve provider and patient knowledge about generics. | 53% in China, between 4% and 23% in Austria, and between 11% and 73% in 17 LMICs. | | |
| World Bank (2017) | LMICs and HICs | Global | Report | TE | Qualitative | Admin cost of HF schemes | High overhead cost of small health insurance pools | Pooling of HF schemes | NA | It can be difficult to merge existing pools for political reasons. | NA |
| Yip and Hafez (2015) | China | Asia | Report | TE | Quantitative | Medicines | - Low stock of essential medicines as these were not preferred by providers. Further, prescribing preferences influenced manufacturing decisions and increased drug expenditure at an annual rate of 15% between 1990 to 2008. | - China established an essential medicines programme in 2009 which included a national essential drugs list.<br>- Centralised bidding and bulk purchasing for primary care institutions.<br>- Zero-profit drug policy: reducing mark-ups of medicines and reducing incentives for over prescription. | - By the end of 2010, nearly 80% of all PHC institutions had implemented the national essential medicine policy.<br>- Bulk purchasing has resulted in a 25% reduction in the average price of essential medicines.<br>- Median price of 29 generic drugs has fallen by 5.3% in the public sector and 4.7% in private pharmacies.<br>- However, availability of surveyed medicines was still low and had actually decreased since 2010 | - There is still little evidence for rational use of medicines and medical expenditure.<br>- A survey covering 3 provinces showed that compensation for health providers was low due to zero-drug mark-up policy. Hence, decreased motivation and increased FFS and administration of injectable antibiotics. | NA |
| Yip and Hafez (2015) | Democratic Republic of the Congo | Africa | Report | TE | Quantitative | Leakages | - Fragmentation of processes, aid coordination, goal setting, operational planning, procurement between donors and country leadership.<br>- Overstaffing and absenteeism. | - A single coordinating mechanism at the national level.<br>- Greater cooperation between donors and government leading to mutually agreed processes and | - Reduced fragmentation led to reduction in management costs of internationally funded projects, from an average of 28% in 2005 to 9% in 2011.<br>- Between 2009 and | NA | NA |

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**Table 3** (*continued*)

| Author (publication year) | Countries | Region | Type of study | Type of efficiency | Efficiency assessment method | Domain of cost savings | Inefficiency discussed | Reforms | Impact of reform on health expenditure | Feasibility of reform | Timing of reform |
|---|---|---|---|---|---|---|---|---|---|---|---|
| | | | | | | | | management procedures.<br>- National System for Procurement of Essential Medicines reasserted control of the national procurement and supply chain.<br>- A public finance reform required eligible staff to retire and decentralised human resource management to ensure better deployment of the workforce. | 2014, better coordination resulted in savings of more than US$ 56 million.<br>- Greater transparency in planning and budgeting enabled some provinces to increase their operational budgets by 30%.<br>- Reform of the pharmaceutical sector and pooling of resources for drug transport by the regional distribution centres of the National System for Procurement of Essential Medicines resulted in annual savings of more than US$ 3.5 million | | |
| Yip and Hafez (2015) | El Salvador | North America | Report | TE | Quantitative | Medicines | - Limited competition among drug distributors, driving costs upward.<br>- Restriction of importation of a drug to single distributors leading to high OOP expenditure, limited access and dissatisfaction.<br>- Lack of laboratories, testing and inspection of drugs further compounded quality | - Establishment of an independent regulatory agency-the National Medicines Directorate which:<br>- Banned hiring officials with links to pharmaceutical companies, royalties to physicians who promoted products.<br>- Ensured regulation of advertising.<br>- Mandated physicians to prescribe by active ingredients and not brand<br>- Established price ceilings for pharmaceuticals. | Average overall price reductions in pharmaceuticals of 20%–25%, although the reductions differed by product, from 3.3% to 30.5%. | NA | Initiated in 2012 |
| Yip and Hafez (2015) | Ethiopia | Africa | Report | TE and AE | Quantitative | HRH | - Despite increase in PHC units in the past decade, HRH required to meet the increase in demand did not, keep pace. In 2005, there were | A new cadre of health extension worker was deployed to health posts to meet family and community demands. | The estimated savings from lower wage bills for health extension workers, health officers and | NA | NA |

(*continued on next page*)

**Table 3** (*continued*)

| Author (publication year) | Countries | Region | Type of study | Type of efficiency | Efficiency assessment method | Domain of cost savings | Inefficiency discussed | Reforms | Impact of reform on health expenditure | Feasibility of reform | Timing of reform |
|---|---|---|---|---|---|---|---|---|---|---|---|
| | | | | | | | 0.3 physicians and 2 nurses per 10 000 population, which are among the lowest densities in Africa.<br>- Inefficient mix of inputs between capital and labour that limited productivity.<br>- Distances to staffed facilities were a major barrier to use of services. | The goal was to have two salaried health extension workers for each population of 5000. | emergency surgical officers are US$ 20 million per year. | | |
| Yip and Hafez (2015) | Republic of Korea | Asia | Report | TE and AE | Quantitative | Admin cost of HF schemes | - High admin costs and inequity in premium contributions, fiscal sustainability, and utilisation of insurance funds.<br>- Fragmentation among more than 350 quasi-public not-for-profit insurers, hence HIFs was too small for efficient risk pooling. | Merging of HIFs into a single risk pool and managed by two agencies. | Administrative costs dropped from 7.87% of all NHIS expenditure to 2.38% between 1996 and 2008. | NA | NA |
| OECD (2017) | OECD countries | OECD | Report | TE | Quantitative | Leakages | - Lack of bulk procurement among hospitals, local governments, precluding volume-related discounts and crating unnecessary task repetition for buyers.<br>- Passive procurement: lack of negotiation as small buyers contract separately while big buyers do not actively use their market power. For example, Mexico until 2007, the procurement function IMSS was embedded in 60 separate entities. | - Various forms of collaborative procurement among countries. | - Mexico: Cumulative savings of $2.8 billion between 2007 and 2010<br>- Greece: 10% overall price reduction for pharmaceuticals and 20% price reduction for selected medical devices.<br>- New Zealand: Cumulative savings of about NZD 5.1 billion between 2005 and 2015, including about NZD 1.9 billion in 2014/15<br>- Denmark and Norway: Savings ranging from 30% to over 60% compared to list prices or average wholesale prices in a group of neighbouring countries. | NA | NA |

(*continued on next page*)

**Table 3** (*continued*)

| Author (publication year) | Countries | Region | Type of study | Type of efficiency | Efficiency assessment method | Domain of cost savings | Inefficiency discussed | Reforms | Impact of reform on health expenditure | Feasibility of reform | Timing of reform |
|---|---|---|---|---|---|---|---|---|---|---|---|
| OECD (2017) | OECD countries | OECD | Report | TE | Quantitative | Admin cost of HF schemes | - High admin costs of health institutions. | - Germany and the Netherlands introduced a legal requirement to estimate any additional administrative burden associated with each new piece of legislation discussed in parliament.<br>- USA: The ACA stipulates a Medical-Loss-Ratio requiring insurers to spend at least 80-85% of premiums on medical claims<br>- Defined ceilings and efficiency targets.<br>- E-solutions to optimise hospital staff, limiting the use of additional temporary staff.<br>- Better monitoring of admin costs. | USA: The share of non-medical overhead costs in net premiums decreased, resulting in accumulated savings of $3.7 billion by 2013. | | |
| Kutzin and Jakab (2010) | Kyrgyzstan | Asia | Report | TE | Quantitative | PHC | - Low budget allocation to PHC.<br>- Fragmentation of payment systems | Switching from a multi-payer to a single-payer system, precluding further fragmentation and allowing unified provider payment systems with consistent financial incentives, thus enabling the rationalisation of the health care system | - The share of total government health expenditure allocated to PHC increased from 26.4% to 37.9%. | NA | NA |

(Gragnolati and Bredenkamp, 2007). After reform in Turkey, the share of public expenditure on pharmaceuticals in GDP decreased from 1.5% in 2003 to 1.4% in 2008 and only rose to 1.6% in 2009 (Okem and Cakar, 2015). Belay and Tandon (2015) estimated that potential gains from addressing absenteeism in Nepal would be equal to increasing government budget on health by at least 1.6% (Belay and Tandon, 2015). Switching to generic medicines was also estimated to yield savings ranging from 4% to 73% of current spending on pharmaceuticals in Pakistan, Austria, China, and 17 LMICs (World Bank, 2017). Reforms leading to bulk procurement also led to a 25% reduction in average price of essential medicines in China (Yip and Hafez, 2015).

Merging multiple health insurance funds into a single risk pool led to a 5% reduction in administrative costs in Republic of Korea (Yip and Hafez, 2015). In the Democratic Republic of the Congo, reduction in the fragmentation of processes and aid coordination also led to a decrease in administrative costs from 25% in 2005 to 9% in 2011 (Yip and Hafez, 2015).

Not all reforms led to cost savings, however. For example, in Spain, a reform that introduced contracting PHC services saw average contracts purchased at a cost that was over 8% above the cost frontier in 1996 (Puig and Ortun, 2003).

### *Feasibility and timing of reforms*

Six studies (Chansa et al., 2008; Mitenbergs et al., 2012; Okem and Cakar, 2015; Puig and Ortun, 2003; Yip and Hafez, 2015; Yip et al., 2012) touched upon the difficulty of implementing these reforms, and therefore their feasibility. Reforms met setbacks such as corruption in the bidding process (Yip et al., 2012), ineffective enforcement of drug-delivery contracts (Yip et al., 2012), inadequate support from government, unfavourable ceilings on expenditures on drugs and capital development (Chansa et al., 2008), shortage of human resource for health (Chansa et al., 2008; Yip et al., 2012), low compensation of workers (especially due to the zero-drug policy) leading to low motivation, and broadly speaking, political challenges (World Bank, 2017). Reforms to rationalise prescription were sometimes not well received by pharmaceutical companies and medical professionals as they were argued to limit patient choice (Mitenbergs et al., 2014). From a timing perspective, when reforms were implemented the process of implementation was lengthy and lasted at least three years (Yip et al., 2012), and at most ten (Okem and Cakar, 2015.

## Discussion

### *Summary of findings*

This review has synthesised findings that relate to health financing inefficiencies, and associated reforms intended to address them. The review looked at the impact of these reforms, their feasibility, and timing. We confirmed the pervasiveness of inefficiencies across the health sector. For example, we found that in some contexts, 37% of healthcare workers were absent, costing governments 37% of health wage bill. Leakages amounted to between 2% and 14% of healthcare spending globally. Administrative costs of health financing schemes ranged between 3.7% and 30% of revenue, although the literature does not comment on what constitutes a high level of administrative cost. Medicines prices varied almost four-fold across countries. Allocation to PHC was considered insufficient, although what would constitute an 'adequate 'allocation to PHC to aim for was not discussed. Our review also found that reforms could lead to savings: 6.1% of spending could be saved on pharmaceuticals by switching to generics, and supply and demand-side reforms could lead to a 30% reduction in pharmaceuticals expenditure, while bulk procurement could bring about a 25% reduction in the price of medicines. Merging health financing schemes could lead to 5% reduction in administrative costs. However, the evidence available on impact of these reforms is limited in quantity (16 studies overall, 4 of which present modelled estimates) and in geographical scope (10 document the impact of an efficiency reform in OECD countries, and 8 in LMICs). The feasibility of implementing these reforms was documented in only 9 studies. Finally, the evidence available points to a lengthy process from reform development to implementation (from 3 to 10 years).

### *Limitations*

There are limitations to this review. Firstly, the estimates used in the included studies were not always generated using standardised methods of capturing efficiency gains while other estimates were modelled projections. While countries saw changes in behaviour and experienced efficiency savings, we could not rule out the effects of other macroeconomic factors, neither could we be assured that the impacts on cost savings are all as a direct result of these reforms. To make assertions that executing a specific reform could lead to a certain degree of cost savings, we would have needed to take into consideration contextual and political factors for which there was insufficient evidence. Further, not all regions and countries were represented in this review, hence, estimates could not be generalised. Finally, having chosen to exclude studies prior to 2000 (30), we could have missed some evidence that would have justified the World Health Report 2010 claim that up to 40% of resources for health are wasted.

### *Further research*

Considering the importance of better understanding the potential to increasing fiscal space for health through reforms tackling inefficiencies, further research is needed to document the source of these inefficiencies and more crucially, what reforms have led to greater savings. The lack of standardisation of methodology is also problematic, and greater attention could be paid to harmonising how efficiency is measured across countries. The development of a normative conceptual framework that clearly defines inefficiency and how addressing inefficiencies in the health system can lead to better outcome is also an important step. This can help structure and organise the areas to investigate and allow for comparison between countries. The framework developed in this article could be taken as a basis upon which to further refine our understanding of the relationships between inputs and outcomes. Finally, understanding the political economy of the reforms would greatly enhance the ability of countries to act upon identified inefficiencies.

### *Policy implications*

The findings of this review question the practical value of the commonly referred-to "finding" that between 20% and 40% of all health resources might be effectively lost to various forms of inefficiency. The presence of these inefficiencies does not imply that policies to address inefficiency will automatically reverse these and be a significant source of fiscal space. Ministries of Finance and technical agencies engaged with how to create additional fiscal space for health should therefore start their projection models with a context-specific analysis of potential inefficiencies, and how much addressing them could save, to avoid developing unrealistic projections.

The review also emphasises the need to recognise the complexity involved in translating these identified sources of inefficiencies into actual efficiency gains, and that some of these inefficiencies may be structural, i.e. political or rooted in historical processes, and therefore difficult to tackle (World Bank, 2017). Researchers and technical agencies should therefore go beyond standard approaches to measuring inefficiencies and integrate a political economy lens, as this would help document why the take up of these reforms is so slow.

These findings also highlight the need for a whole of government approach in tackling inefficiencies. Indeed, the responsibility for developing and implementing reforms pertaining to drug procurement,

health workers' salaries, and leakages in PFM systems lies with ministries of health, ministries of finance, health insurance agencies, drug procurement agencies, ministry of public affairs and the ministry of legal affairs, at a minimum.

## Conclusion

Inefficiencies in spending for health exist. Addressing these should remain a key policy focus across health and other government agencies. However, the expectation that up to 40% of resources could be saved through addressing these inefficiencies may be over-optimistic, as the evidence that efficiency enhancing reforms can be implemented is limited, mixed, and where it exists produces much smaller estimates of efficiency gains. Translating these reforms into actual saving is also a lengthy process, and made all the more complex by the political economy conditions that would need to be tackled at the same time.

## Author contributions

NB led the development of the protocol for the systematic review. RA undertook the systematic search in collaboration with NB. NB led the writing of the article. DE, HW, KH provided comments to the article.

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## Declaration of Competing Interest

The authors declare that they have no known competing financial interests or personal relationships that could have appeared to influence the work reported in this paper.

## Appendix A. Supporting information

Supplementary data associated with this article can be found in the online version at doi:10.1016/j.ssmhs.2024.100008.

## References

Belay, T., Tandon, A., 2015. Assessing Fiscal Space for Health in Nepal. Heath, Nutrition and Population Discussion Paper.

Bredenkamp C, Gragnolati M. Sustainability of health care financing in the western Balkans: an overview of progress and challenges. Vol. 11, Policy Research Working Paper - World Bank. 2008.

Chansa, C., Sundewall, J., McIntyre, D., Tomson, G., Forsberg, B.C., 2008. Exploring SWAp's contribution to the efficient allocation and use of resources in the health sector in Zambia. Health Policy Plan. 23 (4), 244–251.

Fischer, M., Avorn, J., 2003. Economic consequences of underuse of generic drugs: evidence from medicaid and implications for prescription drug benefit plans. Health Serv. Res. 38, 1051–1064.

Gauthier, B., Wane, W., 2009. Leakage of public resources in the health sector: an empirical investigation of Chad. J. Afr. Econ. 18, 52–83.

Gragnolati, M., Bredenkamp, C., 2007. Sustainability of Healthcare Financing in the Western Balkans: An Overview of Progress and Challenges. The World Bank, Policy Research Working Paper Series.

Hanson, K., Brikci, B., Erlangga, D., et al., 2022. The *Lancet Global Health* Commission on financing primary healthcare: putting people at the centre. Lancet Glob. Health.

Kelley, R., 2009. Where Can $700 billion in Waste Be Cut Annually from the U.S. Healthcare System?

Kurowski, C.D.E., Tandon, Ajay, Eozenou, Patrick Hoang-Vu, Schmidt, Martin, Irwin, Alec, Cain, Jewelwayne Salcedo, Pambudi, Eko Setyo, Postolovska, Iryna, 2021. From Double Shock to Double Recovery – Implications and Options for Health Financing in the Time of COVID-19 (Health, Nutrition and Population Global Practice, Issue).

Kutzin, J.C.C., Jakab, M., 2010. Implementing Health Financing Refrom - Lessons from Countries in Transition.

Mitenbergs, U., Taube, M., Misins, J., Mikitis, E., Martinsons, A., Rurane, A., Quentin, W., 2012. Latvia: Health System Review. Health Systems in Transition, pp. 1–191 (xv-xxii).

Mitenbergs, U., Brigis, G., Quentin, W., 2014. Healthcare financing reform in Latvia: switching from social health insurance to NHS and back? Health Policy 118 (2), 147–152. https://doi.org/10.1016/j.healthpol.2014.09.013.

Nundoochan, A., 2020. Improving public hospital efficiency and fiscal space implications: the case of Mauritius. Int. J. Equity Health 19 (1), 152.

OECD, 2017. Tackling Wasteful Spending on Health.

OECD, 2020. Realising the Full Potential of Primary Health Care.

Okem, Z.G., Cakar, M., 2015. What have health care reforms achieved in Turkey? An appraisal of the "Health Transformation Programme". Health Policy 119 (9), 1153–1163.

Okwero, P., Sparkes, S., Mclaughlin, J., Hoogeveen, J.G., 2010. Fiscal Space for Health in Uganda (World Bank Working Paper, Issue.

Puig, J., Ortun, V., 2003. Cost Efficiency in Primary Care Contracting: A Stochastic Frontier Cost Function Approach. Department of Economics and Business, Universitat Pompeu Fabra, Economics Working Papers.

Tandon, A., Cashin, C., 2010. Assessing Public Expenditure on Health from A Fiscal Space Perspective. (HNP Discussion Paper, Issue).

Thomson, S., Vork, A., Habicht, T., Roovali, L., Evetovits, T., Habicht, J., 2010. Responding to the Challenge of Financial Sustainability in Estonia's Health System.

WHO, 2010. Health Financing: The Path to UHC (World Health Report, Issue).

WHO, 2020. Global Spending on Health 2020: Weathering the Storm (924001778X). ⟨https://apps.who.int/iris/bitstream/handle/10665/337859/9789240017788-eng.pdf⟩.

Woolhandler, S., Campbell, T., Himmelstein, D., 2003. Costs of health care administration in the United States and Canada. N. Engl. J. Med. 349, 768–775.

World Bank, 2017. Second Annual UHC Financing Forum - Greater Efficiency for Better Health and Financial Protection 2nd Annual UHC Financing Forum, Washington, DC.

Yip, W., Hafez, R., 2015. Reforms for Improving the Efficiency of Health Systems: Lessons from 10 Country Cases. Improving Health System Efficiency.

Yip, W.C., Hsiao, W.C., Chen, W., Hu, S., Ma, J., Maynard, A., 2012. Early appraisal of China's huge and complex health-care reforms. Lancet 379 (9818), 833–842.

Zeng, W., Yao, Y., Barroy, H., Cylus, J., Li, G., 2020. Improving fiscal space for health from the perspective of efficiency in low- and middle-income countries: what is the evidence? J. Glob. Health 10 (2), 020421.