Using Health Insurance to Improve Equitable Access to *Quality* Services In Low-and-Middle income countries

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List of Abbreviations

ANC	Antenatal Care
CAP	Claims Advanced Payment
CBHI	Community-Based Health Insurance
CDs	Coronavirus Disease of 2019
CHE	Current Health Expenditure
DFID	UK Department for International Development
DHFF	Direct Health Facility Financing
EA	Enumeration Area
EKNZ	Ethikkomission Nordwest-und Zentralschweiz
HQSS	High-Quality Health Systems in the SDG era
iCHF	Improved Community Health Fund
LICs	Low-Income Countries
LMICs	Low-and-Middle-Income Countries
LLMICs	Low and Lower Middle-Income Countries
MDGs	Millennium Development Goals
MHI	Mutual Health Insurance
MLSS	Ministry of Labor and Social Security
MOHCDGEC	Ministry of Health, Community Development, Gender, Equity and Children
NAPSA	National Pension Scheme Authority
NCDs	Non-Communicable Diseases
NCS	Non Contributory Schemes
NHI	National Health Insurance
NHIF	National Health Insurance Fund
NHIMA	National Health Insurance Management Authority
NHIS	National Health Insurance Scheme
NIH	National Institutes of Health
NPO	Not-For-Profit
NPT	Normalization Process Theory
NR	Not Reported

List of Abbreviations

ODK	Open Data Kit
PBC	Performance Based Financing
PHC	Primary Health Care
PNC	Post Natal Care
PORALG	The President's Office
PPP	The President's Office of the Regional Administration and Local Government
PRISMA	Preferred Reporting Items for Systematic Review and Meta-analysis
RCT	Randomized Control Trial
ROBINS-1	Risk of Bias in Non-Randomized Studies of Interventions
SDG	Sustainable Development Goal
SET	Social Exchange Theory
SHI	Social Health Insurance
SSA	Sub-Saharan Africa
STROBE	Strengthening the Reporting of Observational Studies in Epidemiology
TIKA	Tiba Kwa Kadi
UHC	Universal Health Coverage
WHO	World Health Organization
WHS	World Health Survey

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Summary

Universal health coverage (UHC) has received tremendous attention over the last few decades, particularly after its central placement as part of Sustainable Development Goal 3. UHC means all people have access to high-quality services without financial burden. Earlier evidence before this thesis suggested that health insurance programs in LMICs increase service utilization and may reduce financial burden to an extent. However prior to this thesis, there was little evidence on the relationship between health insurance and quality of care in LMICs. Furthermore, there was also very little systematic evidence on inequities in uptake of health insurance in LMICs or the effects of insurance on quality of care in LMICs. The broad goal of the research was to examine health insurance and quality of care in LMICs guided by frameworks for quality of care with case studies in Tanzania and Zambia to understand the implementation of their national health insurance programs.

The first part of the research is an overview of the evidence on the impact of health insurance programs on UHC goals - equity, service utilization and financial protection - and then presenting the rationale for the research on equity and quality of care. The results from the systematic review and meta-analysis on equity show that, on average, vulnerable populations (the poorest and least educated groups) are less likely to enroll in health insurance than better-off groups, despite exemptions and subsidization policies by governments and health insurance agencies to increase uptake among these groups. Only one health insurance program in Colombia that relied on the existing social security database reported higher enrollment among vulnerable groups. While the findings of the review may seem obvious, it fills an important gap in the literature and contributes to the equity debates surrounding the scale-up of health insurance in LMICs. Regarding the impact of health insurance on quality of care in low-income countries, we found few studies that used rigorous study designs or evaluated the effects of health insurance on structural inputs and processes of care. The evidence from these studies indicates that health insurance is not associated (positively or negatively) with structural quality, and its effects on processes of care remain mixed. In regards to the outcome dimension, the evidence suggests that health insurance is linked to improved anthropometric measures for children and biomarkers, such as blood pressure and hemoglobin levels. Therefore, we suspect that the improvements in health outcomes from health insurance were driven mainly by increases in access to care rather improvements in quality.

In the subsequent chapters, the research examined the implementation of health insurance programs in Tanzania and Zambia and their ability to influence the quality of care. In Zambia, we assessed the health system factors that could affect its national health insurance, which offers only hospital services from providers in the public and private sectors. The results showed that in Lusaka, most adult patients do not use primary care facilities for non-emergency care and heavily rely on pharmacies and drug shops. In terms of their confidence in the health system and insurance enrollment, the findings show that among the informal sector population, confidence in the care provided by the public sector is low compared to confidence in the private sector. Confidence in the health system was found to be a significant determinant of health insurance

uptake. While confidence in the public sector was only weakly associated with enrollment, confidence in the private sector was strongly associated with enrollment. In examining the implications of the health system context and the purchasing arrangements of the Zambian National Health Insurance (NHI) on the insurance goal of improving quality of care, the results showed how some of the challenges within the health system could affect the insurance' s ability to influence the quality of care. The challenges include the low public funding for health that has deteriorated the quality of care, particularly at primary healthcare levels. Moreover, weak regulations on health professionals, medicines, and health facilities have also contributed to poor-quality inputs. The findings also shed light on the purchasing arrangements of the Zambia NHI that can influence the quality of care. The health insurance attempted to mitigate some of the challenges in the health system by providing public hospitals with advanced payments for the procurement of medicines and minor renovations. While this may improve some structural inputs for quality of care, the revenue from insurance may not be sufficient for prepaying larger infrastructure projects for hospitals, and they may still require government support through other financing mechanisms. Another finding was that the design to improve the care experiences of members, through short waiting periods and designated services, might not be equitable and unsustainable as coverage increases.

However, the purchasing arrangements of the insurance may also have negative implications for high-quality care. First, the current referral policy does not promote coordination between the public and private sectors. This decreases the opportunities for integration to ensure the continuum of care. Second, the provisional benefits may not be equitably distributed geographically, as the rural areas have fewer private providers and higher-level hospitals than urban areas. The inclusion of private providers was intended to mitigate the challenges in the public sector, but it may further exacerbate the pro-urban pattern of the distribution of health benefits. Third, not all facilities included in the health insurance, particularly those in the public sector, met the quality criteria set by the insurance, thus compromising access to benefits and quality. However, this could create a path dependency where public facilities may not be motivated to uphold the same quality standards as the private sector. Fourth, its supervision and accreditation checklists are heavily focused on structural indicators, and the only dimension of processes of care is care experiences, neglecting other components of quality of care that could assess the quality of care. Fifth, the limited resources in health facilities and the incentive by health insurance for providers to improve the care experiences of its members may jeopardize the care experiences of the uninsured, who are often the poorest populations. Finally, the low payment rates for first-level hospitals, the bottom of the insurance service delivery system, may create incentives for unnecessary referrals to high levels of care and may worsen the bypassing challenges.

While Tanzania has many years of experience implementing its national health insurance scheme, we found that the country faces similar challenges to those that Zambia faces in the design phase of its health insurance scheme. In both countries, we found that delays in reimbursements are a significant burden that affects inputs for quality of care. Some of the contributing factors for the delays are mechanisms for claims processes (electronic vs. paper-based) and lack of competent staff for claims processes. We also found that higher-level health facilities benefit more from health insurance due to members' preferences for higher levels of care. There is also a strong focus on improving members' care experiences through an extensive

selection of public and private providers, but its benefits are distributed inequitably across geographical areas. Similar to in Zambia, health insurance in Tanzania has improved access to high-cost services. However, unlike Zambia, Tanzania's NHIF payment mechanism has incentivized adherence to the national clinical guideline by reimbursing only treatments that follow these guidelines. However, the reduction in NHIF benefit entitlements over the years has dissatisfied its beneficiaries. Although the NHIF had its challenges, the quality of services and benefits are perceived to be much better than the improved community health fund (iCHF), which targets the informal sector. We found that the negative perception of iCHF was due to governance factors, such as the failure of the insurance design to support greater access to medicines and weak accountability of revenue generated from premiums.

The overall findings also informed concrete guidance in the areas of financing, governance and service delivery to countries considering using health insurance programs to make progress towards equitable access to quality services. Importantly, the results offer insights on how countries with existing health insurance programs can design their purchasing arrangements to monitor and improve quality of care. Health insurance programs should balance the different dimensions of quality of care to ensure providers are not incentivized to focus on improving structural inputs of care, which may not lead to a higher quality care. There is also a strong need to use data, such as data from claims and routine health information systems, to monitor the quality of care and use them as learning vehicles to redesign insurance programs for high-quality care and to change providers' behavior.

In addition, the research of this thesis provided the foundation for future research work on various aspects of health insurance and equitable access to quality care. Furthermore, the research showed the need for robust study designs suitable for determining the effectiveness on health insurance and quality of care and more data sources to enable measurement of the different dimensions of quality of care.

Chapter 1 Introduction

1.1 Universal Health Coverage- A Global Agenda

Universal Health Coverage (UHC) has received increasing attention in recent decades as a strategy to improve access to services and reduce financial burden to improve overall health. In 2005, all member states of the World Health Organization (WHO) committed to making progress towards UHC (World Health Assembly, 2005a). Ultimately, in 2015, UHC was prominently placed under the United Nations' Sustainable Development Goals (SDGs) which aim to improve health and development by 2030. UHC is an ambitious goal to provide populations with access to quality essential services without any financial hardship; regardless of socioeconomic conditions (World Health Organization, 2010a). UHC has three final goals: to increase equitable service utilization, improve quality of care, and improve financial protection and equity in finance (Figure 1).

What motivates the push for UHC? Globally, many people who need essential services (such as promotive, preventive, curative, rehabilitative, or palliative health) do not receive them due to various accessibility challenges (World Health Organization et al., 2021). Data from Demographic and Health Surveys (DHS) from 23 countries in sub-Saharan Africa show that among women who did not access healthcare, over half did not do so due to financial constraints, and those in the poorest and least educated group had a greater likelihood of facing access barriers (Seidu, 2020). In the WHO Region of the Americas, a survey found that one-third of the population experienced unmet needs due to accessibility challenges such as financial and availability barriers (Báscolo et al., 2020). For those able to utilize healthcare, there remain two main challenges: First, out-of-pocket spending is unacceptably high in many countries. In 2017, nearly 13.2 percent (996 million) of the global population faced catastrophic health expenditure (i.e. spending 10 percent of their total household budget on health). Additionally, 6.7 percent of people were pushed below the extreme poverty line ($1.90 a day in purchasing power parity, PPP)(World Health Organization, 2010a). Second, low quality of care is a significant problem, particularly in low-and-middle-income countries (LMICs). In 2016, 8.6 million excess deaths could have been managed by healthcare of which 5 million were estimated to be due to receipt of poor quality care (Kruk et al., 2018b).

1.2 Health insurance as a financing strategy for UHC

Based on the WHO's framework on health financing for UHC (Kutzin et al., 2017), several countries have recently implemented various health financing reforms to accelerate progress toward UHC (Jaca et al., 2022). One of the main strategies for UHC in LMICs has been the scale-up of health insurance programs. Proponents of health insurance as a strategy for UHC theorize that, as a prepayment mechanism, it can reduce financial hardship, whereby individuals do not have to pay for health at the point of service thereby reducing the financial barrier could then increase the use of services. Furthermore, supporters argue that having a large pool of different groups from mandatory national health insurance (NHI) can allow cross-subsidization of the poor by the rich and the sick by the healthy to decrease financial hardship and improve efficiency in the health sector

(Banzon and Mailfert, 2018). Proponents also argue that providers can use reimbursement from insurance claims to improve the quality of care. With this rationale, health insurance has become a popular health financing policy option in LMICs. Table 1 gives a summary of low-and middle-income countries with a recent health financing reform through health insurance. Countries such as Ghana, Indonesia, Laos, Nepal, and Zambia, have established various forms of social or national health insurance with a single fund that pools payroll deductions from the formal sector, premium contributions by those in informal sector, and other sources in some countries. In Indonesia and Ghana, for example, funding for the NHI is provided through an earmarked fund from tobacco taxes (Zahari et al., 2021) and a levy on valued added taxes (Wang et al., 2017), respectively. To promote solidarity and increased enrollment, some countries like Ghana, Indonesia, Laos, Nepal, and Zambia made insurance coverage compulsory for the entire population from the onset. Others, such as Kazakhstan, Nigeria, Peru, and Vietnam recently passed compulsory health insurance law for all their citizens. India, Mexico, Pakistan, Thailand, and Vietnam have expanded insurance coverage for poor and vulnerable groups through non-contributory schemes financed by government tax revenues. Countries, such as Ethiopia, Rwanda, Senegal, and Tanzania have introduced voluntary community-based health insurance (CBHI) specifically targeting the informal sector. Additionally, China and Uruguay have prioritized equity through merging of schemes and expansion of benefit entitlements respectively.

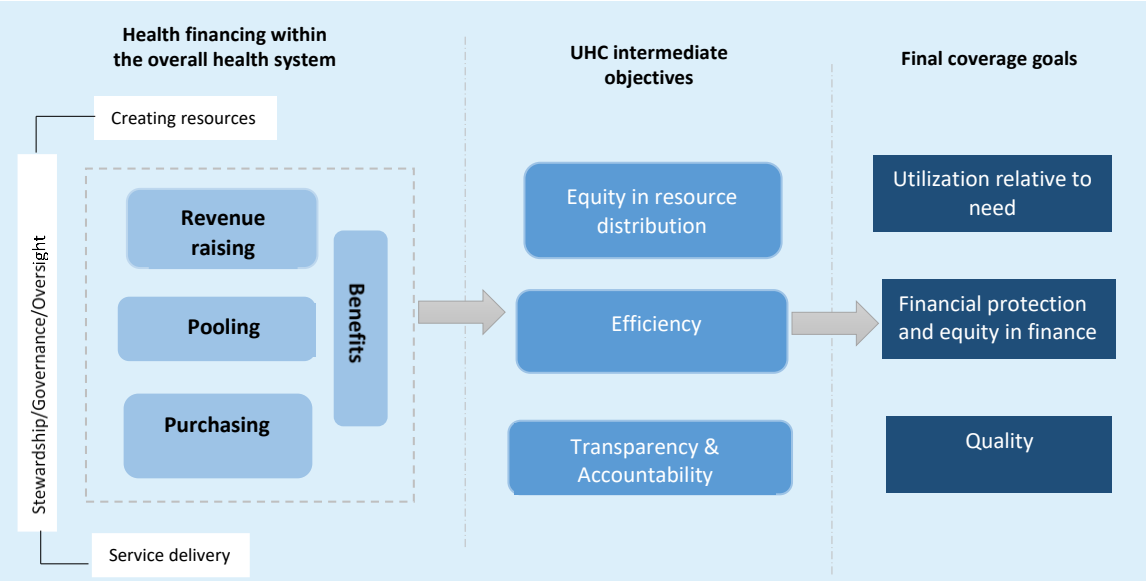

Figure 1: WHO's Framework for Health Financing for UHC (Kutzin et al., 2017)

Implementing health insurance as a strategy for UHC has not been successful in all countries. Like any other health system reform, introduction of health insurance is a highly political process that needs the alignment of ideas, institutions and influential actors to propel its adoption and implementation (Fox and Reich, 2013). For instance, Benin passed a universal health insurance law in 2008, but it was revoked in 2017 by a new government. In countries such as Malaysia (Croke et al., 2019) and Uganda (Mhazo and Maponga, 2022), NHI has been high on the political agenda for many years, but it has yet to be successful due to the resistance of opponents guarding their interests. On the other hand, countries like Burkina Faso (Bicaba et al., 2020),

Cote d'Ivoire (Duran et al., 2020b) and South Africa (Republic of South Africa, 2019) have established laws for a national health insurance, but have yet to be implemented. In South Africa, stakeholders' concerns about quality of care, corruption, overcrowding of private hospitals have stalled the implementation of its NHI (Christmals and Aidam, 2020). A growing number of other low-income countries such as Bangladesh, Madagascar and Malawi are considering NHI legislation as a strategy for UHC. It is therefore, highly important, to establish the current evidence to guide decisions on scaling up health insurance as a policy tool for UHC or for establishing best practices for effective implementation strategies.

Table 1: Health insurance reforms in selected LMICs from 2002-2022

Country(reference)	Reform	Target population	Year
Benin (Houeninvo et al., 2022)	Law on universal health insurance (RAMU)	Entire population	2008
	Suspension of the National Health Insurance Scheme	Entire population	2017
Burkina Faso (Bicaba et al., 2020)	Law on universal health insurance (RAMU)	Entire population	2015
China (Su et al., 2019)	Establishment of the New Cooperative Medical Scheme (NCMS)	Rural residents	2003
	Establishment of the Urban Resident's Basic Medical Insurance (URBMI)	Children, students, and informal sector workers in urban areas	2007
	Establishment of the Urban and Rural Residents Basic Medical Insurance System to merge URBMI and NCMS	Populations under NCMS and URBMI	2016
Colombia (Atun et al., 2015)	Merge of the contributory and subsidized insurance schemes	Entire population	2008
Egypt (Khalifa et al., 2022)	Issued a universal health insurance law	Entire population	2018
Ethiopia (Zelelew et al., 2018)	Adopted a national health insurance strategy for the development of social health insurance for the formal sector and community-based health insurance for the informal sector	Entire population	2008
	Pilot of voluntary community-based health insurance (CBHI) in selected districts	Informal sector	2011
Gabon (Sahli-Majira et al., 2019)	Establishment of mandatory health insurance schemes through Caisse Nationale d'Assurance Maladie et de Garantie Sociale (CNAMGS)	Entire population	2007
Ghana (Wang et al., 2017)	Establishment of NHI- Ghana National Health Insurance Scheme (NHIS)	Entire population	2004
India (Garg et al., 2020)	Establishment of Pradhan Mantri Jan Arogya Yojana (PMJAY) Health Insurance	Families falling under the poor and vulnerable threshold	2018
Indonesia (Maulana et al., 2022)	Establishment of a mandatory NHI-Jaminan Kesehatan Nasional (JKN)	Entire population	2014
Laos (Will, 2022)	Establishment of NHI	Entire population	2012
Kazakhstan (Eriksen et al., 2022)	Establishment of a social health insurance fund	Entire population	2016
	Health insurance coverage made mandatory	Entire population	2020
Kenya (Chi and Regan, 2021)	Health insurance coverage made mandatory	Entire population	2021
Nigeria (Awosusi, 2022)	Establishment of NHI-Nigeria NHIS	Entire population	2004
	Health insurance coverage made mandatory	Entire population	2022
Nepal (Shah et al., 2022)	Establishment of a mandatory NHI	Entire population	2017
Mexico	Establishment of Seguro Popular health insurance	Persons without health insurance	2004
Pakistan (Hasan et al., 2022)	Initiation of Sehat Sahulat Programme	Families living below the poverty line	2015
Peru(de Habich, 2019)	Health insurance coverage made mandatory	Entire population	2009
Philippines(Nuevo et al., 2021)	Automatic entitlement of Philippine Health Insurance Corporation (PhilHealth) benefits	Entire population	2019
	Establishing PhilHealth as the national purchaser of individual-based good and services		
Rwanda(Liu et al., 2019)	Establishment of the community based health insurance (CBHI) -Mutuelle de santé	Individuals not covered by other schemes	2004
Senegal (Daff et al., 2020)	Establishment of CBHI -la Couverture Maladie Universelle	Informal sector	2013
Tanzania (Kalumbia, 2022)	Establishment of CBHI-the Improved Community Health Fund	Informal sector	2018
	Mandatory health insurance introduced to Parliament	Entire population	2022
Thailand (Paek et al., 2016)	Establishment of the Universal Health Coverage Scheme (UCS)	Individuals not covered by the social security scheme	2002
Uruguay (Arbulo et al., 2015)	Establishment of NHI	Entire population	2007
Vietnam (Nguyen et al., 2021)	Expansion of social health insurance	Poor, ethnic minorities, and households in communes designated as highly disadvantaged	2003

1.3 A historical review of health financing trends in LMICs

In most LMICs, household out-of-pocket payments, such as user fees, are a major source of domestic resources for health (Chang et al., 2019). In sub-Saharan Africa (SSA), user fees became prominent in many countries in the late 1980s and early 1990s after decades of using general tax revenues to fund health. The impetus for the inclusion of user fees as a financing mechanism was informed by the Bamako Initiative by African Health Ministers to improve access to quality of care (Asila Pangu, 1997) and the Agenda for Reform in developing countries by the World Bank (Akin et al., 1987) to raise additional resources for health (James et al., 2006). However, user fees were a highly controversial policy, whereby opponents asserted that user fees decrease service utilization, especially for poor and vulnerable groups (Leighton, 1995). Early evidence showed that although user fees were able to increase revenue for the purchase of essential inputs for service delivery, the policy was inequitable, and the poor could not access health services (Waddington and Enyimayew, 1989, Nyonator and Kutzin, 1999). Other findings showed that the introduction of user fees resulted in increased quality of services through staff incentives from user fees, but it also pushed some patients into poverty (Jacobs and Price, 2004). As increasing evidence become available showing that imposing user fees decreased service utilization significantly and widened inequalities in health service access, the discourse on user fees pivoted, and many global health actors such as UNAIDS, UK Department for International Development (DFID), the African Union, and WHO called for their removal (Robert and Ridde, 2013, Pearson, 2004). Many LMICs responded to this call along with the aim to reach the Millennium Development Goals (MDGs) by reducing or removing user fees for at least some population groups. A World Bank report found that out of the 41 African countries with a user fee policy in the early 2000s, 80 percent of them made efforts to eliminate them for specific groups or levels of the health system (Cotlear and Rosemberg, 2018). Burkina Faso, Benin, Ghana, Nigeria, and Tanzania removed user fees targeting vulnerable groups such as pregnant women, children under five, and the elderly. On the other hand, Liberia, Madagascar, South Africa, Uganda, and Zambia implemented policies to remove user fees at all primary public health care facilities. The evidence that emerged showed that the removal of user fees increased access to health services and equitable access to services (Deininger and Mpuga, 2004).

Some researchers cautioned that removing user fees without increased public health funding and strategic implementation would result in unintended consequences on the quality of care through drug shortages and demotivated health workers (Gilson and McIntyre, 2005, James et al., 2006). The researchers' concerns became a reality in some countries. In Zambia, evidence showed that removing user fees did not increase equitable access to health services (Lépine et al., 2018), and the most likely explanation by the authors was the deterioration of the quality of the care, which changed people's value of health care services. In Uganda, although service utilization increased for the poor, the incidence of catastrophic health expenditure did not decrease for them (Deininger and Mpuga, 2004, Xu et al., 2006). The most probable explanation by the authors was the frequent drug shortages in public health facilities that drove patients to purchase drugs at private drug outlets and informal payments to health workers. With the financial sustainability of removing user fees in jeopardy, and the need to progress toward UHC, many countries had to turn to other health financing options. Meanwhile external funding, a critical source of funding is shown to be unsustainable as countries move up income-group (Barroy et al., 2017). The only options were either increased government spending on health or

public health insurance schemes as earlier experiences had shown user fees were not a desirable policy (McIntyre et al., 2013). Ultimately, health insurance has now become the most popular policy option selected by LMICs.

1.4 Debates surrounding health insurance scale up in LMICs

The introduction of health insurance in LMICs is a highly debated policy issue. Opponents of health insurance in LMICs have raised three main concerns. First, as a demand-side financing mechanism, opponents of health insurance, specifically social health insurance (SHI) through labor taxes, assert that the low levels of the formal labor force in LMICs make health insurance in these settings highly undesirable (Yazbeck et al., 2020, Wagstaff, 2010a). In Germany, the first country to introduce SHI historically, the viability of health insurance hinged on the rapid growth of the German industry and blue-collar employment (Busse et al., 2017). A large proportion of the population in formal employment enabled payroll deductions to be feasible and for social health insurance to expand. However, in most LMICs, this critical condition for social health insurance has yet to materialize. Yazbeck and colleagues (2020) showed unregistered employment to be 86 percent in Africa, 68 percent in Asia, and 53 percent in Latin America and the Caribbean. Based on the high informal sector, opponents argue the collection from the formal sector is too small to generate sufficient financial resources to sustain insurance funds and make significant contributions to health spending.

The second main concern among opponents is that health insurance through contributions could have detrimental negative equity consequences, which is against UHC's goals (Wagstaff, 2010a). As the poor are more likely either not to have formal employment or have the ability to pay health insurance premiums, they are less likely to enroll in health insurance and reap the benefits of insurance (Wagstaff, 2010a). Meanwhile, the poor are the most affected by financial barriers to accessing health services and have the worst health outcomes. Therefore, opponents argue that health insurance will only profit the already better off and exclude the poor and vulnerable who need health services and financial protection.

Another concern is that the current health systems in LMICs are not strong or of sufficient quality to support health insurance as a strategy for effective health coverage. Some researchers have argued that, given the pervasive poor quality of care in these countries, simply increasing service utilization through health insurance may be unsuccessful in improving health outcomes, including mortality (Kruk et al., 2018b). Therefore, these researchers have emphasized that health insurance coverage must be coupled with system-wide quality investments to effectively improve health. Others have also cautioned that, as health systems are complex adaptive systems, the introduction of health insurance without strong governance and other effective implementation strategies could lead to inefficiencies in health systems, including provider moral hazard and bypassing of lower levels of care (Awoonor-Williams et al., 2016, Lagarde and Blaauw, 2022). Overall, this thesis aims to contribute new evidence to the current debates about scaling up health insurance in LMICs.

1.5 Current evidence of health insurance as a strategy for UHC goals in LMICs

1.5.1 Impact on health service utilization

Several systematic reviews have assessed the impact of health insurance on service utilization. One systematic review found that SHI and CBHI in LMICs increase utilization for inpatient and outpatient services (Spaan et al., 2012a). Another found that health insurance schemes generally in LMICs increase service utilization (Escobar et al., 2011). A more recent review showed that public health insurance schemes, such as SHI and tax-based health insurance, improve service utilization (Erlangga et al., 2019). In a systematic review, examining health insurance programs in Peru, Colombia, and Bolivia, found that these programs increased the use of outpatient services, hospitalization, and preventive care, particularly among the 0 to 4 age cohort (Bouillon and Tejerina, 2007).

Other systematic reviews and analyses have focused on more narrow health services or populations. A systematic review that examined maternal health services found that health insurance was positively correlated with the use of maternal health services, including facility birth delivery and antenatal care visits (Comfort et al., 2013a). Another review assessed the impact of health insurance on mental health and found that health insurance schemes increased the utilization of mental health care, such as hospitalization and outpatient rehabilitation services (Docrat et al., 2020a). Using data from the 2002-2004 World Health Survey (WHS) across 48 LMICs, El-Sayed and colleagues found that health insurance was associated with higher treatment likelihood for non-communicable diseases (NCDs)(El-Sayed et al., 2015). A review that examined the effect of public health insurance among vulnerable populations such as female heads of households, older adults, and children with disabilities found that health insurance schemes were able to increase service utilization among these groups and also prevent catastrophic health spending to some extent (van Hees et al., 2019b). However, Acharya and colleagues found that insurance schemes were not associated with service utilization in the informal sector (Acharya et al., 2013). Another review found mixed results that health insurance increases use of services among children (Mitra et al., 2017).

Overall, the systematic reviews available to date seem to suggest that health insurance in LMICs increases health service utilization. One remaining gap that emerges is whether increases in health service utilization differ by type of service. Does insurance increase the use of low-cost-effective services/providers or encourage the unnecessary use of higher-cost care? Chapters 7 and 8 of this, we conducted critical analyses of the design features of insurance schemes and their health system context to shed light on these questions in Zambia and Tanzania, respectively.

1.6 Impact on financial protection

The literature provides extensive evidence on the impact of health insurance on financial protection, but it paints a less clear picture of the evidence compared to its effects on service utilization. A systematic review of CBHI in low-income countries (Ekman, 2004) found positive evidence that the scheme provides some financial protection by reducing out-of-pocket spending. Similarly, another one on CBHI in LMICs, found that the program reduces out-of-pocket expenditure, catastrophic spending, household borrowing, and poverty (Habib

et al., 2016). A review of health insurance schemes in general also found that insurance in LMICs provides financial protection by reducing out-of-pocket payments (Spaan et al., 2012a, Ekman, 2004).

Nevertheless, three other reviews found different results (Erlangga et al., 2019, Escobar et al., 2011, Acharya et al., 2013). Acharya and colleagues (Acharya et al., 2013) found any evidence of an impact on financial protection. Erlangga and colleagues found mixed results whereby out of the 34 studies that assessed out-of-pocket expenditure, 17 reported a positive effect of reducing out-of-pocket spending, 15 found no statistically significant effect, and two found a negative effect (Erlangga et al., 2019). Another review also found that high-quality studies had mixed evidence on reducing out-of-pocket expenditure and catastrophic payments, while low and medium quality studies found a positive effect (Escobar et al., 2011). Using data from the 2002-2004 World Health Survey (WHS) for 42 LMICs, El-Sayed and colleagues found that 13 percent of those insured had ineffective insurance-defined as an insured person borrowing or selling personal items to pay for health services, having an untreated chronic condition or recently delivering a child outside of a skilled health facility (El-Sayed et al., 2018). Authors who found inconclusive evidence on financial protection suggested future research to understand the mechanisms by which the contextual factors and the design features of a health insurance scheme can affect out-of-pocket health spending.

1.6.1 Equity in health insurance

Some previous systematic reviews on health insurance have also examined the distributional impact of insurance. Escobar and colleagues found that the impact of health insurance on service utilization varies substantially across populations and across countries (Escobar et al., 2011). Some studies in their review reported that the most vulnerable group (low-income and rural population groups) benefit the most from increased service due to health insurance, while others found that increased service use was among the better off (Hidayat et al., 2004).

However, before assessing the distributional impact of health insurance, we need to take a step back and systematically review the evidence of who even gets the opportunity to enroll in health insurance. The existing literature shows that insurance enrollment is relatively low in LMICs, particularly in sub-Saharan Africa. However, even with the low coverage, it is crucial to determine which socioeconomic groups are enrolling, especially when evidence indicates that financial barriers to accessing health services disproportionately affect vulnerable groups. One review evaluated enrollment among different socioeconomic groups in CBHI programs (Umeh and Feeley, 2017). However, as Table 1 shows, many countries have scaled up health insurance to target their entire populations, unlike CBHI, which primarily targets the informal sector. Chapter 3 of this thesis will be a systematic review of enrollment into health insurance in LMICs.

1.6.2 Impact on quality of care

The section on service utilization presented above suggests that health insurance in LMICs does increase the use of health services. However, given the evidence of the poor quality of care in LMICs, it is essential to assess the quality of health services that individuals receive through health insurance. Increased use of poor-quality health services may result in ineffective care that cannot improve health outcomes. While access to

quality essential services is explicitly emphasized in the definition of UHC, quality of care is often neglected, and improving access and quality appear to be two competing priorities. It has been recognized that effective UHC cannot be achieved without the integration of quality (OECD et al., 2018; Rubinstein et al., 2018).

Previous systematic reviews on the impact of health insurance included quality of care as one of its outcomes but the authors did not explicitly conceptualize quality of care, or the indicators used in measuring the quality of care. For example, a review on CBHI reported no evidence that CBHI programs have an impact on the quality of care or lead to moral hazard that can affect service provision, but it did not mention how it conceptualized quality or what aspects of quality CBHI affected (Ekman, 2004). Another review that included quality of care reported "weak evidence" suggesting that CBHI and SHI have a positive impact on quality of care. They provided examples from studies of schemes in Kenya, Uganda, and Tanzania, which found that health insurance improved service quality through increased essential drug availability and shortened waiting times (Spaan et al., 2012a). A review specifically on maternal health found an inconsistent relationship between health insurance and the quality of maternal health services because of the different quality measures across studies and variation in the direction of the association (Comfort et al., 2013a).

The evidence from previous systematic reviews suggests that health insurance may not have a significant impact on quality of care. The examples provided by the authors suggest they conceptualized quality through service quality, but quality of care is multifaceted. Furthermore, the definition and evaluation of quality of care are equivocal and remain highly contested in the literature. Meanwhile, various frameworks have been developed to define and conceptualize quality of care. To the best of our knowledge, no systematic review on the impact of health insurance has paid critical attention to quality by using a framework to guide its evaluation of quality of care. This thesis in chapter 4 will systematically review the effects of health insurance on quality of care by using a framework to guide the evaluation of quality. Additionally, in chapters 7 and 9, I will examine the implementation of health insurance in Zambia and Tanzania from a quality lens.

1.7 Defining and conceptualizing quality of care

In this section, I present common frameworks that conceptualize quality of care. The definition and conceptualization of quality of care have evolved over the years. One well-known framework is the Donabedian model, published by Avis Donabedian in 1966 (Donabedian, 2005).The model conceptualizes quality of care along three organizational dimensions: structure, processes, and outcome. The structure dimension involves the attributes of the setting of care and inputs for the provision of services. Examples of structural indicators include facilities, equipment, staff training, and providers' knowledge. The process dimension comprises the technical quality of services, and interpersonal relations between providers and patients. The outcomes dimension involves the impact on patients such as reduced mortality, short hospital stays, reduced hospital-related infections, and overall patient satisfaction.

In 1990, the United States Institute of Medicine (IOM) study committee on quality defined quality of care as "the degree to which health services for individuals and populations increase the likelihood of desired health outcomes and are consistent with current professional knowledge." The institute then put forth a framework at

the turn of the twenty-first century for improving the quality of care through a health systems perspective(Institute of Medicine Committee on Quality of Health Care in, 2001). The framework has six aims stipulating that health care should be safe, effective, efficient, patient-centered, timely, and equitable.

Quality of care rose to the attention of the global health community, during the millennium development goals era, as international organizations geared towards improving maternal and newborn outcomes. The World Health Organization's quality of care framework for maternal and newborn health builds on the Donabedian model and the IOM framework by conceptualizing quality through a systems perspective (Tunçalp et al., 2015). The framework describes the health system as the structure or the foundation that enables access to quality care followed by two interlinked dimensions of processes of care (provision and experience of care). In 2018, the Lancet Global Health Commission on High-Quality Health Systems in the SDG era (HQSS) proposed a new framework for understanding quality health systems building on earlier frameworks of quality care (Kruk et al., 2018a). The commission proposed that improving the quality of care would require high-quality health systems. The framework of quality health systems includes three main domains: 1) foundations, 2) processes of care 3) quality impacts. (Figure 2).

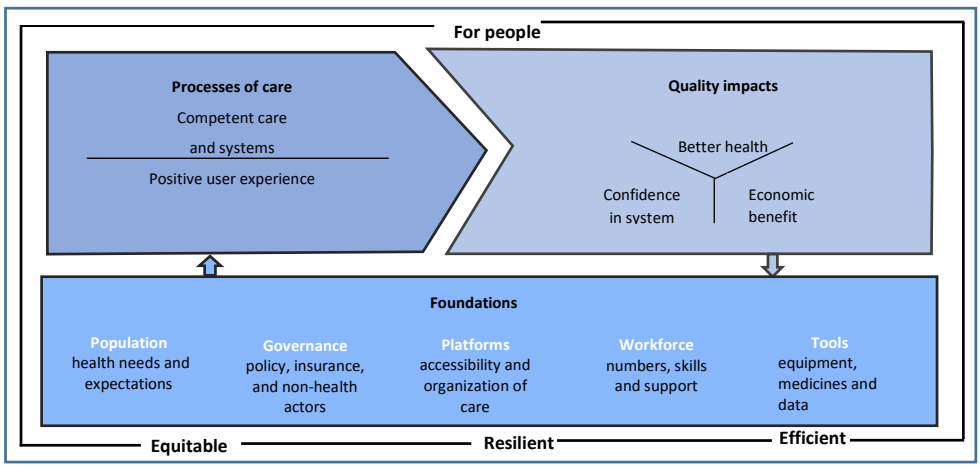

Figure 2: HQSS framework (Kruk et al., 2018a)

1. Foundations or inputs assert that populations must have agency over healthcare decisions and health. Additionally, they are vital in the health systems to push for accountability and transparency of health system performance. Populations' needs should also shape how health systems respond and deliver services. Furthermore, health systems need strong governance and financing to provide leadership, regulation, and oversight over policies and resources to achieve desired health outcomes. In many countries, service delivery is organized typically in three different platforms along community, primary, secondary and tertiary levels. The framework calls for a good facility and provider mix, quality-focused healthcare models, and functional connections between the various levels of care. A highly qualified health workforce, including managers and providers is also crucial to health systems. This workforce must have appropriate competencies to provide quality health services. Tools, such as medicines, equipment, and supplies, are essential to the health system. Additionally, attitudes and behaviors, including quality mindsets, supervision, and audits, are critical elements in the health system.

2. The second domain focuses on the processes of care, which includes competent care and systems and positive user experience. Competent systems focus on how to function to suit the needs of patients and their elements include safety, prevention and detection, continuity and integration, and timely care. In addition, competent systems prioritize the users of health services by focusing on the navigation of care, people's values and preferences, and waiting periods. They treat people with respect and communicate clearly in a dignified manner.

3. Finally, the quality impact domain comprises better health, such as reduced mortality and morbidity and other health-related indicators such as quality of life and well-being. Another impact is confidence in the system by users. This includes trust in health workers to provide high-quality care and uptake of care. The framework's measure of confidence goes beyond the classical measure of satisfaction with care and examines the extent to which people trust, and are willing to use health care or uptake policies. Finally, quality health systems can affect economic benefits by reducing the waste of unnecessary care as well as inappropriate health interventions. In addition, by improving health outcomes, quality health systems can increase work and school productivity.

The framework recommends measuring quality health systems using quality impacts and processes of care. They argue that the foundations of quality health systems such as medicines and qualified health workers are important, but their presence do not necessary lead to quality impacts.

Donabedian model is the framework that will be used in chapter 4. The HQSS framework will guide the analysis of quality in chapters 6, 7 and 9.

1.8 Previous studies on the implementation of health insurance and quality of care in LMICs

The evidence from previous systematic reviews suggests variability in the impact of health insurance on quality of care. Few studies have explored the factors that have affected the implementation of health insurance with its influence on quality of care.

In Thailand, a study on its Universal Coverage Scheme (UCS) showed that geographical monopoly by the district health system (DHS) network prevented a strict contractual agreement conditional on quality (Tangcharoensathien et al., 2015). This restriction led to a strategy to introduce a quality incentive scheme and a stepwise quality improvement initiative in collaboration with the national accreditation body that resulting in an increased number of health facilities meeting national standards for quality. Furthermore, the effective referral policy to tertiary care and specialized health centers ensured continuity of care.

In China and Vietnam, studies have examined how the design features of its insurance systems have resulted in inefficient purchasing and provider incentives (Yip et al., 2019, Li et al., 2011, Li and Fu, 2017, Ha et al., 2021). One study in China suggests that government agencies as purchasers underutilized their bargaining power whereby providers received excessive rates and provided limited monitoring of service quality (Li et al.,

2011). Additionally, in both countries, the use of fee-for-service payment stimulated strong incentives for providers to over-deliver services driven by profits (Ha et al., 2021, Li et al., 2011).

In Ghana, a review of its NHI showed that the introduction of the insurance increased pressure on already limited staff and health infrastructure, which resulted in long waiting periods, differential treatment of NHI clients and non-NHI clients, poor quality of drugs, and enrollees' dissatisfaction with the NHI (Alhassan et al., 2016). Other studies from Ghana reported that long delays in reimbursement of claims affected the operation of accredited NHI facilities to the extent that facilities could not purchase essential medical supplies such as medicines and equipment or pay their casual health workers to facilitate service delivery (Akweongo et al., 2021, Agyepong et al., 2016). The long delays in reimbursement have been attributed to administrative capacity, technical and human resource challenges in claims submission, vetting processing, and reimbursement (Akweongo et al., 2021, Wang et al., 2017, Sodzi-Tettey et al., 2012).

The findings from these studies reveal how the design features of health insurance and the contextual factors can affect the implementation of insurance for quality of care. However, the evidence in the literature has been from selected countries such as Ghana, Thailand, China, and Vietnam. Meanwhile, countries such as Ethiopia, Burkina Faso, and Malawi are contemplating scaling up health insurance are low-income, and their health system contexts are significantly different from countries like China and Thailand. Chapters 5-9 of this thesis will examine the factors that have influenced the implementation of health insurance in Tanzania and Zambia and how these insurance programs can influence access to quality care.

1.9 Quality of care and health insurance enrollment

With the low health insurance coverage in LMICs, particularly in sub-Saharan Africa, many studies have been conducted to determine the factors related to low enrollment rates. Evidence in the literature suggests there is a bidirectional relationship between health insurance and quality of care in that not only can health insurance influence quality of care, but also quality of care can be a determinant of insurance enrollment. Studies in Ethiopia have consistently found that perceived poor quality of care is a major determinant of CBHI enrollment status (Nageso et al., 2020, Abdilwohab et al., 2021, Fite et al., 2021). Studies in Ghana have also found similar findings of perceived poor quality associated with insurance enrollment (Amo-Adjei et al., 2016). Many of these studies on the perceived quality of care and insurance enrollment often measure quality of care using respondents' perception of quality from the last health visit.

Few studies have gone beyond examining individuals' perceptions about system-related factors such as confidence in the health system and perceptions of the government and health insurance enrollment. A qualitative study in Vietnam found that one of the reasons people were uninsured was due to the perceived poor quality of the public health system and the private sector not being included in the health insurance (Dao, 2020). In Chapter 6, this thesis will adapt the HQSS framework to assess quantitatively the association between confidence in the health system and health insurance enrollment among the informal sector in Lusaka, Zambia.

1.10 Selection of Tanzania and Zambia as case studies

The Republic of Tanzania and Zambia were selected as case studies for this thesis because they recently implemented health financing reforms using health insurance-shown in Table 1. They are comparable in terms of their health system challenges but have distinct features, including health financing and service delivery functions. Furthermore, we know anecdotally that Tanzania's National Health Insurance Fund (NHIF) is one of the NHI which Zambia drew lessons from in designing its NHI. I will present the analysis of the two countries separately, and in the final chapter of the thesis, I will conduct a comparative analysis of the implementation of their health insurance.

1.11 Overview of the health sector in Tanzania and Zambia

1.11.1 Key health performance

The table below illustrates the key performance indicators for Tanzania, Zambia, and SSA. The HIV epidemic in the early 1990s significantly affected the life expectancy of Zambia, but it has gradually improved, and in 2020, it was comparable to its counterparts. In all the countries, maternal and under-five mortalities have steadily declined, but Tanzania and Zambia are behind in these indicators, respectively. However, for the UHC indicators, Zambia is performing well relatively compared to the other three countries. Tanzania has the highest proportion of catastrophic health spending among the four countries and spends the least on health in terms of current health expenditure.

Table 2: Key health indicators for SSA, Tanzania and Zambia

Indicators	SSA			Tanzania			Zambia		
	2000	2010	2020	2000	2010	2020	2000	2010	2020
‡Life expectancy at birth, total years	51	57	61	52	60	66	45	57	62
‡Under –five mortality (per 1,000 live births)	151	101	73	130	72	49	156	79	61
‡Maternal mortality ratio (per 100, 000 live births)	870	626	534*	854	664	524*	528	305	213*
‡Neonatal mortality rate (per 1,000 live births	40	32	27	34	25	20	34	26	24
	2000	2010	2019	2000	2010	2019	2000	2010	2019
‡Current health expenditure per capita, PPP(current international $)	17	74	75	13	38		24	55	69
†UHC service coverage index (out of 100 points)	24	34	45	19	41	46	30	45	55
†Catastrophic health spending (at 10% of total household income or consumption)			1.3*			4.3*			0.3*

***Most recent year available. Source: ‡(World Bank, 2023) †(World Health Organization et al., 2021)**

Tanzania and Zambia are battling a double burden of communicable and non-communicable diseases, as shown in Table 3. Communicable diseases such as malaria, HIV/AIDS, and tuberculosis are still burdens in

both countries. Non-communicable diseases (NCDs) such as stroke, ischemic heart diseases, and diabetes are slowly rising in both countries (Gouda et al., 2019). In Zambia, cardiovascular diseases have increased from the seventh to the fifth cause of mortality (Zambia Ministry of Health, 2017a). In 2016, NCDs accounted for 33 percent of all deaths in Tanzania, while the prevalence of hypertension among Tanzanian adults between the ages of 25-64 years is about 25 percent (Kagaruki and Mayige, 2013). Many of the risk factors for deaths and disability in both countries, as shown in table 3 are behavioral risks such as malnutrition, tobacco, and unsafe sex.

Table 3: Burden of diseases in Tanzania and Zambia

Ranking	***Causes of death and disability***		***Risk factors***	
	Tanzania	**Zambia**	**Tanzania**	**Zambia**
1	Neonatal disorders	HIV/AIDS	Malnutrition	Malnutrition
2	HIV/AIDS	Stroke	Air pollution	Unsafe sex
3	Lower respiratory infection	Neonatal disorders	Unsafe sex	Air pollution
4	Stroke	Lower respiratory infection	WaSH	WaSH
5	Tuberculosis	Tuberculosis	High blood pressure	Alcohol use
6	Ischemic heart disease	Diarrheal diseases	Tobacco	High blood pressure
7	Malaria	Ischemic heart diseases	Alcohol use	High body mass index
8	Diarrheal diseases	Malaria	High body-mass index	Dietary risks
9	Congenital defects	Cirrhosis	High fasting plasma glucose	High fasting plasma glucose
10	Diabetes	Diabetes	Dietary risks	Tobacco

WaSH: Water and Sanitation Hygiene Source: (Institute for Health Metrics and Evaluation (IHME), 2019)

1.11.2 Organization of their health systems

In Tanzania, the primary health service providers are the government, faith-based missions, and the for-profit private sector, with the government being the largest service provider. Within the public health sector, health services are offered at the primary healthcare level (community-based services, dispensaries, health centers, and district hospitals), followed by regional and national referral hospitals. Primary health care consists of community services by community health workers who provide promotive and preventive services. The next level is dispensaries, which deliver exclusively outpatient services, and health centers, which provide a broad range of services, including inpatient services. District hospitals provide services such as internal medicine, pediatrics, obstetrics/gynecology, and general surgery. Regional referral hospitals provide specialized care, and national referral hospitals deliver highly advanced care and are teaching hospitals for the training of health professionals.

The health system in Tanzania is highly decentralized. The President's Office of the Regional Administration and Local Government (PORALG) oversees all public services at regional and district/council levels including

health services. The Ministry of Health, Community Development, Gender, Elderly and Children (MoHCDGE&C) is the technical lead on national health policy setting and stewardship.

Similar to Tanzania, the primary health service providers in Zambia are the government, not-for-private faith-based missions, and for-profit private providers with the government being the largest service provider. The public health sector comprises three levels: 1) district level where primary health care services are delivered through health posts, health centers and level-1 hospitals; 2) provincial level consists of Level-2 hospitals that provide services in internal medicine, pediatrics, obstetrics/gynecology, and general surgery; and 3) the national level which includes level 3 and specialized hospitals such as the cancer diseases hospital (Zambia Ministry of Health, 2018).

1.11.3 Health Financing

There have been various health financing reforms to increase additional resources in Tanzania (Mtei et al., 2007). In 1994, user fees were introduced in all health facilities ending the policy of free health care provision for all health facilities since the country's independence. In 1999, the National Health Insurance Fund (NHIF) was established as a mandatory scheme for public sector employees through payroll deductions. NHIF members contribute 6% of their salaries, with an equal contribution by employers and employees. In 2001, the Community Health Insurance (CHF) Act established the CHF for the informal sector and rural populations. In 2009, Tiba Kwa Kadi (TIKA) was established with the same aim as CHF targeting urban populations. Another crucial health financing reform was direct health facility financing (DHFF) in 2013, whereby facilities receive their block grants directly from the Ministry of Finance (MoF), as shown in Figure 3.

The two largest sources of health expenditure are the government and donors. According to the World Bank's public expenditure review, expenditures by government and donors as a percent of the total public health expenditures in 2017 were about 40 percent and 59 percent. Health spending from health insurance schemes, and user fees, although increasing, made a small contribution to the total public health expenditure. NHIF and CHF/TIKA provided an equal share of 0.3 percent of the total public health expenditure, while user fees contributed 0.3 percent.

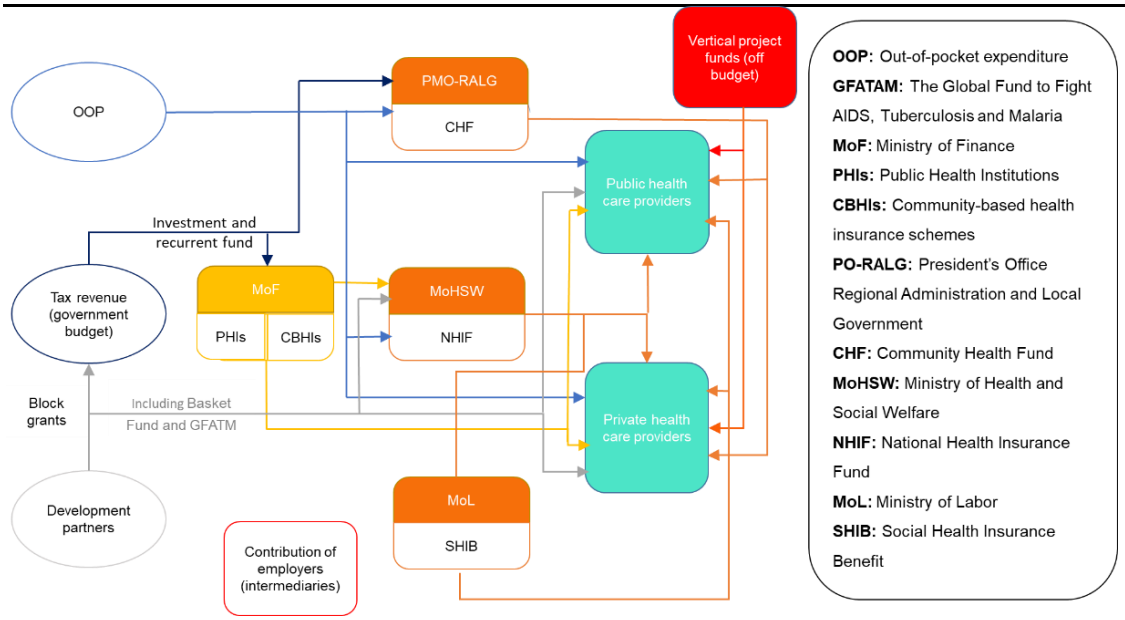

Figure 3: Current health financing structure of Tanzania (Ministry of Health, 2016)

The aim to improve the well-being of its population has been at the forefront of the policy reform agenda. The Ministry of Health's vision of "to *provide equity of access to cost-effective quality health care as close to the family as possible"* has been consistent. This vision led to various organizational and financing reforms over the last three decades, as shown in Table 3. One significant reform was the establishment of the Central Board of Health (CoBH) to purchase health services through performance-based contracting (PBC) in 1996. The central board and PBC were dissolved and the Ministry of Health resumed role as provider and purchaser. Another major health reform includes the removal of user fees introduced in 1993 at the entire primary level of public health facilities in 2012. Finally, in 2018, the government passed the NHI Act that establishing a mandatory national health insurance scheme in Zambia.

The NHI consequently introduced a new financing source for health expenditure (Figure 4). Similar to Tanzania, the two largest financing sources in Zambia are the government and donors. The health sector is highly dependent on external funding, with donors contributing 42 percent to the total current health expenditure (CHE) (Zambia Ministry of Health, 2018). However, donor contribution has decreased over the years and nearly 70 percent of the donors' contributions are earmarked for specific programs and diseases, and they are off-budget from the Ministry of Finance. Out-of-pocket spending by households was about 12 percent of the total CHE, while CHE from the government was 38 percent of the total CHE (Zambia Ministry of Health, 2018). Public health institutions are financed through monthly operational grants from the MoF, and these grants are based on a resource-allocation formula. Hospitals can generate additional funding through 'high-cost' services whereby patients pay for shorter waiting times, non-generic drugs, and extra amenities for inpatient services.

Table 4 Kev health system reforms in Zambia

Period	Organization	Finance	Financing Modality
1992-1993	Devolution of health services	Pooling of government and donor funds for districts	
	Sector-wide approach introduced	Medical user fees introduced with exemptions for the poor	Country-wide performance based contracted
1995-1996	Provider-purchaser split with the creation of CBoH as an autonomous institution responsible for purchasing health services	Basic health care package	
		Population-based resource allocation formula	
2003-2004	Reorganization of sector-wide approach program coordination mechanisms	Needs-based resource allocation formula	
		Introduction of medical levy	
2006-2007	Dissolution of CBoH-MoH resumes role of provider, purchaser and regulator	Some donors move from pooled funding at MoH to general budget support at Ministry of Finance	Performance-based contracting discontinued
		User fees removed in all rural areas (2006) and per-urban areas (2007)	
2011-2013	Transfer of primary health care function from MoH to the Ministry of Community Development	Medical user fees removed at the entire primary health care level	Results-based financing (RBF) in 11 districts
		Medical levy abolished	
2015-2017	Remerge of the primary health care function to MoH		RBF in 53 districts in five out of 10 districts
2018-2020		National Health Insurance Act	RBF ended

***(Chansa, Forthcoming)**

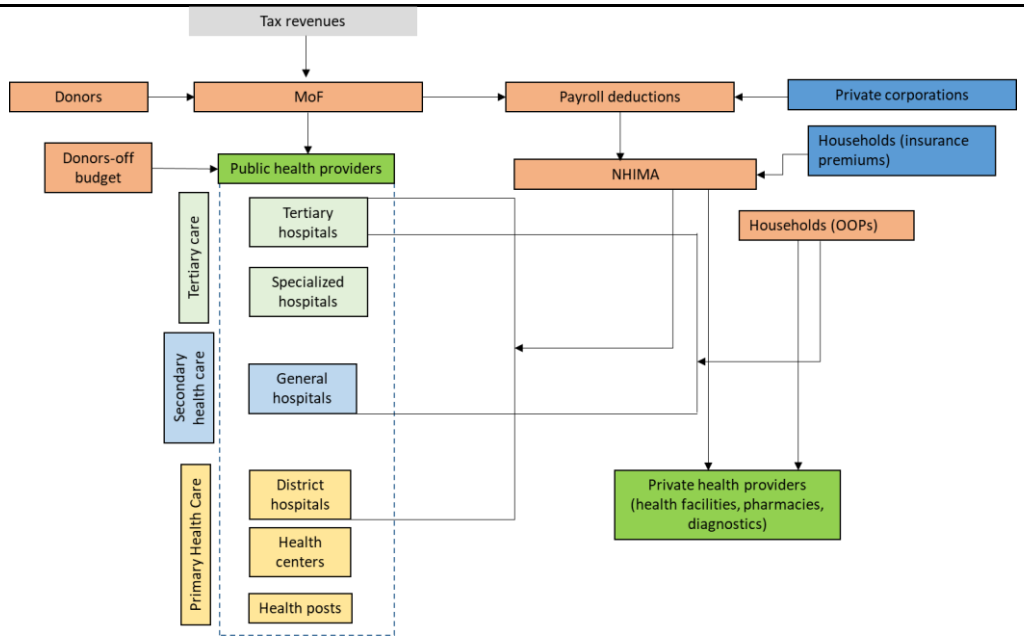

Figure 4: Author's elaboration of the new health financing structure in Zambia with the introduction of NHI

Chapter 2 Aim and objectives

2.1 Aim

Building on the previous evidence in the literature on health insurance, the aim of this PhD thesis is to provide new evidence regarding the impact of the current scale up of health insurance in low and middle-income countries on equitable access to quality services.

2.2 Objectives

Given the above aim, the specific objectives are:

1) To systematically review the literature to assess the extent to which current health schemes reach the poor and vulnerable groups in LMICs (Chapter 3)
2) To evaluate the existing literature on the effectiveness of health insurance in improving quality of care in low-income countries (Chapter 4)
3) To determine the health care seeking behavior of urban households within the Zambia health system context (Chapter 5)
4) To examine the extent to which confidence and trust affect enrollment into the Zambia NHI (Chapter 6)
5) To critically examine broader health system and the purchasing dimensions of the Zambia NHI and its implications for quality of care (Chapter 7)
6) To explore governance factors that influence the implementation of the health financing reforms in Tanzania (Chapter 8)
7) To explore NHIF's role in improving access to quality care services in Tanzania (Chapter 9)

I conclude this thesis with a discussion and conclusion in Chapter 10.

Chapter 3 Equity in health insurance schemes enrollment in low and middle-income countries: A systematic review and meta-analysis

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3.1 Abstract

Background: Ensuring access to essential quality health services and reducing financial hardship for all individuals regardless of their ability to pay are the main goals of universal health coverage. Various health insurance schemes have been recently implemented in low- and middle-income countries (LMICs) to achieve both of these objectives. We systematically reviewed all available literature to assess the extent to which current health insurance schemes truly reach the poor and underserved populations in LMICs.

Methods: In the systematic review, we searched on PubMed, Web of Science, EconLit and Google Scholar to identify eligible studies. which captured health insurance enrollment information in LMICs from 2010 up to September 2019. Two authors independently selected studies, extracted data, and appraised included studies. The primary outcome of interest was health insurance enrollment of the most vulnerable populations relative to enrollment of the best-off subgroups. We classified households both with respect to their highest educational attainment and their relative wealth and used random-effects meta-analysis to estimate average enrollment gaps.

Results: 48 studies from 17 countries met the inclusion criteria. The average enrollment rate into health insurance schemes for vulnerable populations was 36% with an inter-quartile range of 26%. On average, across countries, households from the wealthiest subgroup had 61% higher odds (95% CI: 1.49 to 1.73) of insurance enrollment than households in the poorest group in the same country. Similarly, the most educated groups had 64% (95% CI: 1.32 to 1.95) higher odds of enrollment than the least educated groups.

Conclusion: The results of this study show that despite major efforts by governments, health insurance schemes in low-and middle-income countries are generally not reaching the targeted underserved populations and predominantly supporting better-off population groups. Current health insurance designs should be carefully scrutinized, and the extent to which health insurance can be used to support the most vulnerable populations carefully re-assessed by countries, which are aiming to use health insurance schemes as means to reach their UHC goals. Furthermore, studies exploring best practices to include vulnerable groups in health insurance schemes are needed.

Registration: Not available
Keywords: Health insurance, Low Income Population, Indigents Developing countries

3.2 Introduction

Improving equity in service utilization and ensuring financial protection for all individuals regardless of their ability to pay are key objectives within the global Universal health coverage (UHC) goals. Universal health

coverage is of critical societal importance both in high- and in low-income settings, where inequalities between the rich and poor seem particularly large (McIntyre et al., 2008, McIntyre et al., 2018). Health insurance schemes are currently receiving increased attention globally not only as a health financing mechanism but also as a strategy to achieve universal health coverage (Kutzin et al., 2016) and as a means to reduce inequities between population groups (Carrin et al., 2005).

In the absence of clear international guidelines, many low-and middle-income countries (LMICs) have started implementing a mix of social, national and community based/mutual health insurance schemes over the past 15 years. Traditional social health insurance, which originated in Europe, uses earmarked payroll taxes from the formal sector as part of its health financing arrangements. Despite the generally small size of the formal sector, this type of health financing scheme has been adapted in many low-income settings, particularly in sub Saharan Africa (Yazbeck et al., 2020). For example, in 2018, Zambia, which has an informal sector of almost 90%, passed the National Health Insurance bill, which uses payroll taxes to improve access to quality health care for all its citizens (Tassot et al., 2019, Government of Zambia, 2018a). To extend health insurance coverage for those self-employed and the informal sector, community-based health insurance (CBHI) or mutual health insurance (MHI) have also emerged at various scales in Rwanda, Nepal, India, Burkina Faso, Cameroon, Mali and Senegal. CBHIs and MHI are typically voluntary schemes which target the informal sector and self-employed and their funds are pooled at the community level. Some countries such as Vietnam, Mexico and Peru have established noncontributory schemes using general tax revenues aimed at those not covered by social security schemes (Dmytraczenko, 2015). For example, in Thailand, there are three main health financing arrangements - a social security scheme for private formal sectors, a civil servants' medical benefit scheme for civil servants and their families and a UHC scheme for those not affiliated with the other two schemes (World Health Organization, 2019).

Current evidence of the impact of health insurance schemes in LMICs suggests some positive effects of insurance rollout on UHC goals (Erlangga et al., 2019, Adebayo et al., 2015, Lu et al., 2012, Spaan et al., 2012a, Acharya, 2013). Two recent reviews suggest that the reduction of financial barriers through CBHI and social health insurance improve service utilization and can protect its members from out-of-pocket expenditure (Spaan et al., 2012a, Wiysonge et al., 2017). While these average impacts of health insurance schemes are certain, the extent to which these programs succeed in improving health and wellbeing of the most underserved population groups remains unclear (Wagstaff and Pradhan, 2005, Wagstaff, 2010b). Knowledge and awareness of insurance programs, distance to health facilities, and payments associated with insurance schemes have been shown to be critical predictors of health insurance enrollment(Fenny et al., 2018). Meanwhile, these predicators might also undermine access of the most underserved groups to health insurance schemes.

In this manuscript, we systematically reviewed the literature on health insurance enrollment in LMICs to assess the extent to which current health insurance schemes reach poor and underserved populations.

3.3 Methods

Study Design

This study was designed as a systematic review and a meta-analysis of studies assessing the extent to which the most vulnerable populations are currently covered by health insurance schemes. We define vulnerable populations as the lowest group within the socioeconomic context (i.e., income, wealth quintile and education status in a country).

Eligibility criteria

This review included randomized controlled trials, quasi-experimental, and observational studies related to health insurance enrollment in LMICs. The classification of countries as LMICs was based on the World Bank classification of per capita gross national income in 2019 (GNI per capita of $1,026 or less for low-income countries, GNI per capita between $1,026 and $3,995 for lower middle income countries and for upper-middle income countries, the GNI per capita was $3,996-$12,376) (The World Bank, 2019). We focused on studies that allowed the comparison of health insurance enrollment across groups with different socioeconomic status (income, wealth quintile, education status). We included health insurance schemes funded by the government including noncontributory health insurance and social health insurance schemes. Due to the popularity of community-based health insurances and mutual health insurances in LMICs, studies on such programs were included independent of their implementation scale. We restricted the studies to those published in English.

Studies were excluded if they only graphically displayed group differences in insurance enrollment. We also excluded papers exclusively focusing on private health insurance from the review. Studies which did not allow us to determine the type of health insurance (national, community-based, or private insurance schemes) were excluded.

Search strategy

We conducted electronic searches from June 2019 to October 2019 in PubMed, Web of Science, EconLit (for economics literature) and Google Scholar. The search strategy relied on keywords from a combination of medical subject headings and free text including terms such as “health insurance”, “socioeconomic status”, “enroll” and “reach”. We filtered the search to studies published between January 2010 and September 2019 and were conducted in LMICs. We focused on studies published from 2010 since other systematic reviews on health insurance focused on earlier years (Spaan et al., 2012a). The search strategy for PubMed is shown in Table S1.

Study selection and data extraction

Two independent authors screened all titles and abstracts of the initially identified articles to determine their eligibility for the inclusion criteria. The last author assisted in resolving any disagreement through a third review and after discussion with the review team. In the next phase, full articles were independently assessed for eligibility.

Two authors also independently extracted study information including type of scheme and its details, study design, year of data collection, relative enrollment rates of the poorest and least educated

populations, type of point estimate and point estimate of enrollment for highest wealth and education groups compared to the lowest groups. Data were also extracted for non-overlapping populations (e.g. female vs male, urban vs rural). For studies that reported more than one adjusted point estimate, results from the least adjusted model were extracted in order to measure absolute enrollment gaps as consistently as possible.

Quality assessment

In order to assess study quality and risk of bias, we adapted the National Institutes of Health (NIH) quality assessment tool for cross-sectional and case studies (National Health Lung and Blood Institute, 2021) . The tool contains fourteen parameters addressing internal and external validity concerns such as sample size justification, adjustment of potential confounding variables and participation rate of eligible persons. Given that we were primarily interested in absolute enrollment rates by population group rather than adjusted models, we removed items on the checklist related to confounding and analytical biases and added two questions on representativeness of the data set used, which we deemed to be of critical importance for our analysis.

Data analysis

There were two stages in the analysis. First, we computed average enrollment rates of the poorest subpopulation as well as the absolute gaps in enrollment rates between the best-and worst-off subpopulations. In the second stage, we used random effects meta-analysis to analyze the odds of health insurance enrollment of the group with lowest socioeconomic status relative to the subgroup with the highest socioeconomic status.

Given that multiple enrollment estimates were available for some countries, we first used random-effects meta-analysis to aggregate individual study estimates into a single pooled country estimate, and then conducted country-level meta-analysis using either the pooled estimate from the first step, or, for countries where only one study was available, the single country estimate. We assessed heterogeneity for adjustment in point estimates through subgroup analysis of those studies, which had adjusted vs non-adjusted odds ratio. We conducted all meta-analyses using STATA version 16 and illustrated results using forest plots.

3.4 Results

Search for studies

Figure 5 summarizes the main search process and results. Electronic searches of the four databases identified 1072 studies. After removing duplicates, 824 studies remained. 644 studies were excluded based on abstract and title review. There were 180 full text articles assessed for eligibility. Six studies were identified to be eligible for full-text assessment but they could not be retrieved. Hundred twenty-six studies did not report key variables of interest resulting in a final set of 48 studies.

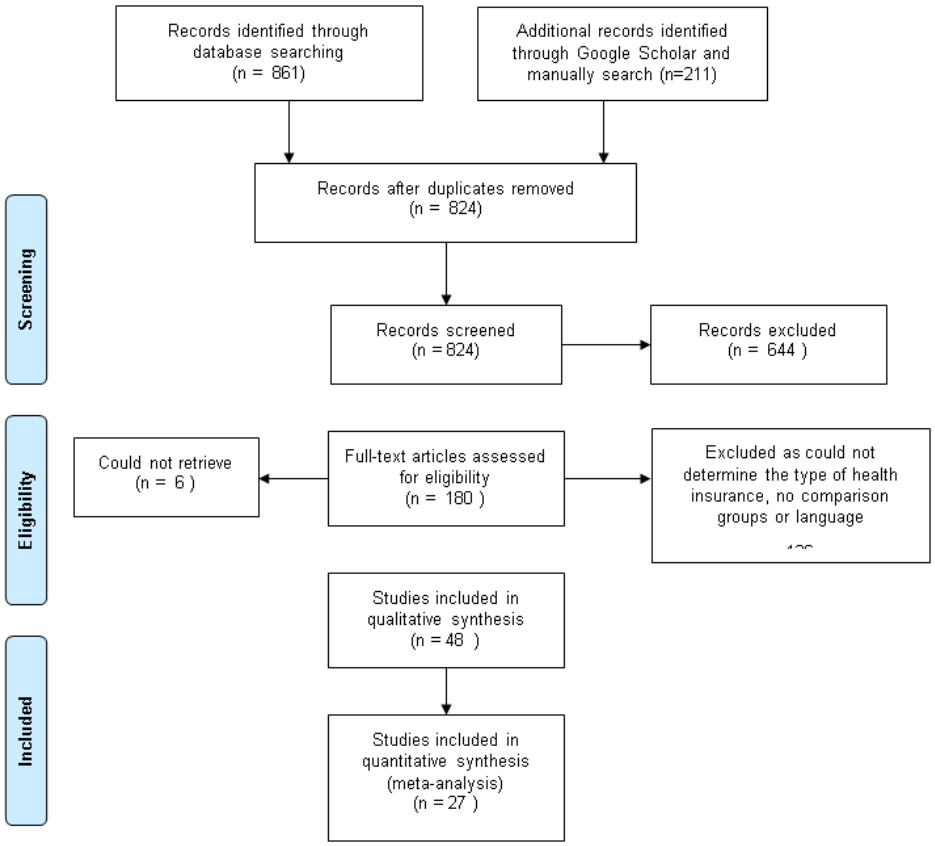

Figure 5: Flowchart of literature search

Characteristics of included studies

Almost all the studies (46/48) analyzed were single-country analyses (Table S2). Thirty-four of the single-country studies were from Sub-Saharan Africa. Notably, 23 studies were from Ghana, two studies each from Rwanda, South Africa, Burkina Faso and Tanzania, one study each in Kenya, Cameroon and Senegal. Twelve studies were conducted in Asia: three studies were from India, two studies each in Vietnam and Bangladesh and one study in Nepal, Laos, China, Sri Lanka, and Iran. There was only one study from South America (Colombia). One study analyzed both Ghana and Senegal (Parmar et al., 2014a). Most of the studies (39/48) were published on from 2014-2018.

More than half of the studies (31/48) used primary data while the rest used representative household survey data. With regards to the primary outcome of interest, 39 studies examined health insurance enrollment by various education groups and 44 studies by wealth groups. For education, most studies (31/39) had four education categories: no formal education, primary education, secondary education, or higher education. For these groupings, enrollment rates were compared between those without any formal education and then those with a secondary or higher education. For income or wealth, majority of the studies (36/44) grouped households into quintiles and then enrollment rates were compared between the richest and poorest subgroups.

Types of schemes and their policies for vulnerable groups

The included papers focused on 29 health insurance schemes in 17 countries as shown in Table 5 Most of the schemes (20/29) were implemented by either the central or sub-national government. The remaining 10 schemes were mutual or community health funds in which eight were organized by not-for-profit organizations and the other two by a research organization, and a health cooperative. Of the 25 schemes in which their year of establishment was reported by the studies, 21 were launched before the year 2010.

Table 5: Characteristics of schemes

Name of Scheme	Insurance Type	Country	Year	Entity responsible for scheme	Targeted Groups	Policy for Vulnerable groups
Amader Shasthya (Mahmood et al., 2018)	MHI	Bangladesh	2012	Research Organization	Chakaria sub district residents	Subsidy rate for the bottom 20% of the population
Labor Association for Social Protection (Sarker et al., 2017)	MHI	Bangladesh	NR	Cooperative	Informal sector	NR
Assurance Maladie à Base Communautaire (Cofie et al., 2013, Parmar et al., 2014a)	CBHI	Burkina Faso	2004	District Government	Nouna District residents	Reduced premium for the poorest
Bamenda Ecclesiastical Provincial Health Assistance (Oraro et al., 2018)	CBHI	Cameroon	NR	NPO	Residents of Bui and Donga-Mantung administrative divisions of North-West Cameroon	NR
New Rural Cooperative Medical Scheme (Jin et al., 2016)	SHI	China	2003	Central Government	Rural population	NR
Urban Employee Basic Medical Insurance (Jin et al., 2016)	SHI	China	1990	Central Government	Urban Employees	NR
Urban Resident Basic Medical Insurance (Jin et al., 2016)	SHI	China	2007	Central Government	Urban non-employees including adolescents and children	NR
Contributory social health insurance(Ruiz Gomez et al., 2013)	SHI	Colombia	NR	Central Government	Formal sector and their dependents	None
Subsidized Regime (Ruiz Gomez et al., 2013)	NCS*	Colombia	NR	Central Government	Low-income populations	Subsidies for lower-income populations
Ghana National Health Insurance (Fenny, 2017, Akazili et al., 2014, Dixon et al., 2011, Dixon and Luginaah, 2014a, Amo, 2014, Kotoh et al., 2016, Jehu-Appiah et al., 2011, Duku et al., 2015, Kusi et al., 2018, Kumi-Kyereme et al., 2013, Amu and Dickson, 2016, Sarpong et al., 2010a, Seddoh and Sataru, 2018, Van der Wielen et al., 2018c, Khalid, 2017, Boateng and Awunyor-Vitor, 2013, Manortey et al., 2014, van der Wielen et al., 2018a, Kuuire et al., 2017, Parmar et al., 2014d)	SHI	Ghana	2003	Central Government	Whole Population	Exemptions for indigents, elderly, children
Jeevan Sanjivani(Panda et al., 2014)	MHI	India	2011	NPO	Kanpur Dehat Residents-rural area (among the poorest states in India)	NR

Rashtriya Swasthya Bima Yojana(Ghosh, 2014)	SHI	India	2008	State Government	Households below poverty level	NR
Sanjivani(Panda et al., 2014)	MHI	India	2011	NPO	Pratapgarh Residents- rural area (among the poorest states in India)	NR
Swastha Kamal(Panda et al., 2014)	MHI	India	2011	NPO	Vaishali Residents- rural area (among the poorest states in India)	NR
Iran Health Insurance Organization(Nosratnejad et al., 2016b)	SHI	Iran	NR	Central Government	Formal civil servants, informal and self-employed, residents of rural areas and small towns and minorities	Compulsory enrollment for groups that receive government subsidies
National Hospital Insurance Fund(Oraro and Wyss, 2018)	SHI	Kenya	1967	Central Government	Whole Population	100% subsidy through the Health Insurance Subsidy Program for the Poor
Community Health Fund(Alkenbrack et al., 2013)	CBHI	Laos	2001	Central Government	Self-employed & Informal sector	NR
Chandranigahapur Hospital of Rautahat district CBHI scheme(Adhikari et al., 2019)	CBHI	Nepal	2005/06	Central Government	Catchment area of Chandranigahapur Hospital	Subsidy rate
Mutuelle de santé (Finnoff, 2010, Lu et al., 2012)	CBHI	Rwanda	1999	Central Government	Informal sector and rural population	Poorest 16% exempted from premium payment
Ndondol(Mladovsky et al., 2014)	CBHI	Senegal	2001	NPO	Informal and agricultural population	NR
Plan Sesame (Parmar et al., 2014d)	NCS	Senegal	2006	Central Government	Older Population	NR
Soppante (Mladovsky et al., 2014)	CBHI	Senegal	1997	NPO	Informal sector	NR
Wer Ak Werle(Mladovsky et al., 2014)	CBHI	Senegal	2000	NPO	Informal traders	NR
Government Employees Medical Scheme (Goudge et al., 2018, Govender et al., 2013)	SHI	South Africa	2005	Central Government	Civil servants	Subsidy for low-income members
Multiple Micro-Insurance Companies(Bendig and Arun, 2011)	MHI	Sri Lanka	NR	NPO	Poor households	NR
Community Health Fund(Macha et al., 2014a)	CBHI	Tanzania	2001	District Government	Rural Informal Sector	Exemptions for poor households
Compulsory Health Insurance(Nguyen and Leung, 2013)	SHI	Vietnam	1993	Central Government	Civil servants, formal sector, pensioners, children below six years	NR
Health Care for the poor(Nguyen and Leung, 2013)	NCS	Vietnam	2003	Central Government	Poor & ethnic minorities	100% subsidy for the poor
Student Health Insurance(Nguyen and Knowles, 2010)	SHI	Vietnam	1995	Central Government	Students	None

* NCS-Non-contributory scheme, NPO-Not-for-profit Organization, NR-Not reported, SHI-Social Health Insurance

A majority of the schemes (25/29) were designed to target specifically the informal sector, poor households, and rural populations and/or provide either premium subsidization or exemption to vulnerable populations. Among these 25 schemes, three (Health Care for the poor in Vietnam, Subsidized Health Insurance in Colombia, and the Kenya National Hospital Insurance Fund) were established to provide 100% subsidy to the poor. The other five schemes were implemented by the central government, which are targeted for specific groups such as the formal sector, students, and urban residents.

Health insurance enrollment rate among the most vulnerable groups

The enrollment rate into any type of health insurance scheme among the most vulnerable population group was 36% on average with an inter-quartile range of 28%. The enrollment rate varied from 10.3% in a district mutual fund in Burkina Faso to 87.8% in the subsidized regime of Colombia' social health insurance which targets the poor (Figure 6). Furthermore, households in the lowest wealth or income quintile were on average 19 percentage points less likely to enroll compared to households in the highest socioeconomic group (Figure S1).

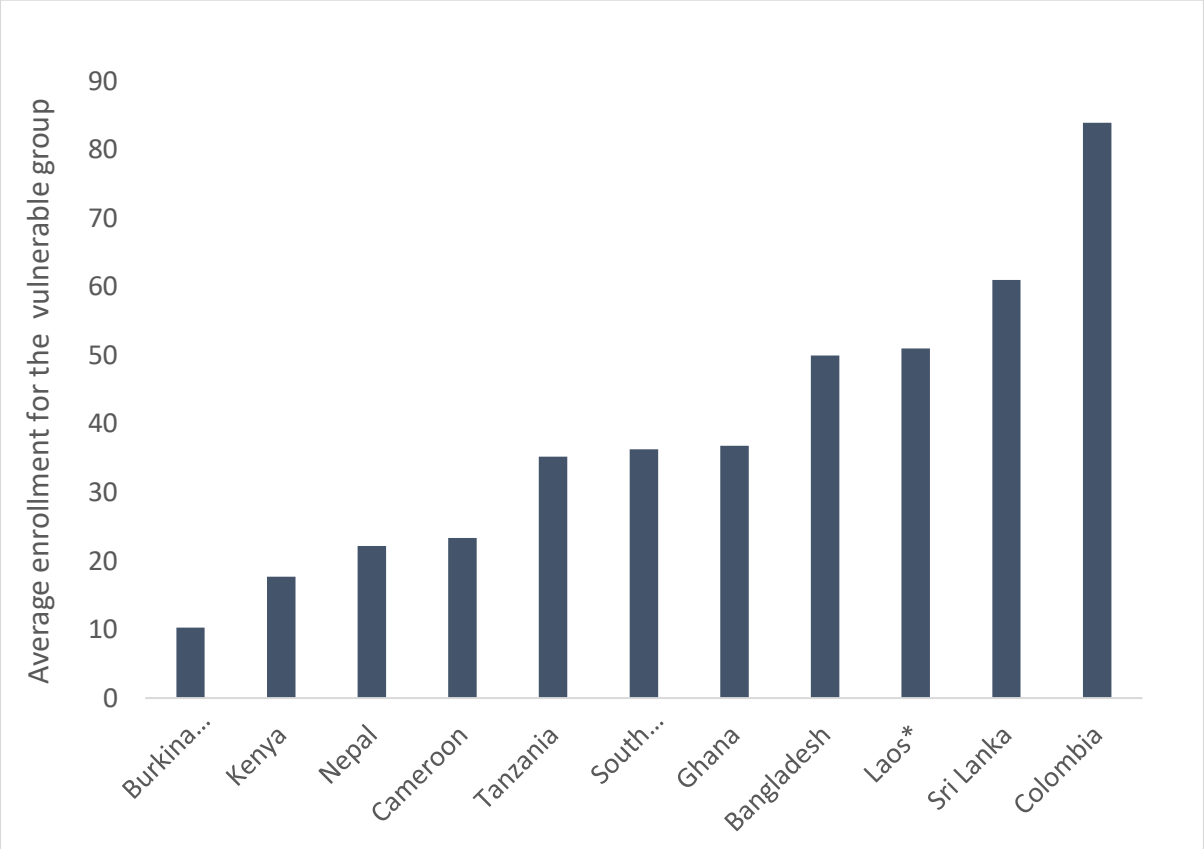

Figure 6: Average household enrollment rate for the vulnerable population by country

Notes: Enrollment rates correspond to reported enrollment rates in the lowest wealth quintile with the exception of Laos and South Africa, where data was only available for the lowest education (no formal education) group

After data extraction, a total of 31 studies from 13 countries reporting odds ratio or logit coefficient comparing highest and lowest groups for wealth and education in health insurance enrollment were included in the meta-analysis. For wealth status, point estimates of the relative insurance enrollment were available from 28 studies covering 12 countries (Figure 7). Multiple point estimates were available for Bangladesh, Cameroon, Ghana, India, and Kenya. Figure S2 shows the results of the random effect meta-analysis used to create a single country-specific estimate for these countries. Across countries, households from the wealthiest subgroup had on average 61% higher odds (95% CI: 1.49 to 1.73) of enrollment into health insurance schemes than households in the poorest group of the same country.

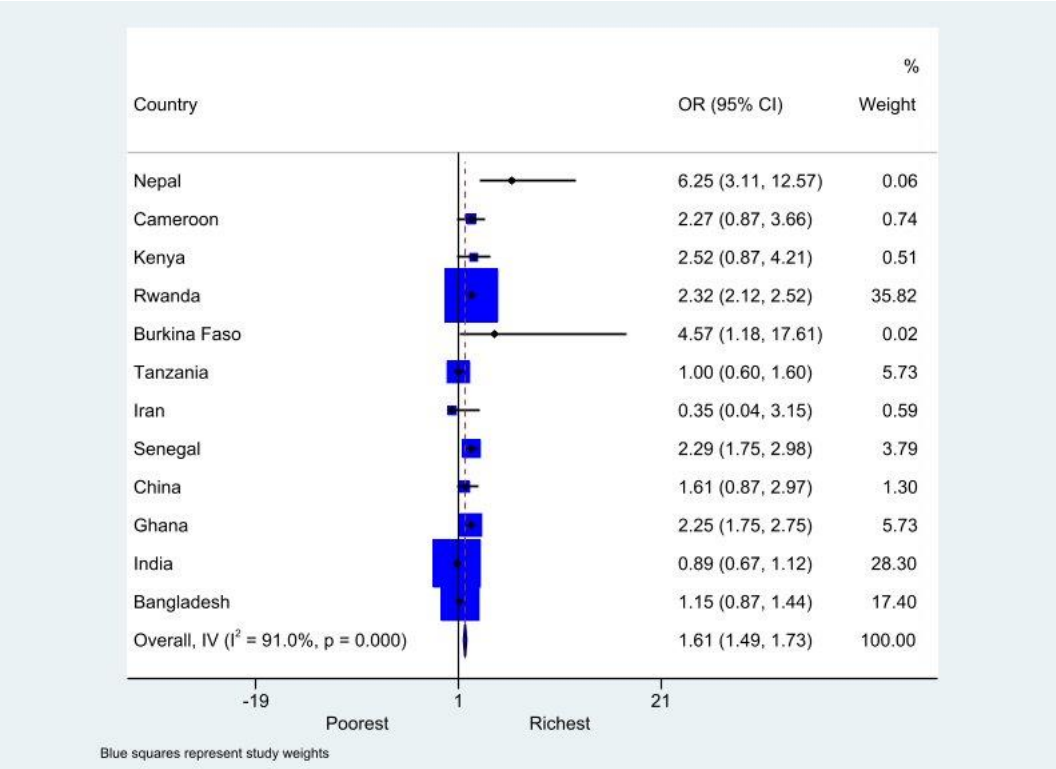

Figure 7: Forest plot showing the meta-analysis of all countries for health insurance enrollment between the highest and lowest wealth groups

There was high heterogeneity across countries (I-squared=91.0%; p-value<0.01). Most (8) of the countries had an odds ratio of enrollment for the richest groups to be over two times the odds of the enrollment for the poorest groups. Only the health insurance schemes in Iran and India had an odds ratio less than one (OR: 0.35, 95% CI: 0.04 to 3.15 and OR: 0.89, 95% CI: 0.67 to 1.12, respectively). The same patterns emerged when we examined enrollment status by educational attainment group. The enrollment gap between the least and most educated groups ranged from -6.9% to -41.2% (Figure S3), with an average gap of about 19 % percentage points. Point estimates of the relative insurance enrollment for education groups were available for 25 studies in 12 countries. As shown in Figure 8, the most educated groups had on average 64% (95% CI: 1.32 to 1.95) higher odds of

enrollment than the least educated groups. The CBHI scheme in Burkina Faso had the highest odds ratio of 6.11 for the enrollment for the most educated compared to the least educated, whilst the lowest odds ratio between these two groups was 0.84 in Tanzania. There was high heterogeneity between studies (I-squared=88.2%; p-value<0.01). There were six countries, Bangladesh, Cameroon, Ghana, India, Kenya and Nepal, which had estimates from multiple studies for education groups (Figure S4).

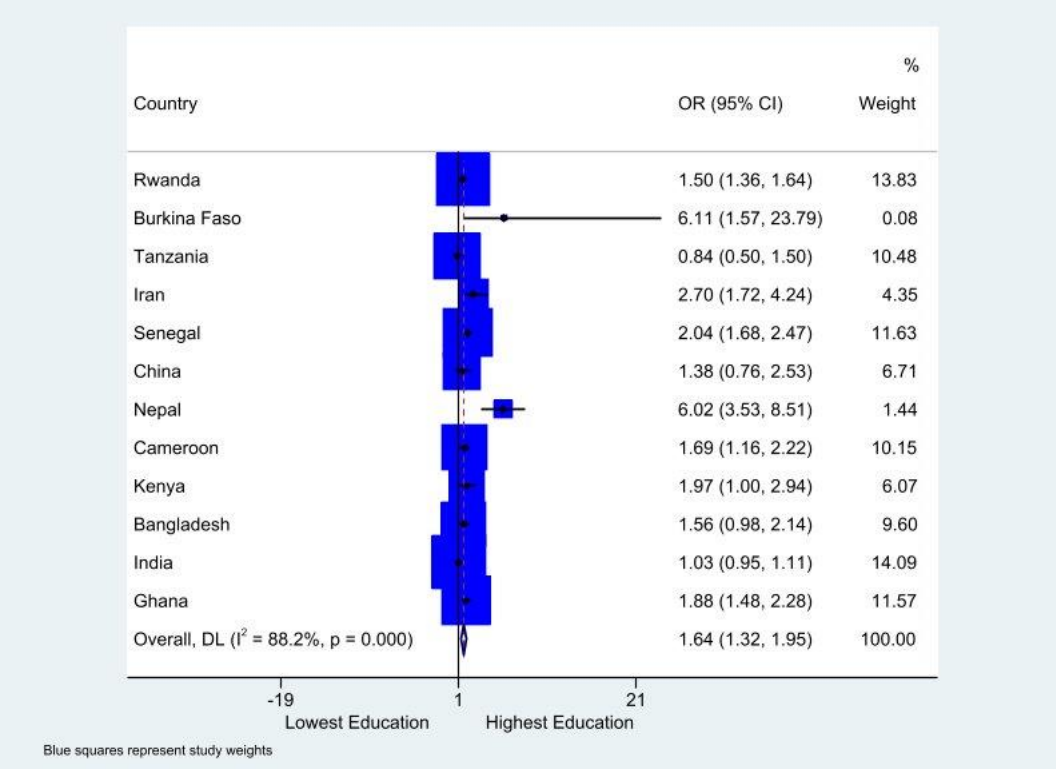

Figure 8: Forest plot showing the meta-analysis of all countries for health insurance enrollment between the highest and lowest educated groups

Subgroup analysis for education comparing studies with crude versus studies with adjusted ORs showed some differences. The pooled unadjusted odds ratio was 2.32 (95% CI: 1.42 to 3.23) compared to the pooled odds ratio of 1.44 (95% CI: 1.24 to 1.63) in studies adjusting for sex, age, ethnicity, location, marital status, household size, religion, health status and employment status (Figure S5).

Quality assessment

All the studies included in the review were observational. Of the 48 studies, 20 were rated as ‘good’, whilst 27 were rated ‘fair’ (Table 6). Only one study was rated as ‘poor’. This study was removed from analysis. The alternative estimates with the full sample are included in File S6. All the studies had the basic elements related to having a clear research question, a defined study population, and selection criteria of participants. However, only 10 studies reported the participation rate of eligible persons.

Few studies relied on large administrative population-based data. Studies were rated as ‘fair’ if the study population was not representative of the general population.

Table 6: Study quality

	Criteria	Yes
1	Was the research question or objective in this paper clearly stated?	48/48
2	Was the study population clearly specified and defined?	48/48
3	Was the participation rate of eligible persons at least 50%?	17/48
4	Were all the subjects selected or recruited from the same or similar populations (including the same time period)? Were inclusion and exclusion criteria for being in the study pre-specified and applied uniformly to all participants	48/48
5	Was the study population similar to the national population?	14/48
6	Was the sampling methods specified and appropriate?	48/48

3.5 Discussion

We conducted a systematic review with the aim of assessing the extent to which health insurance schemes are currently reaching the most vulnerable population groups in LMICs. We found 48 studies, which focused on 29 health insurance schemes from 17 LMICs allowing us to compare enrollment across socioeconomic groups, most of which were published after 2013. Overall, the results of our review are clear: current health insurance schemes reach only a relatively small proportion of the most vulnerable population groups.

The only scheme in which the enrolment rate was far lower for the wealthiest populations was the Colombian subsidized regime, which exclusively targeted the poor and other vulnerable groups as those in the formal sector and self-employed workers with a steady income are required to obtain the contributory regime. Two features of the scheme, which seem important are, first, that the scheme is mandatory for all those who are eligible to enroll. Second, during the period of analysis by Ruiz-Gomez et al, municipalities were using a mean proxy test to select beneficiaries into the scheme through the established social service beneficiaries’ identification system (Sistema de Identificación de los Beneficiarios de los Servicios Sociales, SISBEN) (Montenegro Torres, 2013).

Even though virtually all the other insurance schemes analyzed directly target or subsidize the most vulnerable groups, better-off households have on average almost twice the odds of enrolling in health insurance compared to poorest households. For example, the Ghana health insurance scheme stipulates premium exemptions for indigents, the elderly above 70, pregnant women and children

while the Rwanda Mutelle de Santé exempts the poorest 16% of households from premium payments. Other schemes such as those implemented in Nepal, Bangladesh and Burkina Faso have subsidized rates for the poorest households.

Despite these efforts, enrollment rates of the wealthiest subpopulations are higher than those of the most vulnerable population groups in all of these countries. These results are consistent with previous work on health insurance programs showing that enrollment and willingness to purchase health insurance in LMICs is pro-rich, which are explained by factors such as greater exposure of the rich to the media and their higher income levels to pay for health insurance premiums (Spaan et al., 2012a, Nosratnejad et al., 2016a).

The current enrollment gaps should not necessarily be interpreted as evidence that current targeting efforts do not make enrollment easier for poor households. Rather, it demonstrates that these current measures appear insufficient to equitably include vulnerable populations in health insurance schemes. Given that most health insurance schemes in LMICs are heavily financed by central government revenues, the currently observed enrollment patterns essentially make health insurance a regressive policy, primarily subsidizing health care for better-off households. Further reductions in premiums and improving geographical access to health facilities could potentially increase uptake among poor and underserved populations (Adebayo et al., 2015); other policy options include automatic (free) insurance enrollment of these groups or the direct provision of free health services for these groups.

Despite our best effort to review all of the recent evidence available, the findings presented in this manuscript have limitations. First, the included studies were retrospective and cross-sectional, and primarily focused on CBHI and national health insurance schemes. Second, due to the language restriction for publications in English, there was a limitation by the exclusion of articles published in other languages. In the past two decades, many LMICs in Latin America have implemented health insurance schemes such as non-contributory schemes for vulnerable populations (Bossert et al., 2014). Therefore, restricting the literature search to English may have underrepresented the inclusion of studies from this region, which in turn may have underestimated health insurance enrollment of vulnerable populations. Thirdly, it was also quite striking that nearly half (23/48) of all studies identified focused on Ghana, while no studies were found on several other countries where similar insurance programs have been launched in the recent past. In addition, studies used highly heterogeneous ways of measuring wealth or income that may not be directly comparable. Our analysis also pooled data across different designs of insurance schemes and socioeconomic group definitions and therefore, represents an average across highly heterogeneous systems. In addition, nearly all the studies relied on self-reported data about wealth or income and educational status, which could lead to misclassification due to recall bias. Lastly, another limitation of our study is the lack of longitudinal data that would have allowed evaluating whether there are countries that are successfully reducing inequalities in health insurance enrollment. Large longitudinal trend studies are needed to determine

the contribution of health insurance schemes in reducing inequalities between the rich and poor over time

Despite these limitations, our findings are consistent with a larger analysis of the World Health Surveys conducted in the early 2000s, which suggested that health insurance schemes continue to primarily benefit the better-off populations (El-Sayed et al., 2018). In their current form, health insurance schemes are thus unlikely to be viable mechanisms to promote universal health coverage. Challenges faced by current schemes include difficulties associated with identifying the most poor or vulnerable populations (Aryeetey et al., 2010, Marwa et al., 2013, Umeh, 2017, Salari et al., 2019b) as well as management of rollout and implementation at sub-national levels (Maluka, 2013). Increased financial, political, and institutional resources are likely needed to identify and reach underserved populations. In addition, simplified administrative processes for enrollment such as automatic enrollment after their identification could also facilitate the inclusion of underserved populations (Sood and Wagner, 2018, O'Donnell, 2007, Nsiah-Boateng et al., 2019).

3.6 Conclusion

Although all recently introduced health insurance schemes LMICs aim at providing access to health services as well as financial protection to the most vulnerable populations, current coverage is low among the poor and highly regressive in most countries. Experiences from countries suggest that current strategies to improve coverage of vulnerable populations in health insurance schemes have not achieved their aim of equity. Further investigation is needed to understand why these strategies are not reaching vulnerable groups. The evidence also suggests countries that are planning to establish health insurance schemes with the aim of equity for vulnerable populations might need to reevaluate their approach given the findings of this review.

Availability of data and materials

The data analyzed is available from the corresponding author on reasonable request.

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Not applicable

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Contributions

DOA, BK and FK designed the systematic review. BK led the earlier stages of conducting searches and data extraction DOA wrote the first draft of the article and all co-authors critically reviewed and major contributions to it. The author(s) read and approved the final manuscript.

3.7 Supplemental

Table S1. PubMed search strategy

	Query
#1	"health insurance"[MeSH Terms]
#2	“community based” OR “rural” OR “mutual” OR “micro” OR “community” OR “group”
#3	#1 AND #2
#4	(Afghanistan OR Islamic Republic of Afghanistan OR Bangladesh OR People's Republic of Bangladesh OR Benin OR Dahomey OR Republic of Benin OR Burkina Faso OR Burkina OR Republic of Upper Volta OR Burundi OR Republic of Burundi OR Cambodia OR Kingdom of Cambodia OR Central African Republic OR Chad OR Republic of Chad OR Comoros OR Union of the Comoros OR Democratic Republic of the Congo OR DR Congo OR Congo-Kinshasa OR DRC OR Zaire OR Eritrea OR State of Eritrea OR Ethiopia OR Federal Democratic Republic of Ethiopia OR The Gambia OR Republic of the Gambia OR Guinea OR Republic of Guinea OR Guinea-Conakry OR Guinea-Bissau OR Republic of Guinea-Bissau OR Haiti OR Republic of Haiti OR Kenya OR Republic of Kenya OR North Korea OR Democratic People's Republic of Korea OR Kyrgyz Republic OR Kyrgyzstan OR Liberia OR Republic of Liberia OR Madagascar OR Republic of Madagascar OR Malawi OR Republic of Malawi OR The Warm Heart of Africa OR Mali OR Republic of Mali OR Mozambique OR Republic of Mozambique OR Myanmar OR Burma OR Republic of the Union of Myanmar OR Nepal OR Democratic Republic of Nepal OR Niger OR Republic of Niger OR Rwanda OR Republic of Rwanda OR Sierra Leone OR Republic of Sierra Leone OR Somalia OR Federal Republic of Somalia OR South Sudan OR Republic of South Sudan OR Tajikistan OR Republic of Tajikistan OR Tanzania OR United Republic of Tanzania OR Republic of Tanganyika and Zanzibar OR Togo OR Togolese Republic OR Uganda OR Republic of Uganda OR Zimbabwe OR Republic of Zimbabwe OR Rhodesia)
#5	(Armenia OR armenia OR Bhutan OR Kingdom of Bhutan OR Bolivia OR Plurinational State of Bolivia OR Cameroon OR Republic of Cameroon OR Republic of Cameroun OR Cape Verde OR Republic of Cape Verde OR Cote D'ivoire OR Ivory Coast OR Republic of Cote D'ivoire OR Djibouti OR Republic of Djibouti OR Arab Republic of Egypt OR Egypt OR El Salvador OR Georgia OR Ghana OR Republic of Ghana OR Guatemala OR Republic of Guatemala OR Guyana OR Co-operative Republic of Guyana OR Honduras OR Republic of Honduras OR Spanish Honduras OR Republic of Indonesia OR Indonesia OR India OR Republic of India OR Kiribati OR Republic of Kiribati OR Kosovo OR Kosovo and Metohija OR Laos OR Lao Lao People's Democratic Republic OR Lesotho OR Kingdom of Lesotho OR Mauritania OR Islamic Republic of Mauritania OR Micronesia, Fed. Sts. OR Federated States of Micronesia OR FSM OR Moldova OR Republic of Moldova OR Mongolia OR Morocco OR Kingdom of Morocco OR Nicaragua OR Republic of

	Nicaragua OR Nigeria OR Federal Republic of Nigeria OR Pakistan OR Islamic Republic of Pakistan OR Papua New Guinea OR Independent State of Papua New Guinea OR Paraguay OR Republic of Paraguay OR Philippines OR Republic of the Philippines OR Samoa OR Independent State of Samoa OR Sao Tome and Principe OR Democratic Republic of Sao Tome and Principe OR Senegal OR Republic of Senegal OR Solomon Islands OR Sri Lanka OR Democratic Socialist Republic of Sri Lanka OR Sudan OR Republic of the Sudan OR North Sudan OR Swaziland OR Kingdom of Swaziland OR Ngwane OR Yuwatini OR Syrian Arab Republic OR Syria OR East Timor OR Timor-Leste OR Democratic Republic of Timor-Leste OR Ukraine OR Uzbekistan OR Republic of Uzbekistan OR Vanuatu OR Republic of Vanuatu OR Vietnam OR the Socialist Republic of Vietnam OR West Bank and Gaza OR Yemen OR Yemeni Republic OR Zambia OR Republic of Zambia.)
#6	(Angola OR Republic of Angola OR Albania OR Republic of Albania OR Algeria OR The People's Democratic Republic of Algeria OR American Samoa OR Argentina OR Azerbaijan OR Belarus OR Belize OR Bosnia and Herzegovina OR Bosnia-Herzegovina OR Bosnia OR Botswana OR Brazil OR Federative Republic of Brazil OR Bulgaria OR China OR People's Republic of China OR Colombia OR Costa Rica OR Fiji OR Gabon OR Gabonese Republic OR Grenada OR Hungary OR Islamic Republic of Iran OR Persia OR Iran OR Iraq OR Jamaica OR Jordan OR Hashemite Kingdom of Jordan OR Kazakhstan OR Lebanon OR Lebanese Republic OR Libya OR State of Libya OR Macedonia OR Republic of Macedonia OR Malaysia OR Maldives OR Republic of the Maldives OR Maldives Islands OR Marshall Islands OR Republic of the Marshall Islands OR Palau OR Republic of Palau OR Panama OR Republic of Panama OR Peru OR Romania OR Serbia, OR the Republic of Serbia OR Seychelles OR the Republic of Seychelles OR South Africa OR Saint Lucia OR Saint Vincent and the Grenadines OR Suriname OR Thailand OR Kingdom of Thailand OR Tonga OR Kingdom of Tonga OR Tunisia OR Turkey OR Turkmenistan OR Turkmenia OR Cuba OR Dominica OR Commonwealth of Dominica OR The Dominican Republic OR Ecuador OR Mauritius OR Mexico OR United Mexican States OR Montenegro OR Namibia OR Tuvalu OR Ellice Islands OR Venezuela OR the Bolivarian Republic of Venezuela)
#7	(Low-income country OR lower-income country OR third-world country OR middle-income country)
#8	developing countries[MeSH Terms]
#9	#4 OR #5 OR #6 OR #7 OR #8
#10	#3 AND #9

Author_Year	Country	Data Type	Study design	Sample size	Enrollment for highest vs lowest education group	Enrollment for best vs worst off group
Adhikari_2013(Adhikari et al., 2019)	Nepal	Primary	Case Control	416	Educated vs Uneducated	Quintile 5 vs Quintile 1
Akazili_2014(Akazili et al., 2014)	Ghana	Primary	Cross-sectional	5469	Secondary/Higher vs None	Quintile 5 vs Quintile 1
Fenny_2017(Fenny, 2017)	Ghana	Primary	Cross-sectional	758	Secondary/Higher vs None	Quintile 5 vs Quintile 1
Mahmood_2018(Mahmood et al., 2018)	Bangladesh	Primary	Case Control	1956	10+ years vs None	Quintile 5 vs Quintile 1
Macha_2014[33]	Tanzania	Primary	Cross-sectional	1225	Secondary/Higher vs None	Quintile 5 vs Quintile 1
Alkenbrack_2013(Alkenbrack et al., 2013)	Laos	Primary	Case-Control	3000	University vs Any primary	Quintile 5 vs Quintile 1
Amo_2014(Amo, 2014)	Ghana	Primary	Cross-sectional	210	University vs None	Quintile 5 vs Quintile 1
Kotoh_2016(Kotoh et al., 2016)	Ghana	Primary	Cross-sectional	6790	None	Quintile 5 vs Quintile 1
Dixon_2014(Dixon and Luginaah, 2014b)	Ghana	Primary	Cross-sectional	2119	Secondary/Higher vs None	Quintile 5 vs Quintile 1
Jehu-Appiah_2011(Jehu-Appiah et al., 2011)	Ghana	Primary	Cross-sectional	3301	None	Quintile 5 vs Quintile 1
Duku_2015(Duku et al., 2015)	Ghana	Primary	Cross-sectional	4214	None	Quintile 5 vs Quintile 1
Nguyen_2013(Nguyen and Leung, 2013)	Vietnam	Vietnam Household Living Standard Survey	Cross-sectional	3526	University vs None	Quintile 5 vs Quintile 1
Parmar_2014(Parmar et al., 2014b)	Burkina Faso	Household Survey	Cross-sectional	4695	Literate vs Illiterate	Quart 2-4 vs Quart 1
Kusi_2018(Kusi et al., 2018)	Ghana	Primary	Cross-sectional	3173	Secondary/Higher vs None	Quintile 5 vs Quintile 1
Panda_2014(Panda et al., 2014)	India	Primary	Cross-sectional	433	None	Quintile 5 vs Quintile 1
Panda_2014(Panda et al., 2014)	India	Primary	Cross-sectional	378	None	Quintile 5 vs Quintile 1
Panda_2014(Panda et al., 2014)	India	Primary	Cross-sectional	524	None	Quintile 5 vs Quintile 1

Kusi_2015 (Kusi et al., 2015)	Ghana	Primary	Cross-sectional	2418	None	Quintile 5 vs Quintile 1
Kumi-Kyereme_2013 (Kumi-Kyereme et al., 2013)	Ghana	Ghana DHS	Cross-sectional	4910	University vs None	Quintile 5 vs Quintile 1
Duku_2018(Duku et al., 2018a)	Ghana	Primary	Cross-sectional	4214	Post University vs Primary	Quintile 5 vs Quintile 1
Amu_2016(Amu and Dickson, 2016)	Ghana	Ghana DHS	Cross-sectional	9263	University vs None	Quintile 5 vs Quintile 1
Dixon_2011(Dixon et al., 2011)	Ghana	Ghana DHS	Cross-sectional	9479	Secondary/Higher vs None	Quintile 5 vs Quintile 1
Bendig_2011(Bendig and Arun, 2011)	Sri Lanka	Primary	Case Control	330	University vs None	Quintile 5 vs Quintile 1
Sarpong_2010 (Sarpong et al., 2010b)	Ghana	Primary	Cross-sectional	7225	None	Trisect 3 vs Trisect 1
Seddoh_2018(Seddoh and Sataru, 2018)	Ghana	Household Survey	Cross-sectional	625	Post-University vs None	None
Duku_2018(Duku, 2018)	Ghana	Primary	Cross-sectional	4214	Secondary/Higher vs None	Quintile 5 vs Quintile 1
Oraro_2018(Oraro et al., 2018)	Cameroon	Primary	Cross-sectional	930	Secondary/Higher vs Primary or less	Quintile 5 vs Quintile 1-2
Van der Wielen_2018(van der Wielen et al., 2018a)	Ghana	Ghana Living Standard Survey	Cross-sectional	4086	Secondary/Higher vs None	Bisect 2 vs Bisect 1
Oraro_2018(Oraro and Wyss, 2018)	Kenya	Primary	Cross-sectional	444	Secondary/Higher vs Primary or less	Quintile 5 vs Quintile 1-2
Nguyen_2010(Nguyen and Knowles, 2010)	Vietnam	National Health Survey	Cross-sectional	27563	University vs None	Quintile 5 vs Quintile 1
Dror_2018(Dror et al., 2018)	India	Primary	Cross-sectional	524	None	Quintile 5 vs Quintile 3
Kotoh_2018 (Kotoh et al., 2018a)	Ghana	Household Survey	Cross-sectional	6790	None	Quintile 5 vs Quintile 1
Finnoff_2010 (Finnoff, 2010)	Rwanda	Integrated Living Conditions Survey	Cross-sectional	34785	University vs None	Quintile 5 vs Quintile 1
Khalid_2017(Khalid, 2017)	Ghana	Socioeconomic Panel Survey	Cross-sectional	5761	University vs None	Quintile 5 vs Quintile 1
Lu_2012 (Lu et al., 2012)	Rwanda	Integrated Living Conditions Survey	Cross-sectional	13320	Less than Primary vs None	Quintile 5 vs Quintile 1

Govender_2013 (Govender et al., 2013)	South Africa	Primary	Cross-sectional	1329	University vs None/Primary	None
Boateng_2013 (Boateng and Awunyor-Vitor, 2013)	Ghana	Primary	Cross-sectional	300	University vs None	Quart 4 vs Quart 1
Cofie_2013(Cofie et al., 2013)	Burkina Faso	Household Survey	Cross-sectional	250	Secondary/Higher vs None	None vs Radio or TV
Manortey_2014 (Manortey et al., 2014)	Ghana	Primary	Cross-sectional	3228	University vs None	Trisect 3 vs Trisect 1
Mladovsky_2014(Mladovsky et al., 2014)	Senegal	Primary	Case Control	241	Secondary/Higher vs None	Quintile 5 vs Quintile 1
Jin_2016(Jin et al., 2016)	China	China Health and Longitudinal Survey	Cross-sectional	18605	Secondary/Higher vs None	Quintile 5 vs Quintile 1
Kapologwe_2017 (Kapologwe et al., 2017)	Tanzania	Primary	Cross-sectional	460	Secondary/Higher vs None/Primary	Bisect 2 vs Bisect 1
Sarker_2017(Sarker et al., 2017)	Bangladesh	Primary	Case Control	784	University vs None	Quintile 5 vs Quintile 1
Goudge_2018 (Goudge et al., 2018)	South Africa	Primary	Cross-sectional	1329	University vs None/Primary	None
Van der Wielen_2018	Ghana	Ghana Living Standard Survey	Cross-sectional	5846	Secondary/Higher vs None	Quintile 5 vs Quintile 1
Ruiz Gomez_2013 (Van der Wielen et al., 2018c)	Colombia	Colombian Life Quality Survey	Cross-sectional	NA	None	Quintile 5 vs Quintile 1
Ghosh_2014 (Ghosh, 2014)	India	Primary	Cross-sectional	6000	None	Quintile 5 vs Quintile 1
Nosratnejad_2016	Iran	National Health Survey	Cross-sectional	23543	University vs Primary or less	Quintile 5 vs Quintile 1
Kuuire_2017](Kuuire et al., 2017)	Ghana	Global Ageing and Health Survey	Cross-sectional	1534	University vs None	Quintile 5 vs Quintile 1
Parmar_2014(Parmar et al., 2014c)	Ghana	Primary	Cross-sectional	435	Educated vs Uneducated	Quart 4 vs Quart 1
Parmar_2014(Parmar et al., 2014c)	Senegal	Primary	Cross-sectional	2933	Educated vs Uneducated	Quart 4 vs Quart 2

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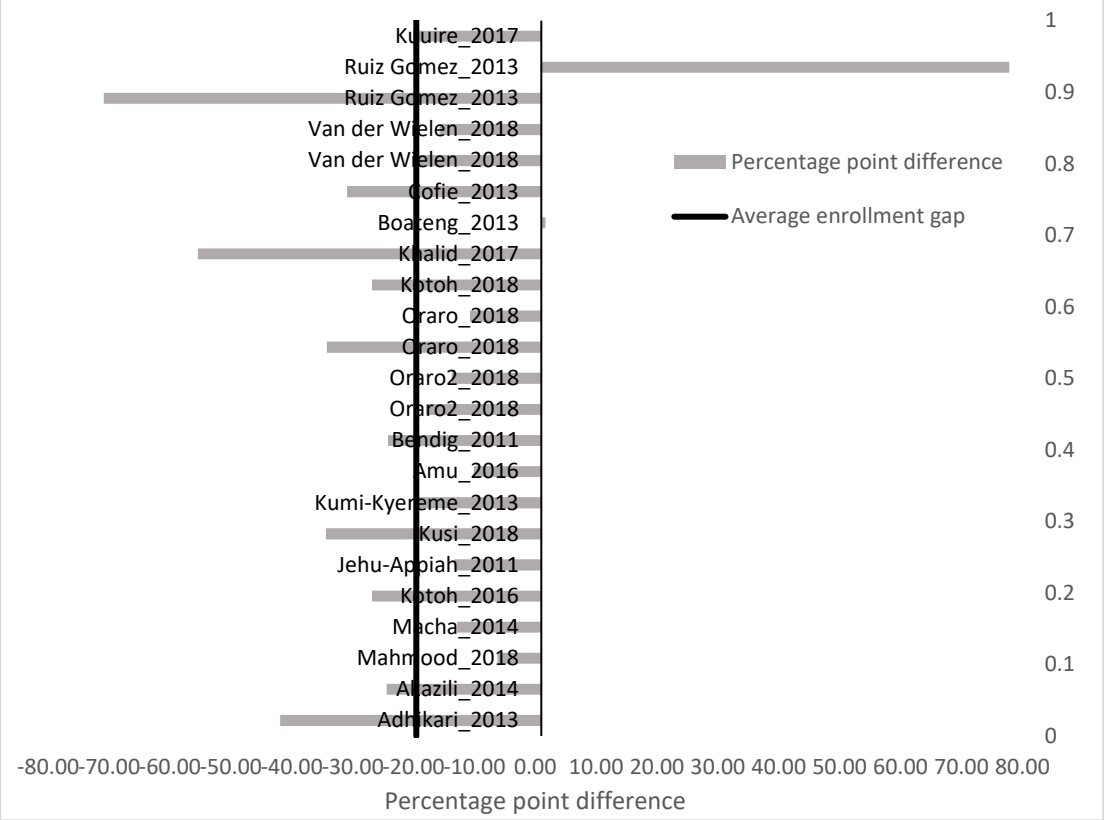
Figure S1. Absolute percentage enrollment gap at the population level between the lowest and highest wealth groups



Of the 48 studies reviewed, 20 studies from eight countries collected data on absolute health insurance enrollment differences at the population level between the highest and lowest groups. However, after removing the one study, which was of low quality, 19 studies remained. Only two studies from Colombia and Ghana (Ruiz Gomez et al., 2013, Boateng and Awunyor-Vitor, 2013) reported a higher percentage of enrollment for the lowest wealth groups than the highest wealth groups. Among these studies, the highest enrollment difference was 77.89% whilst the lowest was 1.7%. The 17 studies, which reported a lower enrollment for the lowest wealth groups, enrollment gaps ranged from -70.84% to -6.2%.

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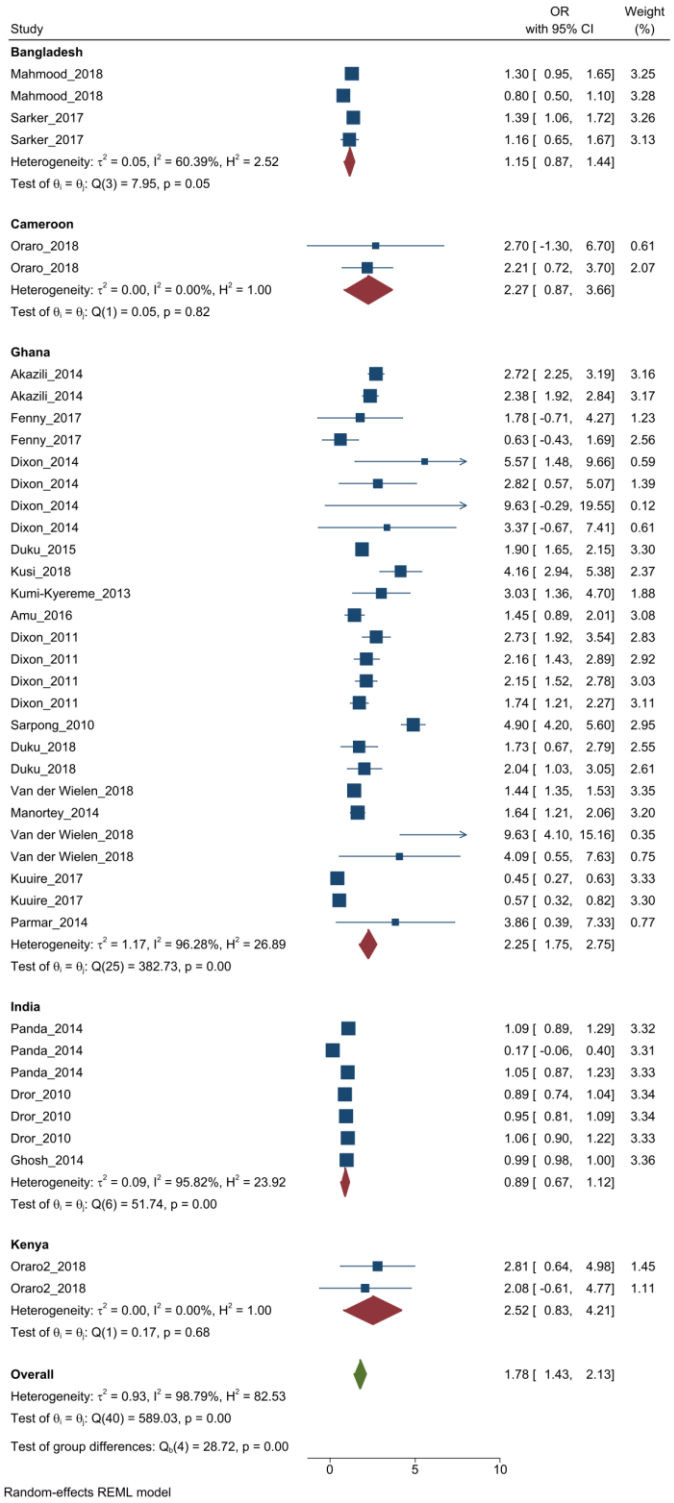
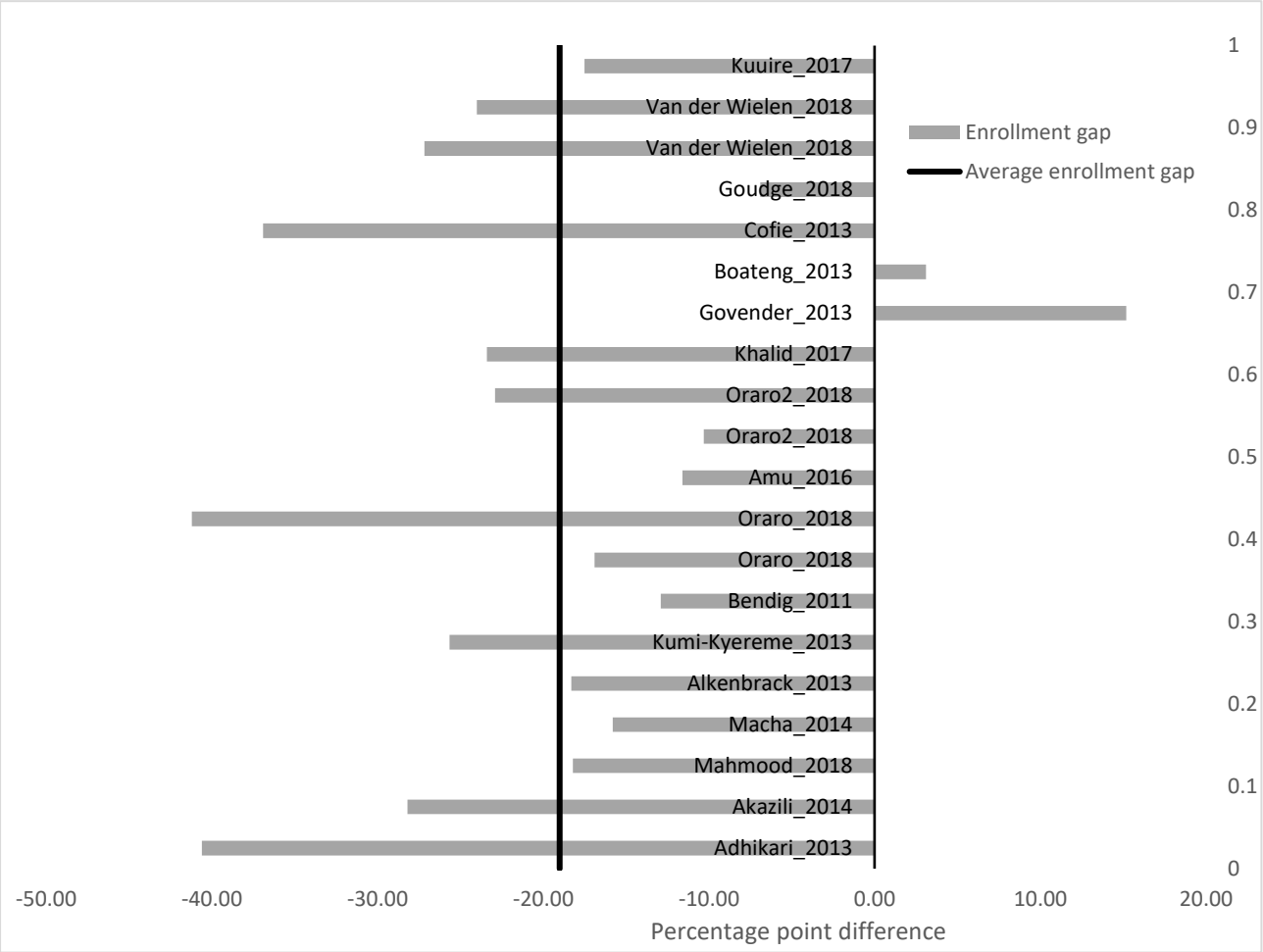


Figure S2:Forest plot showing countries with multiple estimates

Figure S3. Absolute percentage enrollment gap at the population level between the least and most educated groups



Eighteen studies from nine countries reported the absolute health insurance differences at the population level between the lowest and highest education groups. However, we removed one low quality study and it remained with 17 studies. Fifteen of these studies reported a lower percentage of enrollment in health insurance schemes for the least educated groups than the most educated groups. This enrollment gaps between the least and most educated groups ranged from -6.9% to -40.6%. The two studies, which reported a higher percentage of enrollment in health insurance schemes for the least educated groups had a higher percentage gap of enrollment of 15.2 % whilst the lowest percentage gap was 3.1% (Govender et al., 2013, Boateng and Awunyor-Vitor, 2013).

Figure S4: Forest plot showing countries with multiple estimates for education

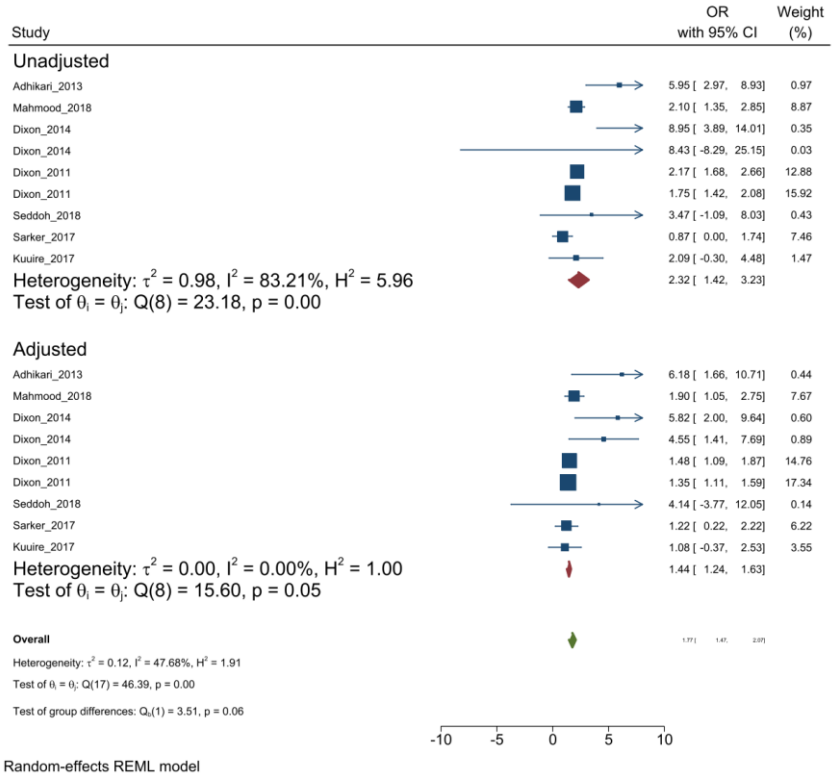
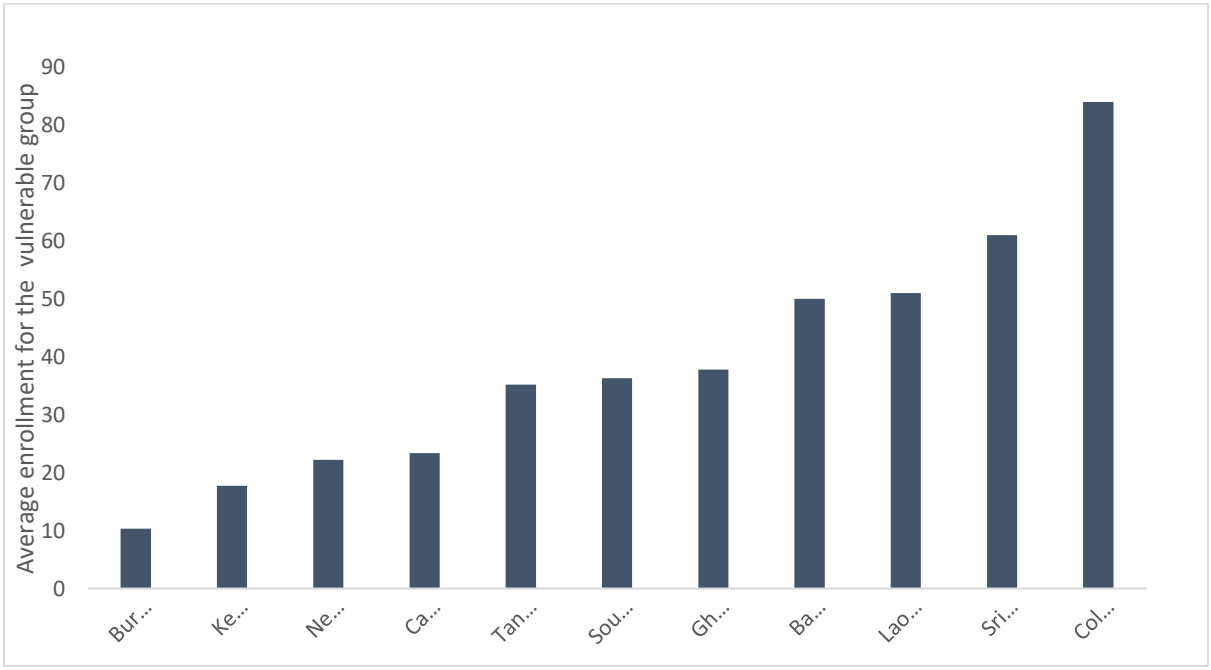


Figure S5: Forest plot showing subgroup analysis of adjusted and crude odds ratio.

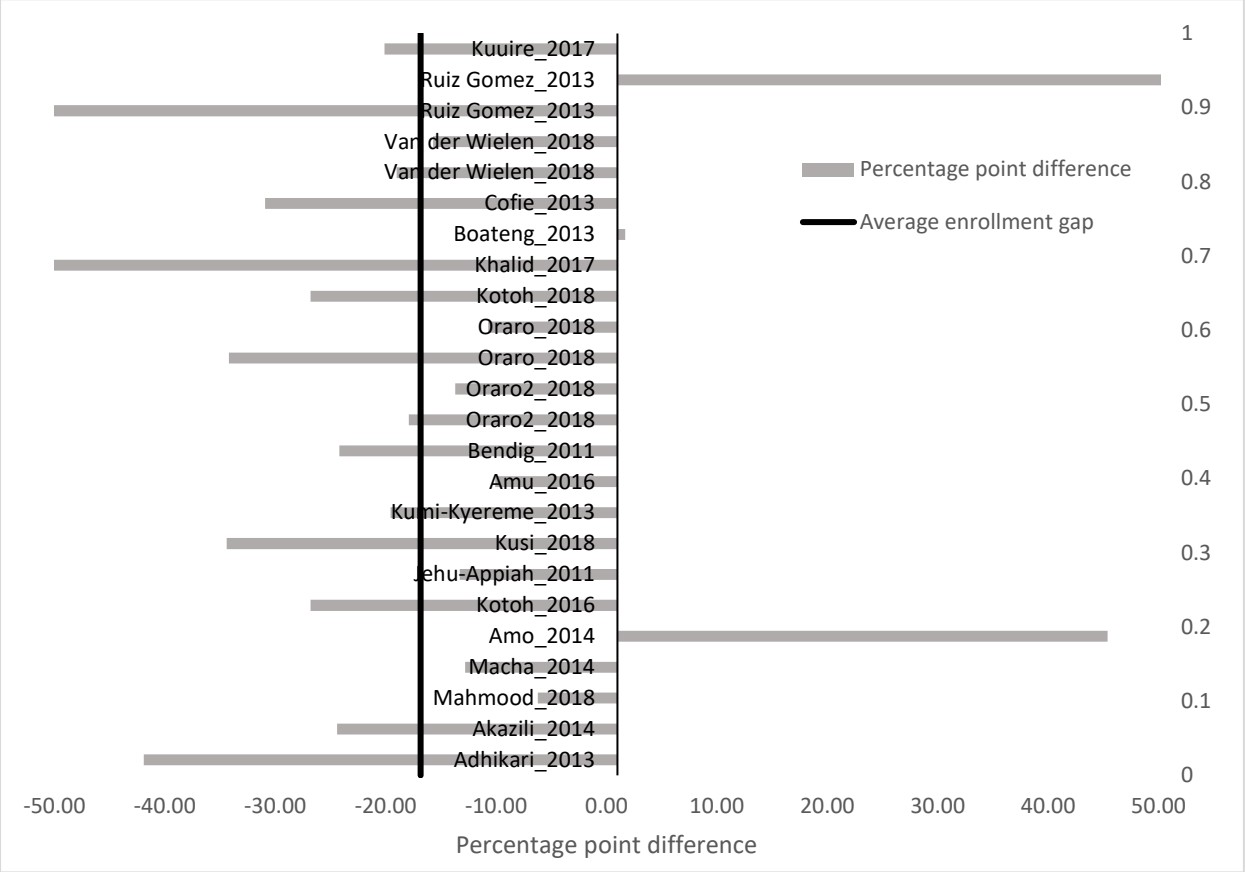
File S6 Tables and Figures excluding study with low quality rating

Enrolment rate into health insurance schemes among vulnerable groups

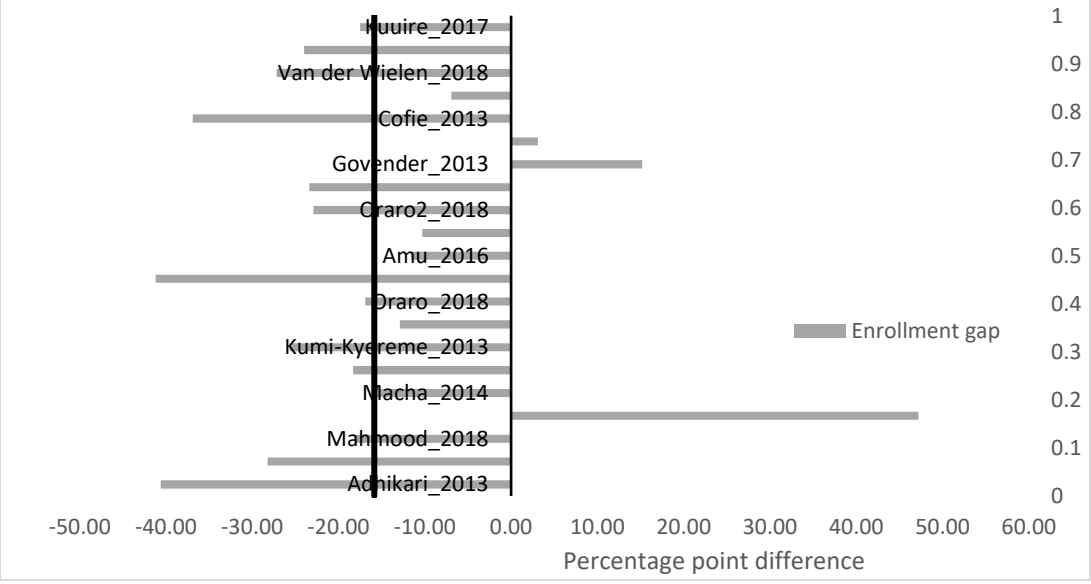


Notes: Enrollment rates correspond to reported enrollment rates in the lowest wealth quintile with the exception of Laos and South Africa, where data was only available for the lowest education (no formal education) group

Absolute percentage enrollment gap at the population level between the least and most wealth groups



Absolute percentage enrollment gap at the population level between the least and most educated groups



Chapter 4 The effects of health insurance on quality of care in low-income countries: A systematic review

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4.1 Abstract

Objectives: To evaluate the effectiveness of health insurance on quality of care in low-income countries (LICs).

Methods: We conducted a systematic review following PRISMA guidelines. We searched seven databases for studies published between 2010 and August 2022. We included studies that evaluated the effects of health insurance on quality of care in LICs using randomized experiments or quasi-experimental study designs. Study outcomes were classified using the Donabedian framework.

Results: We included 15 studies out of the 6,129 identified. Available evidence seems to suggest that health insurance has limited effects on structural quality, and its effects on the process of care remain mixed. At the population level, health insurance is linked to improved anthropometric measures for children and biomarkers such as blood pressure and hemoglobin levels.

Conclusion: Based on the currently available evidence, it appears that health insurance in LICs has limited effects on the quality of care. Further studies are required to delve into the mechanisms that underlie the impact of health insurance on the quality of care and identify the most effective strategies to ensure quality within insurance programs.

Systematic review registration: PROSPERO as CRD42020219984

Keywords: Quality of care, Systematic review, low-income, quality indicators

4.2 Introduction

In the past decades, many low-income and lower-middle income countries (LLMICs) have made commitments to make progress towards universal health coverage (UHC), a critical component of the sustainable development goals (SDGs)(United Nations General Assembly, 2012). UHC aims to ensure that all people have equitable access to quality essential health services without financial hardship (Kieny et al., 2017). To accelerate progress towards this goal, many LLMICs have invested in health insurance (World Health Organization, 2010b).

Countries have implemented an array of health insurance schemes consisting of both mandatory and voluntary schemes. Traditional social health insurance pools low and high-risk individuals who contribute a compulsory premium - typically a fixed percentage of their salaries to these schemes. In countries such as Kenya, Tanzania, and Cambodia, social health insurance targets civil servants, and formally employed workers. In order to reach households in the informal sector, countries such as Burkina Faso, India, Nepal, and Senegal have introduced voluntary schemes such as community-based health insurance (CBHIs) or mutual health insurance schemes. Some countries have established more than one type of insurance schemes for either formal or informal sectors. Tanzania, for example has National Health Insurance Fund (NHIF) for the formal sector and offers the improved community health fund (iCHF) for the informal sector. In practice, countries such as Gabon, Ghana,

Kenya and Zambia have mixed national health insurance schemes, which pool both formal and informal sector contributions.

There is growing literature on the impact of health insurance schemes on specific UHC goals. Five out of six systematic reviews published between 2012 and 2020 found strong evidence that health insurance schemes improved the use of health services (van Hees et al., 2019a, Docrat et al., 2020b, Comfort et al., 2013b, Erlangga et al., 2019). Four systematic reviews also examined the effect of health insurance schemes on financial protection, finding mixed evidence (van Hees et al., 2019a, Erlangga et al., 2019, Spaan et al., 2012b, Acharya, 2013). In this manuscript, we focus on the impact of health insurance on quality of care. Given the attention on coverage and financial risk reduction, the impact of insurance on quality is not obvious and can potentially be negative if supply-side factors are not adjusted to match the additional demand created by insurance coverage. Furthermore, given the critical importance of high quality of care for improving health outcomes in low-income setting(Kruk et al., 2018b) , investigating the impact of insurance on quality and the mechanisms resulting in this effect is of high importance for the current and future rollout of insurance programs.

Theoretical Perspectives of the potential of health insurance schemes to influence quality of care

Several frameworks have been developed to measure quality of care. We use the Donabedian model, which has been used widely in the literature to define quality of care, here (Berwick and Fox, 2016). The framework defines quality along three main dimensions: structure, process and outcomes of care (Donabedian, 1988). Structural quality comprises of the physical and organizational characteristics in health facilities that support and steer the provision of care. Process of care assesses the technical quality of care such as appropriateness of treatment, competence in diagnostic and therapeutic procedures. Process of care also includes interpersonal care, which assess the social and psychological interaction between providers and patients. Finally, outcomes of care include the effects of care on individuals and populations, changes to health status, patient satisfaction and health-related quality of life. The framework is summarized with examples for each domain in table 1.

Studies have shown that health insurance schemes use a mix of strategies to empower patients and improve provider performance (Michielsen et al., 2011, Kolstad and Chernew, 2009). Some schemes use regulations such as accreditations, standard treatment guidelines and audits, to ensure enlisted providers are competent and can provide quality services. Providers that adhere to these regulations receive incentives from insurance agencies, which can be additional resources to improve the structural elements of health facilities for a higher quality of care. Furthermore, through the freedom of choice to select providers, members can “exit” from low-quality health providers and incentivize providers to maintain or improve the quality of their services (Michielsen et al., 2011). Despite the rationale, there is limited systematic evidence of the effectiveness of these strategies by health insurance programs to influence quality of care. The last review dates back to 2011, finding only limited evidence of links between health insurance and quality of care in LLMICs (Spaan et al.,

2012b). The objective of this study is thus to systematically review the more recent evidence on the links between health insurance schemes and quality of care within LLMICs.

Conceptualization of quality of care-Donabedian Framework

Professional bodies and organizations to measure quality of care have developed various frameworks. We use the Donabedian model, which has been used widely in the literature to define quality of care, here (Berwick and Fox, 2016). The framework defines quality along three main dimensions: structure, process and outcomes of care (Donabedian, 1988). Structural quality comprises of the physical and organizational characteristics in health facilities that support and steer the provision of care. Process of care assesses the technical quality of care such as appropriateness of treatment, competence in diagnostic and therapeutic procedures. Process of care also includes interpersonal care, which assess the social and psychological interaction between providers and patients. Finally, outcomes of care include the effects of care on individuals and populations, changes to health status, patient satisfaction and health-related quality of life. The framework is summarized with examples for each domain in table 7.

Table 7: Donabedian Framework on quality of care

Quality domain	Description of domain	Examples of indicators used
Structural	Physical and organizational characteristics of the facility or practice where healthcare occurs	Quality of physical infrastructure, availability of drugs and medical supplies
Process: Technical	Providers' activities in delivering care	Content of care (correct diagnosis, appropriate treatment, Physical examination, Counselling), Prescription practices
Process: Interpersonal care	Patients' subjective experiences not directly related to the clinical care received	Patient perception (waiting time, communication, confidentiality, attitudes of health providers, Sufficient time spent with provider)
Outcome	Effects of care on health status of individuals and populations	Mortality rates, patient-reported health measures, anthropometric measures, overall patient satisfaction

4.3 Methods

Search strategy

We followed the Preferred Reporting Items for Systematic Review and Meta-analysis (PRISMA) protocol guidelines. The protocol for the study was registered in advance in PROSPERO as

CRD42020219984. A comprehensive search of peer-reviewed and grey-literature was conducted using seven electronic databases (Medline, Embase, EconLit, PyscInfo, Web of Science, COCHRANE Central Registry of Trials and WHO Global Index Medicus) for studies published between January 2010 and August 2022. We searched both MeSH terms and keywords related to health insurance schemes and quality of care. An example of full search terms used for Medline and Embase databases can be found in Appendix 1. We also searched the reference lists of all studies that met the inclusion criteria and other similar systematic reviews to identify further relevant articles. Authors of articles that were inaccessible were contacted to obtain full text version of their respective papers.

Study selection

We included empirical research reporting randomized experiments and quasi-experimental designs that assessed the effects of health insurance schemes and any of the Donabedian quality indicators in low-income countries. The review included studies published in English, which reported on public (national health insurance, social health insurance and community-based/mutual health insurance) and private health insurance schemes.

There are notable distinctions between the implementation of health insurance programs in low-income countries and high-income countries, particularly regarding fund collection and coverage. Moreover, low-income countries face the greatest challenges in terms of providing adequate quality of care (Kruk et al., 2018b). Consequently, the issues related to health insurance and quality of care in low-income countries, can significantly diverse from those encountered in high-income countries. This review specifically concentrates on assessing the quality of care in low-income countries. In this study, we defined low-income countries as those classified by the World Bank as either low-income or lower-middle income in 2022. We excluded longitudinal cohort, case-control, cross-sectional studies, qualitative studies, policy briefs, commentaries, conference abstracts and editorials.

After duplicates were removed, two authors (DOA and BK) independently conducted an initial screening of titles and abstracts using the specified inclusion criteria. Non-agreement was resolved through discussion between the two authors. We then retrieved the full text of articles that met or possibly met the criteria. Again, DOA and BK independently checked the full text articles based on the inclusion/exclusion criteria for studies, and non-agreement was resolved through discussions with the other authors.

Data extraction and data analysis

For all relevant studies, a standardized data extraction form was developed. Two authors independently extracted the necessary information from studies, and any differences in data extracted were discussed and resolved. For each of the study, we extracted information on study design, name and type of health insurance, sources of data and study populations. We also extracted information on whether schemes were accompanied by any quality assurance initiatives to ensure compliance of empaneled health facilities with the standards of quality set by the health insurance or quality improvement programs to enhance the quality of care provided in health facilities (Wandersman et al., 2012). Additionally, we extracted outcome(s) and main findings including descriptive statistics, point estimates and confidence

intervals if available. The outcomes were grouped according to the Donabedian framework-structural, process (technical and interpersonal care) and outcome.

Two authors independently assessed the risk of bias of included studies using the appropriate tool. For randomized control trials, we applied the COCHRANE Risk-Bias tool for randomized trials (Flemyng et al., 2020). For non-randomized designs, we used the Risk of Bias in Non-randomized studies of interventions (ROBINS-1) tool (Sterne et al., 2016). The COCHRANE Risk Bias tool assesses bias across five domains (randomization, deviation from intended intervention, missing outcome data, measurement of outcome, and selection of reported results) while ROBINS-1 assess bias across seven domains (confounding, selection of participants, deviations from intended interventions, missing data, measurement of outcomes and selection of reported results). The overall risk bias of each study was categorized as “high”, “moderate” or “low”. Discrepancies in assessments were resolved through consensus. As we selected studies with rigorous study designs, all studies were included in the analysis regardless of its risk of bias category.

We synthesized the findings from included studies by narrative synthesis using the Donabedian classification of its outcome (structural, process (technical and interpersonal care) and outcome).

4.4 Results

Our search strategy identified 6129 unique records of which 6041 did not meet the inclusion criteria. A total of 88 records were screened for eligibility by full-text review. An additional 76 articles were excluded due to various reasons such as inappropriate study designs (n=38) and no quality of care indicators (n=23). A total of 15 studies were included in our final review from 11 countries in Sub-Saharan Africa and Asia (Figure 1). The characteristics of the included studies are shown in Tables 2 and 3. Each of the studies evaluated schemes from a single country. Three studies were conducted in Ghana, two studies each in Nigeria, and Vietnam and one study each from Burkina Faso, Ethiopia, India, Mauritania, Philippines, Uganda, and Tanzania. Out of the 14 studies which reported the years of the scheme’s implementation and time period of data analysis, half (n=7) assessed data 1-3 years after the scheme’s implementation, 4 studies for 4-7 years and 2 studies for 8 years or more. The most common source of data was private survey-survey by researchers (n=8) followed by public or government household survey (n=6). Among the 15 studies, 47 quality of care indicators were evaluated as study outcomes. The most common Donabedian quality of care dimension that studies evaluated was the outcome domain (n=19) followed by structural (n=14), process-interpersonal (n=11), and process-technical dimension (n=3).

Three studies were randomized experiments, and the remaining studies (n=12) used quasi-experimental designs. Studies used quasi-experimental designs such as difference-in-differences analysis (n=7), propensity score matching (n=3), instrumental variable (n=1) and geographic regression discontinuity (n=1).

Using the Cochrane risk of bias tool for randomized studies, the overall rating for the risk of bias was low. Among the non-randomized studies, the overall rating for all studies was moderate based on the ROBINS- I tool.

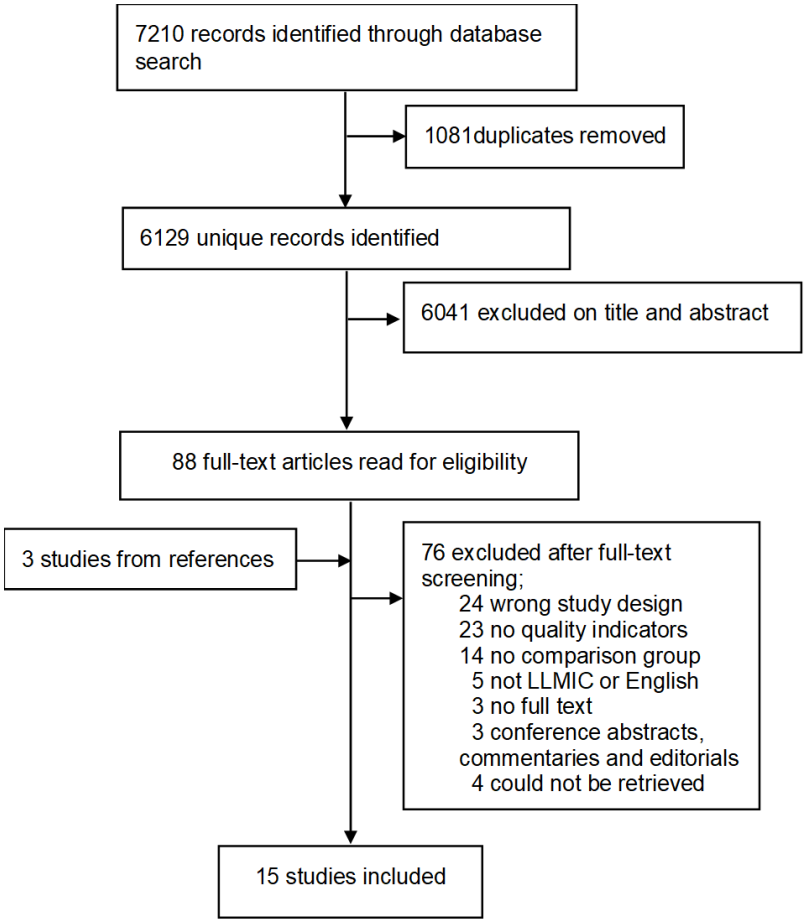

Figure 9: Flow chart of included studies

Three studies were randomized experiments, and the remaining studies (n=12) used quasi-experimental or other econometric approaches. Studies that used quasi-experimental or economic approaches utilized difference-in-differences analysis (n=7), propensity score matching (n=3), instrumental variable (n=1) and geographic regression discontinuity (n=1).

Using the Cochrane risk of bias tool for randomized studies, the overall rating for the risk of bias was low. Among the non-randomized studies, the overall rating for all studies was moderate based on the ROBINS- I tool.

Table 8: Summary of selected characteristics of included studies

Characteristics	Number of studies
Data source	
Public household survey	6
Health facility assessment	2
Patient exit survey	1
Primary household survey	8
Total	17*
Type of Health Insurance Scheme	
Voluntary and mandatory	1
Voluntary	9
Non-contributory	3
Total	13†
Post-establishment years analyzed	
1-3	7
4-7	4
≥8	3
Total	14‡
Quality of care indicator analyzed	
Structural	14
Process-technical	3
Process-interpersonal	9
Outcome	19
Total	45

*Some studies used multiple sources, †Some schemes were analyzed by more than one study, ‡One study did not report years

Table 9: Characteristics of included studies

Author (Year)	Country	Data sources	Empirical methods/approach	Health Insurance	Outcome measured	Bias
Asuming (2013)	Ghana	Household survey	Randomized experiment	Wa West District MHI (voluntary)	Sick days; Performance of daily activities	Low
Bagnoli (2019)	Ghana	MICS 2011	Propensity-score matching	NHIS (voluntary & mandatory)	Stunting, anemia	Moderate
Fink (2013)	Burkina Faso	HDSS Household Survey 2003-2008	Stepped wedge cluster randomization	Nouna CBHI (voluntary)	Age-group specific mortality, facility hours, equipment adequacy, room adequacy, facility hygiene and staff availability	Low
Hendricks (2014)	Nigeria	Household survey	Difference-in-differences	Hygeia Community Health Care program (voluntary)	Blood pressure	Moderate
Hendricks (2016)	Nigeria	Household survey	Difference-in-differences	Kwara State Health Insurance* (voluntary)	Blood pressure	Moderate
Jafree (2021)	Pakistan	Individual survey	Propensity score matching	MHI (voluntary)	Perceived overall health	Moderate
Kuwawenaruwa (2019)	Tanzania	Health facility assessment; Household survey	Difference-in-differences	NHIF's KfW scheme (non-contributory)	Drug supply, availability of contraceptives, availability of medical supplies, facility quality, functionality of equipment, interpersonal care for ANC, content for care for ANC care, content of care for PNC, experience of ANC, waiting time	Moderate
Lambon-Quayefio (2017)	Ghana	DHS 2014	Propensity-score matching	Ghana NHIS (voluntary & mandatory)	Neonatal mortality	Moderate

Nguyen (2017)	Vietnam	LSS 2002, 2004, 2006	Triple-differences; difference-in-discontinuities	Public health insurance (non-contributory for children under 6)	Days in bed, Days with limited activity	Moderate
Nguyen (2019)	Vietnam	LSS 2002, 2004,2006, 2008	Difference-in-differences	Public health insurance (non-contributory for children under 6)	Sick days	Moderate
Nshakira-Rukundo (2020)	Uganda	Household survey	Instrumental variable	Kisiizi CHBI (voluntary)	Stunting	Moderate
Philibert (2017)	Mauritania	DHS 2001; NSIMM 2003; MICS in 2007, 2011	Difference-in-differences	Obstetric Risk Insurance (voluntary)	Neonatal mortality	Moderate
Quimbo (2011)	Philippines	Patient exit survey	Randomized experiment	PhilHealth (voluntary)	CRP, wasting	Low
Shigute (2020)	Ethiopia	Health facility assessment ; Household survey	Difference-in-differences	CBHI (voluntary)	Revenue, drug availability, equipment availability, water supply, electricity access, shortage of budget, shortage of drugs, waiting time, patient satisfaction	Moderate
Sood (2016)	India	Household survey	Geographic regression discontinuity	VAS (non-contributory)	Post operation well-being (self-care, usual activities, walking ability, pain, anxiety, overall health), post operation infections, rehospitalization rates	

*Formerly known as Hygeia Community Health Care program, CBHI: Community Based Health Insurance; DHS: Demographic and Health Survey; HDSS: Health and Demographic Surveillance Site; LSS: Living Standard Survey; MICS: Multiple Indicator Cluster Survey; NSIMM: National Survey on Infant Mortality and Malaria; NHIS: National Health Insurance Scheme; RCT: Randomized control trial; VAS: Vajpayee Arogyashree Scheme

Structural quality dimension

Two studies from Tanzania and Ethiopia reported on several structural quality indicators including the availability of drugs, medical supplies and the functionality of amenities (Appendix 2).(Kuwawenaruwa et al., 2019a, Shigute et al., 2020b) Both studies reported positive effects for many of the indicators, but only three out of the 14 indicators showed significant improvements.

Process dimension: technical

One study examined the impact of a scheme for pregnant women in Tanzania on three technical quality measures and reported significant improvement for only postnatal care for mothers (Appendix 3) (Kuwawenaruwa et al., 2019a). They reported no change for the overall PNC for infants or the ANC whether it was measured through observation of patient-provider interaction or household survey with patients (Kuwawenaruwa et al., 2019a) .

Process dimension: interpersonal care

Three studies reported the effect of health insurance schemes on interpersonal care (Appendix 3) (Shigute et al., 2020a, Fink et al., 2013, Kuwawenaruwa et al., 2019b). One study from Tanzania found that health insurance was associated with improved scores on an index of interpersonal care for postnatal services based on 13 items (Kuwawenaruwa et al., 2019b). Two studies showed no effect on waiting times to receive health services (Kuwawenaruwa et al., 2019b, Shigute et al., 2020a). One of the two studies found that in intervention areas, long waiting times significantly reduced the proportion of women for ANC visits (Kuwawenaruwa et al., 2019b). A study from rural Burkina Faso reported that a CBHI rollout negatively affected quality of care ratings (Fink et al., 2013).

Outcome dimension

Only one study evaluated overall patient satisfaction and reported a positive association (Appendix 4) (Shigute et al., 2020b). Five studies assessed self-reported health outcomes (Appendix 4) (Sood and Wagner, 2016, Jafree et al., 2021, Nguyen and Lo Sasso, 2019, Nguyen, 2020, Asuming, 2013). Three studies reported significant improvements in some of the outcome measures assessed (Asuming, 2013, Sood and Wagner, 2016, Nguyen and Lo Sasso, 2019). Two studies assessed only one outcome measure and one reported a positive improvement while the other reported no significant effect (Nguyen, 2020, Jafree et al., 2021).

Three studies evaluated the effects of health insurance on age-specific mortality rates (Lambon-Quayefio and Owoo, 2017, Philibert et al., 2017, Fink et al., 2013). One one study from Ghana, reported a positive improvement in neonatal mortality after the National Health Insurance Scheme (NHIS) (Lambon-Quayefio and Owoo, 2017). Two studies from Mauritania and rural Burkina Faso, reported no significant effect on neontatal mortality and under-five mortality respectively (Philibert et al., 2017, Fink et al., 2013). The study in n rural Burkina Faso, also reported an increased mortality for individuals aged 65 and older (Fink et al., 2013).

Three studies reported positive effects on different anthropometric measures for children under-five. In Ghana, NHIS was found to positively impact on the height-for-age score, but the gains were not shared equally across regions with lower quality of care (Bagnoli, 2019). Nshakira-Rukundo et al, found that enrolment in a CBHI in rural Uganda was associated with a 4.3% percentage point less probability of stunting.(Nshakira-Rukundo et al., 2020) In the Philippines, health insurance decreased the likelihood of wasting among children by 9-12 percentage points (Quimbo et al., 2011).

Three studies evaluated the impact of health insurance on biomarkers and found positive results. In Ghana, NHIS significantly was found to reduce the probability of anemia among children by 20%.(Bagnoli, 2019) In rural Nigeria, CBHI was associated with a significant decrease in blood pressure two and four years post-implementation (Hendriks et al., 2014, Hendriks et al., 2016). In the Philippines, health insurance was found to also reduce the likelihood of an infection by 4-9 percentage points among children (Quimbo et al., 2011).

4.5 Discussion

This study sought to systematically review the impact of health insurance schemes on the quality of care in LLMICs. We identified 15 studies in 11 countries that evaluated the effects of health insurance schemes on diverse quality of care indicators. We found a large number of studies overall, but only a small number of studies meeting high quality evidence criteria. The findings of this study indicate that the impact of health insurance in LLMICs on quality care is not clearly established. While there were some beneficial effects of health insurance on structural quality indicators, the evidence regarding the impact on the process of care is inconclusive. Additionally, the relationship between health insurance schemes and mortality rates is varied and inconclusive. However, there was a strong positive effect on anthropometric measures for children and biomarkers such as blood pressure, C-reactive protein and hemoglobin levels.

Only two studies measured structural quality in health facilities after introducing health insurance schemes. Given the persistent challenge of the structural quality of care in many low-income countries and the rationalization to use health insurance schemes to increase revenue for health facilities to improve these challenges, evidence gaps appear particularly scarce. Both studies generally found positive results, however nearly two-thirds of indicators that they measured did not show significant improvements. The absence of statistically significant results may be due to the small number of observations (particularly at health facility level) in the two studies and indicators assessed. The results could also be potentially be the absence of an effect of insurance in improving structural care based on previous findings from Tanzania and Ethiopia. Qualitative studies from both countries have found that low reimbursement rates (Kuwawenaruwa et al., 2019a, Duku et al., 2018b, Okoro, 2018, Debpuur et al., 2015, Alatinga and Fielmua, 2011b) and reimbursement delays by health insurance authorities lead to financial constraints at health facilities to improve the drug and medical supplies challenges health facilities are already facing (Duku et al., 2018b, Alatinga and Fielmua, 2011b, Dalinjong and Laar, 2012).

Our review also found limited evidence on health insurance improving processes of care. Only one relevant study examined technical quality after the introduction of a health insurance scheme and found that health insurance was associated with improvement of one content of care indicator. The insurance scheme may have improved specific indicators if financial incentives to providers targeted specifically those indicators (Lavergne, 2017). A small number of studies also examined patient waiting times and found no effect of health insurance. This finding is inconsistent with the systematic review by Spaan et al, which found that health insurance schemes shorten waiting times (Spaan et al., 2012b). Furthermore, only one study examined the perceived quality of care, finding negative effects. Although subjective experiences and perceptions of care are crucial for enrolment and retention rates (Kotoh et al., 2018b, Dror et al., 2016, Adebayo et al., 2014), many of the schemes in low-income countries rarely consider patient experiences as part of health facilities maintaining their accreditation status or quality improvement measures. Health insurance authorities may consider approaches to integrate patient experiences into the accreditation of health facilities or quality improvement initiatives (Auras and Geraedts, 2010, Andres et al., 2019).

Improving the health status and well-being of populations are the ultimate goals of any health system. Our finding that the effect of health insurance on mortality is mixed departs from recent studies from high-income countries (Lee et al., 2010, Goldin et al., 2020, Sommers et al., 2012). Given that on average quality of care is poor in both the public and private sectors, (Berendes et al., 2011) simply increasing access to health facilities without the appropriate provider incentives will likely lead to no significant changes in health outcomes. In Burkina Faso, the negative effects of its CBHI on mortality appeared to have been driven by the adverse provider incentives that resulted in the decline of the quality of care (Fink et al., 2013). It is also possible that it will take longer and larger sample sizes to see the true health impact of health insurance schemes in these settings. Studies in our review assessed mortality over short periods. Larger population-level studies over a longer period are ultimately needed to address this. In contrast to the negative mortality effects observed in Burkina, health insurance programs in India, rural Nigeria and Philippines were associated with improved health outcomes such as post hospitalization wellbeing, blood pressure, reducing wasting and C-reactive protein levels. These programs appear to have been coupled with supply-side interventions to address quality of care issues such as the empanelment of high-quality health facilities, upgrading of health facilities and the training of health workers and provision of financial incentives to providers to deliver high-quality care (Quimbo et al., 2016, Hendriks et al., 2016, Hendriks et al., 2014, Shimkhada et al., 2008a, Sood and Wagner, 2016). This finding suggests that addressing supply-side factors are essential to improving health outcomes. Studies also reported that health insurance was associated with better anthropometric measures for children under-five. We suspect that the improvement in anthropometric measures was driven mainly by increase in access of care rather than improvements in quality. This is inconsistent with a systematic review which found mixed results for health outcomes among children (Shimkhada et al., 2008a).

This study provides a comprehensive systematic review of health insurance schemes on the quality of care in low-income countries. The strengths of this study include the use of the Donabedian model in conceptualizing quality of care. However, the results should be interpreted carefully in light of

some limitations. First, we included only studies published in English and therefore excluded other languages in our search strategy. Second, most of the studies did not investigate the length of enrolment into insurance schemes, which may how health insurance affect quality of care. In light of the limitations of the included studies, robust studies are needed to examine the causal impact of health insurance schemes particularly for process indicators such as appropriate treatment, diagnosis and patients' experiences of care. It is also important for studies to explore the actual causal pathways that health insurance schemes in low-income countries can affect providers' behaviors. In addition, understanding the contextual factors surrounding the health insurance is important to determine how and why these factors influence the ability of insurance schemes to affect quality of care.

In conclusion, this systematic review provides important insights into the effect of health insurance schemes in low-income countries. The results presented here suggest that current evidence suggests that health insurance schemes in low -income countries have limited effects on quality of care. If the expectation of health insurance schemes is to provide additional resources to address quality of care challenges, our findings suggest they do not so. Furthermore, if health insurances schemes were designed to change providers' behavior to improve processes of care, our findings shows that there is little impact. Our findings can serve as a resource to countries considering the use of health insurance schemes to improve quality of care.

Conflict of interest statement

The authors declare that the research was conducted in the absence of any commercial or financial relationships that could be construed as a potential conflict of interest

Author contribution statement

DOA and GF developed the protocol with inputs from BK and GA. DOA and BK did the abstract screening, and data extraction. All authors contributed to the synthesis of the results. DOA wrote the first draft of the manuscript. BK, GA and FT revised successive drafts of the paper and approved the final version. GF supervised the overall work. All authors prepared and approved the article

4.6 Supplemental

Appendix 1: Search strategy

Ovid MEDLINE(R) ALL <1946 to August 19, 2022>> Searched 21 August 2022

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1 Developing Countries.sh,kf. (91613)
2 Africa/ or Asia/ or Caribbean/ or West Indies/ or Middle East/ or South America/ or Latin America/ or Central America/ (91000)
3 (Africa or Asia or Caribbean or West Indies or Middle East or South America or Latin America or Central America).tw. (243214)
4 (Afghanistan or Albania or Algeria or Angola or Argentina or Armenia or Armenian or Azerbaijan or Bangladesh or Benin or Byelarus or Byelorussian or Belarus or Belorussian or Belorussia or Belize or Bhutan or Bolivia or Bosnia or Herzegovina or Hercegovina or Botswana or Brazil or Bulgaria or Burkina Faso or Burkina Fasso or Upper Volta or Burundi or Urundi or Cambodia or Khmer Republic or Kampuchea or Cameroon or Cameroons or Cameron or Camerons or Cape Verde or Central African Republic or Chad or China or Colombia or Comoros or Comoro Islands or Comores or Mayotte or Congo or Zaire or Costa Rica or Cote d'Ivoire or Ivory Coast or Cuba or Djibouti or French Somaliland or Dominica or Dominican Republic or East Timor or East Timur or Timor Leste or Ecuador or Egypt or United Arab Republic or El Salvador or Eritrea or Ethiopia or Fiji or Gabon or Gabonese Republic or Gambia or Gaza or Georgia Republic or Georgian Republic or Ghana or Grenada or Guatemala or Guinea or Guiana or Guyana or Haiti or Honduras or India or Maldives or Indonesia or Iran or Iraq or Jamaica or Jordan or Kazakhstan or Kazakh or Kenya or Kiribati or Korea or Kosovo or Kyrgyzstan or Kirghizia or Kyrgyz Republic or Kirghiz or Kirgizstan or Lao PDR or Laos or Lebanon or Lesotho or Basutoland or Liberia or Libya or Macedonia or Madagascar or Malagasy Republic or Malaysia or Malaya or Malay or Sabah or Sarawak or Malawi or Mali or Marshall Islands or Mauritania or Mauritius or Agalega Islands or Mexico or Micronesia or Middle East or Moldova or Moldovia or Moldovian or Mongolia or Montenegro or Morocco or Ifni or Mozambique or Myanmar or Myanma or Burma or Namibia or Nepal or Netherlands Antilles or Nicaragua or Niger or Nigeria or Muscat or Pakistan or Palau or Palestine or Panama or Paraguay or Peru or Philippines or Philipines or Phillipines or Phillippines or Papua New Guinea or Romania or Rumania or Roumania or Rwanda or Ruanda or Saint Lucia or St Lucia or Saint Vincent or St Vincent or Grenadines or Samoa or Samoan Islands or Navigator Island or Navigator Islands or Sao Tome or Senegal or Serbia or Montenegro or Seychelles or Sierra Leone or Sri Lanka or Solomon Islands or Somalia or Sudan or Suriname or Surinam or Swaziland or South Africa or Syria or Tajikistan or Tadzhikistan or Tadjikistan or Tadzhik or Tanzania or Thailand or Togo or Togolese Republic or Tonga or Tunisia or Turkey or Turkmenistan or Turkmen or Uganda or Ukraine or Uzbekistan or Uzbek or Vanuatu or New Hebrides or Venezuela or Vietnam or Viet Nam or West Bank or Yemen or Zambia or Zimbabwe).tw. (1319988)
5 exp africa/ or algeria/ or egypt/ or libya/ or morocco/ or tunisia/ or cameroon/ or central african republic/ or chad/ or congo/ or "democratic republic of the congo"/ or equatorial guinea/ or gabon/ or burundi/ or djibouti/ or eritrea/ or ethiopia/ or kenya/ or rwanda/ or somalia/ or south sudan/ or sudan/ or tanzania/ or uganda/ or angola/ or botswana/ or lesotho/ or malawi/ or mozambique/ or namibia/ or south africa/ or swaziland/ or zambia/ or zimbabwe/ or benin/ or burkina faso/ or cape verde/ or cote d'ivoire/ or gambia/ or ghana/ or guinea/ or guinea-bissau/ or liberia/ or mali/ or mauritania/ or niger/ or nigeria/ or senegal/ or sierra leone/ or togo/ or americas/ or exp caribbean region/ or exp west indies/ or exp central america/ or belize/ or costa rica/ or el salvador/ or guatemala/ or honduras/ or nicaragua/ or panama/ or panama canal zone/ or latin america/ or mexico/ or exp south america/ or argentina/ or bolivia/ or brazil/ or chile/ or colombia/ or ecuador/ or french guiana/ or guyana/ or paraguay/ or peru/ or suriname/ or uruguay/ or venezuela/ or asia/ or asia, central/ or kazakhstan/ or kyrgyzstan/ or tajikistan/ or turkmenistan/ or uzbekistan/ or exp asia, southeastern/ or borneo/ or brunei/ or cambodia/ or timor-leste/ or indonesia/ or laos/ or malaysia/ or mekong valley/ or myanmar/ or philippines/ or singapore/ or thailand/ or vietnam/ or asia, western/ or bangladesh/ or bhutan/ or india/ or sikkim/ or middle east/ or afghanistan/ or bahrain/ or iran/ or iraq/ or israel/ or jordan/ or kuwait/ or lebanon/ or oman/ or qatar/ or saudi arabia/ or syria/ or turkey/ or united arab emirates/ or yemen/ or nepal/ or pakistan/ or sri lanka/ or far east/ or china/ or beijing/ or macau/ or tibet/ or korea/ or mongolia/ or taiwan/ or indian ocean islands/ or comoros/ or madagascar/ or mauritius/ or reunion/ or seychelles/ or pacific islands/ or exp melanesia/ or exp micronesia/ or polynesia/ or pitcairn island/ or exp samoa/ or tonga/ or prince edward island/ or west indies/ or "antigua and barbuda"/ or bahamas/ or barbados/ or cuba/ or dominica/ or dominican republic/ or grenada/ or guadeloupe/ or

haiti/ or jamaica/ or martinique/ or netherlands antilles/ or puerto rico/ or "saint kitts and nevis"/ or saint lucia/ or "saint vincent and the grenadines"/ or "trinidad and tobago"/ or united states virgin islands/ or oceania/ (1332086)
6 ((developing or less* developed or under developed or underdeveloped or middle income or low* income or underserved or under served or deprived or poor*) adj (countr* or nation? or population? or world or state*)).ti,ab. (125135)
7 ((developing or less* developed or under developed or underdeveloped or middle income or low* income) adj (economy or economies)).ti,ab. (848)
8 (low* adj (gdp or gnp or gross domestic or gross national)).tw. (319)
9 (low adj3 middle adj3 countr*).tw. (26034)
10 (lmic or lmics or third world or lami countr*).tw. (11238)
11 transitional countr*.tw. (175)
12 or/1-11 (2053135)
13 exp Insurance, Health/ (156805)
14 (health adj2 insur*).ti,ab,kw. (51584)
15 or/13-14 (192047)
16 "quality of health care"/ or "outcome and process assessment, health care"/ or outcome assessment, health care/ or patient outcome assessment/ or critical care outcomes/ or patient reported outcome measures/ or treatment outcome/ or process assessment, health care/ or peer review, health care/ or program evaluation/ or benchmarking/ or quality assurance, health care/ or total quality management/ or quality improvement/ or value-based health insurance/ or quality indicators, health care/ or "standard of care"/ or "utilization review"/ or patient satisfaction/ or patient preference/ or needs assessment/ or evaluation study/ or waiting lists/ or checklist/ (1787737)
17 ((qualit* adj3 (health or healthcare or treatment* or outcome* or manag* or assur* or improv* or indicator* or standard* or assess* or evaluat* or benchmark*)) or (patient* adj2 satisfact*) or (waiting adj2 (time* or list*)) or compliance or performance or checklist*).ti,ab,kw. (1846755)
18 or/16-17 (3364125)
19 12 and 15 and 18 (3462)
20 limit 19 to yr="2020 -Current" (696)

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Embase <1974 to 2022 August 19>
Date searched: 21 August 2022
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1 health insurance/ or child health insurance/ or community-based health insurance/ or health insurance eligibility/ or national health insurance/ or private health insurance/ or public health insurance/ or universal health insurance/ (154959)
2 ((health* or cover*) adj2 insur*).ti,ab,kw. (81495)
3 or/1-2 (187369)
4 quality control/ or quality control procedures/ or benchmarking/ or clinical audit/ or nursing audit/ or total quality management/ or quality improvement study/ or health care quality/ or performance measurement system/ or program evaluation/ or evaluation study/ or program effectiveness/ or "utilization review"/ or patient satisfaction/ or patient-reported outcome/ or checklist/ or needs assessment/ or outcome assessment/ (1545212)
5 ((qualit* adj3 (health or healthcare or treatment* or outcome* or manag* or assur* or improv* or indicator* or standard* or assess* or evaluat* or benchmark*)) or (patient* adj2 satisfact*) or (waiting adj2 (time* or list*)) or compliance or performance or checklist*).ti,ab,kw. (2373429)
6 or/4-5 (3521147)
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Appendix 2: Estimates of studies that reported on structural quality of care indicators

Author (Year)	Country	Indicator	Effect	LCI	UCI	Effect type
Kuwawenaruwa (2019)	Tanzania	Index of drugs available	-0.10	-0.35	0.14	Regression coefficient
Kuwawenaruwa (2019)	Tanzania	Availability of contraceptives	0.09	-0.21	0.39	Regression coefficient
Kuwawenaruwa (2019)	Tanzania	Medical supplies	-0.01	-0.26	0.25	Regression coefficient
Kuwawenaruwa (2019)	Tanzania	Equipment with problem <90 days	0.03	-0.06	0.11	Regression coefficient
Kuwawenaruwa (2019)	Tanzania	Electricity function (%)	0.17	-0.3	0.60	Regression coefficient
Kuwawenaruwa (2019)	Tanzania	Water function (%)	0.46	0.10	0.90	Regression coefficient
Kuwawenaruwa (2019)	Tanzania	Toilet function (%)	0.04	-0.2	0.30	Regression coefficient
Kuwawenaruwa (2019)	Tanzania	Facility quality index (mean)	-0.04	-0.09	0.02	Regression coefficient
Shigute (2020)	Ethiopia	Drug availability	0.02	-0.09	0.14	Regression coefficient
Shigute (2020)	Ethiopia	Medical equipment/Facility availability	0.04	-0.02	0.10	Regression coefficient
Shigute (2020)	Ethiopia	Electricity access	0.06	-0.25	0.36	Regression coefficient
Shigute (2020)	Ethiopia	Water supply	0.03	-0.27	0.33	Regression coefficient
Shigute (2020)	Ethiopia	Perceived budget shortage by health workers	-0.22	-0.43	-0.01	Regression coefficient
Shigute (2020)	Ethiopia	Perceived drug shortage by health workers	-0.28	-0.49	-0.07	Regression coefficient

LCI= Lower confidence interval UCI= Upper confidence interval

Appendix 3: Estimates from studies that reported on processes of care indicators

Author (Year)	Country	Indicator	Effect	LCI	UCI	Effect type
Process-technical						
Content of care						
Kuwawenaruwa (2019)	Tanzania	Index of content of care for antenatal care (ANC)-observation of patients	0.09	-0.10	2.27	Regression coefficient
Kuwawenaruwa (2019)	Tanzania	Index of content of care for ANC-household survey	0.01	-0.03	0.04	Regression coefficient
Kuwawenaruwa (2019)	Tanzania	Overall postnatal care (PNC) for mothers	0.18	0.06	0.30	Regression coefficient
Kuwawenaruwa (2019)	Tanzania	Overall PNC care for infant	0.19	-0.11	0.48	Regression coefficient
Process-interpersonal care						
Interpersonal care index						
Kuwawenaruwa (2019)	Tanzania	Index of interpersonal care for PNC	0.24	0.03	0.46	Regression coefficient
Waiting time						
Kuwawenaruwa (2019)	Tanzania	ANC consultation time-minutes	-3.40	-13.7	6.87	Regression coefficient
Kuwawenaruwa (2019)	Tanzania	PNC consultation time-minutes	6.05	-5.93	18.0	Regression coefficient
Shigute (2020)	Ethiopia	Waiting time for patient card	-12.8	-31.8	6.09	Regression coefficient
Shigute (2020)	Ethiopia	Waiting time for seeing a doctor/nurse	0.95	-0.20	0.03	Regression coefficient
Perceived quality of care						
Fink (2013)	Burkina Faso	Facility hours	-0.10	-0.14	-0.05	Regression coefficient
Fink (2013)	Burkina Faso	Equipment adequacy	-0.07	-0.21	0.07	Regression coefficient
Fink (2013)	Burkina Faso	Rooms adequacy	-0.04	-0.18	0.09	Regression coefficient
Fink (2013)	Burkina Faso	Drugs available	-0.10	-0.25	0.04	Regression coefficient
Fink (2013)	Burkina Faso	Facility hygiene	-0.20	-0.38	-0.01	Regression coefficient
Fink (2013)	Burkina Faso	Staff availability	-0.32	-0.58	-0.07	Regression coefficient

LCI= Lower confidence interval UCI= Upper confidence interval

Appendix 4: Estimates from studies that reported on outcome quality of care indicators

Author (Year)	Country	Indicator	Effect	LCI	UCI	Effect type
Patient satisfaction						
Shigute (2020)	Ethiopia	Patient satisfaction	0.18	0.30	0.06	Regression coefficient
Self-reported health outcomes						
Asuming (2013)	Ghana	Number of days of illness in the last one month	-0.34	-0.06	0.41	Regression coefficient
Asuming (2013)	Ghana	Number of days could not perform normal daily activities due to illness	**-0.81**	**-1.47**	**-0.14**	Regression coefficient
Asuming (2013)	Ghana	Could not perform normal daily activities due to illness	-0.03	-0.09	0.03	Regression coefficient
Nguyen (2020)	Vietnam	Number of sick days	-0.22	-3.29	2.86	Regression coefficient
Nguyen (2019)	Vietnam	Number of days staying in bed among children aged 0-2	-0.11	-0.26	0.15	Regression coefficient
Nguyen (2019)	Vietnam	Number of days staying in bed among children aged 3-5	0.02	-0.22	0.28	Regression coefficient
Nguyen (2019)	Vietnam	Number of days with limited activities among children aged 0-2	-0.15	-0.58	0.28	Regression coefficient
Nguyen (2019)	Vietnam	Number of days with limited activities children aged 3-5	-0.76	-1.21	-0.30	Regression coefficient
Jafree (2021)	Pakistan	Overall perceived good health –nearest neighbor matching	0.17*	NR	NR	Regression coefficient
Sood (2016)	India	Self-care post hospitalization	-0.04	-0.57	0.48	Regression coefficient
Sood (2016)	India	Usual activities-post hospitalization	0.05	-0.50	0.59	Regression coefficient
Sood (2016)	India	Walking ability-post hospitalization	0.61	0.07	1.14	Regression coefficient
Sood (2016)	India	Pain-post hospitalization	0.56	0.08	1.04	Regression coefficient
Sood (2016)	India	Anxiety-post hospitalization	0.39	-0.15	0.92	Regression coefficient
Sood (2016)	India	Overall health post hospitalization	0.19	-0.25	0.62	Regression coefficient
Sood (2016)	India	Occurrence of infections post operation	-9.40	-20.2	1.40	Regression coefficient
Sood (2016)	India	Been rehospitalised since the first hospitalization	-16.5	-28.7	-4.30	Regression coefficient
Mortality						
Fink (2013)	Burkina Faso	Under-five mortality	-1.40	-8.02	5.22	Regression coefficient
Fink (2013)	Burkina Faso	Mortality 65+	27.3	4.21	50.3	Regression coefficient
Lambon-Quayefio (2017)	Ghana	Neonatal mortality	-0.07	-0.11	-0.02	Regression coefficient
Philibert (2017)	Mauritania	Neonatal mortality (early days up to 7 days)	1.67	0.74	3.8	Adjusted odds ratio
Philibert (2017)	Mauritania	Neonatal mortality (late death of 28 days)	2.13	1.00	4.54	Adjusted odds ratio
Anthropometric measures						

Bagnoli (2019)	Ghana	Height-for-age score	0.17	0.09	0.25	Mean difference
Nshakira-Rukundo	Uganda	Stunting	-0.04	-0.08	-0.00	Regression coefficient
Quimbo (2011)	Philippines	Wasting	-9.0*	NR	NR	Difference in percentage points
Biomarkers						
Bagnoli (2019)	Ghana	Not anemic (Hb >100g/l)	0.10	0.07	0.14	Mean Difference
Hendriks (2014)	Nigeria	Systolic blood pressure among hypertensive individuals	-5.24	-9.46	-1.02	Regression coefficient
Hendriks (2014)	Nigeria	Diastolic blood pressure among hypertensive individuals	-2.16	-4.27	-0.05	Regression coefficient
Hendriks (2014)	Nigeria	Controlled hypertension	3.16	0.78	12.79	Regression coefficient
Hendriks (2016)	Nigeria	Systolic blood pressure among hypertensive individuals	-4.97	-10.7	0.76	Regression coefficient
Hendriks (2016)	Nigeria	Diastolic blood pressure among hypertensive individuals	-1.81	-4.68	1.06	Regression coefficient
Hendriks (2016)	Nigeria	Controlled hypertension	-0.04	-0.05	0.13	Regression coefficient
Quimbo (2011)	Philippines	CRP positive among children	-4.1*	NR	NR	Difference in percentage points

LCI= Lower confidence interval UCI= Upper confidence interval NR= Not reported, *Significant at 5% level

Chapter 5 Health care seeking in modern urban LMIC settings: evidence from Lusaka, Zambia

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5.1 Abstract

Background: In an effort to improve population health, many low- and middle-income countries (LMICs) have expanded access to public primary care facilities and removed user fees for services in these facilities. However, a growing literature suggests that many patients bypass nearby primary care facilities to seek care at more distant or higher-level facilities. Patients in urban areas, a growing segment of the population in LMICs, generally have more options for where to seek care than patients in rural areas. However, evidence on care-seeking trajectories and bypassing patterns in urban areas remains relatively scarce.

Methods: We obtained a complete list of public health facilities and interviewed randomly selected informal sector households across 31 urban areas in Lusaka District, Zambia. All households and facilities listed were geocoded, and care-seeking trajectories mapped across the entire urban area. We analyzed three types of bypassing: i) not using health centers or health posts for primary care; ii) seeking care outside of the residential neighborhood; iii) directly seeking care at teaching hospitals.

Results: A total of 620 households were interviewed, linked to 88 health facilities. Among 571 adults who had recently sought non-emergency care, 65% sought care at a hospital. Among 141 children who recently sought care for diarrhea, cough, fever, or fast breathing, 34% sought care at a hospital. 71% of adults bypassed primary care facilities, 26% bypassed health centers and hospitals close to them for more distant facilities, and 8% directly sought care at a teaching hospital. Bypassing was also observed for 59% of children, who were more likely to seek care outside of the formal care sector, with 21% of children treated at drug shops or pharmacies.

Conclusions: The results presented here strongly highlight the complexity of urban health systems. Most adult patients in Lusaka do not use public primary health facilities for non-emergency care, and heavily rely on pharmacies and drug shops for treatment of children. Major efforts will likely be needed if the government wants to instate health centers as the principal primary care access point in this setting.

Keywords: child health, Zambia, primary care, bypassing

5.2 Introduction

Despite significant improvements over the past 30 years, mortality rates in LMICs remain high: 4% of children in LMICs die before their 5th birthday, and preventable mortality from both infectious and chronic conditions is significantly higher than in high-income countries (World Bank, 2021, Kruk et al., 2018b). Many efforts to improve health outcomes in LMICs have focused on improving access to primary health care services through interventions such as the removal of user fees for services in public primary health facilities (Lagarde and Palmer, 2011, Lagarde et al., 2012, Hone et al., 2017, Masiye et al., 2010, Ridde

and Morestin, 2011, Masiye, 2008, Clarke-Deelder et al., 2019, Uwemedimo et al., 2018). However, there is widespread evidence that the average quality of care provided in health facilities in many LMICs is low (Kruk et al., 2016, Macarayan et al., 2018, Mohanan et al., 2015, Das et al., 2008, Kruger et al., 2017, Kruk et al., 2018c). In addition, quality of care tends to vary significantly across health facilities, creating a complex decision-making environment for patients who seek care (Leonard and Masatu, 2007, Leslie et al., 2017a, Arsenault et al., 2020).

There is growing evidence that patients in LMICs are increasingly aware of differences in quality of care, and often bypass primary health facilities in their communities to seek care at more distant or higher-level health facilities (Akin and Hutchison, 1999). Extensive bypassing has been documented for childbirth (Kruk et al., 2014, Kruk et al., 2009, Parkhurst and Ssengooba, 2009, Karkee et al., 2015, Mubiri et al., 2020, Sabde et al., 2018, Shah, 2016, Bezu et al., 2021): for example, in a study in Uganda, 29% of women bypassed their nearest health facility for delivery (Mubiri et al., 2020); in a study in Nepal, 71% of women whose nearest facility was a birthing center bypassed the center to deliver in a hospital (Karkee et al., 2015). Studies have also documented high rates of bypassing for primary care in settings such as China, Ghana, India, and Chad (Gauthier and Wane, 2011, Bell et al., 2020, Li et al., 2021, Rao and Sheffel, 2018), and for inpatient care in Sierra Leone and Kenya (Fleming et al., 2016, Ocholla et al., 2020). Fewer studies have examined bypassing for pediatric care (Ocholla et al., 2020, Kahabuka et al., 2011, Arsenault et al., 2020), but these studies also show high rates of bypassing. Important predictors of bypassing include distance to a hospital (Bezu et al., 2021)and perceived quality of the local primary health facility (Kruk et al., 2009, Rao and Sheffel, 2018, Leonard et al., 2003). Bypassing in urban areas, where patients have more options for where to seek care and their choices are less constrained by distance, may be particularly revealing of patient preferences. While evidence on bypassing patterns in urban areas is relatively scarce, the existing evidence suggests that there are often higher rates of hospital use in urban areas relative to rural areas (Li et al., 2021, Arsenault et al., 2020, Okeke and Okeibunor, 2010).

In this study, we describe care-seeking patterns among urban informal sector households in Lusaka, Zambia. Thanks to a 2012 reform(Masiye, 2008) patients in Lusaka are not required to pay fees for primary care as long as they access care through health posts or health centers. Despite these financial incentives to use lower level facilities, there is evidence that many families bypass local health centers and directly seek care either at hospitals or in the private sector(Zambia Statistics Agency, 2019).

To assess the extent of bypassing, we collected detailed treatment seeking data from 620 randomly-selected households in Lusaka, and identified the location and type of facilities used for adult as well as child healthcare. We quantify the rates of three types of bypassing: i) not using health centers or health posts for primary care (non-compliance with government recommendations); ii) seeking care outside of the residential neighborhood (spatial bypassing to reach higher quality facilities), and iii) directly seeking care at tertiary teaching hospitals (bypassing two levels of care).

5.3 Methods

Study setting

Zambia is a lower-middle-income country in southern Africa with a life expectancy at birth of 64 years, maternal mortality rate of 213 deaths per 100,000 live births, and child mortality ratio of 62 deaths per 1,000 live births (World Bank, 2021). In 2019, 44% of the population lived in an urban area [1]. Lusaka district, including the capital city, has a population of approximately two million people living in an area of approximately 418 square kilometers. In Lusaka province (of which 80% is Lusaka district), average household wealth, infrastructure, education levels, and access to health care services are generally higher than in other parts of Zambia. For example, in 2018, 50% of the population of Lusaka province was in the country's highest wealth quintile; 98% had access to an improved source of drinking water compared with 71% nationwide; the female literacy rate was 80% compared with 66% nationwide; and 91% of live births in the preceding five years were in a health facility compared with 84% nationwide (Zambia Statistics Agency, 2019).

The Zambian health system has a pyramid-structure with three levels. Level 1 includes health posts (with catchment areas of 500 households in rural areas and1000 households in urban areas), health centers (with catchment areas of 10,000 in rural areas and 50,000 in urban areas), mini hospitals (catchment population between 50,000 and 80,000) and district hospitals (catchment population between 80,000 and 20,000). Level 2 includes provincial level hospitals (catchment population 200,000 to 800,000) which provide secondary care and curative care in pediatrics, obstetrics and gynecology and general surgery. Level 3 includes tertiary hospitals (catchment population 800,000 and above), such as the University Teaching Hospital in Lusaka, and specialized hospitals, such as the Cancer Diseases Hospital and the National Heart Hospital. Residential neighborhoods are generally assigned to a nearby health center or health post where they are expected to go as their first point-of-contact with the health system; they may then be referred to a hospital if needed. In practice, residents may choose to go to a different health center or health post from the one they are assigned to; in these cases, they do not incur a bypassing fee because they are still accessing the system at the recommended level. However, if they seek care directly at a hospital, then they incur a bypassing fee.

In addition to the public system, there are private and not-for-profit health facilities throughout Zambia. These are registered by the National Health Professions Council (Health Professions Council of Zambia, 2019b). In Lusaka, these are mainly health centers and Level 1 hospitals.

At the data of data collection, residents of Lusaka mainly used Level 1 and Level 3 care, as there were few Level 2 hospitals in the city. Since data collection, many health facilities in Lusaka have been upgraded in levels. Throughout this paper, we focus on the levels as they were at the time of data collection.

Study design

This study was a cross-sectional household survey conducted in Lusaka district in Zambia from November to December 2020.

Study population and sample

The target population for the study was all adults employed in the informal sector and aged between 18–65 years who lived in Lusaka district, and their children. We define the informal sector as businesses or other economic units that are not registered with a tax or licensing authority. Those who are employed in the informal sector tend not to have contracts or entitlements. As of 2014, the informal sector accounted for about 90% of employment in Zambia (Central Statistical Office, 2018). To determine whether respondents were employed in the formal or informal sector, we asked whether they had a formal employment contract and contributed to the National Pension Scheme Authority (NAPSA).

We used a random clustered sampling approach to select households for participation in this study. The target sample size of 700 households was chosen for the purposes of a separate analysis of health insurance participation and health system confidence. To draw the sample, we first randomly sampled 35 enumeration areas (EAs) from the 1,225 listed in the 2010 Zambia Census of Population and Housing. Within each EA, we then approached every fourth household until we reached a sample of 20 informal sector households. Eligible heads of households or their spouse were provided information about the study and those who consented were interviewed using the questionnaire.

For the purposes of this analysis, we defined the adult analytic sample to include all adults whose most recent health visit was for care for a chronic condition, a check-up, or a new (acute) health issue. We excluded adults whose most recent health visit was an emergency. We defined the child sample to include all children aged five and under who had received care in the past two weeks for fever, diarrhea, cough, or fast breathing.

Data collection

Interviewers were trained and supervised directly by a member of the study team (DOA). Household interviews were conducted from November 6 to December 19, 2020. During interviews, adults in the sample were asked about their own care-seeking during their most recent health visit, as well as care-seeking for fever, diarrhea, cough, or fast breathing in the past two weeks for children aged five and under in their household (up to a total of five children per household).

All data were collected using the Open Data Kit (ODK) software package on hand-held tablets. Survey tools were developed in English and then translated to local languages by the survey team. Interviews were conducted in the respondent's preferred language (English, Nyanja, or Bemba). Residential coordinates for all households were collected directly through the tablets using a geolocation function integrated into ODK.

In addition, we collected information on the locations of health facilities in Lusaka. An initial list of facilities as well as their geolocations was obtained from the Zambian Ministry of Health. This list included public

facilities as well as private and not-for-profit (e.g., religious) health facilities. It did not include pharmacies or drug shops. Geocodes of all facilities in the sample were verified by one of the authors (DOA) in January 2021 through a combination of online mapping resources (January 10–15) (Google maps) and personal visits to facilities (January 17–22).

Ethics

We obtained ethical clearance from the University of Zambia Social Sciences and Humanities Ethical Clearance Committee (HSSREC-2020-SEP-012) and authority to conduct research from the National Health Research Authority (NHRA00018/15/10/2020). We also obtained ethical clearance from the Ethikkommission Nordwest- und Zentralschweiz (EKNZ) in Switzerland (AO_2020-00,029).

Primary outcome variables

The primary outcome was bypassing. We used three definitions of bypassing (Table 10). These definitions are not mutually exclusive, but each measure different bypassing constructs with different interpretations. First, we defined “primary care bypassing” as using a health facility other than a health center or health post for any non-emergency care. This strict definition of bypassing aligns with guidelines from Zambia’s Ministry of Health. Second, we defined “horizontal bypassing” as using a distant health facility or a pharmacy rather than a nearby facility for non-emergency care – this type of bypassing implies additional transport time and cost, and is likely a reflection of households anticipating to find higher quality of care outside of their residential areas. To identify nearby facilities, we asked all subjects in each neighborhood about the facility their neighborhood belonged to. In most cases, the large majority of respondents agreed on one specific facility. In some cases, two primary facilities were mentioned. We defined nearby facilities as the one (if only one was mentioned) or two (if two were mentioned) facilities that respondents mentioned, as well as the facility that was spatially closest to the respondent (if this was different from the one or two facilities mentioned). Of note, Ministry of Health guidelines do not specify which specific health facility people should go to for care, so horizontal bypassing can in principle be in line with Ministry of Health guidelines as long as people seek care for non-emergency conditions at a health centre or health post rather than a hospital. In practice, many patients seeking care outside of their residential area seek care at higher level facilities, in which case horizontal bypassing also implies primary care bypassing. Last, we defined “two-level” bypassing as using a teaching hospital (Level 3) for non-emergency care. Patients who do this are bypassing not only the available primary health care facilities but also the regular (Level 1, non-teaching) hospitals.

Table 10: Definitions of bypassing

Type of bypassing	Definition
Primary care bypassing	Using a facility other than a health centre or health post for non-emergency care

Horizontal bypassing	Using a distant facility rather than a nearby facility for non-emergency care; nearby facilities include those spatially closest as well as those listed by respondents as the main facility their neighborhood belonged to
Two-level bypassing	Using a teaching hospital (Level 3) for non-emergency care

Statistical analysis

We began our analysis by describing the characteristics of the adult and child analytic samples. We described respondents' demographic characteristics (e.g., gender and age) as well as the landscape of health facilities in the area the where respondents lived. To describe the landscape of health facilities, we calculated the number of health facilities within 1 km and within 5 km of where each respondent lived using Euclidean distance and then took the average across respondents.

Next, we mapped and described the spatial distribution of the health facilities in Lusaka and the types of facilities that adults and children in the study sample visited. Mapping included any facilities on the Ministry of Health's list of health facilities, but it did not include pharmacies or drug shops, even though some respondents sought care in these locations.

We then calculated the rate of bypassing (using all three definitions above) for adults and children in the sample, disaggregated by the reason for their health visit. We mapped care-seeking patterns for each study participant meeting each of the three definitions of bypassing using QGIS Version 3 (QGIS, 2022). In addition, we examined how bypassing patterns varied across constituencies. Constituencies are administrative areas that contain multiple EAs; Lusaka has 7 constituencies covering 1,125 EAs.

Finally, we used logistic regression to analyze associations between study participant characteristics (including sex, age, marital status, education level, wealth measured using an asset score, and reason for seeking care) and each of the three types of bypassing. We fit models in the adult and child samples separately. We clustered standard errors at the EA level. All analyses were conducted using Stata 16 (Statacorp, 2019).

5.4 Results

A total of 753 randomly selected households were approached by the study team. Nine households (1.2%) were excluded because the respondent was above 65, 43 households (5.7%) could not be reached and 26 (3.5%) indicated they were too busy or not interested in the study. Forty-eight households (6.4%) were employed in the formal sector, and also excluded from the study. We therefore interviewed 627 adults about their recent care-seeking behavior and that of children in their household.

Three EAs had less than four eligible households due to high formal sector employment in these neighborhoods – we excluded households from these areas from the analysis (*N* = 7, 0.9%) because the number of observations was too small to establish the most commonly used health facilities in these settings. A sample flow diagram is included in Additional file 1: Figure S1.

The final adult analytic sample included the 577 adults whose most recent visit to a health facility was for non-emergent care. The majority (78%) of participants were female (Table 11). About one quarter (24%) of the sample was over age 45, 43% was aged 30–44, and 29% was under age 30. The majority (59%) of the sample had completed secondary education or higher. The most common reason for their most recent health visit were new health problems (54%), followed by routine check-up (24%), and chronic disease treatment (22%). On average, the households in the sample had two general hospitals, 16 private facilities, and 11 other health facilities within five kilometers of their homes.

Table 11: Descriptive statistics

	(1) Adult sample (N=577)	**(2) Child sample (N=141)**
Demographic characteristics	*N (%)*	*N (%)*
Female	447 (77.5%)	69 (48.9%)
Age under 30	165 (28.6%)	-
Age 30-44	250 (43.3%)	-
Age 45 plus	142 (24.6%)	-
Primary education or less	234 (40.6%)	-
Secondary education	256 (44.4%)	-
Higher education	87 (15.1%)	-
Married	394 (68.3%)	-
	Mean (SD)	*Mean (SD)*
Asset quintile	3.0 (1.4)	2.7 (1.2)
Reason for seeking care	*N (%)*	*N (%)*
Emergency visit	0 (0.0%)	-
Routine checkup	140 (24.3%)	-
Chronic treatment	128 (22.2%)	-
Acute sickness	309 (53.6%)	-
Diarrhea	-	89 (63.1%)
Fever	-	65 (46.1%)
Cough	-	95 (67.4%)
Fast breathing	-	14 (9.9%)
Facility access	*Mean (SD)*	*Mean (SD)*
Teaching hospitals within 1 km	0.0 (0.0)	0.0 (0.0)
General hospitals within 1km	0.4 (0.5)	0.4 (0.5)
Private facilities within 1 km	1.8 (1.1)	1.9 (1.1)
Other health facilities within 1km	0.9 (0.9)	1.0 (0.8)
Teaching hospitals within 5 km	0.2 (0.4)	0.2 (0.4)
General hospitals within 5 km	2.2 (0.9)	2.2 (0.8)
Private facilities within 5 km	16.0 (5.3)	16.1 (4.8)

Other health facilities within 5 km	10.8 (3.3)	10.8 (2.8)

Notes: Column (2) describes the characteristics of the adult analytic sample, which is restricted to include only adults whose most recent visit to a health facility was for care for a non-emergency condition. Column (2) describes the characteristics of the child analytic sample, which the characteristics of all children in the sampled households who sought care for diarrhea, fever, cough, or fast breathing within the past two weeks.

The survey participants had a total of 402 children under-5 living in their households, of whom 141 had sought care for an episode of diarrhea (63%), fever (46%), cough (67%), or fast breathing (10%) in the past two weeks. About half (49%) of these 141 children were female.

Figure 10 shows the spatial location of all health facilities officially recognized by the Ministry of Health within the District of Lusaka. There were a total of 88 facilities operating in Lusaka district based on the list from the Ministry of Health: two teaching hospitals, six general (Level 1) hospitals, two Level 2 hospitals, 47 private facilities and 31 smaller facilities, including health centres, health posts or mission facilities.

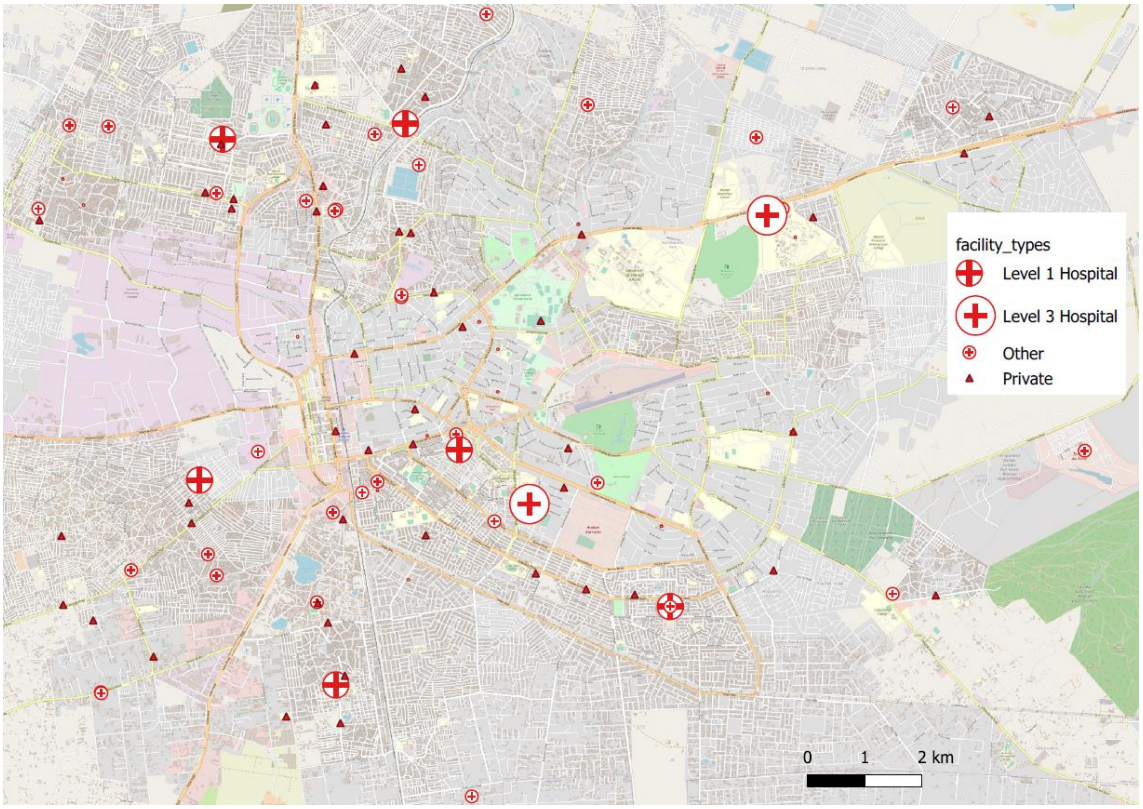

Figure 10: Spatial Distribution of Facilities

Notes: Map shows spatial distribution of health facilities within Lusaka district. “Other” facilities include health centres, health posts as well as health centers operated by missions or faith-based organizations

Figure 11 illustrates the distribution of facilities used for care by reason for seeking care. Across all care or health problem categories, Level 1 hospitals were the most commonly used facility type, with less than one third of adult patients using health posts or health centers for checkup, chronic or acute care. Among adults, non-governmental facilities (private or faith based) were most commonly used for check–ups (11%) and teaching hospitals were most commonly used for chronic care (18%). Compared with adults, children were more likely to receive care in a health post or health center (with 41% seeking care at these facilities), or a pharmacy or drug shop (21%). One third of children received care in a hospital.

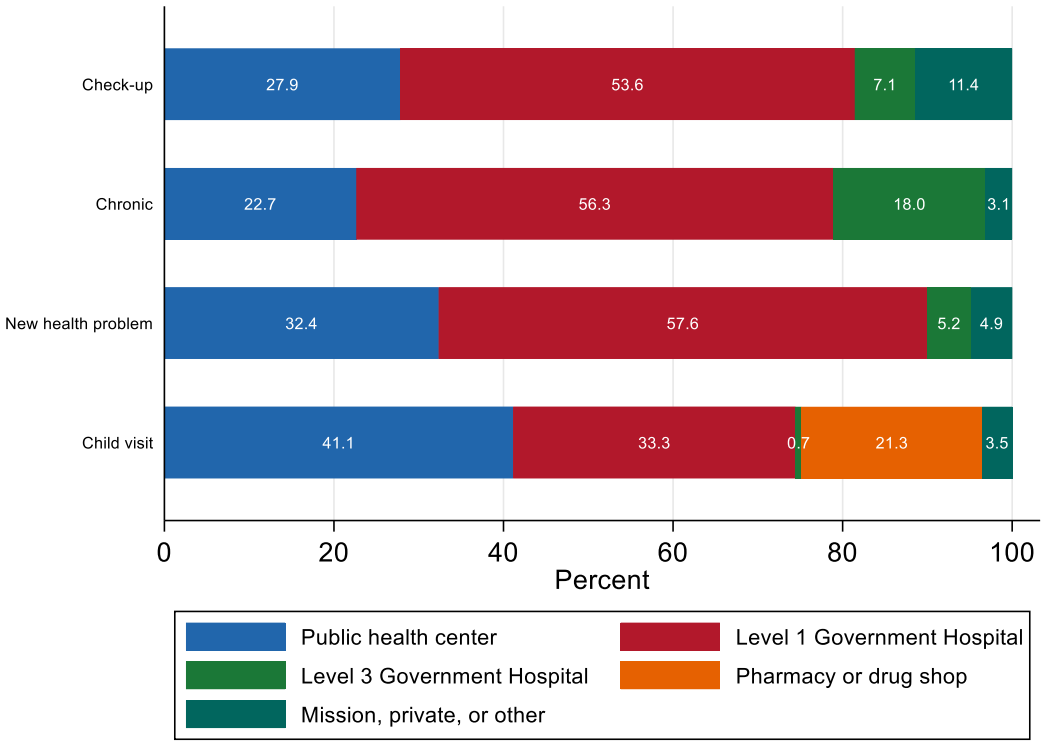

Figure 11: Types of facilities where people seek care, by reason for seeking care

Notes: Figure shows the percentage of respondents who sought care at different types of health facilities, by the type of health visit (adult check-up, adult chronic care visit, adult new health issue, and child visit)

As shown in Table 12, bypassing was very common across all conditions: on average 71% (95% CI: 67% to 75%) of adults bypassed public health centres and posts, with particularly high rates for chronic conditions (77%; 95% CI: 70% to 85%). Horizontal bypassing was less common: 32% (95% CI: 29% to 36%) of adults visited a more distant rather than a nearby health facility, and this rate was similar across different reasons for health visits. Finally, the rate of two-level bypassing among adults was 8% (95% CI: 6% to 11%), with the highest observed rate for adults seeking care for chronic conditions (18%; 95% CI: 11% to 25%).

Table 12: Rate of bypassing, by reason for seeking care

	N	%	95% Confidence Interval
Adults: all conditions (N=577)			
Primary care bypassing	409	71%	(67% - 75%)
Horizontal bypassing	187	32%	(29% - 36%)
Two-level bypassing	49	8%	(6% - 11%)
Adults: check-ups or preventive care (N=140)			
Primary care bypassing	101	72%	(65% - 80%)
Horizontal bypassing	48	34%	(26% - 42%)
Two-level bypassing	10	7%	(3% - 11%)
Adults: follow-up care for a chronic condition (N=128)			
Primary care bypassing	99	77%	(70% - 85%)
Horizontal bypassing	47	37%	(28% - 45%)
Two-level bypassing	23	18%	(11% - 25%)
Adults: new health issue (N=309)			
Primary care bypassing	209	68%	(62% - 73%)
Horizontal bypassing	92	30%	(25% - 35%)
Two-level bypassing	16	5%	(3% - 8%)
Children: any acute sickness (N=141)			
Primary care bypassing	83	59%	(51% - 67%)
Horizontal bypassing	64	45%	(37% - 54%)
Two-level bypassing	1	1%	(0% - 2%)
Children: diarrhea (N=89)			
Primary care bypassing	53	60%	(49% - 70%)
Horizontal bypassing	40	45%	(34% - 55%)
Two-level bypassing	1	1%	(0% - 3%)
Children: fever (N=65)			
Primary care bypassing	35	54%	(41% - 66%)
Horizontal bypassing	23	35%	(23% - 47%)
Two-level bypassing	1	2%	(0% - 5%)
Children: cough (N=95)			
Primary care bypassing	55	58%	(48% - 68%)
Horizontal bypassing	47	49%	(39% - 60%)
Two-level bypassing	1	1%	(0% - 3%)
Children: fast breathing (N=14)			
Primary care bypassing	8	57%	(27% - 87%)
Horizontal bypassing	6	43%	(13% - 73%)
Two-level bypassing	1	7%	(0% - 23%)

The primary care bypassing rate among children was 59% (95% CI: 51% to 67%), slightly lower than the rate among adults. The bypassing rate was similar for children with different symptoms. The rate of horizontal bypassing was slightly higher among children than among adults at 45% (95% CI: 37% to 54%). Among children who bypassed the nearest health facility, 47% (95% CI: 35% to 59%) went to pharmacies and the remainder sought care at more distant public primary care facilities or hospitals. Finally, the rate of two-level bypassing among children was 1% (95% CI: 0% to 2%).

Figure 12 illustrates the spatial patterns of bypassing. About two thirds (67%) of the overall primary care bypassing occurs at local (Level 1) hospitals, which are located within the same constituency and thus are within two km of most households in our sample (Fig.12, Panel A). Horizontal bypassing involves on average slightly larger distances (Fig. 12, Panel B). About half of horizontal bypassing goes to hospitals in other constituencies (UTH and Matero Level 1 hospital appears to be most popular in our sample, accounting for 20 and 14% of total horizontal bypassing, respectively) – the rest of the patients seek care at a mix of public (30%) and private or other facilities (19%) in other parts of the city. Distance travelled is on average largest for two-level bypassing, and mostly concentrated at the University Teaching Hospital (UTH) (Fig. 12, Panel C), which attracts patients from the entire city.

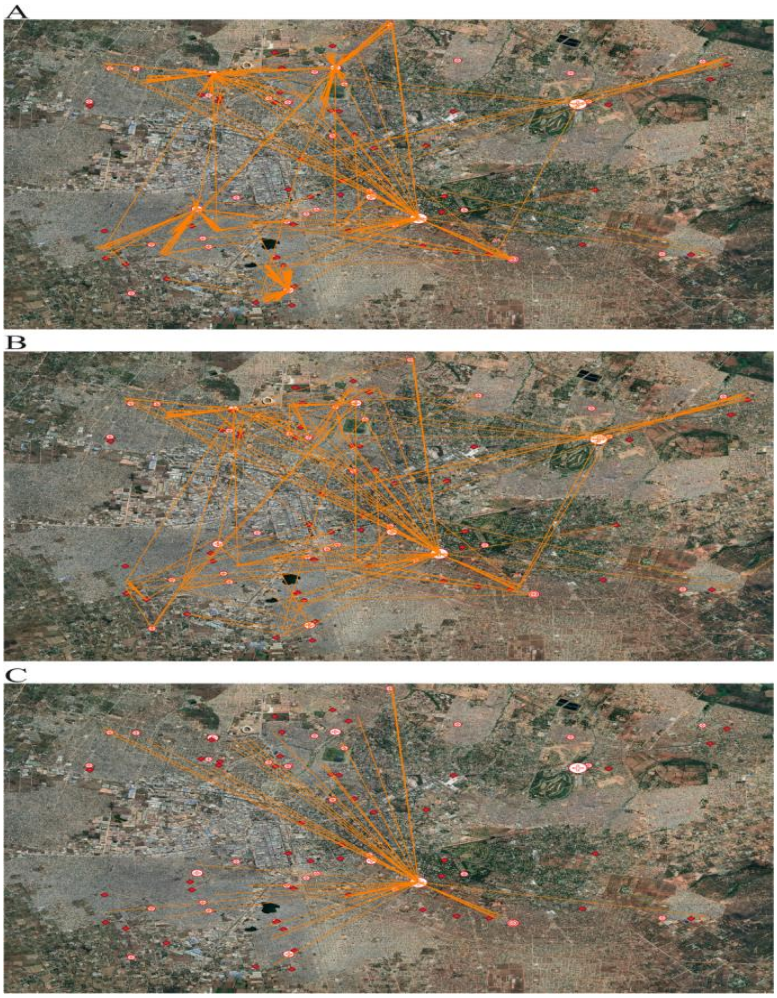

Figure 12 Spatial Distribution of Treatment Seeking among bypassers. **Panel A** Bypassing Health Centres and Health Posts. **Panel B** Horizontal Bypassing. **Panel C** Treatment Seeking at UTH

Bypassing rates varied significantly across the different constituencies in the sample (Additional file 1: Table S1). The rate of primary care bypassing ranged from 28 to 100%, the rate of horizontal bypassing ranged from 5 to 79%, and the rate of two-level bypassing ranged from 0 to 32% across constituencies. The large differences in care seeking behavior can be best illustrated by comparing two constituencies with very different behaviors: in one EA in Lusaka Central near Bauleni Health Centre, only 10% engaged in primary care bypassing, 15% in horizontal bypassing, and only 5% went to teaching hospitals (two-level bypassing). In contrast, in another EA near Chilenje Level 1 Hospital, the rates of bypassing were 95% (primary care bypassing), 47% (horizontal bypassing), and 32% (two-level bypassing).

As shown in Table 13 and Additional file 1: Table S2, bypassing rates varied with respondent characteristics. Among adults (Table 13), women had a 10% lower odds of primary care bypassing (95% CI: 0.83 to 0.98) and a 10% higher odds of horizontal bypassing (95% CI: 1.00 to 1.20) than men, after adjusting for other characteristics. Married participants had a 10% lower odds of horizontal bypassing (95% CI: 0.84 to 0.98) than unmarried participants, though rates of primary care bypassing and two-level bypassing were very similar between married and unmarried participants. Older respondents had higher rates of two-level bypassing and horizontal bypassing, though these associations were only statistically significant for two-level bypassing. Adults with a higher socioeconomic status as measured by education level and asset scores generally had higher rates of bypassing than those with lower socioeconomic status, though this association was not statistically significant for all outcomes and education levels. The finding (from unadjusted analyses) that two-level bypassing is more common among adults seeking care for chronic conditions than other types of care persisted after adjustment for socioeconomic characteristics.

Table 13 Associations between respondent characteristics and bypassing

	(1) Primary Care Bypassing	**(2) Two-level Bypassing**	**(3) Horizontal Bypassing**
Female	0.901**	0.989	1.097**
	(0.830 - 0.979)	(0.938 - 1.043)	(1.003 - 1.200)
Age (Ref = 18-29)			
30-44	1.049	1.049*	1.058
	(0.956 - 1.150)	(0.991 - 1.110)	(0.978 - 1.144)
45+	0.987	1.052*	1.066
	(0.869 - 1.122)	(0.993 - 1.114)	(0.957 - 1.188)
Married	1.007	0.987	0.903**
	(0.934 - 1.086)	(0.927 - 1.051)	(0.835 - 0.976)
Education level (Ref = Primary or less)			
Secondary	1.072	0.999	1.106**
	(0.964 - 1.192)	(0.951 - 1.049)	(1.020 - 1.199)
Higher	1.026	1.130**	1.344***
	(0.850 - 1.238)	(1.014 - 1.259)	(1.142 - 1.581)
Asset score	1.020	1.016**	0.976
	(0.982 - 1.060)	(1.001 - 1.031)	(0.941 - 1.011)
Reason for seeking care (Ref = check-up)			

Chronic condition	1.066	1.096**	1.008
	(0.967 - 1.176)	(1.005 - 1.197)	(0.874 - 1.164)
Acute condition	0.966	0.988	0.956
	(0.885 - 1.056)	(0.946 - 1.032)	(0.860 - 1.062)
Constant	1.968***	0.991	1.335***
	(1.629 - 2.378)	(0.888 - 1.107)	(1.104 - 1.614)
Observations	577	577	577
R-squared	0.035	0.081	0.054

Notes: Table shows exponentiated coefficients and 95% confidence intervals from logistic regression models. Standard errors are clustered at the enumeration area level. “Ref” indicates the omitted reference group for categorical variables. *** p<0.01, ** p<0.05, * p<0.1

Among children (Additional file 1: Table S2), primary care bypassing was higher among those whose caregivers had completed secondary education than those with primary education or less (odds ratio 1.27, 95% CI: 1.06 to 1.53), but there were no statistically significant differences by education level for two-level bypassing or horizontal bypassing. Bypassing rates also did not differ significantly by the asset quintile of the caregiver, after adjusting for other characteristics. Primary care bypassing was significantly less common for female children (odds ratio 0.78, 95% CI: 0.66 to 0.92) than male children, but other forms of bypassing did not vary significantly by gender. Bypassing rates were generally lower among children presenting with fever and higher among children presenting with diarrhea or fast breathing, though these associations were generally not statistically significant.

5.5 Discussion

In this study, we described care-seeking patterns in Lusaka, Zambia and measured the rates of primary care bypassing, horizontal bypassing, and two-level bypassing. Despite recent government efforts to encourage use of primary care through the removal of user fees, primary care bypassing is extremely common in Lusaka, and Level 1 and Level 3 hospitals are used extensively for non-emergency care. These findings are consistent with a growing literature showing high rates of bypassing in low- and middle-income countries (Akin and Hutchison, 1999 , Kruk et al., 2014, Kruk et al., 2009, Parkhurst and Ssengooba, 2009, Karkee et al., 2015, Mubiri et al., 2020, Sabde et al., 2018, Shah, 2016, Bezu et al., 2021, Gauthier and Wane, 2011, Bell et al., 2020, Li et al., 2021, Rao and Sheffel, 2018, Ocholla et al., 2020, Arsenault et al., 2020, Kahabuka et al., 2011, Leonard et al., 2002, Kumar et al., 2018, Tappis et al., 2016, Amoro et al., 2021).

Our study builds on the existing literature by mapping bypassing patterns in an urban setting. In the context of rapid urbanization in sub-Saharan Africa, where the proportion of the population living in an urban area increased from 27 to 41% over the past 30 years(World Bank, 2021), it is important to understand care-seeking patterns in cities. Furthermore, while past studies tended to focus on a single definition of bypassing, we examined the rates of different forms of bypassing and are thus able to further understand different care-seeking patterns. While we found very high rates of primary care

bypassing (71% of adults and 59% of children), we found lower rates of horizontal bypassing (26% of adults and 45% of children).

High rates of hospital use for non-emergency care, as observed in this study and others (Arsenault et al., 2020, Kujawski et al., 2018), present a challenge for achieving the Sustainable Development Goal for universal health coverage (Affairs). The World Health Organization (WHO) has called for a shift of the entry point to the health system from hospitals to primary care centers to promote efficient use of resources, equitable access to care, and continuity of care (World Health Organization, 2015). In Zambia, the user fee structure is set up to discourage the use of hospitals as a first point-of-contact. While hospitals could attempt to stop this practice, it is possible that the bypassing fee incentivizes them to accept patients seeking non-emergency care.

The extensive use of pharmacies and drug shops for pediatric health care observed in this study also presents a potential challenge. Pharmacies play a significant role in primary care provision in many LMICs, often because they are considered to be convenient locations to seek care (Udoh et al., 2020, Okai et al., 2019). However, there is evidence of important gaps in pharmacists' education and training in many settings (Udoh et al., 2020, Improving Health in Slums Collaborative and Watson, 2021), and pharmacies often lack basic medications and equipment for primary care provision(Improving Health in Slums Collaborative and Watson, 2021). Furthermore, a study in Zambia found widespread non-prescription sale of antibiotics in community pharmacies, a practice that may contribute to antimicrobial resistance (Kalungia et al., 2016). It is important to understand why caregivers choose to bring their children to pharmacies instead of free public facilities. If pharmacies are to continue playing an important role in pediatric care in Zambia, there is a need to ensure that they are adequately staffed and supplied, and that measures are in place to ensure appropriate use of medication in these locations.

While this is an observational study and does not provide direct insights into reasons for bypassing, our analysis and the existing literature point to several possible explanations. First, patients may bypass because they perceive care to be of higher quality at a more distant or higher-level facility (Kruk et al., 2009, Leonard et al., 2003). In our data, these perceptions seem to vary substantially across communities: in some EAs, nearly all patients bypassed the local primary care facility while, in others, it was much more commonly used. Higher-income patients, in particular, may be willing to pay more to receive care that they perceive to be of a higher quality (Gauthier and Wane, 2011, Rao and Sheffel, 2018, Arsenault et al., 2020); this may help explain our finding that bypassing is more common among study participants with higher levels of education and household assets. A second possible explanation is that the hours of operation of the bypassed facilities are too limited or inconvenient (Geldsetzer et al., 2014, Mwamba et al., 2018), leading patients to seek care in facilities with hours that are more amenable to their schedules. Another possible explanation is that patients bypass nearby facilities due to fear of stigma from seeking care in their own communities for conditions such as HIV/AIDS. In our analysis of horizontal bypassing, we found that some patients bypassed nearby primary health centers to seek care at more distant primary health centers, while other patients bypassed nearby hospitals to seek care at more distant hospitals. The estimated HIV rate in Lusaka is 16% (Mweemba et al., 2022), and care-

seeking for HIV/AIDS is associated with high levels of stigma (Parsons et al., 2015). Past studies in LMIC settings have found that patients may be willing to travel longer distances to avoid being recognized when seeking testing or treatment for HIV/AIDS (Fonner et al., 2021, Mee et al., 2020), so it is possible that participants in our study chose to bypass nearby facilities for this reason. Finally, many hospitals in Lusaka were upgraded from health centers in recent years (All the clinics in Lusaka upgraded to level 1 hospitals to be operationalized -Government, 2021); it is possible that residents were unaware that they were using hospitals, though the fee structure would likely make it clear. This is an important area for future research.

The strengths of this study include the use of a dataset with a complete mapping of facilities in a major urban center that is likely representative of many urban areas in sub-Saharan Africa, and the detailed data on care-seeking behavior collected from a randomly selected household sample. These descriptive data can be used by local managers to inform analyses of bypassing behaviors and subsequently consider how to address them.

This study also has several weaknesses. First, we do not have information on whether bypassing patients were referred to higher-level facilities by providers in primary health facilities, or were attending follow-up visits which can occur in specialized clinics in teaching hospitals. These care-seeking patterns would be in line with Ministry of Health guidance. While referrals and follow-up visits might help to explain the high rates of two-level bypassing by patients with chronic conditions (as 18% of patients with such conditions seek care at UTH), they are unlikely to explain the broader trends we observe in this study since we found that patients seeking care for new health conditions bypassed at only slightly lower rates than those seeking care for chronic conditions. Data on referral patterns – including whether patients were referred from primary care to higher level facilities, sought care at primary care facilities before deciding themselves to go to higher level facilities, or went straight to higher-level facilities – would help to shed further light on the challenges at the level of primary care facilities. Second, our household survey included informal sector households only. However, this is the large majority of residents in Zambia (Central Statistical Office, 2018), and only 6.4% of the adults we approached for the study were employed in the formal sector and excluded for this reason. It seems unlikely that bypassing behavior would be less pronounced in the formal sector given the generally higher socioeconomic status of these households – assessing these differences would certainly be interesting for future studies. Third, the structure of hospital services in Zambia will be updated in 2022 as part of the 2022–2026 National Health Strategic Plan. However, the hospital mapping we used in this analysis was current for the study period and the Ministry of Health's guidance regarding the use of primary care is not expected to change. Fourth, the time horizons are different for the child sample (past two weeks only) and the adult sample (most recent visit); this may impact our comparisons between adults and children. Finally, we make the assumption that individuals were living in their current household and were at home when they most recently sought care. If many individuals moved between when they sought care and when they were interviewed, or if they sought care during their working day, this might change our results for horizontal bypassing; however, it would not change our results for primary care bypassing or two-level bypassing.

5.6 Conclusions

The results presented in this paper suggest that bypassing is incredibly common in Lusaka, and that existing care-seeking recommendations by the government are largely ignored. As policymakers aim to encourage the use of primary care, it is important to consider how to make lower level facilities more attractive and beneficial to patients. Hospital fee structures such as the one introduced in Zambia, whereby patients can access free primary care but have to pay to directly access care at a hospital, do not seem to deter patients from seeking care in hospitals; this suggests that patients highly value the care provided in hospitals.

Availability of data and materials

The datasets used and/or analyzed during the current study will be made available on the Harvard University Dataverse upon publication.

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Contributions

DOA led the data collection process. GF, EC, and DOA developed the study idea. GF and EC conducted the analysis and drafted the manuscript, with detailed input from DOA. FM and MN reviewed and provided input on the manuscript. All authors approved the final manuscript for publication.

Ethical declarations

Ethics approval and consent to participate

We obtained ethical clearance from the University of Zambia Social Sciences and Humanities Ethical Clearance Committee (HSSREC-2020-SEP-012) and authority to conduct research from the National Health Research Authority (NHRA00018/15/10/2020). We also obtained ethical clearance from the Ethikkommission Nordwest- und Zentralschweiz (EKNZ) in Switzerland (AO_2020-00029). All research was carried out in accordance with relevant guidelines and regulations. All study participants provided informed consent.

Consent for publication

Not applicable.

Competing interests

The authors declare no competing interests.

5.7 Supplemental

Supplementary Appendix to

"Health Care Seeking in Modern Urban LMIC Settings: Evidence from Lusaka, Zambia"

Additional File 1

Figure S1: Sample flow diagram

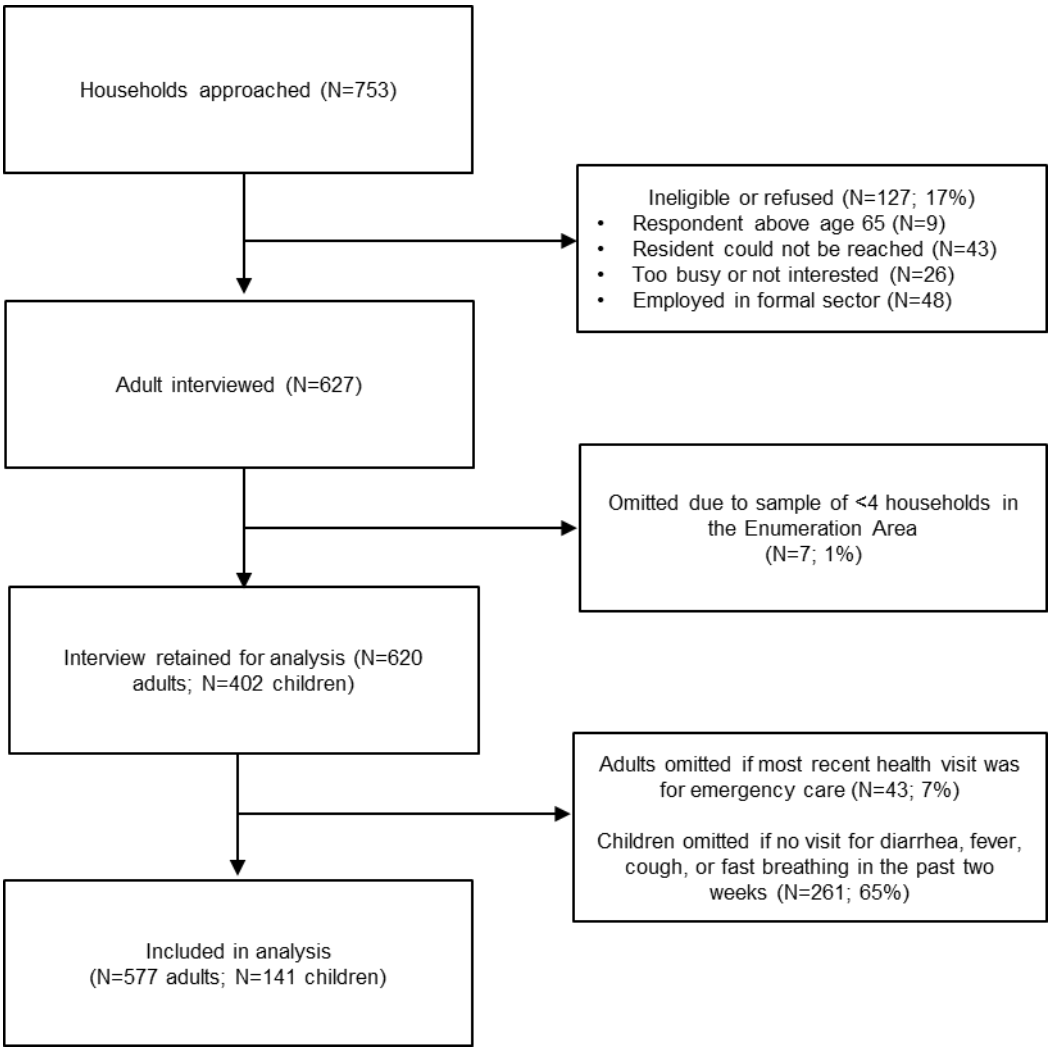

Table S1: Bypassing by study cluster

Cluster	Constituency	Main Public Health Facility (based on participant response)	Closest Public Health Facilities (spatially)	% Bypassing (primary)	% Bypassing (horizontal)	% Bypassing (2-levels)
1	Chawama	Chawama Level 1 Hospital	Chawama Level 1 Hospital Kuku Health Post	90%	30%	10%
2	Chawama	Chawama Level 1 Hospital	Chawama Level 1 Hospital	100%	32%	0%
3	Chawama	Chawama Level 1 Hospital	Chawama Level 1 Hospital	100%	10%	5%
4	Chawama	Chawama Level 1 Hospital	Chawama Level 1 Hospital Kuku Health Post	100%	5%	0%
5	Chawama	Chawama Level 1 Hospital Kuku Health Post	Kuku Health Post	68%	21%	5%
6	Kabwata	Kamwala Health Centre Kabwata Health Centre	Kamwala Health Centre Kamwala South Health Post	50%	61%	22%
7	Kabwata	UTH Kabwata Health Centre	Kabwata Health Centre Kamwala South Health Post	56%	25%	31%
8	Kabwata	Chilenje Level 1 Hospital	Chilenje Level 1 Hospital	95%	47%	32%
9	Kanyama	Kanyama Level 1 Hospital	Kanyama Level 1 Hospital	94%	31%	6%
10	Kanyama	Kanyama Level 1 Hospital Makeni Ecumenical Centre	Kanyama Level 1 Hospital	71%	47%	6%
11	Kanyama	Kanyama Level 1 Hospital Misisi Mini Hospital	Kamwala Health Centre Kanyama Level 1 Hospital	82%	47%	12%
12	Kanyama	Kanyama Level 1 Hospital	Makeni Villa Health Post	60%	55%	5%
13	Kanyama	Kanyama Level 1 Hospital The Salvation Army Men's Clinic	Kanyama Level 1 Hospital	82%	24%	0%
14	Kanyama	Kanyama Level 1 Hospital	Kanyama Level 1 Hospital	95%	25%	5%
15	Lusaka Central	Bauleni Health Centre	Bauleni Health Centre	10%	15%	5%
18	Matero	Matero Level 1 Hospital	Matero Level 1 Hospital	100%	15%	0%
19	Matero	George Health Centre Kapwewe Health Centre	Lilanda Health Post	74%	79%	5%
20	Matero	Matero Level 1 Hospital Matero Health Centre	Matero Health Centre	60%	20%	0%

21	Matero	Matero Level 1 Hospital Matero Health Centre	Matero Level 1 Hospital	89%	11%	5%
22	Matero	Matero Health Centre	Matero Health Centre	26%	47%	11%
23	Matero	Matero Level 1 Hospital	Matero Level 1 Hospital	89%	44%	22%
24	Matero	George Health Centre Paradise Health Post	Paradise Health Post	28%	39%	11%
25	Munali	Chelstone Health Centre	Chelstone Health Centre	50%	56%	25%
27	Mandevu	Chipata Level 1 Hospital	Chipata Level 1 Hospital Mandevu Health Centre	95%	10%	10%
28	Mandevu	Chipata Level 1 Hospital Kabanana Health Post	Mandevu Health Centre	78%	22%	11%
29	Mandevu	Chipata Level 1 Hospital Chaisa Health Centre	Kabanana Health Post	70%	35%	10%
30	Mandevu	Chipata Level 1 Hospital Chaisa Health Centre	Chaisa Health Centre Garden Shimizu Health Post	42%	26%	5%
31	Mandevu	Chipata Level 1 Hospital	Chaisa Health Centre	89%	28%	6%
32	Mandevu	Chipata Level 1 Hospital	Garden Shimizu Health Post	72%	28%	0%
33	Mandevu	Matero Level 1 Hospital Mandevu Health Centre	Chipata Level 1 Hospital	61%	50%	6%
34	Mandevu	Chifundo Clinic Chaisa Health Centre	Chipata Level 1 Hospital	20%	30%	0%

Notes: Several constituencies have two facilities listed as “closest public facilities (spatially).” This is because different facilities were spatially closest to different respondents within the cluster.

Table S2: Associations between respondent characteristics and bypassing among children

	(1) Primary care bypassing	(2) Two-level bypassing	(3) Horizontal bypassing
Caregiver education (Ref = Primary or less)			
Secondary	1.273**	0.995	1.127
	(1.063 - 1.525)	(0.985 - 1.005)	(0.921 - 1.377)
Higher	1.016	1.107	1.108
	(0.596 - 1.730)	(0.938 - 1.306)	(0.811 - 1.513)
Asset quintile	1.029	1.007	0.956
	(0.954 - 1.111)	(0.997 - 1.017)	(0.873 - 1.046)
Reason for seeking care			
Diarrhea	1.072	1.015	1.077
	(0.852 - 1.350)	(0.988 - 1.043)	(0.863 - 1.344)
Fever	0.905	0.993	0.841*
	(0.728 - 1.125)	(0.982 - 1.005)	(0.689 - 1.025)
Cough	0.977	1.010	1.155
	(0.822 - 1.162)	(0.979 - 1.041)	(0.951 - 1.403)
Fast breathing	1.081	1.062	1.017
	(0.809 - 1.443)	(0.974 - 1.158)	(0.790 - 1.310)
Female child	0.775***	1.011	0.957
	(0.657 - 0.915)	(0.991 - 1.031)	(0.752 - 1.217)
Constant	1.713***	0.962	1.606***
	(1.267 - 2.317)	(0.898 - 1.031)	(1.157 - 2.228)
Observations	141	141	141
R-squared	0.162	0.179	0.067

Notes: Table shows exponentiated coefficients and 95% confidence intervals from logistic regression models. Standard errors are clustered at the enumeration area level. “Ref” indicates the omitted reference group for categorical variables. *** p<0.01, ** p<0.05, * p<0.1

Additional File 2

Swiss TPH
Swiss Tropical and Public Health Institute

Vital Strategies

Bloomberg Philanthropies DATA FOR HEALTH INITIATIVE

Survey details

[interviewer_id]
Interviewer name

Choose only one option:

○	Gracious
○	Sitwala
○	Ruth
○	Mundai

[start_time]

Start time:

[end_time]

End time:

[store_gps]
Collect the GPS coordinates of this store.

Geopoint:

[selected_ward]

Name of ward

Choose only one option:

○	Chaisa
○	Chakunkula
○	Chawama
○	Chilenje
○	Harry Mwanga Nkumbula
○	Idependence
○	Justin Kabwe
○	Kabulonga
○	Kabwata
○	Kamwala
○	Kanyama
○	Kapwepwe
○	Lilayi
○	Lima
○	Lubwa
○	Matero
○	Muchinga
○	Munali
○	Mwembeshi
○	Ngwerere
○	Nkoloma
○	Raphael
○	Roma

[selected_ea]

Enumeration area

The choice list of this question (comprising 35 choices) was replaced with a text field due to this question having choice filter and more than 10 choices.

[audit]

Audit:

Socio-demographics

[Q0hh]
Q0. Head of household?

Choose only one option:

○	Yes
○	No, spouse of head

[Q1age]
Q1. Respondent's age?

[Q2sex]
Q2. Record sex as observed

Choose only one option:

○	Female
○	Male

[Q3marital_stat]
Q3. What is your current marital status?

Choose only one option:

○	Married
○	Single
○	Divorced
○	Cohabiting
○	Separated
○	Widow

[Q4edn_lev]
Q4. What is your highest level of education completed?

Choose only one option:

○	No, formal schooling
○	Some primary completed
○	Primary school completed
○	Some secondary completed
○	Secondary school completed
○	Some college or university completed
○	College or University completed
○	Postgraduated completed

[Q5rlgn]
Q5. What is your religion?

Choose only one option:

○	Catholic
○	Protestant
○	Muslim
○	Other

• Relevant when:
Q5. What is your religion? = Other.

[Q5rlgn_oth]
Q5a. Specify other

Household characteristics

[Q6drkn_sour]
Q6. What is the main source of drinking water for members of this household?

Choose only one option:

○	Piped into dwelling
○	Piped into yard/plot
○	Piped to neighbor
○	Public tab/standpipe
○	Borehole
○	Protected well
○	Unprotected well
○	Protected spring
○	Unprotected spring
○	Rainwater
○	Tanker truck
○	Surface water (river/dam/lake/pond)
○	Bottled water
○	Other

• Relevant when:
Q6. What is the main source of drinking water for members of this household? = Other.

[Q6drkn_sour_oth]
Q6a. Specify other

• Relevant when:
Q6. What is the main source of drinking water for members of this household? = Bottled water.

[Q7other_wter_sour]
Q7. What is the main source of water used by your household for other purposes such as cooking and handwashing?

Choose only one option:

○	Piped into dwelling
○	Piped into yard/plot
○	Piped to neighbor
○	Public tab/standpipe
○	Borehole
○	Protected well
○	Unprotected well
○	Protected spring
○	Unprotected spring
○	Rainwater
○	Tanker truck
○	Surface water (river/dam/lake/pond)
○	Bottled water
○	Other

• Relevant when:
Q7. What is the main source of water used by your household for other purposes such as cooking and handwashing? = Other.

[Q7other_wter_sour_oth]
Q7a. Specify other

• Relevant when:
Q6. What is the main source of drinking water for members of this household? ≠ Piped into dwelling || Q6. What is the main source of drinking water for members of this household? = Piped into yard/plot || Q6. What is the main source of drinking water for members of this household? = Piped to neighbor || Q6. What is the main source of drinking water for members of this household? = Bottled water.

[Q8water_lcn]
Q8. Where is the water source located?

Choose only one option:

○	In your own dwelling
○	In your own yard/plot
○	Elsewhere

• Relevant when:
Q8. Where is the water source located? = Elsewhere.

[Q9water_time]
Q9. How long does it take to get there, wait, get water and come back? Minutes

• Relevant when:
Q6. What is the main source of drinking water for members of this household? = Piped into dwelling || Q6. What is the main source of drinking water for members of this household? = Piped into yard/plot || Q6. What is the main source of drinking water for members of this household? = Piped to neighbor || Q6. What is the main source of drinking water for members of this household? = Public tab/standpipe || Q6. What is the main source of drinking water for members of this household? = Borehole || Q7. What is the main source of water used by your household for other purposes such as cooking and handwashing? = Piped into dwelling || Q7. What is the main source of water used by your household for other purposes such as cooking and handwashing? = Piped into yard/plot || Q7. What is the main source of water used by your household for other purposes such as cooking and handwashing? = Piped to neighbor || Q7. What is the main source of water used by your household for other purposes such as cooking and handwashing? = Public tab/standpipe || Q7. What is the main source of water used by your household for other purposes such as cooking and handwashing? = Borehole.

[Q11water_avbty]
Q11. In the past two weeks, was the water from this source not available for at least one full day?

Choose only one option:

○	Yes
○	No
○	Don't know

• Relevant when:

Q6. What is the main source of drinking water for members of this household? ≠ Piped into dwelling || Q6. What is the main source of drinking water for members of this household? = Piped into yard/plot || Q6. What is the main source of drinking water for members of this household? = Piped to neighbor || Q6. What is the main source of drinking water for members of this household? = Public tab/standpipe || Q6. What is the main source of drinking water for members of this household? = Bottled water || Q6. What is the main source of drinking water for members of this household? = Borehole || Q7. What is the main source of water used by your household for other purposes such as cooking and handwashing? = Piped into dwelling || Q7. What is the main source of water used by your household for other purposes such as cooking and handwashing? = Piped into yard/plot || Q7. What is the main source of water used by your household for other purposes such as cooking and handwashing? = Piped to neighbor || Q7. What is the main source of water used by your household for other purposes such as cooking and handwashing? = Public tab/standpipe || Q7. What is the main source of water used by your household for other purposes such as cooking and handwashing? = Borehole.

[Q12safe_wter]

Q12. Do you do anything to the water to make it safer to drink?

Choose only one option:

○	Yes
○	No
○	Don't know

• Relevant when:

Q12. Do you do anything to the water to make it safer to drink? = Yes.

[Q13mk_safe]

Q13. What do you usually do to make the water safer to drink?

Choose one or more options:

☐	Boil
☐	Add bleach/chlorine
☐	Strain through cloth
☐	Use water filter(ceramic, sand, composite, etc)
☐	Solar disinfection
☐	Let it stand and settle
☐	Other
☐	Don't know

• Relevant when:
Q13. What do you usually do to make the water safer to drink? = Don't know.

[Q13mk_safe_oth]
Q13a. Specify other

[Q14str_water]
Q14. How do you store your drinking water?

Choose only one option:

○	Closed container/jerry can
○	Open container/bucket
○	Does not store water
○	Other

• Relevant when:
Q14. How do you store your drinking water? = Other.

[Q14str_water_oth]
Q14a. Specify other

Toilet facility

[Q15toilet_typ]
Q15. What kind of toilet facility do members of this household usually use?

Choose only one option:

○	Flush to piped sewer system
○	Flush to septic tank
○	Flush to pit latrine
○	Flush to somewhere else
○	Flush, Don’t know where
○	Ventilated improved pit latrine
○	Pit latrine with slab
○	Pit latrine without slab/Open pit
○	Composting toilet
○	Bucket toilet
○	Hanging toilet/hanging latrine
○	No facility/bush/field
○	Other

• Relevant when:
Q15. What kind of toilet facility do members of this household usually use? = Other.

[Q15toilet_typ_oth]
Q15a. Specify other

• Relevant when:
Q15. What kind of toilet facility do members of this household usually use? ≠ No facility/bush/field.

[Q16share_toilet]
Q16. Do you share this facility with other households?

Choose only one option:

○	Yes
○	No

• Relevant when:
Q16. Do you share this facility with other households? = Yes.

[Q17hh_toilet]
Q17. Including your own household, how many households use this toilet facility?

• Relevant when:
Q15. What kind of toilet facility do members of this household usually use? ≠ No facility/bush/field.

[Q18toilet_lcn]
Q18. Where is this toilet facility located?

Choose only one option:

○	In your own dwelling
○	In your own yard/plot
○	Elsewhere

Cooking details

[Q19fuel_ckn]
Q19. What type of fuel does your household mainly use for cooking?

Choose only one option:

○	Electricity
○	Solar Power
○	Liquid Propane (LP)
○	Natural Gas
○	Biogas
○	Kerosene
○	Coal, Lignite
○	Charcoal
○	Wood
○	Straw/Shrubs/Grass
○	Agricultural Crop
○	Animal Dung
○	No food cooked in household
○	Other

• Relevant when:
Q19. What type of fuel does your household mainly use for cooking? = Wood.

[Q19fuel_ckn_oth]
Q19a. Specify other

• Relevant when:
Q19. What type of fuel does your household mainly use for cooking? ≠ No food cooked in household.

[Q20ckn_lcn]
Q20. Is the cooking usually done in the house, in a separate building or outdoors?

Choose only one option:

○	In the house
○	In a separate building
○	Outdoors
○	Other

• Relevant when:
Q20. Is the cooking usually done in the house, in a separate building or outdoors? = Answer "96" not found;.

[Q20ckn_lcn_oth]
Q20a. Specify other

• Relevant when:
Q20. Is the cooking usually done in the house, in a separate building or outdoors? = In the house.

[Q21sp_ktn]
Q21. Do you have a separate room, which is used, as a kitchen?

Choose only one option:

○	Yes
○	No

Household possession

[Q22slp_room]
Q22. How many rooms in this household are used for sleeping?

[Q23a_electric]
Q23a.Does your household have electricity?

Choose only one option:

○	Yes
○	No

[Q2b_internet]
Q23b.Does your household have access to internet?

Choose only one option:

○	Yes
○	No

[Q23c_bed]
Q23c.Does your household have a bed?

Choose only one option:

○	Yes
○	No

[Q23d_table]
Q23d.Does your household have a table?

Choose only one option:

○	Yes
○	No

[Q23e_sofa]

Q23e.Does your household have a sofa?

Choose only one option:

- ○ Yes
- ○ No

[Q23f_radio]

Q23f.Does your household have a radio?

Choose only one option:

- ○ Yes
- ○ No

[Q23g_tele]

Q23g.Does your household have a television?

Choose only one option:

- ○ Yes
- ○ No

[Q23h_compt]

Q23h.Does your household have a computer/laptop?

Choose only one option:

- ○ Yes
- ○ No

[Q23i_fridge]

Q23i.Does your household have a refrigerator?

Choose only one option:

- ○ Yes
- ○ No

[Q23j_washmach]

Q23j.Does your household have a washing machine?

Choose only one option:

- ○ Yes
- ○ No

[Q23k_aircon]

Q23k.Does your household have an air conditioner?

Choose only one option:

- ○ Yes
- ○ No

[Q23l_genet]

Q23l.Does your household have a generator?

Choose only one option:

○	Yes
○	No

[Q23m_wave]

Q23m.Does your household have a microwave?

Choose only one option:

○	Yes
○	No

[Q23n_heater]

Q23n.Does your household have a geyser?

Choose only one option:

○	Yes
○	No

[Q24a_watch]

Q24a.Does any member of this household own a watch?

Choose only one option:

○	Yes
○	No

[Q24b_phone]

Q24b.Does any member of this household own a mobile phone?

Choose only one option:

○	Yes
○	No

[Q24c_bic]

Q24c.Does any member of this household own a bicycle?

Choose only one option:

○	Yes
○	No

[Q24d_motor]

Q24d.Does any member of this household own a motorcyle or scooter?

Choose only one option:

○	Yes
○	No

[Q24e_car]
Q24e.Does any member of this household own a car or truck?

Choose only one option:

- ○ Yes
- ○ No

[Q25bank]
Q25.Does any member of this household own a bank account?

Choose only one option:

- ○ Yes
- ○ No

Materials of housing

[Q26flr_mat]
Q26.Observe the main material of the floor of the dwelling

Choose only one option:

- ○ Earth/sand
- ○ Dung
- ○ Wood Planks
- ○ Palm/Bamboo
- ○ Wooden floor
- ○ Vinyl (PVC)
- ○ Ceramic/terazzo tiles
- ○ Cement
- ○ Carpet
- ○ Other

• Relevant when:
Q26.Observe the main material of the floor of the dwelling = Other.

[Q26flr_mat_other]
Q26a.Specify other

[Q27rof_mat]
Q27.Observe the main material of the roof of the dwelling

Choose only one option:

○	No roof
○	Thatch/Palm leaf
○	Rustic Mat
○	Palm/Bamboo
○	Wood Planks
○	Cardboard
○	Metal/Iron sheets
○	Wood
○	Calamine/Cement Fiber
○	Ceramic Tiles/Harvey tiles
○	Cement
○	Roofing shingles
○	Mud tiles
○	Asbestos
○	Other

• Relevant when:
Q27.Observe the main material of the roof of the dwelling = Other.

[Q27rof_mat_other]
Q27a.Specify other

[Q28type_wall]

Q28.Observe the main material of the exterior walls of the dwelling

Choose only one option:

○	No walls
○	Cane/Palm/Trunks
○	Mud tiles
○	Mudbrick
○	Bamboo with mud
○	Stone with mud
○	Plywood
○	Cardboard
○	Reused wood
○	Cement
○	Stone with lime/Cement
○	Burned bricks
○	Cement blocks
○	Wood planks/shingles
○	Other

• Relevant when:

Q28.Observe the main material of the exterior walls of the dwelling = Other.

[Q28type_wall_other]

Q28a.Specify other

Overall health status

[Q29hlth_status]

Q29.Overall, how would you rate your health status

Choose only one option:

○	Very good
○	Good
○	Moderate
○	Bad
○	Very bad

Health facility visit

[Q30visit_outpt]
Q30.In the past 12 months, how many times did you seek care at a clinic or hospital? (only for outpatient vis

[Q31last_visit]
Q31.How long ago was your last visit to a clinic or hospital?

[Q32reson_visit]
Q32.What was the main reason for your last visit?

Choose only one option:

○	Emergency, Accident or Injury
○	Check up or preventive care
○	Follow up on existing chronic problem
○	New health issue

[Q33nme_fac]
Q33.What was the name of the facility?

[Q33a_nbhd_fac]
Q3a.Which neighborhood is the facility located in?

[Q33b_typ_fac]
Q33b.What type of health facility was it?

Choose only one option:

○	Government Health center
○	Government Hospital
○	Mission hospital
○	Pharmacy
○	Private clinic/hospital
○	Don't know
○	Other

• Relevant when:
Q33b.What type of health facility was it? = Other.

[Q33b_typ_fac_other]
Q33ba.Specify other

[Q33c_txt_spend]
Q33c.Overall, how much did you spend for the treatment of the illness (including drugs at the pharmacies)?

Thinking about your last health facility visit (not including overnight stay how would you rate the following:

[Q34length_wait]
Q34.The length of time you waited before you were seen

Choose only one option:

○	Excellent
○	Very good
○	Good
○	Fair
○	Poor

[Q35provid_listen]
Q35.Whether the health provider listened to you carefully

Choose only one option:

○	Excellent
○	Very good
○	Good
○	Fair
○	Poor

[Q36provider_knlg]
Q36.The health provider's medical knowledge and skills

Choose only one option:

○	Excellent
○	Very good
○	Good
○	Fair
○	Poor

[Q37provider_respt]

Q37.The level of respect the provider showed you

Choose only one option:

○	Excellent
○	Very good
○	Good
○	Fair
○	Poor

[Q38provider_time]

Q38.The amount of time the provider spent with you in the visit.

Choose only one option:

○	Excellent
○	Very good
○	Good
○	Fair
○	Poor

[Q39overall_care]

Q39.Overall, considering everything, how would you rate the quality of care you received?

Choose only one option:

○	Excellent
○	Very good
○	Good
○	Fair
○	Poor

[Q40overall_visit]

Q40.Overall, thinking about your entire visit, how would you rate the care you received?

Choose only one option:

○	Excellent
○	Very good
○	Good
○	Fair
○	Poor

Child health

[Q41has_child]
Q41.Are there any children under age five living in this household?

Choose only one option:

○	Yes
○	No

• Relevant when:
Q41.Are there any children under age five living in this household? = Yes.

[Q41a_childn]
Q41a.How many are there?

• Relevant when:
Q41.Are there any children under age five living in this household? = Yes.

child info

Question	Element 1	Element 2	Element 3	Element 4	Element 5
[Q42name_child] **Q42.Name of child**					
[Q42sex_child] **Q42.Sex of child** Choose only one option: Female Male					
[Q42date_child] **Q42.Date of birth** Date: __ / __ / ____ (DD/MM/YYYY)					
[Q43diarrhea] **Q42.Has (name) had diarrhea at any time in the last 2 weeks?** Choose only one option: Yes No Don't know					

Question	Element 1	Element 2	Element 3	Element 4	Element 5
[Q44fever] **Q44.Has (name) been ill with a fever any time in the last 2 weeks?** Choose only one option: Yes No Don't know					
[Q45cough] **Q45.Has (name) had an illness with a cough at any time in the last 2 weeks?** Choose only one option: Yes No Don't know					
[Q46fastbreath] **Q45.Has (name) had fast, short, rapid breaths or difficulty breathing at any time in the last 2 weeks?** Choose only one option: Yes No Don't know					
• Relevant when: Q42.Has (name) had diarrhea at any time in the last 2 weeks? = Yes || Q44.Has (name) been ill with a fever any time in the last 2 weeks? = Yes || Q45.Has (name) had an illness with a cough at any time in the last 2 weeks? = Yes. [Q47advice_chd] **Q47.Did you seek advice or treatment for the illness from any source?** Choose only one option: Yes No Don't know					

Question	Element 1	Element 2	Element 3	Element 4	Element 5
• Relevant when: Q47.Did you seek advice or treatment for the illness from any source? = Yes. [Q48name_trxtchd] Q48.What was the name of the place you sought treatment?					
• Relevant when: Q47.Did you seek advice or treatment for the illness from any source? = Yes. [Q49typfac_chd] Q49.What type of facility was it? Choose only one option: Government Health center Government Hospital Mission hospital Pharmacy Private clinic/hospital Don't know Other					
• Relevant when: Q47.Did you seek advice or treatment for the illness from any source? = Yes. [Q50nbhd_child] Q50.What neighborhood is it located in?					

Question	Element 1	Element 2	Element 3	Element 4	Element 5
• Relevant when: Q47.Did you seek advice or treatment for the illness from any source? = Yes. [Q51antimal_drug] **Q51.At any time during the illness, did (Name) get antimalarial for the illness?** Choose only one option: Yes No Don't know					
• Relevant when: Q47.Did you seek advice or treatment for the illness from any source? = Yes. [Q52antibio_drug] **Q52.At any time during the illness, did (Name) get antibiotics for the illness?** Choose only one option: Yes No Don't know					
• Relevant when: Q47.Did you seek advice or treatment for the illness from any source? = Yes. [Q52atrxtcost] **052.Overall, how much did you spend for the treatment of the illness (including drugs at the pharmacies)?**					

General facility access

[Q53nbd_par]
Q53.What is the name of the closest drug shop or pharmacy from your house?

• Relevant when:
Q53.What is the name of the closest drug shop or pharmacy from your house? ≠ 88.

[Q53a_nbhd_phar]
Q53a.Which neighborhood is this drug shop or pharmacy located?

• Relevant when:
Q53.What is the name of the closest drug shop or pharmacy from your house? ≠ 88.

[Q53b_walk_phar]
Q53b.How long does it take to walk from your house to the drug shop or pharmacy? (assuming you don't st and walk fast) (minutes)

[Q54privt_fac]
Q54.What is the name of the closest private health facility from your house?

• Relevant when:
Q54.What is the name of the closest private health facility from your house? ≠ 88.

[Q54a_nbhd_priv]
Q54a.Which neighborhood is this private health facility located?

• Relevant when:
Q54.What is the name of the closest private health facility from your house? ≠ 88.

[Q54b_walk_priv]
Q54b.How long does it take walk from here to this private health facility? (assuming you don't stop and walk fast) (minutes)

[Q55_govtfac]
Q55.What is the name of the closest government health facility from your house?

• Relevant when:
Q55.What is the name of the closest government health facility from your house? ≠ 88.

[Q55nbhd_govtfac]
Q55a.Which neighborhood is this government health facility located?

• Relevant when:
Q55.What is the name of the closest government health facility from your house? ≠ 88.

[Q55b_walk_govtfac]
Q55b.How long does it take to walk from here to this government facility? (assuming you don't stop and walk fast)

[Q56month_expd]
Q56.On an average, how much does your household spend each month on healthcare (all members combi including drugs, treatment and transport)?

[Q57lge_expd]
Q57.What was the largest health-related expenditure your household had last year and how much did you in total, including drugs, treatment and transport?

• Relevant when:
Q57.What was the largest health-related expenditure your household had last year and how much did you pay in total, including drugs, treatment and transport? > 0.

[Q57a_med_prob]
Q57a.What was the problem?

• Relevant when:
Q57.What was the largest health-related expenditure your household had last year and how much did you pay in total, including drugs, treatment and transport? > 0.

[Q57b_date_medprob]
Q57b.When did this occur?
Date: __ / __ / ____ (DD/MM/YYYY)

• Relevant when:
Q57.What was the largest health-related expenditure your household had last year and how much did you pay in total, including drugs, treatment and transport? > 0.

[Q57c_txrtcost]
Q57c.What was the total treatment cost? (cost of diagnosis, treatment and drugs)

[Q57d_pharm]
Q57d. How much of this money did you spend at the pharmacy or private drug store?

[Q57e_diagnos]
Q57e. How much of this money did you spend for diagnostics elsewhere?

[O57f_hf]
Q57f. How much of this money did you spend at the actual health facility?

[Q57g_nonhthcost]
Q57g. What was the total cost of non-health related cost? (Transport)

• Relevant when:
Q57.What was the largest health-related expenditure your household had last year and how much did you pay in total, including drugs, treatment and transport? > 0.

[Q57h_make_paymt]
Q57h.How did you make the payment?

Choose only one option:

○	Paid myself
○	Borrowed from family or friends
○	Sold assets
○	Did not pay

Confidence and trust

[Q58confid_pub]
Q58.How confident are you that if you become very sick tomorrow, you would be able to receive effective treatment from the public health facilities?

Choose only one option:

○	Not at all confident
○	Not very confident
○	Somewhat confident
○	Very confident

[Q59confid_priv]

Q59.How confident are you that if you become very sick tomorrow, you would be able to receive effective treatment from the private health facilities?

Choose only one option:

○	Not at all confident
○	Not very confident
○	Somewhat confident
○	Very confident

[Q60trust_govt]

Q60.How much of the time do you think you can trust the National government to do what is right?

Choose only one option:

○	Always
○	Most of the time
○	Some of the time
○	Hardly ever
○	Never

[Q61hlthsec_rate]

Q61.How well or badly is the health sector doing in improving health services?

Choose only one option:

○	Very badly
○	Fairly badly
○	Fairly well
○	Very well
○	Don’t know or I have never heard

Political affiliation

[Q62presid_elec]

Q62.If presidential elections were tomorrow, would you like a change in government?

Choose only one option:

○	Yes
○	No
○	Don't know
○	Refused

[Q63rate_govt]
Q63.How well do you think the current government doing in performing their duties?

Choose only one option:

○	Very badly
○	Fairly badly
○	Fairly well
○	Very well
○	Don't know or I have never heard

Health insurance

[Q64_insur]
Q64. Zambia has launched the National Health Insurance for Zambian Households to access health service without financial hardship. Do you currently have any health insurance

Choose only one option:

○	Yes
○	No

• Relevant when:
Q64. Zambia has launched the National Health Insurance for Zambian Households to access health services without financial hardship. Do you currently have any health insurance = Yes.

[Q64a_typ]
Q64a.What type of health insurance

Choose only one option:

○	National Health Insurance
○	Private health insurance
○	Employer-based
○	Community-based/Mutual Health Insurance
○	Other

• Relevant when:
Q64a.What type of health insurance = Other.

[Q64b_typ_oth]
Q64b.Specify other

• Relevant when:
Q64. Zambia has launched the National Health Insurance for Zambian Households to access health services without financial hardship. Do you currently have any health insurance = Yes.

[Q64c_card]
Q64c.May I please see your insurance card?

Choose only one option:

○	Yes, card observed
○	No refused
○	Did not have it

• Relevant when:
Number drawn for experimental selection ≤ 0.5.

[notselected]
Note: Household was not selected for insurance game

• Relevant when:
Number drawn for experimental selection > 0.5 && Q64. Zambia has launched the National Health Insurance for Zambian Households to access health services without financial hardship. Do you currently have any health insurance = No.

Health insurance Exercise

[Q65game]
Q65.We have developed a little game that illustrates how insurance works in practice. Would you be willing to play a few rounds of this game with me?”

Choose only one option:

○	Yes
○	No

• Relevant when:
Q65.We have developed a little game that illustrates how insurance works in practice. Would you be willing to play a few rounds of this game with me?” = Yes.

[r1_healthy]
Game 1: how many of the 12 cards drawn were healthy cards?

• Relevant when:
Q65.We have developed a little game that illustrates how insurance works in practice. Would you be willing to play a few rounds of this game with me?" = Yes.

[r1_kids]
.How many child sickness?

• Relevant when:
Q65.We have developed a little game that illustrates how insurance works in practice. Would you be willing to play a few rounds of this game with me?" = Yes.

[r1_physio]
.How many physio events?

• Relevant when:
Q65.We have developed a little game that illustrates how insurance works in practice. Would you be willing to play a few rounds of this game with me?" = Yes.

[r1_unknown]
.How many unknown problems?

• Relevant when:
Q65.We have developed a little game that illustrates how insurance works in practice. Would you be willing to play a few rounds of this game with me?" = Yes.

[r1_major]
..how many major events?

• Relevant when:
Q65.We have developed a little game that illustrates how insurance works in practice. Would you be willing to play a few rounds of this game with me?" = Yes.

[r2_healthy]
Game 2: how many of the 12 cards drawn were healthy cards?

• Relevant when:
Q65.We have developed a little game that illustrates how insurance works in practice. Would you be willing to play a few rounds of this game with me?" = Yes.

[r2_kids]
..how many child sickness?

• Relevant when:
Q65.We have developed a little game that illustrates how insurance works in practice. Would you be willing to play a few rounds of this game with me?" = Yes.

[r2_physio]
..how many physio events?

• Relevant when:
Q65.We have developed a little game that illustrates how insurance works in practice. Would you be willing to play a few rounds of this game with me?" = Yes.

[r2_unknown]
..how many unknown problems?

• Relevant when:
Q65.We have developed a little game that illustrates how insurance works in practice. Would you be willing to play a few rounds of this game with me?" = Yes.

[r2_major]
..how many major events?

• Relevant when:
Q64. Zambia has launched the National Health Insurance for Zambian Households to access health services without financial hardship. Do you currently have any health insurance = No.

[Q66pay]
Q66.How much would you be willing to pay to get health insurance per month for yourself?

• Relevant when:
Q64. Zambia has launched the National Health Insurance for Zambian Households to access health services without financial hardship. Do you currently have any health insurance = No.

[Q66a_pay]
Q66a.How much would you be willing to pay to get health insurance per month for entire household?

• Relevant when:
Q66a.How much would you be willing to pay to get health insurance per month for entire household? > 0.

[Q66b.hhnum]
Q66b. How many dependants do you have?

• Relevant when:
Q64. Zambia has launched the National Health Insurance for Zambian Households to access health services without financial hardship. Do you currently have any health insurance = No && Q66a.How much would you be willing to pay to get health insurance per month for entire household? > 0.

[Q67_fees]
Q67.Would you rather pay monthly fees or annual fees?

Choose only one option:

○	Monthly
○	Annually
○	Other

• Relevant when:
Q67.Would you rather pay monthly fees or annual fees? = Other.

[Q67a_oth]
Q67a.Other specify

• Relevant when:
Q67.Would you rather pay monthly fees or annual fees? = Annually.

[Q67a_ann]
Q67b. If annual, which month would you prefer to pay the annual fee?

Choose only one option:

○	January
○	Februrary
○	March
○	April
○	May
○	June
○	July
○	August
○	September
○	October
○	November
○	December

• Relevant when:
Q66.How much would you be willing to pay to get health insurance per month for yourself? > 0.

[Q68]
Q68.Based on the 1% of your monthly income, how much will you pay for health insurance each month?

• Relevant when:
Q64. Zambia has launched the National Health Insurance for Zambian Households to access health services without financial hardship. Do you currently have any health insurance = No.

[Q68_reg]
Q68.As part of this project, we offer all respondents support with enrollment. If you are interested, we can register you on the scheme's website. We will need your personal details, NRC and monthly income. Will you enroll in the scheme if I help you with the registration process or explain how the scheme works?

Choose only one option:

○	Yes
○	No

• Relevant when:
Q68.As part of this project, we offer all respondents support with enrollment. If you are interested, we can register you on the scheme's website. We will need your personal details, NRC and monthly income. Will you enroll in the scheme if I help you with the registration process or explain how the scheme works? = No.

[Q69_reason]
Q69.What is the main reason you will not enroll?

Choose only one option:

○	Cannot afford the premium
○	Do not need insurance
○	Poor quality of care
○	Do not trust government programs
○	Do not understand the scheme
○	None
○	Other

• Relevant when:
Q69.What is the main reason you will not enroll? = Other.

[Q69a__oth]
Q69a.Specify other

• Relevant when:
Q69.What is the main reason you will not enroll? ≠ None || Q68.As part of this project, we offer all respondents support with enrollment. If you are interested, we can register you on the scheme's website. We will need your personal details, NRC and monthly income. Will you enroll in the scheme if I help you with the registration process or explain how the scheme works? = Yes || Q64. Zambia has launched the National Health Insurance for Zambian Households to access health services without financial hardship. Do you currently have any health insurance = Yes.

[Q70_reason]
Q70.Is there another reason you will not enroll?

Choose only one option:

○	Cannot afford the premium
○	Do not need insurance
○	Poor quality of care
○	Do not trust government programs
○	Do not understand the scheme
○	None
○	Other

• Relevant when:
Q70.Is there another reason you will not enroll? = Other.

[Q70a_oth]
Q70a.Specify other

• Relevant when:
Q70.Is there another reason you will not enroll? ≠ None || Q68.As part of this project, we offer all respondents support with enrollment. If you are interested, we can register you on the scheme's website. We will need your personal details, NRC and monthly income. Will you enroll in the scheme if I help you with the registration process or explain how the scheme works? = Yes || Q64. Zambia has launched the National Health Insurance for Zambian Households to access health services without financial hardship. Do you currently have any health insurance = Yes.

[Q71_reason]
Q71.Is there another reason you will not enroll?

Choose only one option:

○	Cannot afford the premium
○	Do not need insurance
○	Poor quality of care
○	Do not trust government programs
○	Do not understand the scheme
○	None
○	Other

• Relevant when:
Q71.Is there another reason you will not enroll? = Other.

[Q71_oth]
Q71a.Specify other

[telephone]
Telephone number please?

Chapter 6 Confidence in the health system and health insurance enrollment among the informal sector population in Lusaka, Zambia

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6.1 Abstract

Background

To improve equitable access to quality essential services and reduce financial hardship, low-and-middle-income countries are increasingly relying on prepayment strategies such as health insurance schemes. Among the informal sector population, confidence in the health system to provide effective treatment and trust in institutions can play an important role in health insurance enrollment. The objective of this study was to examine the extent to which confidence and trust affect enrollment into the recently introduced Zambia National Health insurance.

Methods

We conducted a regionally representative cross-sectional household survey in Lusaka, Zambia collecting information on demographics, health expenditure, ratings of last health facility visit, health insurance status and confidence in the health system. We used multivariable logistic regression to assess the association between enrollment and confidence in the private and public health sector as well as trust in the government in general.

Results

Of the 620 respondents interviewed, 70% were enrolled or planning to enroll in the health insurance. Only about one-fifth of respondents were very confident that they would receive effective care in the public health sector 'if they became sick tomorrow' while 48% were very confident in the private health sector. While confidence in the public system was only weakly associated with enrollment, confidence in the private health sector was strongly associated with enrollment (Adjusted odds ratio (AOR) 3.40 95% CI 1.73 – 6.68). No association was found between enrollment and trust in government or perceived government performance.

Conclusions

Our results suggest that confidence in the health system, particularly in the private health sector, is strongly associated with health insurance enrollment. Focusing on achieving high quality of care across all levels of the health system may be an effective strategy to increase enrollment in health insurance.

Highlights

- Confidence in receiving effective care from the public health sector is low
- Intention to enroll in the health insurance is high
- Higher confidence in the private sector is related with health insurance enrollment
- Trust in the government and its perceived performance are not related to enrollment

6.2 Introduction

Health insurance schemes are being used increasingly as one of the main strategies to make progress towards universal health coverage in low-and-middle-income countries (LMICs) (Barasa et al., 2021). However, despite substantial efforts made by many countries, health insurance coverage remains low in most countries, with only one third of the population currently covered by health insurance in LMICs (Hooley et al., 2022) and often large socioeconomic disparities in enrollment (Osei Afriyie et al., 2022).

One of the main challenges in expanding health insurance coverage in LMICs are the often large informal populations. In sub-Saharan Africa, 85.8% of total employment occurred in the informal sector in 2018 (International Labor Organization, 2018).The enrollment of the informal sector into formal social protection programs is challenging because the informal sector generally comprises a highly diverse population that is highly unregulated, with low and often irregular incomes from self-employment(International Labor Organization, 2018). This diversity makes it difficult for social programs such as insurance schemes to assess households' needs, but also to identify them and collect contributions from them. Therefore, even in countries such as Ghana and Kenya where their national health insurance schemes have been operational for many years, health insurance coverage is still very low; 56% and 20% respectively (Amu et al., 2018, Kazungu and Barasa, 2017).

To increase health insurance coverage of the informal sector, several studies have assessed the determinants of health insurance demand in LMICs. In general, socio-demographic characteristics such as age, gender, place of residency (rural vs urban) are significant factors for health insurance enrollment (Salari et al., 2019a, Shao et al., 2022, Van der Wielen et al., 2018b). Studies have also shown that occupation, income, wealth and education are important for health insurance demand (Akokuwebe and Idemudia, 2022, Aregbeshola and Khan, 2018, Kimani et al., 2014, Yadav and Mohanty, 2021). Models of adverse selection suggest that with voluntary enrollment in general, only those with the highest health needs will enroll in health insurance (Akerlof, 1970, Belli, 2001, Cutler and Zeckhauser, 1998). Few studies have examined how the health system characteristics contribute to health insurance enrollment.

With health insurance, which generally requires individuals to make monthly or yearly contribution, confidence in the health system may be an important concern(Thornton et al., 2010). Confidence and trust, two related theoretical concepts, capture patients' experiences with health systems and shape personal health practices and decisions. This study contributes to the understanding of the determinants of health insurance enrollment among the informal sector in LMICs by assessing how confidence in the health system influences informal sector health insurance enrollment in Lusaka, Zambia. Confidence is related to the expected technical competency and ability of systems to deliver its goals based on experiences and rationality(Smith, 2005). Trust can be defined as the moral competency for action and generally captures an interpersonal relation with individuals or institutions (Smith, 2005). Our main hypothesis is that having low confidence in the health system will decrease the odds of enrolling in the national health insurance. We made a distinction between the public and private health sector as, at the time of the study, the majority of accredited providers in Lusaka were in the public health sector with a few private health providers (pharmacies and diagnostic centers) accredited to serve the insurance's beneficiaries. We hypothesize that individuals who have more confidence in either sector are more likely to benefit from the health insurance later as public health facilities and some private providers are accredited to serve health insurance enrollees. We also hypothesize that individuals not trusting the government may be more reluctant to contribute to a public social health protection program and thus may be more likely to opt out of social health insurance.

Theories of decision-making and empirical hypothesis

A broad economic and social science literature has analyzed how individuals make decisions under uncertainty, including decisions regarding health insurance (Schneider, 2004). In expected utility models, rational agents assess their expected utility with insurance versus their expected utility without insurance (Kirigia et al., 2005, Mathauer et al., 2008). Rational agents will enroll in health insurance if the utility gains exceed the cost of insurance(Schneider, 2004)). Prospect theory is also commonly used to analyze health insurance demand whereby individuals insure based on gain prospect and loss aversion rather than against uncertainty (Schneider, 2004). Both theories have been criticized for not taking into consideration societal context and human behavior (Thaler, 2016). Income smoothing and risk aversion are clearly not the only determinants of enrollment. Insurance also provides access to services that will otherwise be unaffordable to an individual with limited means (Nyman, 1999).

Other social science studies found that confidence in institutions influences decision-making(Schneider, 2005). In the context of health insurance, based on personal experiences with the health system and reports in the media, individuals may form their perception about the competence of the public health system to provide effective care. Their confidence in the public and private health providers may influence their decision to enroll in the national health insurance. Willingness to enroll in a health insurance scheme may even be lower if individuals have limited financial means and perceive their need for care in the future to be low.

The hypothesis we tested in this paper is whether high confidence in the health system is associated with higher probability in enrolling in the health insurance. As explained in further details below, we distinguish two types of confidence: confidence in the public health sector and confidence in the private health sector. As the health insurance is implemented by a semi-autonomous government agency, we also tested whether trust and perceived performance of the government influence enrollment.

National health insurance in Zambia

In Zambia, public, faith-based and private providers provide health services. All health facilities in the country are regulated and licensed by the Health Professional Council of Zambia (HPCZ). The public health system consists of the primary health care (PHC) services, which includes health posts, health centers and level-1 hospitals. Specialized services such as obstetrics, internal medicine and surgery are provided by level-2 and level-3 hospitals. In 2012, the government abolished user fees at the entire PHC level in public health facilities. All services under these health facilities are supposed to be free-of-charge. In addition, patients referred from these PHC facilities to level-2 and level-3 hospitals are supposed to be treated free of charge. This policy decreased out-of-pocket expenditures for households (Lépine et al., 2018), however widespread shortage of drugs and inadequate funding to the health sector, galvanized the establishment of a national health insurance.

In 2018, the Zambian government passed its National Health Insurance Act with the aim of providing 'universal access to quality insured health services'(Government of Zambia, 2018a).The act explicitly mandates all residents and citizens 18 years and above to register as a member of the scheme. Formal sector employees are automatically enrolled through a 1% contribution of their monthly basic salary with employers equally matching (Government of Zambia, 2019a). Those self-employed or in the informal sector are required to contribute 1% of declared income. According to the National Labor Survey in 2020, nearly 60% of the employed population were in informal (Central Statistical Office, 2018) Principal members can have six dependents who must be their registered spouse and children under 18 years. According to the Act, NHIMA is required to cater for those classified as poor and vulnerable, those over 65 and mentally or physically disabled populations. According to NHIMA, the health insurance has 1,748,349 principal members with 417,881 members in the informal sector for an estimated coverage of 24% (National Health Insurance Mangement Authority, 2022)

The scheme commenced implementation of its benefit package in February 2020. The scheme operates only from level-1 hospitals upwards although level-1 hospitals are part of the primary health care services. At the time of the study in 2020, the national health insurance management authority (NHIMA) had accredited public health facilities and some private providers, which were pharmacies and diagnostic centers. Private health facilities were the next phase of providers to be included under the scheme. Currently, the scheme has 276 accredited health providers- 38% are public; 47% private and 15% faith-based providers (National Health Insurance Mangement Authority, 2022). The benefit package covered by the scheme is comprehensive and it includes outpatient consultations, minor and major surgical procedures, maternal and newborn interventions, physiotherapy and rehabilitation services, vision care,

dental and oral health, cancer services and mental health. The package also includes blood and pharmaceutical products. The medicines are a subset from the national essential medicines list that are generic. The package does not include procedures for cosmetic purposes, or treatment abroad. In addition, to minimize cost, outpatient visits are limited to three visits per episode and new enrollees can only access services after three months of enrollment (National Health Insurance Mangement Authority, 2020)

6.3 Methods

Study design

This study is based on a regionally representative cross-sectional household survey among the informal sector population in Lusaka district, Zambia, implemented from November 6 to December 19, 2020. We selected Lusaka, as it is the most densely populated district in Zambia with nearly 12% of the country's population living within an area of 418 square kilometers. According to the 2020 Labor survey, 58% of the working population in Lusaka province were in the informal(Zambia Statistics Agency, 2020). Furthermore, the district has the largest share of private health providers in the country with one fifth of service providers being the private health sector (Health Professions Council of Zambia, 2019b).

A two-stage cluster random sampling was used to obtain the sample. First, we randomly selected 35 enumeration areas (EAs) out of the 1225 EAs used in the 2010 Zambia Census of Population and Housing. In the second stage, we selected 20 households by systematically selecting every fourth household within each EA for an interview. Heads of households were the primary targets for the interviews. In case, they were unavailable, their spouses were interviewed. We used a deductive approach to identify the informally employed by asking whether heads of households had a formal employment contract and contributed to the National Pension Scheme Authority (NAPSA). Eligible household heads or their spouses were provided information about the study, and those who consented were interviewed using the questionnaire. Following the Ghana Demographic and Health Surveys (Ghana Statistical Service, 2015, Ghana Statistical Service, 2017) (Ghana Statistical Service, 2015; 2017) we targeted an average cluster size of 20 and assumed an intra-cluster correlation coefficient (ICC) of 0.05, resulting in a design effect of 1.95. Based on these assumptions, a total sample size of 693 household heads was required to detect a 25% difference in enrollment rates between high and low confidence groups with power 0.8.

A structured questionnaire was administered using the Open data kit (ODK) software on hand-held tablets to collect information on socio-demographics, household assets, health status, healthcare utilization behavior, access to health facilities, health expenditure patterns, child health, confidence in the health system, trust in the general government, political affiliation and health insurance status. Data collectors who were fluent in English, Nyanja and Bemba were trained on the data collection tools and procedures. Data collectors spoke the preferred language of respondents and translated the questions during the interview using vocabulary agreed upon during data collection training.

Measures

Health insurance enrollment

The main study outcome of interest was enrollment in the National Health Insurance Scheme, which was derived from the questions: “Are you currently enrolled in the NHIS?” or “Will you enroll in the scheme if I explain how the scheme works?” (Appendix 1 for survey tool) Respondents who were interested in enrolling were provided with information on how to enroll in the scheme including the application form, bank and contact details for the health insurance authority. Data collectors followed up with respondents who were interested via telephone after three weeks to check their progress with enrollment and provided guidance.

Confidence in the health system

We based our survey questions on the Lancet Commission for High Quality Health System framework (Kruk et al., 2018a). As Zambia has a distinct mixed health system (public and private health sector), we measured confidence in the two sectors separately. We used health facilities as a proxy for the larger health sector. Respondents were asked; “How confident are you that if you become very sick tomorrow, you would be able to receive effective treatment from the public health facilities” and “How confident are you that if you become very sick tomorrow, you would be able to receive effective treatment from the private health facilities?“(Pinto, 2018, Kruk et al., 2018a) The responses were on a Likert scale from “Not at all confident,” “Not very confident, “Somewhat confident, and “Very confident (Appendix 1 for survey tool).

General trust in the national government and perceived performance of the government

As health insurance involves management and the use of insurance funds, trust in governments and institutions is equally important. Reports of corruption in the media and other governance factors can influence health insurance enrollment. To measure trust in the government, we adapted questions from the WHO World Health survey (WHS): “How much of the time do you think you can trust the National government to do what is right?” with responses “always, “most of the time”, “some of the time”, “hardly ever and “never” (World Health Organization, 2002). To have the trust variable on a similar scale as the other predictors, we recoded the values in Likert scale in reverse: whereby “never” took a value of 1 and “always” took a value of 5. To measure perceived performance of the government, we also adapted the WHO WHS, “How well do you think the current government is doing in performing their duties?” with responses being “very badly”, “fairly badly”, “fairly well”, “very well” and “don't know or have not never heard (World Health Organization, 2002)”. The value of “don't know or refused to answer” was recoded as neutral taking a value of 3.

Analysis

Descriptive statistics including frequencies and percentages were calculated to describe the demographics, socio-economic, health system, and political factors by health insurance enrollment status. Differences between the two groups was determined using chi-square test and fisher's exact test where expected frequencies in any combination is less than 10. Next, we estimated health insurance enrollment using two logistic regression models. The first, measures the association between health insurance enrolment and the main predictors of interests-confidence in the public health sector, confidence in the private health

sector, trust in the government and perceived government performance. The dependent variable, health insurance enrollment, was binary taking a value of either 1 or 0 for enrolled or planning to enroll and not planning to enroll, respectively. The probability model assumes that the probability of enrolling $y_i = 1$ is associated with a vector of explanatory variables as follows:

$$\log\left(\frac{y_i}{1-y_i}\right) = \beta_0 + \beta_1 x_i + u_i$$

Where $y_i/1\text{-}y_i$ is the odds of being enrolled or planning to enroll, β_0 is the intercept and β_1 is a vector of coefficients estimated for the main predictors of interest. To facilitate interpretation, we transformed the four-predictor variables to a 0–1 range using the following function: : $z_i = \frac{x_i - \min(x)}{\max(x) - \min(x)}$

Where z_i is the *i*th-normalized response of individual i and $x = (x_1 \ldots, x_n)$. This approach assumes that each-step of responses (example, from “Very confident,” to “Somewhat confident, and “Not very confident” to Not all confident) corresponds to an equal increase.

Next, we adjusted for the models controlling for an extensive set of potential confounders. We controlled for variables related to health insurance enrollment, including demographics (age, sex, marital status, religion, number of children) and socioeconomic status (wealth, highest educational attainment). We also included individuals’ experiences during their last health facility visit (waiting times, knowledge of the provider, respect by the provider, time spent with provider). The overall index for health facility experiences and asset-based wealth were calculated using principal component analysis (Vyas and Kumaranayake, 2006) Other health system variables were frequency of health facility visits (number of health facility visits in the last year), largest health expenditure (“What was the largest health-related expenditure your household had last year?“) and payment mode for their largest expenditure. Political affiliation was also included (“Do you want a change in government in the next election?“). Clustering of outcomes at the community level was taken into account during the analysis by using community random-effects. Data were analyzed using Stata 16 (StataCorp, 2015). We used The Strengthening the Reporting of Observational Studies in Epidemiology (STROBE) guidelines for reporting cross-sectional studies (Appendix 2 for the checklist).

We also conducted sensitivity analysis to test the robustness of the results. First, as being registered with a health insurance has been shown to be associated with confidence in the health system (Roder-DeWan et al., 2020)we excluded the individuals who already have health insurance. Second, we excluded the individuals that responded “don't know” or “I have never heard” for perceived performance of the government. Lastly, we stratified the results by wealth quintile as previous studies have found that socioeconomic status affects patients' perception of health care and social trust (Arpey et al., 2017, Brandt et al., 2015).

6.4 Results

The survey team approached 753 randomly selected households. Nine household heads (1.2%) were excluded because the respondents were above 65 years of age, 43 household heads (5.7%) could not be reached and 26 (3.5%) mentioned they were busy or not interested in the study. Forty-eight household heads (6.4%) were employed in the formal sector, and were excluded from the study. Three enumeration areas had less than four eligible households due to high formal sector employment in these areas. We excluded households in those areas from the analysis (N = 7, 0.9%) resulting in a final sample of 620 household heads.

Characteristics of respondents and group differences by health insurance enrollment status are presented in Table 1. Respondents were young on average with the majority being less than 40 years (58.2%) and had completed at least some secondary schooling (66.6%). About 23% were males and nearly 69% were married or cohabiting. Nearly half of (49.6%) respondents indicated that there were no children under five years living in household. Over three quarters of respondents, (87.5%) rated their health status as at least moderate and a few (11%) had not visited a health facility in the past year. Participants generally had a positive experience about their last health facility; over 60% rated their experience as good, very good, or excellent. The vast majority of the participants (94.0%) had visited a government-owned health facility at their last visit. Most of the respondents (70.5%)'s largest health expenditure in the past year was less than 500 kwacha (33 USD). The majority (73.4%) of respondents paid their largest health expenditure on their own while 23.7% of respondents had to borrow money or sell their assets to pay.

Table 14: Health insurance enrollment and characteristics of respondents

Characteristics	Full sample N (%)	Enrolled/Plans to enroll N (%)	Does not intend to enroll N (%)	p-value
Confidence in the public health sector				
Very confident	161 (26.0)	128 (26.5)	33 (24.3)	0.597
Somewhat confident	171 (27.6)	134 (27.7)	37 (27.2)	
Not very confident	167 (26.9)	133 (27.5)	34 (25.0)	
Not at all confident	121 (19.5)	89 (18.4)	32 (23.5)	
Confidence in the private health sector				
Very confident	57 (9.2)	36 (7.4)	21 (15.4)	0.001
Somewhat confident	103 (16.6)	72 (14.9)	31 (22.8)	
Not very confident	160 (25.8)	124 (25.6)	36 (26.5)	
Not at all confident	300 (48.4)	252 (52.1)	48 (35.3)	
Trust in government				
Always	99 (16.0)	77 (15.9)	22 (16.2)	0.733
Most of the time	122 (19.7)	98 (20.3)	24 (17.7)	
Some of the time	324 (52.3)	247 (51.0)	77 (56.6)	
Hardly ever	49 (7.9)	41 (8.5)	8 (5.9)	
Never	26 (4.2)	21 (4.4)	5 (3.6)	
Perceived performance of government				
Very well	27 (4.4)	21 (4.4)	6 (4.4)	0.878
Fairly well	278 (44.8)	215 (44.4)	63 (46.3)	
Neutral	45 (7.3)	35 (7.2)	10 (7.4)	
Fairly badly	190 (30.7)	153 (31.6)	37 (27.2)	
Very badly	80 (12.9)	60 (12.4)	20 (14.7)	
Age				
18-29	175 (28.3)	137 (28.3)	38 (27.9)	0.686
30-39	186 (30.0)	145 (30.0)	41 (30.2)	
40-49	141 (22.7)	114 (23.5)	27 (19.8)	
>=50	118 (19.0)	88 (18.2)	30 (22.1)	
Gender				

Male	143 (23.1)	107 (22.1)	36 (26.5)	0.286
Female	477 (76.9)	377 (77.9)	100 (73.5)	
Marital status				
Married/Cohabiting	426 (68.7)	330 (68.2)	96 (70.6)	0.593
Single/Divorced/Separated/Widow	194 (31.3)	154 (31.8)	40 (29.4)	
Religion				
Catholic	150 (24.2)	120 (24.8)	30 (22.1)	0.065
Protestant	405 (65.3)	311 (64.3)	94 (69.1)	
Muslim	18 (2.9)	11 (2.3)	7 (5.1)	
Other	47 (7.6)	42 (8.7)	5 (3.7)	
Highest educational attainment				
None	111 (17.9)	79 (16.3)	32 (23.5)	0.266
Primary	291 (46.9)	230 (47.5)	61 (44.9)	
Secondary	122 (19.7)	97 (20.0)	25 (18.4)	
Tertiary +	96 (15.5)	78 (16.1)	18 (13.2)	
Wealth quintile index				
Poorest	137 (22.1)	100 (20.7)	37 (27.2)	0.129
Poorer	111 (17.9)	90 (18.6)	21 (15.4)	
Middle	130 (21.0)	96 (19.8)	34 (25.0)	
Richer	118 (19.0)	100 (20.7)	18 (13.2)	
Richest	124 (20.0)	98 (20.2)	26 (19.1)	
Number of children under 5 years in household				
None	308 (49.7)	231 (47.7)	77 (56.6)	0.169
1-2	303 (48.9)	245 (50.6)	58 (42.7)	
3 or more	9 (1.5)	8 (1.7)	1 (0.7)	
Want change in government				
Yes	276 (44.5)	220 (45.4)	56 (41.2)	0.434
No	174 (28.1)	136 (28.1)	38 (27.9)	
Don’t know	100 (16.1)	72 (14.9)	28 (20.6)	
Refused to answer	70 (11.3)	56 (11.6)	14 (10.3)	
Health status				
Very good	49 (7.9)	41 (8.5)	8 (5.9)	0.150

Good	166 (26.8)	118 (24.4)	48 (35.3)	
Moderate	328 (52.9)	264 (54.5)	64 (47.1)	
Bad	71 (11.4)	56 (11.6)	15 (11.0)	
Very bad	6 (1.0)	5 (1.0)	1 (0.7)	
Number of health facility visits in the last year				
None	69 (11.1)	47 (9.7)	22 (16.2)	0.094
1-2	259 (41.8)	203 (41.9)	56 (41.2)	
3 or more	292 (47.1)	234 (48.4)	58 (42.6)	
Quality index of last health facility visit				
Excellent	125 (20.2)	1109 (22.5)	16 (11.8)	0<0.00 01
Very good	164 (26.4)	1109 (22.5)	55 (40.4)	
Good	94 (15.2)	76 (15.7)	18 (13.2)	
Fair	114 (18.4)	87 (18.0)	27 (19.9)	
Poor	123 (19.8)	1103 (21.3)	20 (14.7)	
Type of health facility last visited				
Government	583 (94.0)	454 (93.8)	129 (94.9)	0.164
Private/mission-owned	36 (5.8)	30 (6.2)	6 (4.4)	
Outside of Zambia	1 (0.2)	0 (0.0)	1 (0.7)	
Largest health expenditure in the last year				
0-100 Kwacha	138 (22.3)	99 (20.5)	39 (28.7)	0.005
101-500 Kwacha	299 (48.2)	226 (46.7)	73 (53.7)	
501-1000 Kwacha	90 (14.5)	77 (15.9)	13 (9.5)	
1000 + Kwacha	93 (15.0)	82 (16.9)	11 (8.1)	
Payment mode of largest health expenditure in the last year				
Borrowed/sold assets	147 (23.7)	127 (26.2)	20 (14.7)	0.02
Paid themselves	411 (66.3)	312 (64.5)	99 (72.8)	
Did not pay	2 (0.3)	2 (0.4)	0 (0.0)	
No health expenditure	60 (9.7)	43 (8.9)	17 (12.5)	
Number of observations	620	484	136	

The largest health expenditure was higher for those insured or planning to enroll than for those who did not intend to enroll. In addition, those currently insured or planned to enroll were more likely to borrow money or sell their assets to pay for health services compared to those who refused to enroll.

About 20% of respondents were very confident in 'receiving effective treatment if sick tomorrow' from the public sector (Fig. 1a). On the other hand, in answering the same question for the private sector, nearly half (48.4%) of respondents mentioned that they were very confident (Fig. 1b). In regards to their trust in the national government, 52% respondents expressed that they could trust the government some of the time while 20% stated that, they could never trust the government in 'doing the right thing' (Fig. 2). In addition, respondents rated their government's performance in currently their duties highly whereby nearly half (49%) of respondents indicated that either the government is performing its doing very well or fairly well (Fig. 2b).

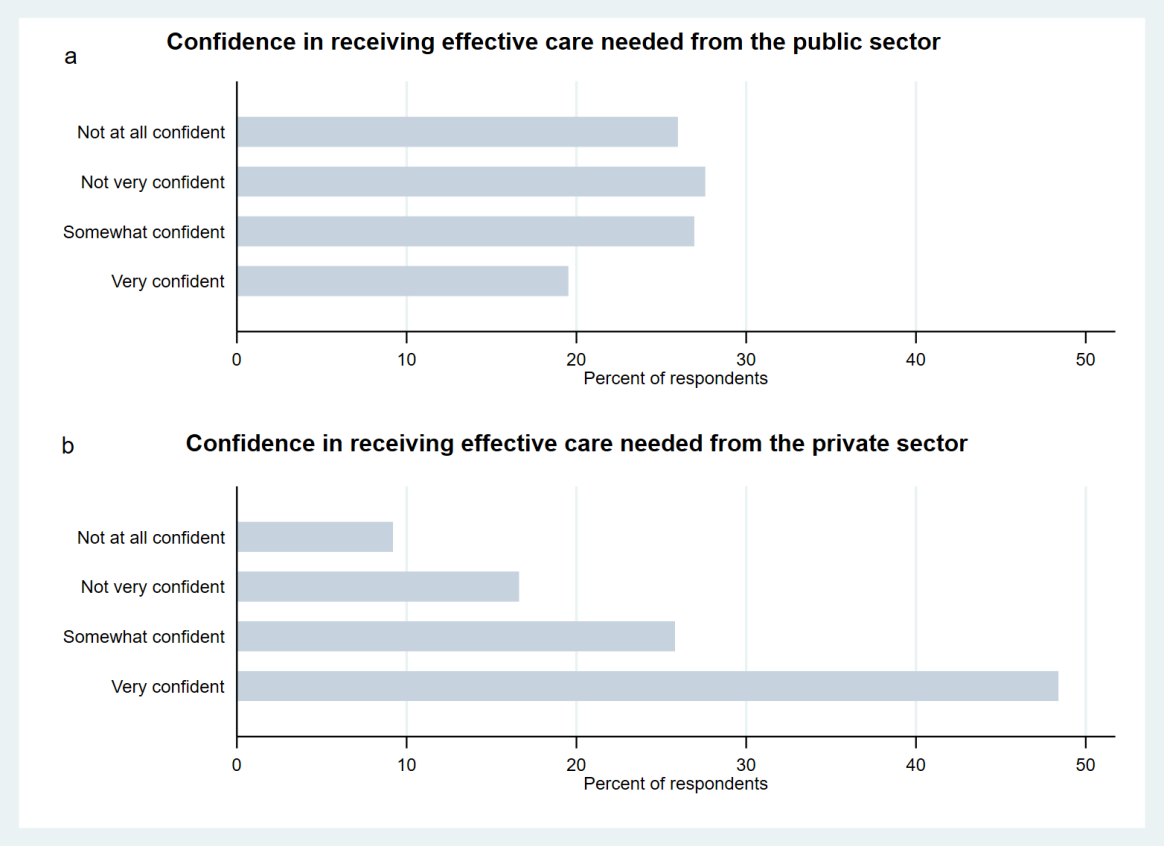

Figure 13: Confidence in receiving effective care needed from the public and private sector

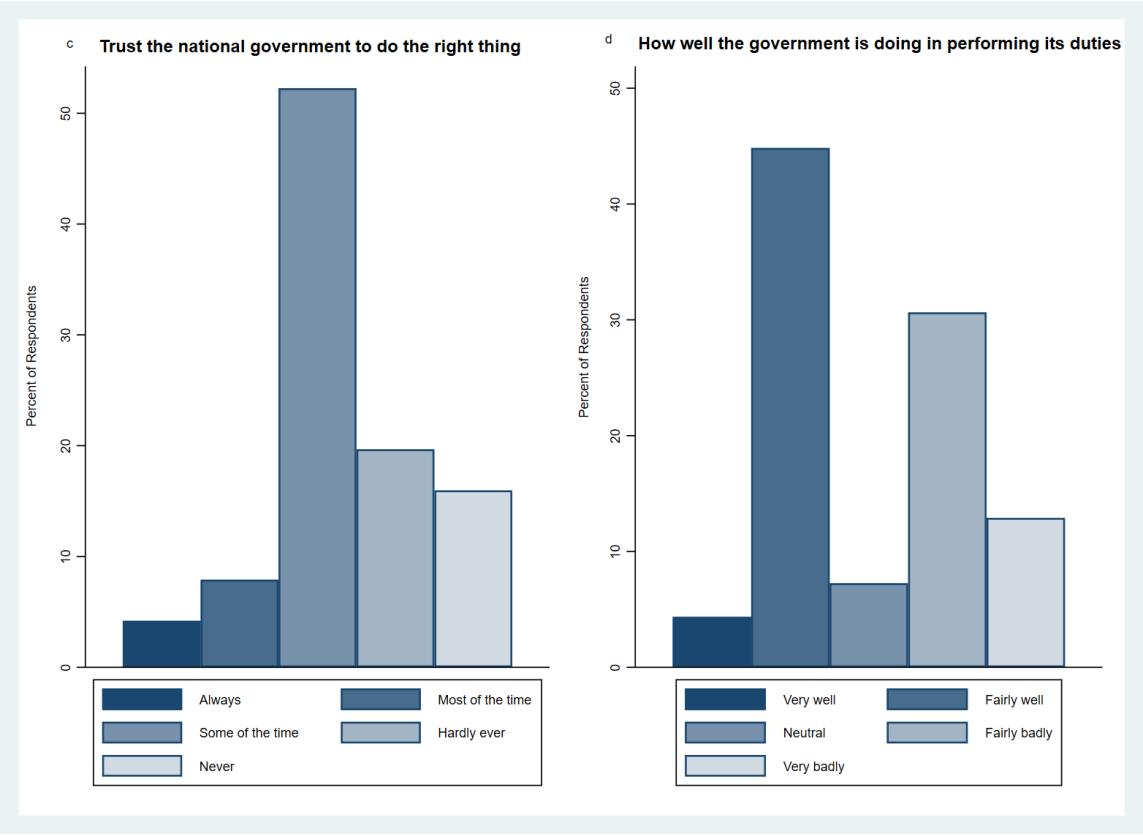

Figure 14: Trust and perceived performance of the national government among respondents.

Table 15 shows unadjusted associations between our four main predictors of interest and insurance enrollment. In the bivariate analysis, confidence in the public sector was not a significant determinant in enrollment (OR 0.77 95% CI 0.45 to 1.32). However, a unit increase in the normalized confidence in the private sector was associated with 3.17 greater odds of enrollment (95% CI 1.83 to 5.47). Neither trust in the government (OR 1.80 95% CI 0.51 to 2.31) nor perceived government performance (OR 0.95 95% CI 0.50 to 1.81) were associated with enrollment. After controlling for all the main predictors (Table 16, column 4), there was even a stronger association between confidence in the private sector and health insurance enrollment (Adjusted odds ratio (AOR) 3.89 95% CI 2.16 to 6.99).

Table 15: Health insurance enrollment and main predicator variables.

	Bivariate	Adjusted for main predicators
Main predictor	OR (95% CI)	
Confidence in the public health sector	0.77 (0.45 to 1.32)	1.10 (0.60 to 2.01)
Confidence in the private health sector	3.17 (1.83 to 5.47)	3.89 (2.16 to 6.99)
Trust in the government	1.08 (0.51 to 2.31)	1.80 (0.73 to 4.41)
Perceived performance of government	0.95 (0.50 to 1.81)	1.13 (0.54 to 2.34)

Note: Original scales of responses were transformed into continuous variables ranging from 0-1

The association between confidence in the health system, trust in the government and perceived performance and health insurance enrollment controlling for sociodemographic characteristics, health status and other health system factors are presented in Table 16. After adjusting for these factors, the estimated odds ratio of enrollment increased slightly to 0.80 for a unit change in confidence in the public health sector but remained non-statistically significant (95% CI 0.43 to 1.51). The estimated odds ratio of enrollment decreased to 2.88 for a unit change in confidence in the private health sector (95% CI 1.56 to 5.29). After controlling for all covariates and other predictors, confidence in the public health sector and private health sector were associated with 1.02 and 3.40 greater odds (95% CI 0.42 to 1.51, and 1.56 to 5.28) of enrolling in the health insurance respectively. There was still no association between health insurance enrollment and neither trust in the government nor perceived performance of the government. The number of health facility visits and experience at last health facility visit were not associated with enrollment. Respondents who had over 1000 Kwacha (76 USD) as their largest health expenditure in the past year had 2.30 times higher odds (95% CI 1.02 to 5.21) of enrollment in all the models. In addition, those in the richer quintile were 2.08 times higher odds (95% CI 1.07 to 4.11) of enrolling compared to the poorest quintile. There was a decrease in the odds of enrollment for the richest wealth quintile, although it was not significant. Being Muslim and rating health status as good were associated with lower odds of health insurance enrollment in all the models.

Table 16: Adjusted associations between health insurance enrollment and main predicator variables

	Confidence in public sector (1)	Confidence in private sector (2)	Trust in the government (3)	Perceived performance of government (4)	All (5)
	OR (95% CI)				
Confidence in the public sector	0.80 (0.43 to 1.51)	_	_	_	1.02 (0.52 to 1.98)
Confidence in the private sector	_	**2.88 (1.56 to 5.29)**	_	_	**3.40 (1.73 to 6.68)**
Trust in the government	_	_	1.46 (0.50 to 4.23)	_	1.97 (0.70 to 5.56)
Perceived performance of government	_	_	_	1.48 (0.76 to 2.89)	1.57 (0.75 to 3.27)
Age					
18-29	References	References	References	References	References
30-39	0.96 (0.53 to 1.73)	0.95 (0.52 to 1.73)	0.98 (0.54 to 1.76)	0.96 (0.53 to 1.74)	0.97 (0.53 to 1.80)
40-49	1.32 (0.74 to 2.33)	1.33 (0.77 to 2.30)	1.30 (0.74 to 2.28)	1.28 (0.72 to 2.26)	1.35 (0.76 to 2.39)
>=50	0.87 (0.47 to 1.61)	0.97 (0.53 to 1.79)	0.89 (0.48 to 1.66)	0.86 (0.46 to 1.61)	1.00 (0.53 to 1.91)
Sex					
Males	References	References	References	References	References

Females	1.11 (0.73 to 2.02)	1.20 (0.70 to 2.05)	1.20 (0.70 to 2.04)	1.17 (0.68 to 2.02)	1.18 (0.67 to 2.07)
Religion					
Catholic	References	References	References	References	References
Protestant	0.82 (0.50 to 1.33)	0.83 (0.52 to 1.32)	0.80 (0.50 to 1.27)	0.80 (0.50 to 1.28)	0.80 (0.49 to 1.31)
Muslim	**0.35 (0.12 to 0.99)**	**0.33 (0.12 to 0.95)**	**0.35 (0.12 to 0.98)**	0.36 (0.13 to 1.02)	**0.35 (0.13 to 0.94)**
Other	3.03 (0.95 to 9.65)	3.29 (1.03 to 10.5)	3.00 (0.94 to 9.61)	3.20 (1.00 to 10.2)	3.58 (1.06 to 12.08)
Highest educational attainment					
None	References	References	References	References	References
Primary	1.64 (0.89 to 3.04)	1.46 (0.77 to 2.74)	1.70 (0.91 to 3.18)	1.70 (0.92 to 3.12)	1.54 (0.81 to 2.92)
Secondary	1.65 (0.84 to 3.23)	1.53 (0.76 to 3.07)	1.70 (0.87 to 3.34)	1.68 (0.87 to 3.25)	1..63 (0.81 to 3.26)
Tertiary +	1.88 (0.92 to 3.81)	1.69 (0.77 to 3.70)	2.00 (0.99 to 4.01)	**2.05 (1.05 to 3.99)**	1.89 (0.86 to 4.18)
Marital status					
Single/Divorced/Separated/Widow	References	References	References	References	References
Married/Cohabiting	0.82 (0.47 to 1.44)	0.83 (0.46 to 1.48)	0.81 (0.47 to 1.41)	0.80 (0.45 to 1.40)	0.80 (0.44 to 1.45)
Wealth quintile index					
Poorest	References	References	References	References	References
Poorer	1.62 (0.84 to 3.13)	1.52 (0.78 to 2.95)	1.66 (0.86 to 3.20)	1.66 (0.86 to 3.20)	1.52 (0.80 to 2.89)
Middle	1.14 (0.65 to 2.03)	1.14 (0.63 to 2.05)	1.15 (0.65 to 2.05)	1.15 (0.65 to 2.06)	1.14 (0.64 to 2.03)
Richer	**2.19 (1.17 to 4.11)**	**2.06 (1.07 to 3.98)**	**2.20 (1.17 to 4.15)**	**2.23 (1.19 to 4.19)**	**2.08 (1.07 to 4.01)**
Richest	1.11 (0.58 to 2.11)	0.98 (0.52 to 1.87)	1.11 (0.59 to 2.09)	1.13 (0.60 to 2.12)	0.99 (0.53 to 1.87)
Number of children in household					
None	References	References	References	References	References
1-2	1.40 (0.84 to 2.31)	1.42 (0.86 to 2.34)	1.38 (0.83 to 2.29)	1.39 (0.84 to 2.31)	1.42 (0.86 to 2.33)
3 or more	2.13 (0.25 to 18.2)	1.62 (0.20 to 13.09)	2.28 (0.25 to 20.7)	2.14 (0.24 to 18.7)	1.52 (0.17 to 13.3)
Want change in government					
Yes	References	References	References	References	References
No	1.11 (0.71 to 1.75)	1.23 (0.79 to 1.92)	1.00 (0.64 to 1.56)	0.95 (0.58 to 1.55)	1.00 (0.62 to 1.62)
Don’t know	0.72 (0.41 to 1.28)	0.74 (0.42 to 1.33)	0.67 (0.38 to 1.21)	0.64 (0.36 to 1.14)	0.62 (0.34 to 1.11)
Refused to answer	0.99 (0.53 to 1.83)	1.03 (0.51 to 2.09)	0.88 (0.47 to 1.67)	0.85 (0.44 to 1.62)	0.84 (0.44 to 1.59)
Health status					
Very good	References	References	References	References	References
Good	**0.45 (0.23 to 0.86)**	**0.48 (0.25 to 0.95)**	**0.45 (0.24 to 0.85)**	**0.45 (0.24 to 0.87)**	**0.50 (0.25 to 0.98)**

Moderate	0.83 (0.43 to 1.61)	0.86 (0.44 to 1.71)	0.84 (0.42 to 1.67)	0.85 (0.43 to 1.66)	0.93 (0.46 to 1.88)
Bad	0.76 (0.29 to 1.96)	0.78 (0.28 to 2.13)	0.75 (0.29 to 1.95)	0.79 (0.31 to 2.00)	0.84 (0.31 to 2.29)
Very bad	0.50 (0.03 to 7.73)	0.37 (0.03 to 4.67)	0.45 (0.03 to 6.47)	0.50 (0.04 to 6.67)	0.30 (0.03 to 3.29)
Number of health facility visits in the last year					
None	References	References	References	References	References
1-2	1.55 (0.90 to 2.65)	1.60 (0.96 to 2.66)	1.54 (0.89 to 2.64)	1.54 (0.89 to 2.65)	1.56 (0.92 to 2.65)
3 or more	1.41 (0.72 to 2.77)	1.46 (0.78 to 2.76)	1.43 (0.74 to 2.78)	1.43 (0.74 to 2.75)	1.48 (0.79 to 2.78)
Type of health facility					
Public	References	References	References	References	References
Private/mission-owned	1.33 (0.60 to 2.94)	1.20 (0.54 to 2.67)	1.42 (0.65 to 3.12)	1.49 (0.68 to 3.26)	1.28 (0.56 to 2.94)
User-experience index	1.01 (0.88 to 1.16)	0.99 (0.87 to 1.13)	1.04 (0.90 to 1.19)	1.04 (0.90 to 1.19)	1.03 (0.89 to 1.20)
Largest health expenditure in the last year					
0-100 Kwacha	References	References	References	References	References
101-500 Kwacha	1.09 (0.62 to 1.91)	1.04 (0.59 to 1.83)	1.09 (0.62 to 1.92)	1.07 (0.60 to 1.90)	1.06 (0.59 to 1.91)
501-1000 Kwacha	1.85 (0.89 to 3.85)	1.82 (0.86 to 3.86)	1.93 (0.91 to 4.09)	1.85 (0.89 to 3.84)	1.92 (0.90 to 4.08)
1000 + Kwacha	**2.35 (1.08 to 5.11)**	**2.28 (1.01 to 5.11)**	**2.38 (1.10 to 5.13)**	**2.34 (1.08 to 5.08)**	**2.30 (1.02 to 5.21)**
Payment mode of largest health expenditure in the last year					
Borrowed/sold assets	References	References	References	References	References
Paid themselves	0.58 (0.32 to 1.05)	0.60 (0.33 to 1.08)	0.58 (0.33 to 1.05)	0.58 (0.32 to 1.04)	0.62 (0.34 to 1.12)
No health expenditure	0.71 (0.27 to 1.87)	0.76 (0.29 to 1.97)	0.73 (0.27 to 1.92)	0.73 (0.28 to 1.92)	0.80 (0.31 to 2.05)

Note: Logistic regression model for each predicator and covariates are displayed in columns (1) through (4). Logistic regression model for all predictors and covariates are displayed in column (5). Confidence intervals are in parentheses. Original scales of the predictor responses were transformed into continuous variables ranging from 0 to 1

Table 17 shows robustness checks as well as some stratified results. The results were robust to excluding those who already have health insurance (Table 17, column 1). When we exclude respondents who were not sure about government performance (N = 570), results for relative confidence in the private health sector are similar, and a negative and significant relationship between performance perception and

enrollment emerges (Table 17, column 2). In columns 3 and 4 of Table 17, we stratify results by wealth quintiles: Results are noisy, but suggest generally stronger associations in the bottom than the top quintiles.

Table 17: Health insurance enrollment after restricting main predictors and wealth

	Excluding already enrolled	Excluding no response for perceived government	Only top 2 wealth quintiles	Only bottom 2 wealth quintiles
	OR (95% CI)			
Confidence in the public sector	1.11 (0.57 to 2.16)	0.97 (0.51 to 1.86)	2.36 (0.66 to 8.43)	1.34 (0.32 to 5.52)
Confidence in the private sector	**3.68 (1.84 to 7.35)**	**4.35 (2.07 to 9.16)**	3.19 (0.56 to 18.1)	3.90 (1.21 to 12.6)
Trust in the government	2.34 (0.81 to 6.77)	1.77 (0.55 to 5.70)	8.70 (0.86 to 88.1)	0.23 (0.05 to 0.99)
Perceived performance of government	1.72 (0.86 to 3.46)	**0.42 (0.18 to 0.95)**	2.49 (0.52 to 11.9)	2.04 (0.61 to 6.86)
Age				
18-29	References	References	References	References
30-39	0.93 (0.49 to 1.77)	0.82 (0.41 to 1.59)	1.58 (0.58 to 4.29)	0.69 (0.20 to 2.37)
40-49	1.27 (0.69 to 2.33)	1.08 (0.56 to 2.06)	1.47 (0.56 to 3.85)	1.48 (0.60 to 3.66)
>=50	0.88 (0.45 to 1.75)	0.91 (0.46 to 1.83)	1.51 (0.35 to 6.43)	0.81 (0.35 to 1.86)
Sex				
Males	References	References	References	References
Females	1.27 (0.74 to 2.18)	0.91 (0.50 to 1.65)	1.69 (0.67 to 4.26)	0.68 (0.24 to 1.94)
Religion				
Catholic	References	References	References	References
Protestant	0.75 (0.45 to 1.24)	0.80 (0.46 to 1.37)	0.62 (0.31 to 1.24)	0.99 (0.46 to 2.14)
Muslim	**0.36 (0.14 to 0.96)**	**0.34 (0.12 to 0.92)**	0.36 (0.05 to 2.58)	0.11 (0.01 to 1.28)
Other	**4.06 (1.24 to 13.4)**	**16.8 (2.97 to 95.7)**	1.70 (0.14 to 20.1)	3.11 (0.50 to 19.6)
Highest educational attainment				
None	References	References	References	References
Primary	1.45 (0.74 to 2.82)	1.37 (0.73 to 2.61)	0.59 (0.13 to 2.73)	1.31 (0.40 to 4.25)
Secondary	1.39 (0.67 to 2.86)	1.37 (0.60 to 3.11)	0.94 (0.19 to 4.66)	0.39 (0.11 to 1.34)
Tertiary +	1.55 (0.64 to 3.76)	1.84 (0.81to 4.18)	0.81 (0.15 to 4.28)	__
Marital status				
Single/Divorced/Separated/Widow	References	References	References	References
Married/Cohabiting	0.76 (0.40 to 1.42)	0.75 (0.39 to 1.43)	0.50 (0.16 to 1.57)	1.08 (0.51 to 2.28)
Wealth quintile index				
Poorest	References	References	__	References
Poorer	1.61 (0.85 to 3.05)	1.42 (0.76 to 2.66)	__	1.57 (0.72 to 3.42)
Middle	1.12 (0.61 to 2.05)	1.11 (0.62 to 1.99)	__	__
Richer	**2.03 (1.03 to 3.99)**	**2.02 (1.03 to 3.95)**	References	

Richest	0.83 (0.42 to 1.61)	0.87 (0.46 to 1.68)	0.54 (0.22 to 1.34)	__
Number of children in household				__
None	References	References	References	References
1-2	1.35 (0.81 to 2.23)	1.65 (0.93 to 2.93)	0.76 (0.30 to 1.90)	**2.90 (1.53 to 5.50)**
3 or more	1.50 (0.15 to 15.3)	1.11 (0.16 to 7.88)	__	1.66 (0.12 to 23.7)
Want change in government				
Yes	References	References	References	References
No	0.95 (0.59 to 1.55)	1.02 (0.60 to 1.73)	0.85 (0.26 to 2.76)	1.21 (0.53 to 2.76)
Don't know	0.56 (0.30 to 1.02)	0.50 (0.27 to 0.90)	0.39 (0.09 to 1.69)	0.55 (0.18 to 1.67)
Refused to answer	0.66 (0.35 to 1.24)	0.93 (0.41 to 2.13)	0.48 (0.16 to 1.48)	1.33 (0.47 to 3.73)
Health status				
Very good	References	References	References	References
Good	0.54 (0.26 to 1.13)	**0.37 (0.15 to 0.93)**	0.69 (0.28 to 1.66)	0.33 (0.05 to 2.14)
Moderate	0.99 (0.49 to 2.01)	0.75 (0.28 to 2.03)	1.84 (0.64 to 5.34)	0.36 (0.06 to 2.01)
Bad	0.93 (0.35 to 2.45)	0.62 (0.18 to 2.19)	1.09 (0.18 to 6.46)	0.59 (0.07 to 4.62)
Very bad	0.30 (0.03 to 3.42)	0.14 (0.01 to 2.31)	__	0.33 (0.00 to 25.9)
Number of health facility visits in the last year				
None	References	References	References	References
1-2	1.57 (0.88 to 2.77)	1.54 (0.86 to 2.75)	0.65 (0.19 to 2.20)	3.41 (1.04 to 11.2)
3 or more	1.47 (0.80 to 2.69)	1.58 (0.85 to 2.92)	0.75 (0.27 to 2.11)	2.29 (0.74 to 7.12)
Type of health facility				
Public	References	References	References	References
Private/mission-owned	0.92 (0.37 to 2.30)	1.46 (0.65 to 3.30)	2.46 (0.86 to 7.04)	__
User-experience index	1.09 (0.94 to 1.25)	1.05 (0.90 to 1.22)	1.00 (0.75 to 1.32)	1.11 (0.87 to 1.42)
Largest health expenditure in the last year				
0-100 Kwacha	References	References	References	References
101-500 Kwacha	1.24 (0.67 to 2.29)	1.07 (0.56 to 2.02)	0.69 (0.16 to 2.97)	0.42 (0.19 to 0.90)
501-1000 Kwacha	2.30 (1.03 to 5.14)	2.00 (0.91 to 4.43)	2.06 (0.36 to 11.9)	0.62 (0.18 to 2.08)
1000 + Kwacha	**2.64 (1.10 to 6.36)**	**2.49 (1.06 to 5.82)**	1.94 (0.49 to 7.66)	1.20 (0.24 to 6.06)
Payment mode of largest health expenditure in the last year				
Borrowed/sold assets	References	References	References	References
Paid themselves	0.61 (0.33 to 1.12)	0.68 (0.35 to 1.30)	0.55 (0.18 to 1.71)	0.38 (0.16 to 0.92)
No health expenditure	0.82 (0.31 to 2.15)	0.69 (0.25 to 1.94)	0..41 (0.06 to 2.95)	0.44 (0.09 to 2.22)

Number of Observations	570	573	238	235

Note: Logistic regression model for all predictors and covariates after restricting enrollment, perceived performance and stratifying wealth quintiles. Confidence intervals are reported in parentheses. Original scales of the predictor responses were transformed into continuous variables ranging from 0 to 1.

6.5 Discussion

Our study investigated the relationship between trust and confidence in government and health systems and health insurance enrollment in the context of Zambia's recently introduced National Health Insurance Scheme. We found that while trust in the government was not associated with enrollment, confidence in the health system - particularly in the private sector - was strongly and positively associated with health insurance enrollment. These findings suggest that enrollment decisions are not based primarily on the organization running the scheme (the government in this case), but rather by the subjectively perceived quality of services that can be obtained with health insurance. Our findings are similar to those of other studies conducted in LMICs that have examined quality of care and health insurance enrollment. A study of a mutual health organization in Guinea-Conakry found that although respondents had a good understanding of the principles and concepts behind health insurance, and valued its redistributive effects, quality concerns in the health system was a major deterring factor for enrollment (Criel and Waelkens, 2003). A study in Ghana also found that negative provider attitudes, and the perception of the technical quality of care, did not increase the odds of health insurance ownership (Jehu-Appiah et al., 2011). In Nicaragua, quality concerns in the public sector was a deterring factor in health insurance enrollment, and respondents had a preference for private providers (Thornton et al., 2010). Interestingly, the type of health facility (public vs private) visited last and the number of visits were not associated with health insurance enrollment. We measured experiences and overall quality of care during the last visit in our study too but neither were associated with health insurance enrollment. Perhaps this is because the majority of respondents rated their experiences and quality of care as good, very good, or excellent. Our finding illustrates the importance of measuring confidence in the health system, as experiences or quality rating of their last health facility visit may not capture fully how individuals perceive the whole system.

However, we also found that trust and perceived performance of the government were not significant predicators of enrollment. This finding differs from the results of a qualitative study conducted in Nigeria, whereby potential enrollees where skeptical about the government's ability to successfully ran the health insurance due to its failure in implementing programs in other sectors. Perhaps in Zambia, the role of the government may not be an important factor for potential enrollees due to how the health insurance was established. The establishment of a national health insurance had been an ongoing discussion in Zambia among health stakeholders since the 1990s and it had not been a push from a specific ruling party. Meanwhile, in other countries such as Ghana, the establishment of its national health insurance scheme (NHIS) was often part of the political agenda during the general election campaigns. In fact, it has been argued that the political nature of the NHIS made it a significant determinant of enrollment (Alatinga and Fielmua, 2011a).

Our findings also show that individual factors are associated with health insurance enrollment. Those in the richer wealth quintile had higher odds of enrollment, which is consistent with previous studies (Fenny, 2017, Jehu-Appiah et al., 2011) and suggests that credit-constraints may also explain restricted enrollment in some populations. Interestingly, enrollment was not very high in the top wealth quintile. People whose largest health expenditure in the past year was above 1000 Kwacha (76 USD) were more than twice as likely to enroll in the health insurance. This is likely because health insurance may be attractive to those expecting to pay high medical expenditure and who perceive that enrolment in the health insurance would be cost saving (Baillon et al., 2022). Surprisingly, conditional on sociodemographic factors, including wealth, gender and marital status, and higher education (above secondary) had no additional explanatory power, which is different than findings from Ghana and Kenya (Kimani et al., 2014, Salari et al., 2019a) but similar to a study in Nicaragua (Thornton et al., 2010). This difference may be due to the overall high level of educational attainment in our sample that may different from the general population in Zambia and elsewhere.

There are several limitations with our study. Although Lusaka is a relatively heterogeneous district with a population in both the formal and informal sector, a few pockets have predominantly people employed in the formal sector. Some of these few small areas were in our sample, which made it difficult to identify the required number of informal sector households in these areas. Lusaka is a big city and the capital of Zambia, and its population tends to be wealthier, more educated, and younger than the general population of the entire country (Aurick et al., 2017, International Labor Organization, 2018). In addition, our results may not be generalizable to rural areas, which have fewer private health providers than in urban settings such as Lusaka. Finally, as an observational study, our models are subject to omitted variable bias. We attempted to control for as many confounders associated with health insurance enrollment and confidence in the health system, but we did not examine all possible factors. First, household size, which has been found as a determinant for enrollment was omitted in our model. However, we included the number of children in the household in our model. In addition, we did not control for the health status of the other members of the household. As principal members of the scheme can have additional six beneficiaries under them, having a household member with a chronic illness may influence enrollment.

Our study may have policy implications. There is a crucial need to make fundamental improvements across the entire health system to achieve high quality of care, which can increase enrollment in health insurance. Major global reports have emphasized four main strategies to improve quality: 1) leadership and governance specifically focused on quality, 2) highly trained health workforce, 3) better use of information systems, and 4) applying evidence-based practices such as the use of clinical guidelines (Braithwaite et al., 2020). These actions are beyond the national health insurance scheme and will require concerted efforts with the Ministry of Health and other key stakeholders. However, it is unclear the extent that improvements in the quality of care can increase individuals' confidence (Bleich et al., 2009).

Confidence in the private sector is a strong determinant in health insurance enrollment and its inclusion in the health insurance scheme seems to align with individuals' preferences. Although the majority of the respondents relied on public health facilities, they report a high confidence in the private sector. Since the

study, NHIMA has accredited a number of private health facilities, and it is gradually adding more every month across the country. However, there needs to be careful planning of the inclusion of the private sector as overreliance by people who believe it is superior to public institutions may jeopardize the financial sustainability of the scheme. The private sector has higher reimbursement rates than the public sector due to the former receiving subsidization from the government. Attention should also be drawn to training, and quality improvement in private sector, as though it may be perceived as having high quality of care, this often sometimes may not be the reality (Mackintosh et al., 2016, Montagu and Goodman, 2016). In addition, strong linkages in care coordination and information systems between the two sectors will be essential (Morgan et al., 2016).

Finally, our study demonstrated that vulnerable groups are less likely to enroll in the national health insurance. The implication is that with equitable access being one of the main priorities of the health insurance, more efforts will be required to reach the poorest groups. The National Health Insurance Act requires NHIMA to facilitate access to the scheme for the poor and vulnerable groups. In addition, any person classified by the Ministry responsible for social welfare may be exempted from contributions. These mandates by the Act will require active coordination with the Ministry of Community Development and Social Services (MCDSS) to identify recent vulnerable groups. MCDSS already has a cash transfer program for vulnerable groups but not all eligible are under the program. In addition, economic crisis over the years coupled with the COVID-19 pandemic have greatly affected Zambia and this could have pushed more households into poverty (Geda, 2021b, Paul et al., 2021a). Close monitoring of the effectiveness of the policy options at sub-national levels is essential. As those within the richest group were also less likely to enroll in the scheme, targeted policies, which address their concerns, may attract them to the scheme and may contribute to the viability of the scheme as they pay higher insurance contributions.

6.6 Conclusion

We found that confidence in health systems is a key predictor of health insurance enrollment. Improving quality of care in both the private and public sector may help increase future enrollment. To reach the most vulnerable groups, further coordination with other social protection programs may also be needed.

Credit author statement

Doris Osei Afriyie: Conceptualization, Methodology, Formal analysis, Visualization, Writing-original draft, Writing-reviewing and Editing **Felix Masiye:** Methodology, Writing-reviewing and Editing. **Fabrizio Tediosi:** Visualization**,** Writing-review and Editing. **Günther Fink:** Conceptualization, Methodology, Formal analysis, Writing-review and Editing, Supervision.

Ethical approval

We obtained ethical clearance from the University of Zambia Social Sciences and Humanities Ethical Clearance Committee as well as the permission to conduct this research from the National Health Research Authority. We also obtained ethical clearance from the Ethikkommission Nordwest-und

Zentralschweiz (EKNZ) in Switzerland. An informed consent was obtained from each respondent before the interview started.

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.

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6.7 Supplemental

Appendix 1: Survey

Survey details

[interviewer_id]

Interviewer name

Choose only one option:

○	Gracious
○	Sitwala
○	Ruth
○	Mundai

[start_time]

Start time:

[end_time]

End time:

[store_gps]

Collect the GPS coordinates of this store.

Geopoint:

[selected_ward]

Name of ward

Choose only one option:

○	Chaisa
○	Chakunkula
○	Chawama
○	Chilenje
○	Harry Mwanga Nkumbula
○	Idependence
○	Justin Kabwe
○	Kabulonga
○	Kabwata
○	Kamwala
○	Kanyama
○	Kapwepwe
○	Lilayi
○	Lima
○	Lubwa
○	Matero
○	Muchinga
○	Munali
○	Mwembeshi
○	Ngwerere
○	Nkoloma
○	Raphael
○	Roma

[selected_ea]

Enumeration area

The choice list of this question (comprising 35 choices) was replaced with a text field due to this question having choice filter and more than 10 choices.

[audit]

Audit:

Socio-demographics

[Q0hh]
Q0. Head of household?

Choose only one option:

○	Yes
○	No, spouse of head

[Q1age]
Q1. Respondent's age?

[Q2sex]
Q2. Record sex as observed

Choose only one option:

○	Female
○	Male

[Q3marital_stat]
Q3. What is your current marital status?

Choose only one option:

○	Married
○	Single
○	Divorced
○	Cohabiting
○	Separated
○	Widow

[Q4edn_lev]
Q4. What is your highest level of education completed?

Choose only one option:

○	No, formal schooling
○	Some primary completed
○	Primary school completed
○	Some secondary completed
○	Secondary school completed
○	Some college or university completed
○	College or University completed
○	Postgraduated completed

[Q5rlgn]
Q5. What is your religion?

Choose only one option:

○	Catholic
○	Protestant
○	Muslim
○	Other

• Relevant when:
Q5. What is your religion? = Other.

[Q5rlgn_oth]
Q5a. Specify other

Household characteristics

[Q6drkn_sour]
Q6. What is the main source of drinking water for members of this household?

Choose only one option:

○	Piped into dwelling
○	Piped into yard/plot
○	Piped to neighbor
○	Public tab/standpipe
○	Borehole
○	Protected well
○	Unprotected well
○	Protected spring
○	Unprotected spring
○	Rainwater
○	Tanker truck
○	Surface water (river/dam/lake/pond)
○	Bottled water
○	Other

• Relevant when:
Q6. What is the main source of drinking water for members of this household? = Other.

[Q6drkn_sour_oth]
Q6a. Specify other

• Relevant when:
Q6. What is the main source of drinking water for members of this household? = Bottled water.

[Q7other_wter_sour]
Q7. What is the main source of water used by your household for other purposes such as cooking and handwashing?

Choose only one option:

○	Piped into dwelling
○	Piped into yard/plot
○	Piped to neighbor
○	Public tab/standpipe
○	Borehole
○	Protected well
○	Unprotected well
○	Protected spring
○	Unprotected spring
○	Rainwater
○	Tanker truck
○	Surface water (river/dam/lake/pond)
○	Bottled water
○	Other

• Relevant when:
Q7. What is the main source of water used by your household for other purposes such as cooking and handwashing? = Other.

[Q7other_wter_sour_oth]
Q7a. Specify other

• Relevant when:
Q6. What is the main source of drinking water for members of this household? ≠ Piped into dwelling || Q6. What is the main source of drinking water for members of this household? = Piped into yard/plot || Q6. What is the main source of drinking water for members of this household? = Piped to neighbor || Q6. What is the main source of drinking water for members of this household? = Bottled water.

[Q8water_lcn]
Q8. Where is the water source located?

Choose only one option:

○	In your own dwelling
○	In your own yard/plot
○	Elsewhere

• Relevant when:
Q8. Where is the water source located? = Elsewhere.

[Q9water_time]
Q9. How long does it take to get there, wait, get water and come back? Minutes

• Relevant when:
Q6. What is the main source of drinking water for members of this household? = Piped into dwelling || Q6. What is the main source of drinking water for members of this household? = Piped into yard/plot || Q6. What is the main source of drinking water for members of this household? = Piped to neighbor || Q6. What is the main source of drinking water for members of this household? = Public tab/standpipe || Q6. What is the main source of drinking water for members of this household? = Borehole || Q7. What is the main source of water used by your household for other purposes such as cooking and handwashing? = Piped into dwelling || Q7. What is the main source of water used by your household for other purposes such as cooking and handwashing? = Piped into yard/plot || Q7. What is the main source of water used by your household for other purposes such as cooking and handwashing? = Piped to neighbor || Q7. What is the main source of water used by your household for other purposes such as cooking and handwashing? = Public tab/standpipe || Q7. What is the main source of water used by your household for other purposes such as cooking and handwashing? = Borehole.

[Q11water_avbty]
Q11. In the past two weeks, was the water from this source not available for at least one full day?

Choose only one option:

○	Yes
○	No
○	Don't know

• Relevant when:
Q6. What is the main source of drinking water for members of this household? ≠ Piped into dwelling || Q6. What is the main source of drinking water for members of this household? = Piped into yard/plot || Q6. What is the main source of drinking water for members of this household? = Piped to neighbor || Q6. What is the main source of drinking water for members of this household? = Public tab/standpipe || Q6. What is the main source of drinking water for members of this household? = Bottled water || Q6. What is the main source of drinking water for members of this household? = Borehole || Q7. What is the main source of water used by your household for other purposes such as cooking and handwashing? = Piped into dwelling || Q7. What is the main source of water used by your household for other purposes such as cooking and handwashing? = Piped into yard/plot || Q7. What is the main source of water used by your household for other purposes such as cooking and handwashing? = Piped to neighbor || Q7. What is the main source of water used by your household for other purposes such as cooking and handwashing? = Public tab/standpipe || Q7. What is the main source of water used by your household for other purposes such as cooking and handwashing? = Borehole.

[Q12safe_wter]
Q12. Do you do anything to the water to make it safer to drink?

Choose only one option:

○	Yes
○	No
○	Don't know

• Relevant when:
Q12. Do you do anything to the water to make it safer to drink? = Yes.

[Q13mk_safe]
Q13. What do you usually do to make the water safer to drink?

Choose one or more options:

☐	Boil
☐	Add bleach/chlorine
☐	Strain through cloth
☐	Use water filter(ceramic, sand, composite, etc)
☐	Solar disinfection
☐	Let it stand and settle
☐	Other
☐	Don't know

• Relevant when:
Q13. What do you usually do to make the water safer to drink? = Don't know.

[Q13mk_safe_oth]
Q13a. Specify other

[Q14str_water]
Q14. How do you store your drinking water?

Choose only one option:

○	Closed container/jerry can
○	Open container/bucket
○	Does not store water
○	Other

• Relevant when:
Q14. How do you store your drinking water? = Other.

[Q14str_water_oth]
Q14a. Specify other

Toilet facility

[Q15toilet_typ]
Q15. What kind of toilet facility do members of this household usually use?

Choose only one option:

○	Flush to piped sewer system
○	Flush to septic tank
○	Flush to pit latrine
○	Flush to somewhere else
○	Flush, Don’t know where
○	Ventilated improved pit latrine
○	Pit latrine with slab
○	Pit latrine without slab/Open pit
○	Composting toilet
○	Bucket toilet
○	Hanging toilet/hanging latrine
○	No facility/bush/field
○	Other

• Relevant when:
Q15. What kind of toilet facility do members of this household usually use? = Other.

[Q15toilet_typ_oth]
Q15a. Specify other

• Relevant when:
Q15. What kind of toilet facility do members of this household usually use? ≠ No facility/bush/field.

[Q16share_toilet]
Q16. Do you share this facility with other households?

Choose only one option:

○	Yes
○	No

• Relevant when:
Q16. Do you share this facility with other households? = Yes.

[Q17hh_toilet]
Q17. Including your own household, how many households use this toilet facility?

• Relevant when:
Q15. What kind of toilet facility do members of this household usually use? ≠ No facility/bush/field.

[Q18toilet_lcn]
Q18. Where is this toilet facility located?

Choose only one option:

○	In your own dwelling
○	In your own yard/plot
○	Elsewhere

Cooking details

[Q19fuel_ckn]
Q19. What type of fuel does your household mainly use for cooking?

Choose only one option:

○	Electricity
○	Solar Power
○	Liquid Propane (LP)
○	Natural Gas
○	Biogas
○	Kerosene
○	Coal, Lignite
○	Charcoal
○	Wood
○	Straw/Shrubs/Grass
○	Agricultural Crop
○	Animal Dung
○	No food cooked in household
○	Other

• Relevant when:
Q19. What type of fuel does your household mainly use for cooking? = Wood.

[Q19fuel_ckn_oth]
Q19a. Specify other

• Relevant when:
Q19. What type of fuel does your household mainly use for cooking? ≠ No food cooked in household.

[Q20ckn_lcn]
Q20. Is the cooking usually done in the house, in a separate building or outdoors?

Choose only one option:

○	In the house
○	In a separate building
○	Outdoors
○	Other

• Relevant when:
Q20. Is the cooking usually done in the house, in a separate building or outdoors? = Answer "96" not found;.

[Q20ckn_lcn_oth]
Q20a. Specify other

• Relevant when:
Q20. Is the cooking usually done in the house, in a separate building or outdoors? = In the house.

[Q21sp_ktn]
Q21. Do you have a separate room, which is used, as a kitchen?

Choose only one option:

- ○ Yes
- ○ No

Household possession

[Q22slp_room]
Q22. How many rooms in this household are used for sleeping?

[Q23a_electric]
Q23a.Does your household have electricity?

Choose only one option:

- ○ Yes
- ○ No

[Q2b_internet]
Q23b.Does your household have access to internet?

Choose only one option:

- ○ Yes
- ○ No

[Q23c_bed]
Q23c.Does your household have a bed?

Choose only one option:

- ○ Yes
- ○ No

[Q23d_table]
Q23d.Does your household have a table?

Choose only one option:

- ○ Yes
- ○ No

[Q23e_sofa]
Q23e.Does your household have a sofa?

Choose only one option:

- ○ Yes
- ○ No

[Q23f_radio]
Q23f.Does your household have a radio?

Choose only one option:

- ○ Yes
- ○ No

[Q23g_tele]
Q23g.Does your household have a television?

Choose only one option:

- ○ Yes
- ○ No

[Q23h_compt]
Q23h.Does your household have a computer/laptop?

Choose only one option:

- ○ Yes
- ○ No

[Q23i_fridge]
Q23i.Does your household have a refrigerator?

Choose only one option:

- ○ Yes
- ○ No

[Q23j_washmach]
Q23j.Does your household have a washing machine?

Choose only one option:

- ○ Yes
- ○ No

[Q23k_aircon]
Q23k.Does your household have an air conditioner?

Choose only one option:

- ○ Yes
- ○ No

[Q23l_genet]

Q23l.Does your household have a generator?

Choose only one option:

- ○ Yes
- ○ No

[Q23m_wave]

Q23m.Does your household have a microwave?

Choose only one option:

- ○ Yes
- ○ No

[Q23n_heater]

Q23n.Does your household have a geyser?

Choose only one option:

- ○ Yes
- ○ No

[Q24a_watch]

Q24a.Does any member of this household own a watch?

Choose only one option:

- ○ Yes
- ○ No

[Q24b_phone]

Q24b.Does any member of this household own a mobile phone?

Choose only one option:

- ○ Yes
- ○ No

[Q24c_bic]

Q24c.Does any member of this household own a bicycle?

Choose only one option:

- ○ Yes
- ○ No

[Q24d_motor]

Q24d.Does any member of this household own a motorcyle or scooter?

Choose only one option:

- ○ Yes
- ○ No

[Q24e_car]
Q24e.Does any member of this household own a car or truck?

Choose only one option:

- ○ Yes
- ○ No

[Q25bank]
Q25.Does any member of this household own a bank account?

Choose only one option:

- ○ Yes
- ○ No

Materials of housing

[Q26flr_mat]
Q26.Observe the main material of the floor of the dwelling

Choose only one option:

- ○ Earth/sand
- ○ Dung
- ○ Wood Planks
- ○ Palm/Bamboo
- ○ Wooden floor
- ○ Vinyl (PVC)
- ○ Ceramic/terazzo tiles
- ○ Cement
- ○ Carpet
- ○ Other

• Relevant when:
Q26.Observe the main material of the floor of the dwelling = Other.

[Q26flr_mat_other]
Q26a.Specify other

[Q27rof_mat]
Q27.Observe the main material of the roof of the dwelling

Choose only one option:

○	No roof
○	Thatch/Palm leaf
○	Rustic Mat
○	Palm/Bamboo
○	Wood Planks
○	Cardboard
○	Metal/Iron sheets
○	Wood
○	Calamine/Cement Fiber
○	Ceramic Tiles/Harvey tiles
○	Cement
○	Roofing shingles
○	Mud tiles
○	Asbestos
○	Other

• Relevant when:
Q27.Observe the main material of the roof of the dwelling = Other.

[Q27rof_mat_other]
Q27a.Specify other

[Q28type_wall]
Q28.Observe the main material of the exterior walls of the dwelling

Choose only one option:

○	No walls
○	Cane/Palm/Trunks
○	Mud tiles
○	Mudbrick
○	Bamboo with mud
○	Stone with mud
○	Plywood
○	Cardboard
○	Reused wood
○	Cement
○	Stone with lime/Cement
○	Burned bricks
○	Cement blocks
○	Wood planks/shingles
○	Other

• Relevant when:
Q28.Observe the main material of the exterior walls of the dwelling = Other.

[Q28type_wall_other]
Q28a.Specify other

Overall health status

[Q29hlth_status]
Q29.Overall, how would you rate your health status

Choose only one option:

○	Very good
○	Good
○	Moderate
○	Bad
○	Very bad

Health facility visit

[Q30visit_outpt]
Q30.In the past 12 months, how many times did you seek care at a clinic or hospital? (only for outpatien

[Q31last_visit]
Q31.How long ago was your last visit to a clinic or hospital?

[Q32reson_visit]
Q32.What was the main reason for your last visit?

Choose only one option:

○	Emergency, Accident or Injury
○	Check up or preventive care
○	Follow up on existing chronic problem
○	New health issue

[Q33nme_fac]
Q33.What was the name of the facility?

[Q33a_nbhd_fac]
Q3a.Which neighborhood is the facility located in?

[Q33b_typ_fac]
Q33b.What type of health facility was it?

Choose only one option:

○	Government Health center
○	Government Hospital
○	Mission hospital
○	Pharmacy
○	Private clinic/hospital
○	Don’t know
○	Other

• Relevant when:
Q33b.What type of health facility was it? = Other.

[Q33b_typ_fac_other]
Q33ba.Specify other

[Q33c_txt_spend]
Q33c.Overall, how much did you spend for the treatment of the illness (including drugs at the pharmacie

Thinking about your last health facility visit (not including overnight st how would you rate the following:

[Q34length_wait]
Q34.The length of time you waited before you were seen

Choose only one option:

○	Excellent
○	Very good
○	Good
○	Fair
○	Poor

[Q35provid_listen]
Q35.Whether the health provider listened to you carefully

Choose only one option:

○	Excellent
○	Very good
○	Good
○	Fair
○	Poor

[Q36provider_knlg]
Q36.The health provider's medical knowledge and skills

Choose only one option:

○	Excellent
○	Very good
○	Good
○	Fair
○	Poor

[Q37provider_respt]
Q37.The level of respect the provider showed you

Choose only one option:

○	Excellent
○	Very good
○	Good
○	Fair
○	Poor

[Q38provider_time]
Q38.The amount of time the provider spent with you in the visit.

Choose only one option:

○	Excellent
○	Very good
○	Good
○	Fair
○	Poor

[Q39overall_care]
Q39.Overall, considering everything, how would you rate the quality of care you received?

Choose only one option:

○	Excellent
○	Very good
○	Good
○	Fair
○	Poor

[Q40overall_visit]
Q40.Overall, thinking about your entire visit, how would you rate the care you received?

Choose only one option:

○	Excellent
○	Very good
○	Good
○	Fair
○	Poor

Child health

[Q41has_child]
Q41.Are there any children under age five living in this household?

Choose only one option:

○	Yes
○	No

• Relevant when:
Q41.Are there any children under age five living in this household? = Yes.

[Q41a_childn]
Q41a.How many are there?

• Relevant when:
Q41.Are there any children under age five living in this household? = Yes.

child info

Question	Element 1	Element 2	Element 3	Element 4	Element 5
[Q42name_child] **Q42.Name of child**					
[Q42sex_child] **Q42.Sex of child** Choose only one option: Female Male					
[Q42date_child] **Q42.Date of birth** Date: __ / __ / ____ (DD/MM/YYYY)					
[Q43diarrhea] **Q42.Has (name) had diarrhea at any time in the last 2 weeks?** Choose only one option: Yes No Don't know					

Question	Element 1	Element 2	Element 3	Element 4	Element 5
[Q44fever] **Q44.Has (name) been ill with a fever any time in the last 2 weeks?** Choose only one option: Yes No Don't know					
[Q45cough] **Q45.Has (name) had an illness with a cough at any time in the last 2 weeks?** Choose only one option: Yes No Don't know					
[Q46fastbreath] **Q45.Has (name) had fast, short, rapid breaths or difficulty breathing at any time in the last 2 weeks?** Choose only one option: Yes No Don't know					
• Relevant when: Q42.Has (name) had diarrhea at any time in the last 2 weeks? = Yes || Q44.Has (name) been ill with a fever any time in the last 2 weeks? = Yes || Q45.Has (name) had an illness with a cough at any time in the last 2 weeks? = Yes. [Q47advice_chd] **Q47.Did you seek advice or treatment for the illness from any source?** Choose only one option: Yes No Don't know					

Question	Element 1	Element 2	Element 3	Element 4	Element 5
• Relevant when: Q47.Did you seek advice or treatment for the illness from any source? = Yes. [Q48name_trxtchd] Q48.What was the name of the place you sought treatment?					
• Relevant when: Q47.Did you seek advice or treatment for the illness from any source? = Yes. [Q49typfac_chd] Q49.What type of facility was it? Choose only one option: Government Health center Government Hospital Mission hospital Pharmacy Private clinic/hospital Don't know Other					
• Relevant when: Q47.Did you seek advice or treatment for the illness from any source? = Yes. [Q50nbhd_child] Q50.What neighborhood is it located in?					

Question	Element 1	Element 2	Element 3	Element 4	Element 5
• Relevant when: Q47.Did you seek advice or treatment for the illness from any source? = Yes. [Q51antimal_drug] **Q51.At any time during the illness, did (Name) get antimalarial for the illness?** Choose only one option: Yes No Don't know					
• Relevant when: Q47.Did you seek advice or treatment for the illness from any source? = Yes. [Q52antibio_drug] **Q52.At any time during the illness, did (Name) get antibiotics for the illness?** Choose only one option: Yes No Don't know					
• Relevant when: Q47.Did you seek advice or treatment for the illness from any source? = Yes. [Q52atrxtcost] **052.Overall, how much did you spend for the treatment of the illness (including drugs at the pharmacies)?**					

General facility access

[Q53nbd_par]
Q53.What is the name of the closest drug shop or pharmacy from your house?

• Relevant when:
Q53.What is the name of the closest drug shop or pharmacy from your house? ≠ 88.

[Q53a_nbhd_phar]
Q53a.Which neighborhood is this drug shop or pharmacy located?

• Relevant when:
Q53.What is the name of the closest drug shop or pharmacy from your house? ≠ 88.

[Q53b_walk_phar]
Q53b.How long does it take to walk from your house to the drug shop or pharmacy? (assuming you don
and walk fast) (minutes)

[Q54privt_fac]
Q54.What is the name of the closest private health facility from your house?

• Relevant when:
Q54.What is the name of the closest private health facility from your house? ≠ 88.

[Q54a_nbhd_priv]
Q54a.Which neighborhood is this private health facility located?

• Relevant when:
Q54.What is the name of the closest private health facility from your house? ≠ 88.

[Q54b_walk_priv]
Q54b.How long does it take walk from here to this private health facility? (assuming you don't stop and v
fast) (minutes)

[Q55_govtfac]
Q55.What is the name of the closest government health facility from your house?

• Relevant when:
Q55.What is the name of the closest government health facility from your house? ≠ 88.

[Q55nbhd_govtfac]
Q55a.Which neighborhood is this government health facility located?

• Relevant when:
Q55.What is the name of the closest government health facility from your house? ≠ 88.

[Q55b_walk_govtfac]
Q55b.How long does it take to walk from here to this government facility? (assuming you don't stop and v fast)

[Q56month_expd]
Q56.On an average, how much does your household spend each month on healthcare (all members co including drugs, treatment and transport)?

[Q57lge_expd]
Q57.What was the largest health-related expenditure your household had last year and how much did y in total, including drugs, treatment and transport?

• Relevant when:
Q57.What was the largest health-related expenditure your household had last year and how much did you pay in total, including drugs, treatment and transport? > 0.

[Q57a_med_prob]
Q57a.What was the problem?

• Relevant when:
Q57.What was the largest health-related expenditure your household had last year and how much did you pay in total, including drugs, treatment and transport? > 0.

[Q57b_date_medprob]
Q57b.When did this occur?
Date: __ / __ / ____ (DD/MM/YYYY)

• Relevant when:
Q57.What was the largest health-related expenditure your household had last year and how much did you pay in total, including drugs, treatment and transport? > 0.

[Q57c_txrtcost]
Q57c.What was the total treatment cost? (cost of diagnosis, treatment and drugs)

[Q57d_pharm]
Q57d. How much of this money did you spend at the pharmacy or private drug store?

[Q57e_diagnos]
Q57e. How much of this money did you spend for diagnostics elsewhere?

[O57f_hf]
Q57f. How much of this money did you spend at the actual health facility?

[Q57g_nonhthcost]
Q57g. What was the total cost of non-health related cost? (Transport)

• Relevant when:
Q57.What was the largest health-related expenditure your household had last year and how much did you pay in total, including drugs, treatment and transport? > 0.

[Q57h_make_paymt]
Q57h.How did you make the payment?

Choose only one option:

○	Paid myself
○	Borrowed from family or friends
○	Sold assets
○	Did not pay

Confidence and trust

[Q58confid_pub]
Q58.How confident are you that if you become very sick tomorrow, you would be able to receive effective treatment from the public health facilities?

Choose only one option:

○	Not at all confident
○	Not very confident
○	Somewhat confident
○	Very confident

[Q59confid_priv]

Q59.How confident are you that if you become very sick tomorrow, you would be able to receive effective treatment from the private health facilities?

Choose only one option:

○	Not at all confident
○	Not very confident
○	Somewhat confident
○	Very confident

[Q60trust_govt]

Q60.How much of the time do you think you can trust the National government to do what is right?

Choose only one option:

○	Always
○	Most of the time
○	Some of the time
○	Hardly ever
○	Never

[Q61hlthsec_rate]

Q61.How well or badly is the health sector doing in improving health services?

Choose only one option:

○	Very badly
○	Fairly badly
○	Fairly well
○	Very well
○	Don’t know or I have never heard

Political affiliation

[Q62presid_elec]

Q62.If presidential elections were tomorrow, would you like a change in government?

Choose only one option:

○	Yes
○	No
○	Don't know
○	Refused

[Q63rate_govt]
Q63.How well do you think the current government doing in performing their duties?

Choose only one option:

○	Very badly
○	Fairly badly
○	Fairly well
○	Very well
○	Don't know or I have never heard

Health insurance

[Q64_insur]
Q64. Zambia has launched the National Health Insurance for Zambian Households to access health ser without financial hardship. Do you currently have any health insurance

Choose only one option:

○	Yes
○	No

• Relevant when:
Q64. Zambia has launched the National Health Insurance for Zambian Households to access health services without financial hardship. Do you currently have any health insurance = Yes.

[Q64a_typ]
Q64a.What type of health insurance

Choose only one option:

○	National Health Insurance
○	Private health insurance
○	Employer-based
○	Community-based/Mutual Health Insurance
○	Other

• Relevant when:
Q64a.What type of health insurance = Other.

[Q64b_typ_oth]
Q64b.Specify other

• Relevant when:
Q64. Zambia has launched the National Health Insurance for Zambian Households to access health services without financial hardship. Do you currently have any health insurance = Yes.

[Q64c_card]
Q64c.May I please see your insurance card?

Choose only one option:

○	Yes, card observed
○	No refused
○	Did not have it

• Relevant when:
Number drawn for experimental selection ≤ 0.5.

[notselected]
Note: Household was not selected for insurance game

• Relevant when:
Number drawn for experimental selection > 0.5 && Q64. Zambia has launched the National Health Insurance for Zambian Households to access health services without financial hardship. Do you currently have any health insurance = No.

Health insurance Exercise

[Q65game]
Q65.We have developed a little game that illustrates how insurance works in practice. Would you be wil to play a few rounds of this game with me?"

Choose only one option:

○	Yes
○	No

• Relevant when:
Q65.We have developed a little game that illustrates how insurance works in practice. Would you be willing to play a few rounds of this game with me?" = Yes.

[r1_healthy]
Game 1: how many of the 12 cards drawn were healthy cards?

• Relevant when:
Q65.We have developed a little game that illustrates how insurance works in practice. Would you be willing to play a few rounds of this game with me?" = Yes.

[r1_kids]
..how many child sickness?

• Relevant when:
Q65.We have developed a little game that illustrates how insurance works in practice. Would you be willing to play a few rounds of this game with me?" = Yes.

[r1_physio]
..how many physio events?

• Relevant when:
Q65.We have developed a little game that illustrates how insurance works in practice. Would you be willing to play a few rounds of this game with me?" = Yes.

[r1_unknown]
..how many unknown problems?

• Relevant when:
Q65.We have developed a little game that illustrates how insurance works in practice. Would you be willing to play a few rounds of this game with me?" = Yes.

[r1_major]
..how many major events?

• Relevant when:
Q65.We have developed a little game that illustrates how insurance works in practice. Would you be willing to play a few rounds of this game with me?" = Yes.

[r2_healthy]
Game 2: how many of the 12 cards drawn were healthy cards?

• Relevant when:
Q65.We have developed a little game that illustrates how insurance works in practice. Would you be willing to play a few rounds of this game with me?" = Yes.

[r2_kids]
..how many child sickness?

• Relevant when:
Q65.We have developed a little game that illustrates how insurance works in practice. Would you be willing to play a few rounds of this game with me?" = Yes.

[r2_physio]
..how many physio events?

• Relevant when:
Q65.We have developed a little game that illustrates how insurance works in practice. Would you be willing to play a few rounds of this game with me?" = Yes.

[r2_unknown]
..how many unknown problems?

• Relevant when:
Q65.We have developed a little game that illustrates how insurance works in practice. Would you be willing to play a few rounds of this game with me?" = Yes.

[r2_major]
..how many major events?

• Relevant when:
Q64. Zambia has launched the National Health Insurance for Zambian Households to access health services without financial hardship. Do you currently have any health insurance = No.

[Q66pay]
Q66.How much would you be willing to pay to get health insurance per month for yourself?

• Relevant when:
Q64. Zambia has launched the National Health Insurance for Zambian Households to access health services without financial hardship. Do you currently have any health insurance = No.

[Q66a_pay]
Q66a.How much would you be willing to pay to get health insurance per month for entire household?

• Relevant when:
Q66a.How much would you be willing to pay to get health insurance per month for entire household? > 0.

[Q66b.hhnum]
Q66b. How many dependants do you have?

• Relevant when:
Q64. Zambia has launched the National Health Insurance for Zambian Households to access health services without financial hardship. Do you currently have any health insurance = No && Q66a.How much would you be willing to pay to get health insurance per month for entire household? > 0.

[Q67_fees]
Q67.Would you rather pay monthly fees or annual fees?

Choose only one option:

○	Monthly
○	Annually
○	Other

• Relevant when:
Q67.Would you rather pay monthly fees or annual fees? = Other.

[Q67a_oth]
Q67a.Other specify

• Relevant when:
Q67.Would you rather pay monthly fees or annual fees? = Annually.

[Q67a_ann]
Q67b. If annual, which month would you prefer to pay the annual fee?

Choose only one option:

○	January
○	Februrary
○	March
○	April
○	May
○	June
○	July
○	August
○	September
○	October
○	November
○	December

• Relevant when:
Q66.How much would you be willing to pay to get health insurance per month for yourself? > 0.

[Q68]
Q68.Based on the 1% of your monthly income, how much will you pay for health insurance each month?

• Relevant when:
Q64. Zambia has launched the National Health Insurance for Zambian Households to access health services without financial hardship. Do you currently have any health insurance = No.

[Q68_reg]
Q68.As part of this project, we offer all respondents support with enrollment. If you are interested, we can register you on the scheme's website. We will need your personal details, NRC and monthly income. Will you enroll in the scheme if I help you with the registration process or explain how the scheme works?

Choose only one option:

○	Yes
○	No

• Relevant when:
Q68.As part of this project, we offer all respondents support with enrollment. If you are interested, we can register you on the scheme's website. We will need your personal details, NRC and monthly income. Will you enroll in the scheme if I help you with the registration process or explain how the scheme works? = No.

[Q69_reason]
Q69.What is the main reason you will not enroll?

Choose only one option:

○	Cannot afford the premium
○	Do not need insurance
○	Poor quality of care
○	Do not trust government programs
○	Do not understand the scheme
○	None
○	Other

• Relevant when:
Q69.What is the main reason you will not enroll? = Other.

[Q69a__oth]
Q69a.Specify other

• Relevant when:
Q69.What is the main reason you will not enroll? ≠ None || Q68.As part of this project, we offer all respondents support with enrollment. If you are interested, we can register you on the scheme's website. We will need your personal details, NRC and monthly income. Will you enroll in the scheme if I help you with the registration process or explain how the scheme works? = Yes || Q64. Zambia has launched the National Health Insurance for Zambian Households to access health services without financial hardship. Do you currently have any health insurance = Yes.

[Q70_reason]
Q70.Is there another reason you will not enroll?

Choose only one option:

○	Cannot afford the premium
○	Do not need insurance
○	Poor quality of care
○	Do not trust government programs
○	Do not understand the scheme
○	None
○	Other

• Relevant when:
Q70.Is there another reason you will not enroll? = Other.

[Q70a_oth]
Q70a.Specify other

• Relevant when:
Q70.Is there another reason you will not enroll? ≠ None || Q68.As part of this project, we offer all respondents support with enrollment. If you are interested, we can register you on the scheme's website. We will need your personal details, NRC and monthly income. Will you enroll in the scheme if I help you with the registration process or explain how the scheme works? = Yes || Q64. Zambia has launched the National Health Insurance for Zambian Households to access health services without financial hardship. Do you currently have any health insurance = Yes.

[Q71_reason]
Q71.Is there another reason you will not enroll?

Choose only one option:

○	Cannot afford the premium
○	Do not need insurance
○	Poor quality of care
○	Do not trust government programs
○	Do not understand the scheme
○	None
○	Other

• Relevant when:
Q71.Is there another reason you will not enroll? = Other.

[Q71_oth]
Q71a.Specify other

[telephone]
Telephone number please?

Appendix 2

STROBE Statement for Cross-Sectional Studies, for:
Confidence in the health system and health insurance enrollment among the informal sector population in Lusaka, Zambia

	Item No	Recommendation	Page No & paragraph
Title and abstract	1	(*a*) Indicate the study's design with a commonly used term in the title or the abstract	Abstract
		(*b*) Provide in the abstract an informative and balanced summary of what was done and what was found	Abstract
Introduction			
Background/rationale	2	Explain the scientific background and rationale for the investigation being reported	Introduction Para 1-3
Objectives	3	State specific objectives, including any prespecified hypotheses	Introduction Para 3
Methods			
Study design	4	Present key elements of study design early in the paper	Methods Para 1-2
Setting	5	Describe the setting, locations, and relevant dates, including periods of recruitment, exposure, follow-up, and data collection	Methods Para 1
Participants	6	(*a*) Give the eligibility criteria, and the sources and methods of selection of participants	Methods Para 2
Variables	7	Clearly define all outcomes, exposures, predictors, potential confounders, and effect modifiers. Give diagnostic criteria, if applicable	Methods Para 4-6 Para 8
Data sources/ measurement	8*	For each variable of interest, give sources of data and details of methods of assessment (measurement). Describe comparability of assessment methods if there is more than one group	Methods Para 4-6
Bias	9	Describe any efforts to address potential sources of bias	Methods Para 3
Study size	10	Explain how the study size was arrived at	Methods Para 2

Quantitative variables	11	Explain how quantitative variables were handled in the analyses. If applicable, describe which groupings were chosen and why	Methods Para 4-6
Statistical methods	12	(*a*) Describe all statistical methods, including those used to control for confounding	Methods Para 8
		(*b*) Describe any methods used to examine subgroups and interactions	Results Para 7
		(*c*) Explain how missing data were addressed	Results N/A
		(*d*) If applicable, describe analytical methods taking account of sampling strategy	Methods Para 8
		(*e*) Describe any sensitivity analyses	Results Para 7
Results			
Participants	13*	(a) Report numbers of individuals at each stage of study—eg numbers potentially eligible, examined for eligibility, confirmed eligible, included in the study, completing follow-up, and analysed	Results Para 1
		(b) Give reasons for non-participation at each stage	Results Para 1
		(c) Consider use of a flow diagram	-
Descriptive data	14*	(a) Give characteristics of study participants (eg demographic, clinical, social) and information on exposures and potential confounders	Results Para 2-4 Table 1
		(b) Indicate number of participants with missing data for each variable of interest	N/A
Outcome data	15*	Report numbers of outcome events or summary measures	Results para 2 Table 3
Main results	16	(*a*) Give unadjusted estimates and, if applicable, confounder-adjusted estimates and their precision (eg, 95% confidence interval). Make clear which confounders were adjusted for and why they were included	Results Para 5-6 Table 2-3
		(*b*) Report category boundaries when continuous variables were categorized	N/A

		(*c*) If relevant, consider translating estimates of relative risk into absolute risk for a meaningful time period	N/A
Other analyses	17	Report other analyses done—eg analyses of subgroups and interactions, and sensitivity analyses	Results Para 7 Table 4
Discussion			
Key results	18	Summarise key results with reference to study objectives	Discussion Para 1
Limitations	19	Discuss limitations of the study, taking into account sources of potential bias or imprecision. Discuss both direction and magnitude of any potential bias	Discussion Para 4
Interpretation	20	Give a cautious overall interpretation of results considering objectives, limitations, multiplicity of analyses, results from similar studies, and other relevant evidence	Discussion Para 1-3
Generalisability	21	Discuss the generalisability (external validity) of the study results	Discussion Para 4
Other information			
Funding	22	Give the source of funding and the role of the funders for the present study and, if applicable, for the original study on which the present article is based	Title page

*Give information separately for exposed and unexposed groups.

Chapter 7 Purchasing for High-Quality Care Using National Health Insurance: Evidence from Zambia

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7.1 Abstract

Abstract

Improving the quality of care is essential for progress toward universal health coverage. Health financing arrangements offer opportunities for governments to incentivize and reward improvements in the quality of care provided. This study examines the extent to which the purchasing arrangements established within Zambia's new National Health Insurance can improve equitable access to high-quality care. We adopt the Strategic Purchasing Progress and the Lancet Commission for High-Quality Health Systems frameworks to critically examine the broader health system and the purchasing dimensions of this insurance scheme and its implications for quality care. We reviewed policy documents and conducted 31 key-informant interviews with stakeholders at national, sub-national, and health facility levels. We find that the new health insurance could boost financial resources in higher-levels of care, improve access to high-cost interventions and improve care experiences for its beneficiaries as well as integrate the public and private sectors. Our findings also suggest that the health insurance will likely improve some aspects of structural quality but may not be able to influence process and outcome measures of quality. It is also not clear if health insurance will improve efficiency in service delivery, and whether benefits realized will be distributed in an equitable manner. These potential limitations are attributable to the existing governance and financial challenges, low investments in primary care, and shortcomings in the design and implementation of the purchasing arrangements of health insurance. Although Zambia has made progress in a short span, there is a need to improve its provider payment mechanisms, and monitoring and accounting for higher quality of care.

Keywords: Health insurance, quality of care, purchasing, health financing, Zambia

Key messages

- The health insurance scheme could potentially improve access to high-cost interventions and integrate the public and private sectors.
- More progress toward strategic purchasing for quality of care by the Zambia National health Insurance is likely possible with government contribution to the scheme for vulnerable groups, increased investments in primary health care and strong governance for quality
- Health insurance can positively influence the quality of care through a balance of structural, process, and outcome indicators to monitor providers and the use of the claims data across its mix of providers

7.2 Introduction

Poor quality of care continues to be a primary cause of high mortality in low-and middle-income countries (LMICs), with an estimated 8.6 million excess deaths contributed to low quality of care in 2016 (Kruk et al., 2018b) . This high excess mortality highlights the persistent gaps in effective

coverage of essential interventions as well as the low fraction of potential health gain that is currently delivered to populations (Ng et al., 2014).

At the macro-system level, health financing, and purchasing in particular, is one of the main strategies that can be used to influence greater quality in the health system (Lagomarsino et al., 2012, Kutzin, 2013, Mbau et al., 2018). When countries establish mechanisms for resource pooling, it places them in a better position to strategically purchase for quality services. Purchasing is considered "strategic" if the allocation of funds to health service providers by purchasers is linked to provider performance or population needs (Mathauer et al., 2019). Purchasers can be institutions such as Ministries of Health, mandatory health insurance agencies, or other autonomous insurance agencies. As health financing reforms are implemented within the broader health system context, which is dynamic and complex in nature, it is important to examine how this context shapes reforms and their ability to achieve their goals(Duran et al., 2020a).

Health insurance schemes have been introduced in many LMICs in recent years, offering new opportunities for governments to become "strategic purchasers" and to improve access to high-quality care to make progress towards universal health coverage (UHC) (Mathauer et al., 2019). Zambia is one of the countries that has recently introduced health insurance. In 2018, Zambia passed its National Health Insurance (NHI) Act with the aim of providing 'universal access to quality health services'(Government of Zambia, 2018b). The Act established the National Health Insurance Management Authority (NHIMA), a semi-autonomous agency, which is now in charge of collecting contributions from residents, purchasing services from various health institutions, and providing entitlements to beneficiaries. According to the current statutory instrument, employees are mandated to contribute 1% of their monthly salary with employers equally matching(Government of Zambia, 2019b). Those self-employed and the informal sector must contribute 1% of their declared monthly income with 60 kwacha (USD 4) being the minimum contribution. Deductions from salaries of the formal sector began in October 2019 and disbursement of funds to health facilities commenced in February 2020. Principal members can have six beneficiaries under their membership and as of February 2022, the number of registered principal members and secondary registered beneficiaries were 1.35 million and 500,000 respectively (National Health Insurance Management Authority, 2022). Individuals over 65 years, mentally ill, and physically disabled are exempted from contributions.

As the health insurance is in its early phase of implementation and considers reforms that facilitate its goal of steering towards UHC, it is critical to identify the implications of its purchasing functions and assess its future impact on high-quality care for all. In this article, we examine the design of the purchasing arrangements within Zambia's NHI and its implications for accessing high-quality care.

7.3 Methods

Study design and setting

Zambia is a lower-middle-income country in Southern Africa with a population of 18 million of which over half live in rural areas. Table 18 shows the key indicators for Zambia.

The main health service providers are public, although there are many faith-based mission and private providers. The public health system is organized as a pyramid structure with three main levels. The bottom level constitutes primary care that includes first level/Level-1 hospitals, health centers, and health posts. In 2012, user fees were abolished in all public primary care facilities (Chitah et al., 2018). Level-2 hospitals are one level above these facilities and mainly used for curative care in pediatrics, obstetrics, and general surgery followed by the tertiary level, which includes the teaching hospitals that provide specialized care such as cancer treatment, dialysis, and orthopedics. Public health institutions are financed through monthly operational grants from the Ministry of Finance (MOF) that are on a needs-based resource-allocation formula.

Table 18: Key indicators for Zambia (The World Bank, 2020, International Monetary Fund, 2020)

		Year
Macro-fiscal indicators		
GDP per capita (current US$)	*985*	*2020*
Total Public debt (% GDP)	*95.5*	*2020*
Poverty rate at US$1.90 per day	*58.7*	*2015*
Demography		
Population (millions)	*18*	*2020*
Urban population (% of total population)	*45*	*2020*
Health Financing indicators		
Current health expenditure, as % of GDP	*4.5*	*2016*
Government health expenditure, as % of current health expenditure	*41*	*2016*
Out-of-pocket health expenditure, as % of total health expenditure	*12*	*2016*
Key health indicators		
Life expectancy at birth, total (years)	*64*	*2019*
Maternal mortality ratio (per 100, 000 live births)	*213*	*2017*
Neonatal mortality rate (per 1,000 live births)	*24*	*2020*
Births attended by skilled health workers as % of total births	*80.4*	*2018*

Study population

Key-informant interviews were carried out with 31 stakeholders at national, subnational and health facilities from November 2020 to February 2021. Key-informants were purposely selected focusing on those involved in health policy, health financing, design and implementation of the health insurance. At the national level, interviews were conducted with stakeholders from governmental (Ministry of

Health (MOH), Ministry of Finance (MOF) and Ministry Labor and Social Security (MLSS), private sector, multilateral and non-governmental organizations. Three provinces were purposely selected based on distance from the capital and performance on health outcomes such as maternal mortality and under-five mortality. In each province, stakeholders at the provincial health office and facility managers of level-2 hospitals were interviewed. Within each province, one district, which has an accredited first-level hospital, was conveniently selected.

We also conducted a document review of published articles, policy documents, and country reports. Documents were identified through the interviews with the stakeholders. Additionally, we searched PubMed and Google scholar databases, using the search terms “health systems” or “health financing” or “health insurance” and “Zambia”.

Study conceptual framework

To examine the potential ability of the Zambia NHI to influence equitable access to high quality care, we adapted the strategic health purchasing (SHP) progress framework (Cashin et al., 2018). The framework was developed to examine the critical functions necessary for strategic purchasing of health care by purchasing agencies such as NHI. The framework focuses on purchasing as a policy lever to improve UHC's intermediate and ultimate objectives such as equity, efficiency, and quality.

The framework consists of two main dimensions that are critical for purchasing to contribute to the quality of service delivery. The first dimension is the health system functions that support the ability of purchasing to influence the quality of services, and the second dimension is the purchasing functions.

The health systems functions that are critical to support strategic purchasing are: 1) Governance and information 2) Service readiness and provision and 3) Sufficiency and institutional flow of resources. Governance and information comprise the regulatory policies and systems needed to support quality as well as strengthening systems for establishing licensure and accreditation systems. Service readiness and provision pertain to improving processes for evidence-based care, and having adequate inputs such as medicines available to enable the delivery of high-quality services. Last, the financial flows to providers ensure sufficient resources for health and a reduction in fragmentation of pooled funds. In addition, giving providers autonomy in spending and managerial decision-making is important.

There are four main domains under the purchasing functions of the SHP framework. These purchasing functions include 1) Governance of purchasing 2) Health care goods and services to purchase 3) Providers from whom goods and services are purchased 4) How to purchase. Governance of purchasing includes alignment of purchasing with UHC goals, assigning clear roles and responsibilities for participating institutions, and ensuring institutions and staff have the technical capacity to fulfill their duties. For health care goods and services to purchase, countries have to define and create systems for revising benefit package and the list of covered medicines by relevant stakeholders. In addition, there needs to be a description of requirements for purchasing such as

adherence to standard treatment guidelines and referrals guidelines including gate-keeping policies. In regards to providers to purchase from, this involves the use of quality requirements of the benefit package to determine eligibility for service providers for each level of care, and the decision to include private providers. Last, the design of how to purchase services and goods. This encompasses the basis of payment, which includes payment rates, and how to hold providers accountable for service quality.

To conceptualize quality of care, we adapted the Lancet Commission for High-Quality Health Systems (HQSS) framework (Kruk et al., 2018a). The framework asserts that quality improvement require system-level interventions involving leadership at all levels of the health system and interventions that value people. We focus on the processes of care domain and the framework proposes for it to be asserted along with two main components, competent care and systems and positive user experiences. Competent care and systems require evidence-based and effective care that includes correct diagnosis, appropriate treatment, and counseling and referral. Capable systems include safety, prevention and detection, continuity and integration, timely action, and population health management. Positive-user experience demand respect for patients, which includes dignity, privacy, non-discrimination, autonomy, and clear communication. In addition, there is a need for user focus to have a choice of providers, short wait times, affordability, and ease of use. In this study, we consider insured patients (NHIMA members and beneficiaries) and uninsured patients as “users”. We examine how the health insurance is designed to improve the experiences of its beneficiaries and if there are spillover effects or unintended consequences of its design and implementation on the general population”

Data collection and analysis

Key-informant interviews were conducted using a semi-structured interview guide. The guide was designed using constructs from strategic purchasing and HQSS frameworks. The interviews were conducted in English by the first author, and they lasted on average an hour.

After the completion of the interviews, we applied the seven-step framework analysis method. This included transcription, familiarization with transcripts, coding, developing a framework, application of framework, charting and data interpretation (Srivastava and Thomson, 2009). Atlas ti.8 was used to assist in coding.

7.4 Results

The results of the study are presenting the context of the health system in Zambia and the design of the three main purchasing functions of its NHI and their implications to influence quality of care.

Health System Functions

The health system functions in terms of governance of quality, service delivery, and financing are essential to the extent to which a purchaser such as NHIMA can achieve its goal of improving access to quality care (Cashin et al., 2018). However in Zambia, our analysis of the document review and

key-informant interview points to several governance challenges including mismanagement of public resources (Chansa et al., 2018) such as a major scandal in 2020 with the procurement of about USD $17 million worth of defective health kits and medicines. Although there is a council responsible for licensing health facilities and training institutions, stakeholders perceived its power as a regulator with "teeth" as weak. Quality of care has been highly prioritized with the national quality improvement guidelines in 2017 (Zambia Ministry of Health, 2017b)and the performance improvement and Quality assurance strategy 2019-2021(Zambia Ministry of Health, 2019) but the wide variety of definitions of quality of care by stakeholders suggest engagement with the documents has been limited. One view particularly those at the lower levels of the health system had the assumption that without adequate structural capacity quality can never be guaranteed. Another view placed a high emphasis on quality from users 'perception in terms of waiting times, and the availability of health workers, and medicines. Interviewees explained that the perception of quality centered on medicines and diagnostics, as those have been the major public concern.

There have also been financial challenges with public health spending declining over the years. The share of general government expenditure on current health expenditure (CHE) was 7.1% in 2016, substantially below the Abuja target of 15% (Zambia Ministry of Health, 2018). Meanwhile donors contribute about 42% to the total CHE of which 70% is earmarked for specific diseases (Zambia Ministry of Health, 2018). The government's deficit in health spending has been compounded by a major macroeconomic crisis coupled with the COVID-19 pandemic, which have shifted the government's priorities towards debt repayment (Geda, 2021a, Paul et al., 2021b, Zambia Ministry of Finance, 2020). The low public health spending has affected the financial resources health facilities receive with three out of the 12 monthly grants disbursed the year before the insurance implementation. Even with the low public health spending, expenditure is not uniform across the health system with larger proportions dedicated to hospitals compared to primary care(Chansa et al., 2018). Meanwhile, stakeholders perceived payroll contributions to the health insurance were likely not be sufficient for major improvements in quality of care as the formal sector which is the majority of the insurance's members is very small (Central Statistical Office, 2019).

The governance and financing challenges have been detrimental to the quality of service provision particularly at primary healthcare level (Chansa et al., 2018). Although primary health care is 'free', due to shortage of medicines and supplies users sometimes pay out of pocket.(Chansa et al., 2019). The funding challenges have also affected filling the human resource for health gaps for services such as surgery, obstetrics and anesthesia (Republic of Zambia, 2018).

The service delivery challenges are not homogenous across geographical locations. In rural areas, the main challenge is physical access as hospital services are located in district and provincial centers. The Zambia Flying Doctors were established to aid in transporting patients to higher levels of care, but this service is not fully functional across the country. In urban areas, long waiting times is the major issue, particularly in hospitals partly due to bypassing of lower levels of care although there is a referral guideline and bypassing fee policy in some hospitals.

To improve service readiness for the implementation of the health insurance, NHIMA provided claims advanced payment (CAP) to health facilities to make short-term investments for quality improvement. However, some stakeholders perceived this payment not to be sufficient as facilities 'needs were far greater. CAP is based on the monthly grant from the MOF which uses the needs-based resource allocation formula that have been difficult to fully apply due to the proliferation of new districts (Chansa et al., 2018).

Health care goods and services to purchase

The health insurance requires members to make four consecutive contributions before accessing health services. Services includes a range of essential services such as cesarean sections and costly interventions including cancer care and dialysis (National Health Insurance Management Authority, 2020). Stakeholders believed that this arrangement would allow individuals to be able to receive high-cost hospital interventions without having to face financial hardship. According to stakeholders, the initial design of the benefit package in 2019 was informed by the national health strategic plan, the burden of diseases, and in consultation with relevant stakeholders. The health insurance bill is explicit in the use of generic medicines and the establishment of a drug formulary system to discourage the use of ineffective or costly medications. However, for services and medical interventions, there are no clear guidance on mechanisms, and the conditions to make systematic revisions to the benefit package. In the absence of a clear regulatory framework to guide the revision of the benefit package, there has been pressure by influential groups to expand the package to include high-cost services such as treatment abroad.

One of the main approaches by NHIMA in delivering higher-quality services is improving user experiences. To mitigate some of the service delivery challenges in public hospitals, NHIMA introduced a new tier into the service structure by requiring facilities to have designated inpatient care and sufficient supply of medicines for its members. In addition, facilities are encouraged to fast-track NHIMA patients for outpatient services and operate a 24/7 hour member access. Providers described the challenges in implementing these institutional reforms. For instance, a manager in a Level-2 hospital, elaborated that the hospital had already outgrown the population it serves, and creating wards specifically for NHIMA patients is difficult. Furthermore, they mentioned that insufficient workforce makes it demanding to have adequate staff dedicated to NHIMA patients. Some stakeholders felt the reforms raise equity concerns.

'The concept of NHIMA, they wanted everybody to be receiving the quality service. Now because of the challenge, we've seen in some institutions now, they are trying to reserve drugs...'No this is for NHIMA members and this is for ordinary members'. Ordinary person will come, they will say, 'There is no Panadol. Go and buy.' But a NHIMA person will come and then they will give. But that's not what we are encouraging. We are saying all patients should receive the health services because we need to raise the standard at all our institutions.' (Provincial KI)

Those at the facility level argued for the decision to create separate services for NHIMA members. One is the need to show the benefit of the health insurance for members compared to the general population.

'So the NHIMA client is a paying client so the money that they are giving us is been deducted through their pay slip. So of course it's something that is mandatory with the laws of Zambia however, we find that once you are paying for service and you are in queue with everyone else even with some who are not paying…it really puts a damper on the patient experience. By separating the NHIMA patients to sort of like...if I could say fast track them getting their service for which they are paying for, we believe that this will make their experience here at the hospital more enjoyable and more comfortable.' (Health facility KI)

Providers from whom goods and services are purchased

As user fees had already been abolished at the primary care level, NHIMA had to cover services offered above level-1 hospitals. However, level-1 hospitals were included as their exclusion would have restricted access to care in rural areas. There were concerns raised by some stakeholders of the efficiency implications of this new arrangement with the current MOH referral guidelines. There were interpretations that the health insurance being offered at high levels, insurance members and service providers will exacerbate the bypassing of lower levels of care.

'NHIMA is a business. Even when you enter this institution, it's a business. If a customer is entering your shop, do you chase them? So you won't chase the customer so even here, that is the concept ...maybe even the institution, the management they should have that focus. Because here, a NHIMA client comes, then you say, 'No you go and start with the clinic'. What are you losing? You are losing resources.' (Provincial KI)

Stakeholders mentioned that the inclusion of private providers could improve the integration of the different service providers in the health system and increase the choices of scheme members as the health insurance allows beneficiaries to use private pharmacies in the instance of drug stock-outs. Others also perceived the inclusion of the private sector to be a good strategy to decongest public health facilities in urban areas. However, there were three main concerns raised by others about the inclusion of the private sector. One was the implications for inter-facility communication and referral networks for the diverse service providers as the national referral policy pertains only to the public sector.

The second concern is the efficiency implications of using private pharmacies in filling the gaps in the public health sector.

"Our pharmacies in the public facilities should have those drugs. There is no reason why we should be encouraging our public facilities to write a prescription to a private pharmacy. It doesn't make logical sense to me. Because we should encourage the public facility to recoup everything.

Remember this guy is using government time, is paid by the government, (Mbau et al.) writes a prescription for a private facility to benefit." (National KI)

Lastly are the equity implications of who benefits from the inclusion of private providers. In 2019, there were 543 registered private health facilities including diagnostic centers but nearly 80% were located in two provinces, and most providers were concentrated within the urban districts these provinces (Health Professions Council of Zambia, 2019a).

One of the main approaches that NHIMA is using to guarantee quality from all providers is through accreditation. Service providers that have valid license and are fully compliant with their relevant regulatory bodies are eligible to apply for accreditation. There is an accreditation checklist developed for the various service providers. A review of the quality indicators of the accreditation and inspections tools showed the assessment to be heavily focused on the structural capacity of providers with less emphasis on process or impact indicators. Even with the current accreditation tools, policy makers acknowledged that due to the persisting health system challenges not all accredited health facilities particularly those in the public sector met the accreditation standards. This has been the need to balance access and quality as being stringent on the standards would have cut off beneficiaries in remote areas from having access to the scheme.

The Act also provides NHIMA the power and authority to remove health facilities that do not comply with its standards and regulation from its list of accredited health facilities. However some stakeholders were skeptical of NHIMA actually exercising its power over health facilities, which do not comply with regulations due to previous experiences of officials in charge of quality programs been removed for exercising their authority.

How to purchase

The health insurance has mixed payment methods. Accredited pharmacies and diagnostic centers are paid by fee-for-service. Level-1 hospitals receive a flat rate payment with different rates for inpatient and outpatient services. At Level-2 and 3 hospitals, the flat rate payment is also used for outpatient services, but the payment for inpatient services are diagnosis-related groups (DRGs) and fee-for-service for high-cost interventions such as dialysis, and some cardiac interventions. Level-2 and 3 hospital managers mentioned that funding from NHIMA has made a difference in supplementing the purchase of commodities such as essential medicines. However, they acknowledged that this increased funding is not adequate to close the gap in providing high quality services. Providers reflected that even with the resources from NHIMA, there is a greater need to improve physical infrastructure and procure medical equipment. As the rates for first levels and higher-levels are substantially different, Level-1 hospitals deemed this not to be fair as they also provide some of the inpatient services as higher levels. In addition, some stakeholders mentioned the need to shift to the traditional per-capita payment for Level-1 hospitals whereby providers are paid in advance. Besides the differences in the payment mechanisms, stakeholders also mentioned that there have been reimbursement delays, which can lead to interruption of service provision.

However, according to the Health Insurance Act, and the memorandum of understanding between NHIMA and MOH, NHIMA has 90 days to reimburse health facilities after claims submission. Some stakeholders mentioned that the delays were partly caused by health facilities due to delays in submitting claims and erroneous filing of claims. Furthermore, NHIMA office been based in Lusaka, had made it challenging to resolve claim issues promptly for providers farther from the city.

Governance in Purchasing

A critical element in the governance of purchasing is having effective information systems to monitor quality of care, provider behavior and process claims. Meanwhile in Zambia, there are various electronic health systems in public health facilities which are uncoordinated and have created information silos (Republic of Zambia, 2018). In addition, there are low levels of computer literacy in health facilities, and underdeveloped technological structure. The claim process is manual which some health facilities mentioned it was cumbersome and increased the likelihood of billing errors.

Although there are clear roles and responsibilities of NHIMA and MOH on paper (Zambia Ministry of Health, 2020), there is still a conflict of interest among the purchasing institutions. The health insurance Act provides a considerably amount of power to a “Minister” who in 2021 was the Minister of Health. This minister in collaboration with NHIMA is in charge of activities such as appointing members of NHIMA supervisory board, prescribing provider payment methods and the reporting requirements for accredited health facilities in which the majority are under the Ministry of Health (Government of Zambia, 2018b).

As previously mentioned, in the public health sector NHIMA is currently relying on the referral policy of Ministry of Health, which have challenges in enforcement. In addition, there are currently no mechanisms to coordinate service delivery from both the private and public sectors. Furthermore, with the addition of private pharmacies, there are no existing mechanisms for monitoring prescription patterns or adherence to rational use of medicines.

Strong technical capacity is needed by NHIMA to be a strategic purchaser, which can influence access to quality. These technical activities include actuarial analysis, information technology, health technology assessment and quality auditing. There is limited technical capacity to carry such activities.

The health insurance act provides a legal basis for the rights of all beneficiaries to have equitable access to quality health services. In addition, the act states the importance of transparency and accountability of the health insurance to beneficiaries. As most public health facilities are ‘free’, there is now a high expectation of the services from NHIMA by the public.

To improve clarity about the scheme and accountability for quality services, NHIMA has created various tools to empower members about their benefits and their rights to high quality services. A health complaints committee has been established, which is in charge of hearing and determining matters related to accredited health care providers and NHIMA. Individuals not satisfied with the committee’s decision are allowed to take their case all the way to the High Court and must be

compensated by NHIMA if they win. NHIMA has also established an online-platform for grievances against accredited health providers, a 24/7 call center and a NHIMA agent in some accredited health facilities to respond to enquiries. There are also representatives of various employee associations in the public and private sectors are on NHIMA's board. The biggest hurdle has been the lack of clarity about the limits of the benefit package and the obscurity in the mandate of the Ministry of Health and NHIMA.

7.5 Discussion

The results presented here suggest that Zambia's National Health Insurance is designed to make progress towards strategic purchasing of quality care. With the inclusion of private providers, the insurance has the potential to increase the choices of citizens, particularly those in the urban areas, and integrate the public and private health sectors. Furthermore, unlike other LMICs, which started with schemes for specific groups, Zambia committed from the outset of the insurance scheme to including everyone under its health insurance. This is an important feature as the experience of several countries showed that incrementally expanding the population groups included in health insurance schemes is extremely challenging (Bazyar et al., 2021a, Kutzin, 2013). However, similar to other low-and upper middle-income settings, our findings suggest that significant changes are needed in the purchasing arrangements for the health insurance's ability to influence high-quality care (Chukwuma et al., 2021, Gatome-Munyua et al., 2022, Amporfu et al., 2022)

Our findings show that the health system challenges in regulatory structures, government health spending, and effective referral policy have hindered the design and the early phase of its implementation of the national health insurance as a purchaser to impact high quality of care. First, the limited regulatory bodies with teeth to enforce high-quality health system inputs coupled with low government health spending have led to NHIMA not being able to leverage its role to ensure that all of its providers met its defined quality standards for accreditation. The scheme had to balance access to its benefits and quality of care. Second, the low government spending on health has subsequently led to perpetual drug shortages, long waiting times, and poor facility infrastructure in health facilities, which have resulted in signals to providers to distinguish services for beneficiaries to improve their care experiences, an operational challenge for providers. Third, weak enforcement of the national referral policy for gatekeeping could exacerbate the unnecessary use of care at higher levels through opportunistic behaviors by providers and insurance beneficiaries.

The design features of the national health insurance also face certain shortcomings as a strategic purchaser for quality. First, the scheme's accreditation and monitoring tools on providers' performance are heavily reliant on structural quality indicators. Although structural aspect of quality is a challenge in Zambia, evidence has shown that the relationship among these dimensions is not always hierarchal, and weakness in structural quality does not imply processes of care and impacts cannot be monitored (Kruk et al., 2018a, Quentin W, 2019). Second, during the study period, the claims submission process was manual, which is prone to errors and low uptake of claims data to monitor performance. To monitor the quality of care effectively, a robust information management

system is crucial for the timely use of claims data for quality improvements (Ng et al., 2019, Weiner et al., 1990, Konrad et al., 2019). Since the study period, NHIMA has established an electronic claim processing system, a substantive milestone in providing data for decision-making, and learning. Although the system is in its infancy, it offers the opportunity to use claims to monitor the care given across by different providers. Third, the reimbursement timeframe of 90 days stipulated by the health insurance act is too long for providers to adequately maintain quality of care through the procurement of medicines and other essential consumables. Similar reimbursement delays have been reported in India and Ghana whereby providers subsequently limited services to insurance members (Boyanagari and Boyanagari, 2019, Akweongo et al., 2021).

The Zambia National Health Insurance is implementing a blended provider payment through fee-for-service, DRGs and a flat rate payment system for hospital care. However, the low rates for level-1 hospitals could undermine the motivation and quality of care from these providers. Since the study period, NHIMA has increased the rates for level-1 hospitals, which shows NHIMA is learning as a purchaser to use information to make the necessary changes. It will be vital to assess in the future, whether the new rates in level-1 hospitals and the scheme's payment methods are creating the right incentives to influence quality of care by providers. Appropriate referrals and coordination of care among the different levels are still not part of the provider payment mechanism. As level-1 hospitals are at the bottom of the referral system under the scheme, NHIMA can incentivize them for appropriate referrals and coordination to higher-levels of care.

Based on the findings, we provide recommendations on how the national health insurance in Zambia can leverage to make a higher influence on quality of care. First, with the launch of pay-for-performance (P4P) under the health insurance, there is potential for greater influence on providers' behavior for higher quality of care. A systematic review on P4P found that process and intermediary outcome indicators are more likely to affect quality of care (Van Herck et al., 2010). Zambia can leverage on its NHI's P4P for a higher quality of care from its diverse providers through the selection of process and outcome indicators that account for patient safety, appropriate treatment, patient satisfaction ratings and clinical outcomes (Hussein et al., 2021). Second, efforts towards improving quality of care should also consider equitable access to these high quality services. As geographical access to the higher-level facilities where the scheme operates is a challenge for a significant proportion of Zambians, investments in referral networks and inter-facility communication will be crucial. In addition, equity concerns raised about the involvement of the private health sector needs to be addressed. Since the study period, accreditation of private providers has continue to mirror the unequal geographical distribution of private providers within the health system. NHIMA may have to consider including the cost of transportation from remote communities to areas, which have private providers in the instances of shortage of supplies in the public sector. Third, the actual implementation and enforcement of the accountability actions to improve quality of care as stipulated by the health insurance act will require NHIMA and its leadership to be insulated from political interferences. During the study period, NHIMA was under MOH, but a change in government in August 2021, moved the Authority to MLSS. This shift may be a path towards autonomy from MOH whose leadership had the

sole responsibility to appoint NHIMA's supervisory board and lead the development of statutory instruments. To improve accountability for all Zambians, representation on the board from nongovernmental organizations, which represent vulnerable groups such as those unemployed and disabled, should be considered.

This study had some limitations. As with any analysis pertaining to health system reforms, its results are highly time-bound to the study period. As stated previously, there have been several changes within the scheme since the study period including the payment mechanism and claims management system. Further research should assess the effects of these new changes. In addition, the study heavily focused on stakeholders in the public sector, as public health facilities were the major providers of the scheme at the time. There is also a likelihood of selection bias from the key informant interviews as three stakeholders either declined or could not be reached. As the health insurance was relatively new, it is possible that stakeholders with different views about the insurance were less likely to participate in the study. However, we corroborated the interviews with the document review to reduce selection bias.

7.6 Conclusion

We drew upon conceptual frameworks on strategic purchasing and quality of care to examine how the design of the Zambia National Health Insurance Scheme may affect access to quality care. While still in its infancy, the design of the purchasing arrangements of health insurance appears to be in the right direction despite some shortcomings. More progress toward strategic purchasing for quality of care is likely possible with government contribution to the scheme for vulnerable groups, increased investments in primary health care and a larger and better-qualified health workforce, good governance for quality, and an effective referral system within the entire health system. Health insurance can also positively influence the quality of care through a balance of structural, process, and outcome indicators to monitor providers and the use of the claims data across its mix of providers.

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Reflexivity statement: The authors include one female and three males and span multiple levels of seniority. While three of the authors are health economist specializing in health financing reforms related to health insurance in sub-Saharan Africa, the third have expertise conducting qualitative fieldwork in the Global South. Three of the authors have extensive expertise conducting health systems research in Zambia.

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Data Availability Statement

Summaries of the interview transcripts are available from the corresponding author upon reasonable request.

Competing interests

The authors declare no competing interests

Chapter 8 Governance factors that affect the implementation of health financing reforms in Tanzania: an exploratory study of stakeholders' perspectives

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8.1 Abstract

The development of effective and inclusive health financing reforms is crucial for the progressive realisation of universal health coverage in low-income and middle-income countries. Tanzania has been reforming health financing policies to expand health insurance coverage and achieve better access to quality healthcare for all. Recent reforms have included improved community health funds (iCHFs), and others are underway to implement a mandatory national health insurance scheme in order to expand access to services and improve financial risk protection. Governance is a crucial structural determinant for the successful implementation of health financing reforms, however there is little understanding of the governance elements that hinder the implementation of health financing reforms such as the iCHF in Tanzania. Therefore, this study used the perspectives of health sector stakeholders to explore governance factors that influence the implementation of health financing reforms in Tanzania. We interviewed 36 stakeholders including implementers of health financing reforms, policymakers and health insurance beneficiaries in the regions of Dodoma, Dar es Salaam and Kilimanjaro. Normalisation process theory and governance elements guided the structure of the in-depth interviews and analysis. Governance factors that emerged from participants as facilitators included a shared strategic vision for a single mandatory health insurance, community engagement and collaboration with diverse stakeholders in the implementation of health financing policies and enhanced monitoring of iCHF enrolment due to digitisation of registration process. Governance factors that emerged as barriers to the implementation were a lack of transparency, limited involvement of the private sector in service delivery, weak accountability for revenues generated from community level and limited resources due to iCHF design. If stakeholders do not address the governance factors that hinder the implementation of health financing reforms, then current efforts to expand health insurance coverage are unlikely to succeed on their own.

Key words: Tanzania, governance, health financing, health systems, health insurance

Key questions

What is already known?

- The implementation of health financing reforms is often challenging.
- Health systems governance is critical for successful implementation of health financing reforms such as the scale-up of health insurance schemes.
- Through its Health Sector Strategic Plan, Tanzania has implemented various health financing reforms including the improved community health funds (iCHFs).

What are the new findings?

- Stakeholders reported strong collaboration and participation by politicians, non-governmental stakeholders and communities in the implementation of health financing strategies; however, the role of the private sector has been limited.
- Lack of transparency by leaders in messaging about health insurance entitlements has contributed to misunderstanding of how health insurance works among community members.
- Collective action to effectively implement health financing reforms has been hindered by the lack of systematic information about vulnerable populations and by the design of the scheme, which does not take into account health system weaknesses such as shortage of medicines.

Key questions

What do the new findings imply?

- Collaboration and strategic partnerships should extend beyond the health sector and local communities to non-health actors and private partners; in doing so, Tanzania may better mobilise adequate resources for operating sustainable health financing schemes.
- The Tanzanian government should invest in resolving the governance issues, which affect health financing reforms such as iCHF in order to improve the quality of healthcare and the perceived value of social health protection—doing so will be important for encouraging the enrolment of new members in both current and future social health protection schemes.

8.2 Introduction

Sustainable Development Goal (SDG) 3.8 promotes universal health coverage (UHC), ensuring that all people will obtain the quality health services they need while not suffering financially as a result of seeking healthcare (World Health Organization, 2014, World Health Assembly, 2005b, United Nations, 2015). The journey towards UHC requires inclusive social health protection based on health systems

that are affordable and able to adapt to sociodemographic and technological changes, responding to the evolving needs of the population. In the last decade, several low/middle-income countries have implemented health system reforms, including the introduction of health insurance schemes, to accelerate progress towards UHC (Fenny et al., 2021).

Understanding of the contextual factors, along with sound health system governance and political commitment, are deemed to be among the determinants of better health and a path to improved social health protection performance (Balabanova et al., 2013, Fryatt et al., 2017). Good governance is explicitly mentioned in SDG 16, pointing to the need to 'build effective, accountable and inclusive institutions'. The relationship between governance and health is multifaceted, as the health sector is connected to broader public policies and those specific to the health sectors, as well as the effectiveness of institutions or organisations (Fryatt et al., 2017).

In broad terms, governance can be defined as how societies make and implement collective decisions (Kickbusch and Gleicher, 2014). Yet, in relation to health systems, governance has been conceptualised in different ways .(Pyone et al., 2017). Governance encompasses multiple aspects, such as systems of representation and engagement for citizens, accountability mechanisms, power and institutional authority, ownership, political stability, transparency and the rule of law (Balabanova et al., 2013, Mikkelsen-Lopez et al., 2011. It is related to how policies are formulated and implemented, how regulation is generated and exercised, and to the accountability mechanisms of all stakeholders .(Lewis, 2006, Loewenson, 2008, World Health Organization, 2007) Governance. Governance is thus related to how political, economic and administrative leadership and authority are exercised within a health system.

The WHO defines health systems governance as 'ensuring strategic policy frameworks exist and are combined with effective oversight, coalition-building, the provision of appropriate regulations, attention to system-design, and accountability'(World Health Organization, 2007). From this perspective, good governance involves leadership in coordinating the resources and stakeholders (policymakers, implementers, civil society groups, private sector and citizens) involved in the implementation and accountability of health services and programmes. Evidence has also shown how good governance is imperative for the operationalisation and successful implementation of health financing strategies (Yuan et al., 2017, Ogbuabor and Onwujekwe, 2018) . Yet, there is little clarity about the specific governance elements, which are important for particular health financing strategies.

In Tanzania, there are two main insurance schemes—the National Health Insurance Fund (NHIF) and the improved community health fund (iCHF) (NHIF, 2018).The NHIF mainly covers public sector employees while the iCHF, a voluntary scheme, targets the rural and informal sector; with a majority of Tanzanians falling within this category. Introduced in 2018, iCHF is an upgrade of the community health fund (CHF) which was established in 2001. The launch of iCHF included pooling of funds at the regional level and expansion of the benefit package to include health services at the regional level. Financing of iCHF is through premiums from households and contributions from the national government. In the design of the scheme, households who are deemed too poor are exempt from premium payments.

Premiums are per household of six and are set according to the geographical location of households (rural vs urban region). From each premium payment, 80% is allocated to capitation payments to hospitals and primary care facilities, 10% commission for the officer who enrols a household, 9% for administration costs and 1% for reserves (Lee et al., 2018). Contributions from the national government comprise equal matching funds for each household premium contribution received at the regional level. For example, if the household premium at a region is 30 000 shillings (US$12.94), government contribution should match equally to have a total contribution of 60 000 shillings (US$25.87) per household. There are also expenditure allocations for the matching funds received from national government: 80% to health facilities on a per capita basis, 15% for administrative costs and 5% for reserves.

Tanzania's Health Sector Strategic Plan IV-2015–2020 emphasized the need to improve governance, revenue collection, and the pooling of funds and healthcare purchasing (Ministry of Health and Social Welfare, 2015). This plan outlines the long-term aim to scale up the coverage of the existing health insurance schemes with the long-term objective to integrate them into a single mandatory national health insurance to reduce fragmentation and to extend coverage to the entire Tanzanian population. A key part of the plan is to scale up the coverage of iCHF. Yet, despite government efforts, only 25% of the population is enrolled into iCHF (Lee et al., 2018). Prior research on community health funds has found the low enrolment rate to be associated with demand-side issues such as poor understanding of the scheme and supply-side factors including a limited benefit package and poor quality of care at public health facilities (Macha et al., 2014b). There are also concerns about the financial sustainability of iCHF (Lee et al., 2018). However, the literature related to the governance factors surrounding the implementation of iCHF in Tanzania remains limited.

As the time frame of this strategic plan has ended, it is important to identify and understand the factors that have been influencing the implementation of health financing reforms in Tanzania. Therefore, the aim of this manuscript is to present a synthesis of identified governance-related barriers and facilitators for the successful implementation of health financing reforms, including the improved community health fund, in Tanzania.

8.3 Methods

Study design and settings

This study used a qualitative research design to elicit the views of health sector stakeholders regarding the implementation of iCHF. The study was conducted in three regions in Tanzania, which are Dodoma, Dar es Salaam and Kilimanjaro. These regions were purposively selected because the Dodoma and Dar es Salaam regions host the headquarters of the NHIF; the Ministry of Health Community Development, Gender, Elderly and Children; and the President's Office of Regional Administration and Local Government, thus facilitating the recruitment of relevant policymakers engaged in the implementation of health financing strategies. The Kilimanjaro region was selected because it was expected that participants from the region would provide rich discourse on iCHF implementation and

health financing, as the region was one of the first to pilot and subsequently adopt the iCHF in 2014 (Wagenaar et al., 2016).

Study population and participant selection

The data for the study were obtained from in-depth interviews with 36 health stakeholders conducted between November 2019 and January 2020. Prior to recruiting participants, a context mapping was conducted to gain a deeper understanding of who to interview based on their direct and indirect contributions to the implementation of health financing strategies (Sleeswijk Visser et al., 2005). Twelve key informants were identified through the context mapping. After the context mapping, a snowball sampling approach was employed to identify additional relevant stakeholders (Patton, 1990). Recruitment ended at the level of theoretical saturation of the data (Patton, 1990, Saunders et al., 2018)

Participants of the study included policymakers and implementers such as regional and district coordinators of iCHF, medical directors of health facilities, health workers, district council management teams, community leaders and iCHF members. Medical and healthcare professionals made up the largest portion of participants; many of whom were responsible for health facility governance, budget planning or the implementation of the iCHF in their respective health facilities and jurisdictions. The full details of participant characteristics can be found in supplemental table 1.

Study conceptual framework

In order to investigate the factors that have influenced the implementation and scale-up of the coverage of iCHF in Tanzania, the normalisation process theory (NPT) was integrated into the inquiry process (May and Finch, 2009, May et al., 2018). The NPT framework focuses on the work that individuals and groups do to enable the normalisation of complex interventions or programmes including policies (Murray et al., 2010). The NPT framework was used to investigate how governance-related factors have been affecting the implementation and scale-up of iCHF.

NPT in this study denotes the normalisation of the implementation of all iCHF activities—that is, education about iCHF, revenue generation, supervision and delivery of health services and claims reimbursement. Normalisation is achieved when the implementers' roles and activities are standardised or conform to the requirements (ie, governance aspects) of successful implementation of iCHF.

There are four main domains of NPT: coherence, cognitive participation, collective action and reflexive monitoring. Coherence is how actors involved in the intervention make sense or understand the aims, objectives and expected benefits of the intervention. Cognitive participation is the relational work that actors do to build and sustain intervention. Central to cognitive participation is 'the question of who does the work' (Gillespie et al., 2018) Collective action is the operational work people do to enact a set of practices. It focuses on how the work is done by actors. Reflexive monitoring is the formal and informal appraisal of the effectiveness and progress of the intervention or programmes by actors.

In addition to NPT framework, we adapted a governance framework drawing from the Siddiqi framework for assessing health systems governance and WHO health systems governance framework, to understand governance factors, which have promoted or inhibited the implementation of iCHF(World Health Organization, 2007, Siddiqi et al., 2009). The governance elements in our adapted framework have six main domains, which include policy guidance and vision; intelligence/information; system design; accountability and transparency; regulation and incentives; and participation, collaboration and coalition building (table 19). Our assumption underlying the use of NPT and the aforementioned governance frameworks in our study was that both frameworks provide a deeper understanding of the factors that have affected the implementation of iCHF.

Table 19: Description of the governance elements of the adapted framework

Governance element	Description (Siddiqi et al., 2009)
Policy guidance and vision	Formulating sector strategies and also specific technical policies; defining goals, directions and spending priorities across services
Participation, Collaboration and coalition building	Across sectors in government and with actors outside government, including civil society, to influence action on key determinants of health and access to health services; to generate support for public policies, and to keep the different parts connected - so called 'joined up government'
Accountability and Transparency	Ensuring all actors involved in health are accountable to the public as well as to the institutional stakeholders. Transparency is needed to achieve accountability
Regulation and incentives	Designing regulations and incentives and making sure they are fairly enforced
System design	Ensuring a fit between strategy and structure and reducing duplication and fragmentation
Intelligence and Information	Ensuring generation, analysis and use of intelligence and information on coverage, service access especially for vulnerable populations

Data collection and analysis

In-depth interviews were carried out using a semi-structured interview guide in the local language (Kiswahili). The interviews were conducted at the preferred location of the participants; most participants selected their offices. The interviews lasted 15–90 min. The interview guides were designed using NPT and governance constructs.

Each domain of NPT and governance were operationalised into specific questions. The questions focused generally on the roles of the stakeholders, their perceptions about the challenges that affect the implementation of health financing reforms and the participation of local community members in the formulation of health financing policies in the country. The questions were piloted during interviewer training. All necessary revisions to the interview guide were made prior to proceeding with principal data collection (training process described in supplemental materials). Research assistants conducted in-

person interviews in Kiswahili, then simultaneously transcribed and translated the Kiswahili audio recording to English text.

We used framework analysis to guide deductive data analysis within the scope of the NPT and governance frameworks, while inductive analysis explored themes as they emerged from the data.(May and Finch, 2009, May et al., 2018, Pyone et al., 2017).Three authors coded the data separately before being validated by intercoder agreement. The data were first coded using governance elements of the adapted governance framework and later reorganised under the related NPT domains. Analyses were performed using ATLAS.ti V.8.0.

8.4 Results

Governance elements that emerged as facilitators or barriers to the implementation of iCHF are presented within the NPT domains in table 20. We also present a broader description of the findings supported by participants' excerpts.

Table 20: Summary of Findings

NPT Domain	Description	Governance Factors that emerged
Coherence	The manner in which key implementers and beneficiaries make sense of the health financing strategy and how they understand the strategic vision at national level.	**Facilitators**: 1. Coherent understanding of current health financing policy 2. Shared strategic vision for a single national health insurance by stakeholders **Barriers** 1. Lack of transparency leading to misunderstanding of iCHF benefit package 2. Limited capacity of health-facility governing committees and communities to actively participate in the implementation of health financing strategies
Cognitive participation	The relational work that implementers, communities and other actors do to build and sustain a community of practice around implementing iCHF.	**Facilitator** 1. Engagement and collaboration of stakeholders in the designing and implementation of health financing strategies **Barrier** 1. Limited involvement of the private sector in service delivery for iCHF
Collective work	The operational work that people do to enact a set of practices; including resources such as finances and data to operationalize iCHF.	**Barriers**: 1. Limited financial resources to support awareness campaigns, 2. Weak accountability of revenues generated from premiums 3. Incentives for the implementation of iCHF are irregular 4. Failure of iCHF design to support a wider access to medicine for beneficiaries

		5. Limited data or information to determine eligible groups for premium exemptions under iCHF
Reflective monitoring	Formal or informal appraisal in which implementers and beneficiaries appraise the progress of the implementation of health financing strategies and the social health protection schemes in Tanzania	**Facilitator**: 1.Enhanced monitoring of enrolment progress due to digitalization of registration process **Barrier**: 1. Limited supervision of iCHF due to inadequate resources

Coherence

Facilitator

Coherent understanding of current health financing policy

Having clearly defined policy guidance is an important element of good governance. Stakeholders' responses about the current health financing strategies and arrangements were consistent and coherent. Policymakers and stakeholders at higher levels of the health system seemed to be most familiar with the reforms:

When you speak of this policy, you speak of the guideline of financing health services [that] was put into place by the ministry of health. […]. Speaking of financing health services, I can speak of three major areas: we finance by using health insurance, this is iCHF, which was previously known as CHF, then there is NHIF and other private insurances, then there is cash payment. (IDI 25, social worker at the President's Office)

Shared strategic vision for a single national health insurance by stakeholders

Most stakeholders reported a shared strategic vision with the aim to implement a mandatory and single national health insurance. Although some participants were not specifically asked about mandatory health insurance, they consistently cited it as a policy priority. Stakeholders thought that it is necessary for the government to make health insurance mandatory in order to create the opportunity for all individuals to access affordable healthcare:

For us to reach the goals [access to quality services for all without financial hardship], health insurance should be mandatory. Every family should have [health insurance]. […]. If this is done, even the services will improve because there will be sufficient money to run the health centres. (IDI 24, enrolment officer)

Barriers

Lack of transparency leading to misunderstanding of benefit package

Stakeholders mentioned that there is misunderstanding about health insurance schemes among community members. They explained this was due to limited transparency about the benefit packages of the health insurance scheme. Some participants explained that some policymakers such as politicians convey inaccurate information to the public, thus creating mistrust of iCHF among beneficiaries.

Politicians just tell citizens that everything is free, something which is professionally not possible. How can an adult access health care for only 1600 shillings (US$0.69). (IDI 10, social welfare officer)

Limited capacity of communities to participate actively in iCHF

Community members who are involved in health facility governing committees mentioned that they have received a few orientations about health insurance schemes but they have not participated in specific training about health financing, thus they do not have full capacity to implement health insurance schemes such as iCHF. Participants also mentioned that the communities have a poor understanding of how health insurance schemes work generally.

Cognitive participation

Facilitator

Collaboration/participation and coalition building

Collaboration and participation of various actors within and outside the health sector are important for good governance. Participants perceived that there is a strong collaboration between implementers of iCHF and other stakeholders such as politicians, religious leaders and non-governmental organisations (NGOs) with each stakeholder having specific roles. They reported that members of parliament and religious leaders have been important players in creating awareness about the importance of iCHF to communities. They also mentioned that NGOs have also been instrumental in paying premiums on behalf of vulnerable households.

Stakeholders in higher administrative levels mentioned that it is standard practice to involve communities when developing national policies, and stakeholders at lower levels of the health system agreed by mentioning that health facility governing committees involve communities in both decision-making and policy implementation. They also gave the expansion of the benefit package to regional hospitals as an example of including communities' voices in iCHF implementation.

Barrier

Limited involvement of the private sector in service delivery for iCHF

Stakeholders mentioned that the role of the private sector is limited in the implementation of iCHF. They explained that the government could collaborate with private health facilities to provide healthcare or diagnostic services in case the services are unavailable in the public health facilities. Participants also mentioned public–private partnership to purchase and maintain laboratory equipment in public health facilities, which are not always readily available.

I think the government should involve private sector in the provision of health care. For example, the government has laboratories. The medical equipment facilities are changing almost each year. The government can partner with the private sector to purchase or maintain its equipment such as CT scan, X-ray etc. (IDI 08, NGO stakeholder)

Collective action

Under collective action, inadequate resources such as finances, human resources and medicines emerged as the main barriers that affect the operationalisation of iCHF. Governance factors, which were cited to contribute to inadequate resources, include system design, poor regulation/incentives, weak accountability of revenues and limited intelligence/information.

Barriers

Limited financial resources

Participants explained that one of the challenges that affects the implementation of iCHF is that the current iCHF design does not account for financial resources to support districts on community education and awareness activities:

The responsibility [of education campaigns] should go hand in hand with funding resources because it is difficult to assign a staff to go more than 50 km for sensitization campaign without providing him/her a transport, fare [for public transport], funds for accommodation, etc. So, funds and human resources [are] still a challenge [for sensitization campaigns]. (IDI 30, member of Council Health Management Team)

Some healthcare workers indicated that due to the limitation of financial resources for education activities, they often use their own resources for awareness campaigns. They explained that they do this because of the realisation that increasing enrolment will generate more revenue for their respective health facilities.

Furthermore, participants highlighted various governance factors that contribute to limited financial resources as follows:

Weak accountability of revenues generated from premiums

Stakeholders across various levels of the health system reported that weak financial accountability plays a significant role in limiting financial resources. At the community level, stakeholders mentioned that ensuring accountability in the submission of premiums collected by enrolment officers has been an issue:

Most of the time, you will find [that] the money in the [bank] account is 75%–80% of the total money that is supposed to be in the account. This means that, there are people who have been registered, and they are supposed to receive the services but their contribution has not reached at the administrator. Why? Most likely, the money is still in the hands of the registration officers and they use the money. (IDI 09, iCHF coordinator)

Incentives for the implementation of iCHF are irregular

According to iCHF regulations, central government is supposed to match the funds received from every premium collected, however, participants reported that they experience challenges in receiving these iCHF matching funds:

I am just telling you [it] has been challenging to get that extra 30 000 shillings [matching funds] from the government. We did not receive [the contributions] last year [or] this year. By policy and procedure, we expect 60 000 shillings but we end up [only] getting 30 000 shillings. This is very hard because in the end the health facilities are [still] providing the services but with little money. (IDI 09, regional iCHF coordinator)

Failure of iCHF design to support wider access to medicines for beneficiaries

Participants mentioned that availability of medicines is one of the main expectations of beneficiaries when they receive health services. However, the availability of medicines in public health facilities is often limited. Therefore, even iCHF members may have to pay out-of-pocket for medicines at pharmacy outlets.

I think things should be improved in the CHF to allow patients to get medicines from a nearby pharmacy if medicines they need are not available at the health facility. This is because if medicines are not available they have to go to buy and they start complaining: 'what is it for we are paying if we cannot get drugs at the health facility?' (IDI 07, community health worker)

Limited intelligence/information to support identification of vulnerable groups

Participants further mentioned that limited information about vulnerable groups, who are eligible for exemption under iCHF, is another implementation challenge. This challenge makes it difficult to identify and include vulnerable groups in the iCHF:

The challenge we face is how to identify those extremely poor communities. [That needs] an intensive survey to identify them. (IDI 36, iCHF coordinator)

In addition, stakeholders also mentioned that limited intelligence to determine eligibility for exemptions has led to abuse of the policy:

[…] Its implementation has challenges because there is no special recognition system to identify if this is a poor person or not. So you will find sometimes that there are people who do not deserve to get exemption but they are getting it that way. That is a challenge. (IDI 23, economist)

Reflexive monitoring

Facilitator

Enhanced monitoring of enrolment progress due to digitalisation of registration

Stakeholders explained that the new digital system for enrolment has made it easier to monitor enrolment rate progress of iCHF for households. Participants at the regional levels mentioned that the current iCHF digital system has enabled them to monitor daily enrolment without having to travel to the district levels. In addition, the digital system of the enrolment process has also helped to identify the discrepancies between the number of people enrolled and the revenue collected.

ICHF has a proper system, a system that from where I am, I can tell what is happening in Tandahimba. I can see how many people are registered and the amount of money collected in every council. (IDI 25, social worker)

Barrier

Inadequate supervision due to limited resources

Supervision can be an important aspect of enhancing monitoring and accountability of progress towards successful implementation of iCHF. Coordinators of iCHF mentioned that supervision of enrolment centres and health facilities is one of their responsibilities but due to lack of financial resources, they are unable to fulfil this responsibility:

Sometimes we face the challenge of financial resources. There was a time we needed funds for fuel to enable us to do supportive supervision but we didn't get hence we failed to support the planned activities. (IDI 36, iCHF coordinator)

8.5 Discussion

This study has explored the factors, which have influenced the implementation of iCHF using NPT and governance frameworks. Our findings suggest that collaboration and participation by various actors are prominent aspects of governance and NPT that support the implementation of iCHF in Tanzania.

Politicians and religious leaders have played a role in creating awareness about health insurance schemes. Unfortunately, participants frequently reported that politicians sometimes use simple yet misleading statements, such as 'free healthcare', to attract popularity. Other evidence from sub-Saharan Africa has demonstrated that opaque communication can also confuse communities and erode their trust in preventive health services (Danhoundo et al., 2017). Although politicians and other influential stakeholders are important collaborators for iCHF, it is important that their communication about the iCHF benefit package and how insurance works be consistent and accurate to improve the awareness and acceptability of health insurance in Tanzania.

Participants also identified that community engagement and collaboration are standard practices when developing national policies such as for iCHF in Tanzania. Evidence shows that routine practices of implementing health financing reforms can be achieved when multiple actors engage in delivering health insurance outputs and share a coherent view of their roles and purpose (May and Finch, 2009). A study in South Africa revealed that community engagement in the introduction and implementation of national health insurance was useful for holding the government accountable, while a systematic review of other settings revealed that community engagement was important for addressing inequalities in health (O'Mara-Eves et al., 2013, Setswe and Witthuhn, 2013). Conversely, studies in other countries have found that communities can lack commitment or react hostilely to programmes when they are not included in planning and budgeting processes.(Chirenje et al., 2013). As Tanzania continues to make

important decisions regarding health financing reforms, such as mandatory health insurance, it is important that communities are included in this process.[17] However, the low enrolment rates of communities into iCHF and their limited capacity to understand health financing strategies, including health insurance schemes, raise concerns about the degree of community engagement and collaboration. This limitation of communities may not only affect cognitive participation, but also their influence in collective action. Beneficiaries of iCHF and citizens can also influence the implementation of iCHF through collective action (Bigdeli et al., 2020). The literature has shown that investments in improving communities' required skills and confidence are important enablers for effective engagement and their subsequent participation (De Weger et al., 2018).

Although various actors were engaged in the implementation of iCHF, the design of iCHF has restricted the resources needed to take collective action to effectively implement iCHF. One of the main themes that emerged was the need for intensive awareness campaigns in communities about health insurance schemes. Yet, according to participants, the design of iCHF does not take into account the necessary resources needed to conduct these awareness campaigns. Participants also mentioned that the inconsistent availability of medicines in public health facilities is a major challenge, which is a critical factor for users' perception about health insurance. Participants mentioned that the collaboration of iCHF with the private sector could bridge this gap. Some of these design challenges highlighted by participants are not unique to Tanzania. In both Ghana and Gabon, for example, there have also been accounts of medicine stock-outs and financial challenges hindering the implementation of their health insurance schemes (Fenny et al., 2016, Jehu-Appiah et al., 2011, Sanogo et al., 2020). This evidence reinforces the notion that implementing effective social health protection schemes requires taking into account quality healthcare that responds to the population's needs in the design of these schemes.

Patients also reported that weak accountability of iCHF premiums has contributed to the limited financial resources available. The digitisation of the enrolment process has made it easier to monitor discrepancies between the number of enrollees and revenue collected. However, there need to be better controls to account for this discrepancy. Weak accountability can have multiple negative implications on programme performance; for example, a systematic review revealed that limited financial accountability could hinder the utilisation and financial sustainability of CHFs in low-income and middle-income countries (Fadlallah et al., 2018). However, strong oversight competencies can foster accountability in public healthcare systems (Bakalikwira et al., 2017).Therefore, enrolment officers, community leaders and district supervisors should cooperate to implement strong accountability systems, ensuring that iCHF premiums actually reach health facilities and that enrolment officers are fairly compensated accordingly.

Another important challenge facing health insurance schemes is the limited intelligence or information to support the identification of groups who should be exempt from paying insurance premiums (including weak means-testing mechanisms). Achieving equity in access to health insurance depends on the extent to which health financing reforms integrate mechanisms to include vulnerable and low-income population groups (Ifeagwu et al., 2021). Evidence indicates that Tanzania has yet to implement

efficient, accurate and community-accepted methods for identifying low-income households and that current interventions can fail to identify up to one-third of households that should have been eligible for premium exemptions (Kuwawenaruwa et al., 2015). In order to avoid setbacks to achieving UHC, health insurance schemes should collaborate with other social protection programmes, such as the Tanzania Social Action Fund, to learn from their experiences in identifying and protecting vulnerable groups (Wang et al., 2018).

Across our findings, we demonstrate how NPT constructs and governance elements can provide a deeper understanding of the implementation of iCHF. NPT helped in the exploration of the multidimensional nature of the relationship between communities and health systems while identifying the key governance elements that facilitate or hinder the implementation of iCHF.

Limitations

The findings of this study should be interpreted in light of some important limitations related to the study design and settings. First, this study only focused on the views of domestic government partners and did not include stakeholders working in the private sector or international organisations, which are important players in the health financing ecosystem in Tanzania. In addition, in using a qualitative approach, the findings reflected stakeholders' perceptions and not necessarily the actual governance actions. However, the policymakers, implementers and beneficiaries who participated in this study provided insights that could improve the development of health financing reforms in Tanzania and could guide policymakers on how they should implement upcoming mandatory and single health insurance schemes in Tanzania. To the best of our knowledge, this study is the first to use NPT constructs to investigate governance-related factors that facilitate or hinder the implementation of health financing reforms. Future studies using similar frameworks will provide additional valuable insights regarding their application in this context.

8.6 Conclusion

This study used NPT constructs to identify multiple governance-related barriers and facilitators that affect the implementation of health financing reforms in Tanzania. Regarding health financing reforms, policymakers and implementers were most familiar with the iCHF. However, they must address governance and operational challenges, such as limited financial accountability, lack of transparency and lack of financial resources, if Tanzania wishes to implement an effective, sustainable and equitable health financing strategy. Collaboration and strategic partnerships should extend beyond the health sector and local communities to non-health actors and private partners. In doing so, Tanzania may better mobilise adequate resources for operating a sustainable health financing strategy.

The findings of this study support the argument that if the government and stakeholders do not resolve governance issues that negatively affect the implementation of iCHF, then current efforts to increase the coverage of health financing schemes may not be sufficient for achieving their goals of the Health Sector Strategic Plan and for UHC.

Data availability statement

Data are available upon reasonable request. According to the institutional review board of IHI, we are not allowed to make the data publicly available. Interested researchers should contact the corresponding author.

Ethics statements

Patient consent for publication

Not required.

Ethics approval

The study was approved by the institutional review board of the Ifakara Health Institute (reference number: IHI/IRB/No:35-2020) and the National Institute for Medical Research of Tanzania (reference number: NIMR/HQ/R.8a/Vol. IX/3518). Written informed consent was obtained from all participants prior to taking part in the research.

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Contributors DOA and BH equally contributed to this manuscript as joint first authors. Manuscript preparation, codebook development and data analysis were led by authors DOA and BH. The codebook was then validated through intercoder agreement between coauthors DOA, BH and GM. SMM conceived and designed the study, and together with GM trained research assistants and coordinated data collection. SMM and FT provided supervision, guidance, and critical review throughout data analysis and the development of this manuscript. FT also conceived the larger research project, 'Health systems governance for an inclusive and sustainable social health protection in Ghana and Tanzania,' within which the present study is nested. The corresponding author, BH, had full access to all data in the study and had final responsibility for the decision to submit this manuscript for publication.

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Competing interests None declared.

Patient and public involvement Involvement of the public was central to the design of this study, in that we sought to include participants from all levels of the Tanzanian health system—from policymakers to patients and beneficiaries. Involvement of the Tanzanian public will also extend to the dissemination of these findings: we will directly visit with Tanzanian policymakers, implementers and

beneficiaries in order to present these findings to them, and subsequently engage in focus group discussions in order to explore the incorporation of these findings into the future and ongoing development and implementation of health financing reforms.

8.7 Supplemental

Training of research assistants

Training of research assistants The research team was recruited based on their experience with qualitative research, particularly the implementation of IDIs with key government officials, community members and health care providers. Research assistants were evaluated based on their understanding of the human research ethics. During the training, the research assistants were exposed to the aims of the study, study objectives, tool guides, means of safeguarding the quality of qualitative research and the essentials of informed consent. Study tools were piloted at the completion of training. All observations from the pilot study were considered and adjustments relating to the questions were immediately implemented prior to proceeding with principal data collection.

Table 1: Characteristics of study participants (N=36

Variables	**n (%)**
Level of education (n=35, missing=1)	
No formal education	1 (2.9)
Primary (standard 7)	9 (25.7)
Some secondary	2 (5.7)
Advanced diploma	1 (2.9)
Post-secondary	9 (25.7)
Dental medicine	1 (2.9)
Diploma in medicine (Clinical officer)	4 (11.4)
Doctor of medicine (Medical officer)	8 (22.9)
Stakeholder Category (N=36)	
Beneficiary	7 (19.4)
Community leaders (with health promotion role)	2 (5.6)
Community Health Worker	2 (5.6)

Social Worker	With iCHF coordination role	2 (5.6)
	Without iCHF role	1 (2.8)
Non-governmental stakeholders		2 (5.6)
Member of Parliament		1 (2.8)
Ministry of Health Official		1 (2.8)
NHIF Personnel		2 (5.6)
Healthcare provider (n=11)	With iCHF coordination role	3 (8.3)
	With governance role	6 (16.7)
	Without governance role	2 (5.6)
Health Facility Governing Committee Chairperson		2 (5.6)
iCHF Enrolment Officer		1 (2.8)
Council Health Management Team Member		2 (5.6)

Chapter 9 Understanding Tanzania's National Health Insurance's role in improving service coverage and quality of care using causal loop diagrams

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9.1 Abstract

Health insurance is one of the main financing mechanisms currently being used in low and middle-income countries to improve access to quality services. Tanzania has been running its National Health Insurance Fund (NHIF) since 2001 and has recently undergone significant reforms. However, there is limited attention to the causal mechanisms through which NHIF improves service coverage and quality of care. This paper aims to use a system dynamics (qualitative) approach to understand NHIF causal pathways and feedback loops for improving service coverage and quality of care at the primary healthcare level in Tanzania. We used qualitative interviews with 32 stakeholders from national, regional, district, and health facility levels conducted between May to July 2021. Based on the main findings and themes generated from the interviews, causal mechanisms, and feedback loops were created. The majority of feedback loops in the CLDs were reinforcing cycles for improving service coverage among beneficiaries and the quality of care by providers, with different external factors affecting these two actions. Our main feedback loop shows that the NHIF plays a crucial role in providing additional financial resources to facilities to purchase essential medical commodities to deliver care. However, this cycle is often interrupted by reimbursement delays. Additionally, beneficiaries' perception that lower-level facilities have poorer quality of care has reinforced care seeking at higher-levels. This has decreased lower level facilities' ability to benefit from the insurance and improve their capacity to deliver quality care. Another key finding was that the NHIF funding has resulted in better services for insured populations compared to the uninsured. To increase quality of care, the NHIF may benefit from improving its reimbursement administrative processes, increasing the capacity of lower levels of care to benefit from the insurance and appropriately incentivizing providers for continuity of care.

9.2 Introduction

Increasing equitable access to health services and improving financial protection is a high priority on the global agenda, and universal health coverage (UHC)(World Health Organization, 2010) is part of the United Nations sustainable development goals. Low-and-middle income countries (LMICs) are currently implementing various strategies to strengthen their health systems to move closer towards UHC (Jaca et al., 2022). One of the main health financing strategies LMICs are using to tackle both dimensions of UHC is implementing and scaling up the coverage of health insurance programs.

Current evidence suggests that health insurance can improve access to services in LMICs (Spaan et al., 2012, van Hees et al., 2019, Erlangga et al., 2019). In Sub-Saharan Africa (SSA), studies in Ghana, Ethiopia, and Rwanda have shown that health insurance improved service utilization and drug prescriptions (Blanchet et al., 2012, Garcia-Mandicó et al., 2021, Wang et al., 2017, Saksena et al., 2011, Tilahun et al., 2018). However, the effect of health insurance on catastrophic health expenditures is mixed (Woldemichael, 2019, Kusi et al., 2015, Raju and Younger, 2022, Salari et al., 2019). Impacts of health insurance also do not appear to be equitable, as the wealthiest households

are more likely to enroll and gain from health insurance (Woldemichael, 2019, Osei Afriyie et al., 2022, Barasa et al., 2021, Chirwa et al., 2021). Furthermore, the quality of services that health insurance provides has been debated (Alhassan et al., 2016). In Gabon, a study found that stock out of drugs and equipment is a barrier to quality maternal healthcare even for insured patients (Sanogo et al., 2020).

Tanzania has two major public health insurance schemes targeting specific groups: the National Health Insurance Fund (NHIF) and the Improved Community Health Fund (iCHF). Tanzania established the NHIF by an Act of Parliament in 1999 as a mandatory social health insurance scheme for public employees(The United Republic of Tanzania, 1999) . In 2013, NHIF expanded membership for other population groups on a voluntary basis. However, coverage has remained limited, with only approximately 7 percent of the population covered by NHIF (Lee, 2018). The scheme is financed through a fund consisting of monthly contributions from self-employed individuals, employees, and employers, grants, donations, and income from investments made by the national health insurance fund board. Those in the formal sector contribute 3 percent of their monthly salary and equal matching by employers (The United Republic of Tanzania, 2016). There is also a voluntary scheme for those in the informal sector through annual premium contributions, which vary by age and number of beneficiaries.

The health insurance program covers employees and their families-spouses, parents, and four legal dependents (biological or adopted children). In 2021, the government adjusted the age of dependents that can be covered to children still in education from 18 to 21 years of age. Retired contributors and their spouses are covered as well. The scheme offers comprehensive services under its benefits package, which includes outpatient and inpatient services, medicines, diagnostic tests, surgical care, dental care, optic care, and physiotherapy care. NHIF has a mix of service providers as its accredited providers. These providers include public and private health facilities, faith-based organizations, diagnostic centers, and pharmaceutical outlets, which comprise pharmacies and accredited drug-dispensing outlets (ADDOs). NHIF uses a fee-for-service to reimburse healthcare providers.

Since the establishment of NHIF, there has been little published evidence about its contribution to improving service coverage and quality of care in Tanzania. The few studies on the scheme were conducted primarily in urban areas (Musau, 2011, Kumburu, 2015, Silvia, 2013) and since their publications, NHIF has undergone numerous reforms, including digitalizing its information and claim management systems, loan program to help providers improve their infrastructure and gatekeeping measures on accessing its benefits package. In addition, NHIF is positioning itself to manage the administrative structures of the single mandatory health insurance that the Government of Tanzania seeks to unify existing insurance schemes and extend coverage to all Tanzanians.

With the acknowledgement that health systems are dynamic complex systems, there has been a growing need to use a system dynamics qualitative approach to identify factors that can influence the implementation of system-wide interventions (de Savigny et al., 2017, Cassidy et al., 2021). As Tanzania strives to establish a single mandatory health insurance, it is imperative to consider

complexities of the insurance's influence on the health system. By understanding and analyzing the causal mechanisms through which NHIF enhances service coverage and quality of care, we can address the limitations of the current approach and effectively shape future reforms. In this paper, we used a complex systems approach to understand the role of NHIF in service coverage and quality of care at primary health care facilities in Tanzania using qualitative interviews with stakeholders.

9.3 Methods

The qualitative interviews were conducted in rural and peri-urban settings in Tanzania. The health system in Tanzania operates in a decentralized system and its referral system is organized in a pyramid structure (Kapologwe et al., 2020). At the base of the pyramid is primary health care consisting of the community, followed by dispensaries, health centers, and district hospitals. District hospitals are followed by regional referral hospitals, zonal hospitals, specialized hospitals and finally the National Hospital. The two rural sites were Bahi and Chamwino districts in the Dodoma region. Kibaha is a peri-urban area district in Pwani region. We selected these districts because of their experiences implementing various health insurance schemes including NHIF.

Study population and participant selection

Using the already established network between Ifakara Health Institute and NHIF, we used purposive sampling to identify relevant participants based on their roles within NHIF and their contribution to the implementation of NHIF. Next, we used snowball sampling to identify other participants. Study participants included policymakers at the national level and implementers such as regional and district coordinators of NHIF, in-charges of health facilities, NHIF focal persons at health facilities, and health providers. We focused only on primary care facilities as NHIF benefit packages differ across primary health care and higher-levels of care. The inclusion criteria for health facilities was NHIF accreditation status. We included both public and private health facilities. We conducted interviews with 32 stakeholders in the initial CLDs and expert validation of the CLD with seven stakeholders (Table 1).

Data collection and analysis

In-depth interviews were conducted from May to July 2021 using a semi-structured interview guide that focused broadly on the sufficiency of resources overall (financial, medicines, medical supplies, workforce, and infrastructure) for service delivery and the role of NHIF in improving the quality of care. We piloted the interview guide during the research assistants' training. All the appropriate revisions were made to the interview guides, which were translated into the local language of Kiswahili before data collection commenced.

Qualified research assistants conducted the interviews after they were trained on the study tools and reminded about human research ethics. The first author supervised the study and provided constant consultation and reflections with the field team. The interviews were conducted in Kiswahili at the preferred location of participants, which was mostly the respondent's workplace. The interviews lasted

an average of 43 minutes. After the interviews, the Kiswahili audios were simultaneously transcribed and translated into English text.

We used inductive content analysis to analyze the collected data. Two team members independently reviewed transcripts and derived a list of codes and relationships, which they discussed until a consensus was reached. Findings were grouped into three hierarchical categories- main ideas (domains) with corresponding themes and sub-themes. ATLAS.ti V.8.0 was used to support the data management process.

After completing the coding and analysis, a summary of key findings was produced. These key findings were used to develop a causal loop diagram, a system dynamic tool (de Savigny et al., 2017) that helped visualize the complex network of feedback loops within the health system that have influenced the implementation of the NHIF for improving service coverage and quality of care. To link the findings to feedback mechanisms and identify dominant themes, Kim and Anderson's purpose text analysis was adapted (Kim and Andersen, 2012). This involved four steps:

1. Causal links were identified using the themes and key findings generated. This process was iterative and ended only when each causal link was corroborated from other transcripts.
2. Following this, the causal relationships were transformed to word-and-arrow diagrams to represent an interaction. Arrows indicate the direction of the causal relationship, positive (+) and negative (-) signify the polarity of the relationships. A positive relationship implies that with all things being equal, a positive change in the cause variable will result in an increase in the effect variable. A negative relationship implies that a positive change in the cause variable will result in a decrease in the effect variable, with all things being equal. Delays in the influence of a cause variable over the effect variable was depicted using two lines through an arrow.
3. When a causal link indicated a reciprocal relationship, a feedback loop was created. Each feedback loop was assessed in terms of whether it was a reinforcing (R) or balancing (B) loop. A reinforcing loop signifies a positive or intensifying behavior and a balancing loop signifies a negative or stabilizing behavior.
4. All the feedback loops were assembled into a CLD to create a visual model using Vensim PLE software.
5. The initial CLDs created were shared with additional stakeholders in a stakeholder meeting to validate the extent to which the CLDs reflected their experience of implementing NHIF.
6. Based on the inputs from the stakeholders, final CLDs were created. In the interest of presenting a more reader-friendly and clear CLDs, smaller loops within each domain were presented first.

Table 21: Categories of respondents involved in the study

Level of interview	Respondents	Number of interviews
National level	NHIF technical managers	3
	MOHCDGEC policy leads	2
Regional level	NHIF Coordinator	1
District level	NHIF Coordinators	3
	Council health management team members	4
Health facility level	In-charges of health facilities	9
	Health providers	7
	NHIF focal persons	3
Total		**32**

Ethical considerations

Ethical clearance was obtained from the institutional review board of the Ifakara Health Institute (IHI/IRB/No: 6-2021) and the National Institute for Medical Research (NIMR/HQ/H.8a/Vol.IX/3684). Participants provided written informed consent to participate in the interview and have the interviews audio recorded.

9.4 Results

There were three main domains that emerged as NHIF's roles. The domains are: 1) increasing access to high-quality services for families 2) improving service provision capacity 3) governance structures for improving service coverage and quality of care.

Domain 1: Role of NHIF in increasing access to high-quality services for families

The mechanisms that result in changes in access to service coverage for NHIF beneficiaries are presented in Figures 15 and 16. Figure 15 shows the role of NHIF in beneficiaries receiving services through its benefit package. The high financial contribution allows the insurance to have a benefit package that permits beneficiaries to receive timely care and increased choices in different providers compared to those using iCHF (Figure 15, R1).

"If you look at the NHIF you can be treated anywhere, and its scope is huge and with many services. CHF itself has some restrictions because even its contribution is 30,000/= Tzs [12.93 USD] per year for one household with six people, so taking that amount is about 5000 Tzs [2.16 USD] per person per year, which is not enough to treat a person in a year. So NHIF benefits a lot even though it is expensive" (Stakeholder 5).

However, the scope of benefit entitlement are dependent on the financial viability of the insurance fund, which is dependent on the cost of services beneficiaries are utilizing (Figure 15, R1). Participants observed that cost containment measures such as gatekeeping and restrictions on the benefits package, has decreased some beneficiaries' perception of the quality of care using the insurance.

*"No one should be subjected to restrictions when it comes to receiving service. The aim is to protect the insurance scheme from people doing forgery that is accepted, but no one should be limited to receiving the service. At first, the situation was good but we are starting to see signs that raise concerns for example the way we have started to be told not to get sick more than 3 times in a month. This has begun to cast doubts" (*Stakeholder 9*).*

The quality of care using health insurance is closely tied to access to needed services. One crucial element affecting beneficiaries' perceived quality of care under the insurance is the availability of drugs in facilities- a major challenge in facilities (Figure 15, R2). To mitigate the frequent drug stock out in facilities, NHIF has expanded the number of private pharmacies that are accredited with the organization. However, beneficiaries' ability to receive medication is still contingent upon the availability of such pharmacies in their local area. For those in rural areas where these outlets are scarce, they may have to contend with long distances and high travel costs to reach towns with more providers.

"Another thing you find someone has been prescribed medication and we don't have. We filled out a form for him so he can get the medicines from a drug shop but they are complaining it cost them time or fare and sometimes one can go to more than one drug store" (Stakeholder 7).

Another crucial mechanism influencing the quality of care using the health insurance is beneficiaries' understanding of their benefit entitlements (Figure 15, B1). Participants suggested NHIF providing clear information to beneficiaries about their entitlements can improve their comprehension of the insurance program, and the health insurance could do more to educate its beneficiaries.

"We are requesting when your patients come to join the insurance I do not know what kind of agents they will use but they should tell them if you join this package it covers 1, 2, 3 and does not cover 1, 2, 3… be open. If you can't help us, give us the leaflets so that when a patient comes to shout at me I give him a leaflet" (Stakeholder 13).

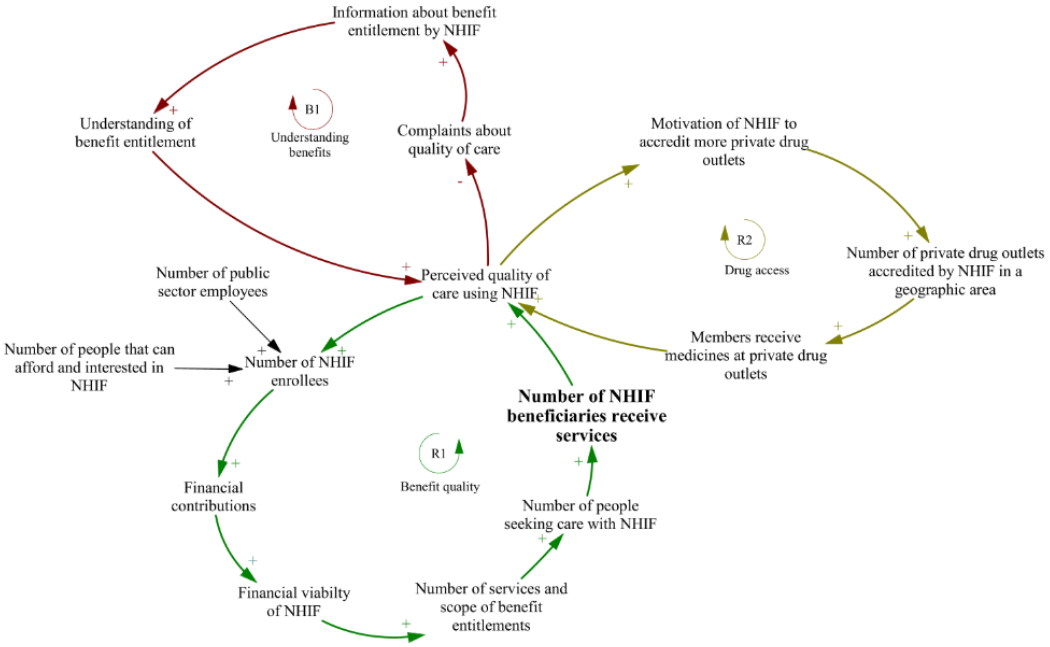

Figure 15: Mechanisms in which NHIF influences beneficiaries receiving services using the insurance

Figure 16 presents mechanisms of NHIF's role in where beneficiaries seek care. Beneficiaries' perception of quality of care at a specific facility determines whether they seek care there. Their perception of quality of care at a facility is influenced by the quality of infrastructure (Figure 16, R3), and the number and skill mix of health workers which depends on and reallocation of health workers to other facilities (Figure 16, B2) and the recruitment of competent health workers (Figure 16, B3), which is dependent on government budget. The perception that higher-level facilities have a high quality of care because of the number of specialists, better infrastructure and sufficient medical commodities has led (Figure 16, R4) to increased demand for services at these facilities than lower-level health facilities (dispensaries and health centers).

"If you look at the influx of fund members going to the higher level hospitals, one of the main reasons is my prospect of getting care I will get in bigger facilities than the lower centers. One of the reasons is infrastructure, medical equipment and access to medicine. At higher levels, there are enough specialists in various areas, diagnostic equipment is available, service delivery facilities are available, and medicines are available. So, comparing high and low levels in terms of health insurance members the biggest influx is at the higher because, whatever s/he expects, s/he is going to it there" (Stakeholder 25).

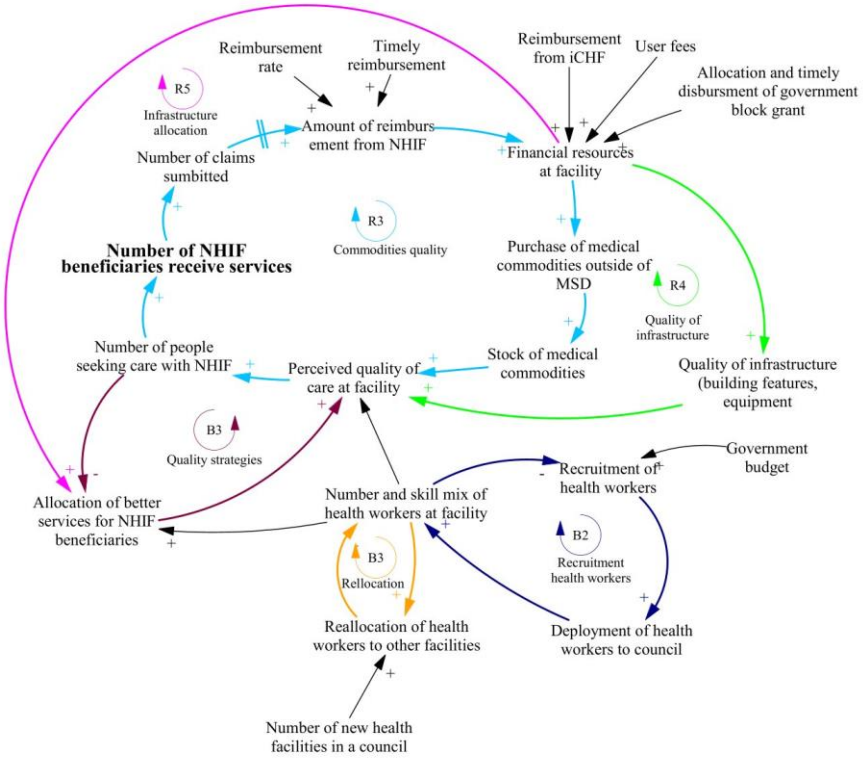

Figure 16: The role of NHIF in beneficiaries' care seeking

To increase the number of beneficiaries seeking care at their facilities, providers have created different strategies to allocate better services to them in order to improve their perception of the quality of care at their facilities (Figure 16, B4). These strategies include short waiting times, better facility infrastructure, and dedicated staff for members.

"NHIF members like to be treated as special. Luckily, the old labor ward building was not used so we decided to have a certain team of staff who will be serving the NHIF members. We relocated them to that building. So, when NHIF member comes he/she has to go to that building." (Stakeholder 9).

However, facilities' ability to allocate better services for members depends on their financial resources. Hence, facilities with more staff and financial resources enable them to direct some of these resources to NHIF beneficiaries and attract them.

Domain II: NHIF's role in improving service provision capacity

The mechanisms that result in the changes in the supply of services are shown in figures 17, 18 and 19. Figure 17 shows the role of NHIF in improving the structural capacity of facilities. The 'NHIF reimbursement' loop (Figure 17, R6) is a virtuous cycle of growing action where facilities obtain reimbursement from NHIF for the services, which increases their financial resources to purchase medical commodities and improve the quality of their infrastructure through rehabilitation (Figure 17, R7) and increase their capacity to deliver services. This revenue from NHIF is crucial as they face challenges with their other sources of funding, such as irregularity of government block grants, low

user fees, and low reimbursement rates from iCHF. According to NHIF guidelines, facilities are required to allocate a percentage of their reimbursement towards rehabilitation, medicines and medical supplies to enhance their capacity to deliver services. The ability of facilities to use NHIF revenue to purchase medicines and medical supplies outside of the government's medical stores department (MSD) is critical, as frequent drug stock-out is a major challenge. However, delays in reimbursement, a common problem, disrupt providers' ability to procure medical commodities necessary for service delivery.

"The last payment I did a thorough follow up because the delay was too much. They say if you file a claim we should be paid within three months but that was over that time. Now when the delay is too much you start failing to buy medicines and reagents on time" (Stakeholder 9).

Facilities' capacity to provide services is also dependent on the number and skill mix of health workers at the facility which is dependent on deployment of health workers (Figure 17, B2) and relocation of health workers (Figure 17, B4).

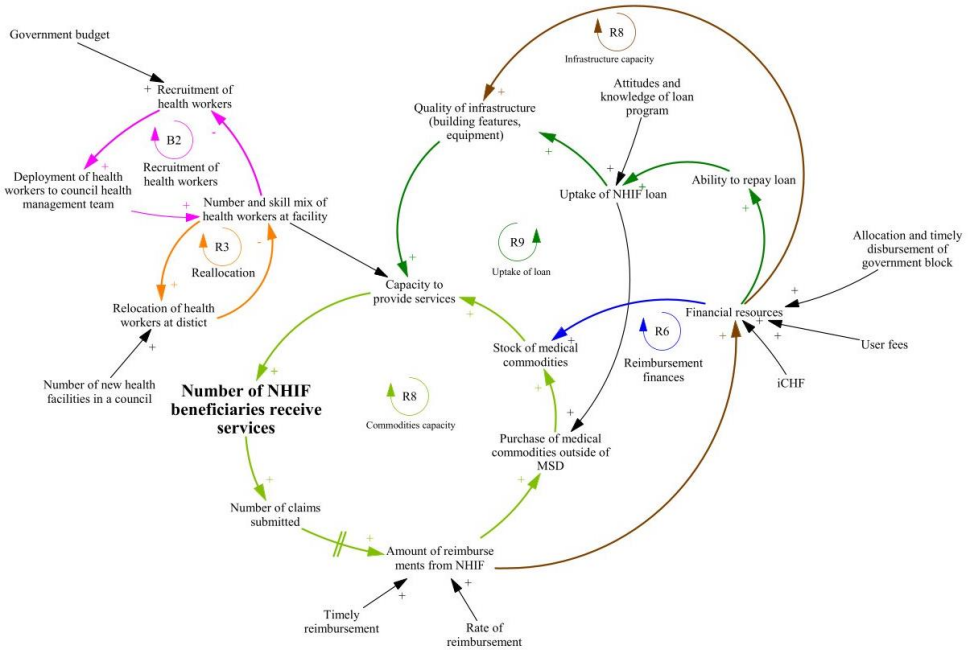

Figure 17: The mechanisms in which NHIF changes the structural capacity of providers

The NHIF has also established a loan program to help providers improve their infrastructure (Figure 17, R9) and procure medical commodities, which is another mechanism to enhance their capacity. However, the uptake of the loan program has been low, especially among public facilities, due to poor knowledge and attitudes towards the loan and financial resources. Despite this, larger hospitals with greater financial resources have been able to take advantage of the program to expand their facilities and purchase new equipment, which has boosted their capacity to deliver services. Overall, while the loan program has the potential to provide critical support to facilities, there is a need for increased

awareness and access to information about the program, particularly among smaller facilities with limited financial resources.

Figure 18 presents detailed mechanisms in the role of NHIF in the stock of medicines at facilities. Facilities having sufficient stock of medicines decreases the need to issue referral reforms to drug outlets, which allows them to earn higher reimbursement from NHIF (Figure 18, R9). The opportunity to gain more resources from NHIF through beneficiaries receiving medicines directly from facilities creates two actions. One action is developing strategies to improve stock of medicines at facilities to decrease issuance of referral reforms to private pharmacies (Figure 18, B4).

"Right now, we are improving further by making sure they [NHIF beneficiaries] get medication. In the past, when certain drugs are out of stock you fill out a 2C form [referral form] and he is supposed to go and get the drug from a drug shop. Now the challenge that came up, the drug shop that was providing this service stopped providing that service. But also, it was challenging for customers to go to town just to pick one item. So, we started tracking how many 2C forms were given out per month. Why is that so? So, we look at the things that are missing and make sure *they exist…so that has improved a lot"* (Stakeholder 12).

The second action is reserving drugs for NHIF beneficiaries who, through their use of services, enables providers to gain more financial resources (Figure 18, B5).

"At times there are medicines put aside for NHIF clients because they are so committed to us. We do not have bad intention but because of the commitment that the NHIF shows" (Stakeholder 23).

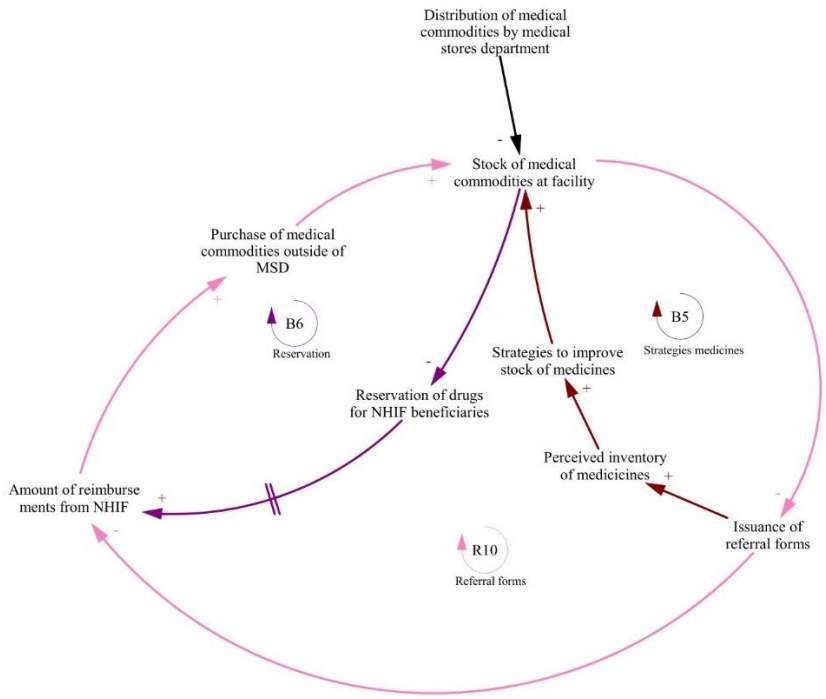

Figure 18: Mechanisms in which influences the stock of medicines at facilities

Figure 19 shows the other avenues in which NHIF influences facilities in the service provision for its beneficiaries. The bonus motivation loop (Figure 19, R11) is a virtuous cycle of growing action where bonus payments from NHIF reimbursements increase health worker motivation to exert effort in serving NHIF clients. However, health worker motivation to serve NHIF clients is sustained by timely claims reimbursement.

A patient without health insurance pays on the spot and you can deposit to the account and do anything with it but with NHIF, it takes up to three months to be paid. With this delay, it holds you back to use the money while you have used drugs and even reagents. The staff who do that work are not motivated… the delays demoralize them" (Stakeholder 7).

The amount of NHIF reimbursement providers receive also motivates them to serve NHIF beneficiaries and develop strategies to allocate better services to them (Figure 19, R12).

"The portfolio of the fund has been a major source of revenue for the respective facilities. In that sense, the facilities are always looking for ways to improve the service for the fund members to protect this portfolio, which provides huge revenue to the facility. For example, others have reached a stage that fund members get a separate area in order to access the services. This is to improve the service for the fund members in order to protect the group that brings huge revenue to the facilities" (Stakeholder 25).

The choice loop is another virtuous cycle of growth (Figure 19, R13) where NHIF members having choices in provider selection create competition among providers. This competition then stimulates facilities to create strategies to allocate better services to beneficiaries and increase their perception of their quality in order to attract them. Again, facilities' ability to develop these strategies is dependent on their overall capacity to provide services.

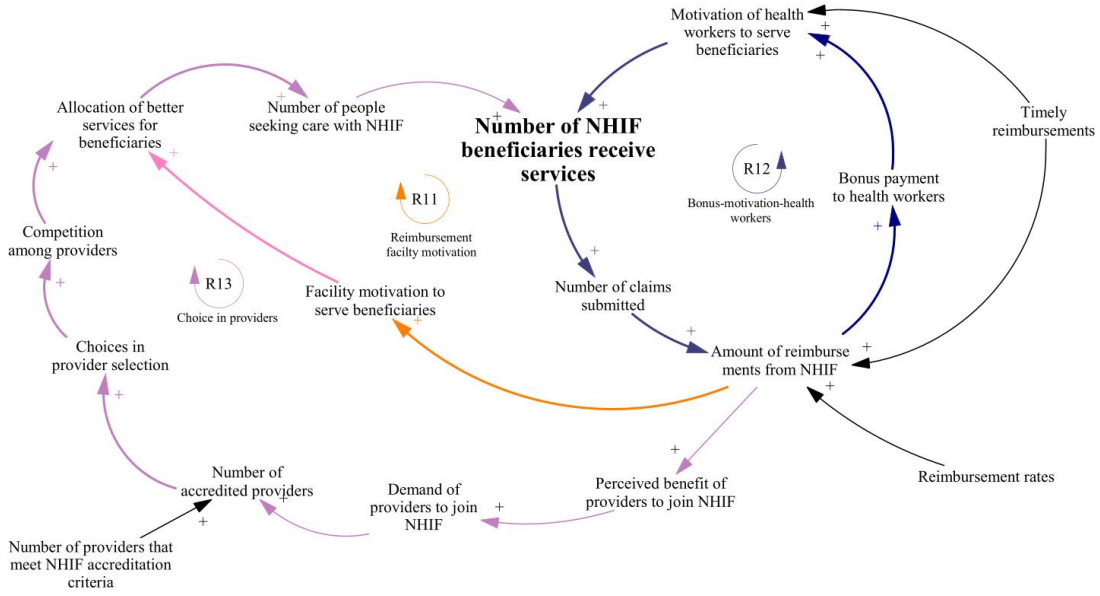

Figure 19: Further mechanisms in which NHIF influences service provision for its beneficiaries

Domain III: NHIF's role in the governance for improving service coverage and quality of care

The mechanisms that NHIF plays in the governance for improving service coverage and quality of care are presented in figures 20 and 21. Figure 20 shows a crucial pathway to improve the quality of care by providers, which is through financial incentives for full reimbursement by adhering to the Ministry of Health's standard treatment guidelines for treatment and prescription of medicines (Figure 20, B6).

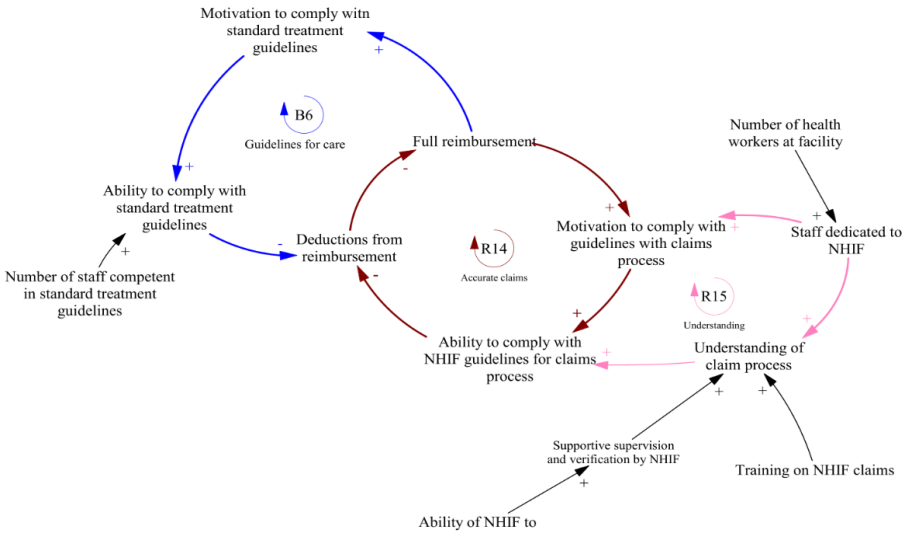

Figure 20: Mechanisms in which NHIF ensures adherence to guidelines and impact quality of services

Before NHIF can receive information about the services facilities provided, providers must submit claims. The 'accurate claims' loop illustrates a virtuous cycle of growing action where health workers' ability to comply with NHIF guidelines for accurate claims decreases deductions from reimbursement to receive full reimbursement (Figure 20, R13). However, this cycle is sustained by health workers' understanding of the claims process and having staff dedicated to NHIF claims process who are trained in the claim process by NHIF (Figure 20, R14). Health workers' understanding of the claims process is also increased during continuous supportive supervision, which is determined by NHIF's ability to supervise.

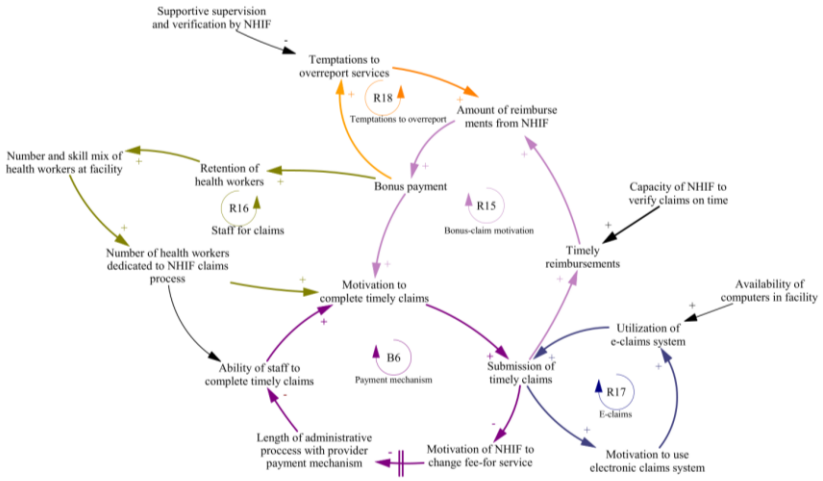

Figure 21: NHIF governance structures for monitoring service provision

The 'bonus claims-motivation' loop (Figure 21, R15) is a virtuous cycle where bonus payments to health workers motivate them to complete claims on time for timely reimbursement, which also depends on the capacity of NHIF to verify claims on time. The claims process at facilities is considerably time-consuming and encompasses different administrative steps, so to enable timely claims, facilities need to have adequate health workers to allocate some to the claims process (Figure 21, R16).

"For us the task becomes difficult because it depends on the facility staff. We have to process claims and then send claims at the same time we have other responsibilities to perform. We don't earn a lot of money to allow us to hire other people to process the claims. For small health facilities like us, it is difficult. For example, I process claims but still I have other responsibilities, which are my main responsibilities that put me here and that is to provide care to patients." (Health facility stakeholder 21).

The health insurance has introduced an electronic claims system to reduce the burden of the claims process and increase timely submission (Figure 21, R17). However, this cycle can only be initiated and sustained through the availability of computers at the facility.

"There was a time we complained we do not have computers to use when we want to fill the forms. So they (NHIF) gave one computer to us and they installed the system for us. It has helped us to find out if a client is active but also we use it to fill patient information and the service one [patient] received" (Stakeholder 23).

The 'payment mechanism' loop (Figure 21, B7) is a balancing cycle of stabilizing behavior whereby health workers' ability to complete claims on time is dependent on the administrative process with the fee-for-service payment mechanism that requires detailed information on services provided. The tedious claims process and its negative influence on timely submission have motivated NHIF to consider moving to other payment mechanisms, such as capitation.

"As we add members, we are looking at the possibility of doing a mixed kind of payment mechanism, perhaps a capitation mechanism, which can be used for primary level centers to ensure that it reduces the long chain of involvement. Capitation is going to be similar to the budget that you have. It means it will be according to the catchment area of the population of the respective area and the facility will be given a specific rate. It doesn't involve a long process like the fee for service system" (Stakeholder 29).

The bonus payment from NHIF can tempt health workers to over-report services they provided, particularly with the fee-payment mechanism, and receive more reimbursement from NHIF (Figure 21, R18). However, close monitoring and verification by NHIF coordinators can mitigate this challenge.

"There are some people who lie. They may say they are offering certain services but they do not. Through supervision, they follow up (Stakeholder 30)."

9.5 Discussion

The aim of this paper was to understand the role of Tanzania's NHIF in service coverage and quality of care at primary care facilities by using CLDs. The use of CLDs helped to understand the pathways in which the system (beneficiaries and providers) responds to the health insurance and how their feedback affects service coverage and quality of care overtime.

On the beneficiaries/demand side, we observed that in the CLD, beneficiaries' ability to receive services under the insurance is a critical leverage point (Loop R1) for service coverage and perceived quality of care in using the health insurance. Beneficiaries had a higher perception of quality of care using NHIF due to its comprehensive benefit package, especially also when compared to the iCHF, the insurance for the informal sector. Whereas NHIF includes the private health sector to alleviate the challenges in public health facilities, iCHF does not, and its beneficiaries are restricted to primary and secondary health facilities in the region they registered for the health insurance. With ongoing discussions to have a merger of schemes under the single national health insurance, the interests of those benefiting from NHIF need to be managed carefully as examples from Indonesia, Thailand, and Turkey have shown the critical role of public sector employees in the establishment of a single national health insurance (Bazyar et al., 2021b).

The study findings also underscore the importance of the initial benefit package designs by health insurance schemes on quality of care. The recent cost containment measures through restrictions on the benefit package is perceived to have affected individuals' access to care and quality of care using the health insurance. Quantitative studies from the United States and Taiwan found that demand strategies such as cost-sharing reduced utilization for essential medicines ultimately had adverse consequences (Liu and Romeis, 2004, Chandra et al., 2021). The predicament of NHIF's financial sustainability is a lesson for other countries in SSA that are considering implementing national health insurance schemes to be cautious in designing their benefit packages as it can disrupt the virtuous cycle of perceived quality of care and long-term consequences of reduced uptake by voluntary

members. It may be better to increase and expand benefits than impose restrictions in the future (Ochalek et al., 2018, World Health Organization, 2021).

Individuals' perceived quality of care with using the health insurance was also dependent on whether they received services from NHIF providers in their geographical location. Since the study period, the insurance have ceased urban health facilities from issuing prescription forms to private pharmacies to motivate them in ensuring adequate stock of medical commodities. This will ensure that health facilities particularly those in the public sector gain full reimbursement and the insurance does not reimburse private pharmacies who have higher payment rates. More importantly, the unequal distribution of private pharmacies and hospitals in rural areas have limited access to NHIF benefits for rural populations, leading to disparities in accessing high-quality care. The benefit design not covering transportation for referrals or the coordination of referrals by providers in rural areas was reported by participants to deter individuals from accessing care at higher levels of care or incurring higher indirect medical costs. This finding is consistent with studies from Ghana, Malawi, and Uganda, which reported that even after new financial protection policies to increase coverage, transport cost was still a barrier to accessing care for rural populations (Aikins et al., 2021, Abiiro et al., 2014, Kakama et al., 2020). To improve integrated continuum care for those in rural areas, NHIF could incentivize lower-level health facilities appropriately to coordinate referrals to higher levels of care or other service providers (Tsiachristas, 2016).

Beneficiaries' perceived quality of care at health facilities (Loop R4) is also another critical advantage point for improving quality of care. The perception that lower levels of care-primary care facilities have poor quality of care due to drug shortages, limited infrastructure and workforce, have led to bypassing these facilities to higher levels of care. Hence, their participation in the health insurance is lower than higher-levels of care and do not have the opportunity to receive reimbursements and have adequate inputs for quality of care. A quantitative analysis of the 2016 claims data found that five hospitals in Dar es Salaam, the capital city of Tanzania, accounted for 30% of the total claims (Durizzo et al., 2022). The potential unforeseen consequence of higher-level facilities benefiting more from the insurance may perpetuate the issue of bypassing lower levels of care.

Additionally, the intention to improve beneficiaries' perceived quality of care and increase their utilization have created unintended consequences by skewing aspects of facility resources for insured groups rather than the entire population. Already, findings from our study and others in Tanzania have found that public health facilities struggle with high-quality facility infrastructure and physical environment and need to address these to improve the quality of care for all (Renggli et al., 2019, Yahya and Mohamed, 2018, Solnes Miltenburg et al., 2018). Additionally, financial barriers are the main reason for low health insurance uptake, and the least poor are more likely to enroll in health insurance, particularly NHIF (Umeh, 2018, Amu et al., 2022). Further, given that public health facilities and NHIF receive public subsidies (Mtei et al., 2012), investments in infrastructure targeting NHIF members could drive inequities in health care benefits. Furthermore, although NHIF has differential premium rates, according to the study findings, the scheme is still expensive for many Tanzanians,

and most vulnerable groups cannot afford it. Alternatively, those in the informal sector can enroll in iCHF; however, our findings and others suggest that the scope of services and benefits from iCHF are unequal to NHIF (Osei Afriyie et al., 2021, Mselle et al., 2022).

The findings also identified that reimbursement delays could undermine virtuous cycles to improve quality of care. As the other funding sources are irregular and insufficient, timely NHIF reimbursement is crucial for budgeted medicines, medical consumables, and other essentials health facilities have planned to purchase. To reduce delays, NHIF has introduced a digital claims management system, but not all health providers have yet to implement the system. NHIF could support more providers to introduce the new electronic system to improve the efficiency of claims submissions and reduce deductions in NHIF transfers due to errors in claims completion. Another inhibiting factor for delays is the fee-for-service payment mechanism. The findings from this study and others show that fee-for-service is cumbersome administratively, especially for primary healthcare facilities.(Lee, 2018, Ikegami, 2015) There have been discussions for years to introduce new provider payments such as capitation and global budgets, but NHIF has yet to implement them. Upcoming reforms on the provider payment system could introduce capitation through a pilot phase in selected districts before a national rollout (Andoh-Adjei et al., 2018). The administrative processes of NHIF must be streamlined and highly functional to support the single national health insurance that is anticipating more Tanzanians to enroll in health insurance.

While the findings of this study contribute to the understanding of NHIF's role in service coverage and quality of care, there are several limitations. One, we did not include NHIF beneficiaries outside of the health system. As majority of the stakeholders we included were public sector employees, they are also mandatory members of the insurance and their perspectives may be different from voluntary members who are outside of the public health system. Their views may have been useful in gaining a deeper understanding of NHIF's role in service coverage and quality of care. Second, the generalizability of the findings to represent the role of NHIF in service coverage and quality of care among other providers (private providers and high-level public facilities). Due to limited resources, the study included mostly public providers, as there are the majority in the country. In addition, high-level facilities were excluded, as there are differences in the benefit package for these facilities and primary health care facilities, which is the greater share of health facilities in the health system.

9.6 Conclusion

The results presented here suggest that the NHIF has great potential to improve access to services and quality of care. However, in order to have these positive impacts, the NHIF might benefit from improving its reimbursement administrative processes and revising the design of its incentives to providers to ensure all health facilities benefit from the scheme. In addition, the NHIF may have to reexamine its gatekeeping measures to ensure that these mechanisms to reduce overuse and contain budgets do not reduce health. Addressing these challenges will be crucial as NHIF positions itself to

lead the country's single national health insurance to provide access to high-quality care for all Tanzanians.

Chapter 10 Discussion

10.1 Summary of findings

The evidence presented in this thesis strongly highlights the growing popularity of health insurance as a health financing mechanism in LMICs to move closer to UHC. According to the WHO, UHC means that all people have access to high quality health services without financial hardship. Earlier evidence before this thesis suggested that health insurance programs increase health service utilization (Spaan et al., 2012a, Comfort et al., 2013a, Docrat et al., 2020a, Escobar et al., 2011) and may improve financial protection to some extent (Spaan et al., 2012a, Ekman, 2004, Habib et al., 2016, El-Sayed et al., 2018). Prior to this thesis, there was little evidence on the relationship between health insurance and quality of care in LMICs. Furthermore, there was also very little systematic evidence on inequities in uptake of health insurance in LMICs or the effects of insurance on quality of care in LMICs. The evidence in the literature showed that health insurance is associated with improved health status (Erlangga et al., 2019) but not linked to patient satisfaction (Devadasan et al., 2011b), a critical aspect of quality of care. Furthermore, studies from Ghana and India have alluded to the influence of the service delivery design on the implementation of health insurance programs for access to quality services (Fiestas Navarrete et al., 2019, Devadasan et al., 2011a). However, few studies have carefully examined the health system context and purchasing arrangements (benefit package, selection of providers, provider payment mechanisms, and governance for purchasing) by health insurance programs that could influence the quality of care.

The broad goal of the research presented here was to examine health insurance and quality of care in LMICs guided by frameworks for quality of care with case studies in Tanzania and Zambia to understand the implementation of their national health insurance programs.

The first two sections of the thesis examined evidence on equitable insurance enrollment and the effects of health insurance on the quality of care. In chapter 3, we found that, on average, vulnerable populations (the poorest and least educated groups) are less likely to enroll in health insurance than better-off groups despite exemptions and subsidization policies by governments and health insurance agencies to increase uptake among these groups. Only one health insurance program in Colombia that relied on the existing social security database reported higher enrollment among vulnerable groups. While the findings of the review may seem obvious, it fills an important gap in the literature and contributes to the equity debates surrounding the scale-up of health insurance in LMICs. Additionally, equity is an important dimension of quality of care (Kruk et al., 2018a, Institute of Medicine Committee on Quality of Health Care in, 2001). In chapter 4, using the Donabedian quality of care model, we found few studies that used rigorous study designs or evaluated the effects of health insurance on structural inputs and processes of care. The evidence from these studies indicates that health insurance is not associated (positively or negatively) with structural quality, and its effects on processes of care remain

mixed. In regards to the outcome dimension, the evidence suggests health insurance is linked to improved anthropometric measures for children and biomarkers such as blood pressure and hemoglobin levels. We suspect, therefore, that the improvements in health outcomes from health insurance were driven mainly by increases in access to care rather improvements in quality.

In the subsequent chapters, I examined the implementation of health insurance programs in Tanzania and Zambia and their ability to influence the quality of care. Chapters 5 and 6 assessed the health system factors in Zambia that could affect its national health insurance, which offers only hospital services from providers in the public and private sectors. The results in chapter 5 showed that in Lusaka, most adult patients do not use primary care facilities for non-emergency care and heavily rely on pharmacies and drug shops. In chapter 6, we show that among the informal sector population, confidence in the care provided by the public sector is low compared to confidence in the private sector. Confidence in the health system was found to be a significant determinant of health insurance uptake. While, confidence in the public sector was only weakly associated with enrollment, confidence in the private was strongly associated. To the best of my knowledge, this is the first study that has assessed confidence in the health system and insurance enrollment in Zambia. Recent discussions on social media suggest that many are satisfied with the inclusion of the private sector and the wide accessibility of the health insurance to various providers. In chapter 7, we showed how some of the challenges within the health system could affect the insurance's ability to influence the quality of care. The challenges include the low public funding for health that has deteriorated the quality of care, particularly at primary healthcare levels. Moreover, weak regulations on health professionals, medicines, and health facilities have also contributed to poor-quality inputs.

The findings in chapter 7 also shed light on the purchasing arrangements of the Zambia NHI that can influence the quality of care. The health insurance attempted to mitigate some of the challenges in the health system by providing public hospitals with advanced payments for the procurement of medicines and minor renovations. While this may improve some structural inputs for quality of care, the revenue from insurance may not be sufficient for prepaying larger infrastructure projects for hospitals, and they may still require government support through other financing mechanisms. Another finding was that the design to improve the care experiences of members, through short waiting periods and designated services, might not be equitable and unsustainable as coverage increases.

However, the purchasing arrangements of the insurance may also have negative implications for high-quality care. First, the current referral policy does not promote coordination between the public and private sectors. This decreases the opportunities for integration to ensure the continuum of care. Second, the provisional benefits may not be equitably distributed geographically as the rural areas have fewer private providers and higher-level hospitals than urban areas. The inclusion of private providers was intended to mitigate the challenges in the public sector, but it may further exacerbate the pro-urban pattern of the distribution of health benefits. Third, not all facilities included in the health insurance, particularly those in the public sector, met the quality criteria set by the insurance, thus compromising access to benefits and quality. However, this could create a path dependency where public facilities may not be motivated to uphold the same quality standards as the private sector. Fourth, its supervision

and accreditation checklists are heavily focused on structural indicators, and the only dimension of processes of care is care experiences, neglecting other components of quality of care that could assess the quality of care. Fifth, the limited resources in health facilities and the incentive by the health insurance for providers to improve the care experiences of its members may jeopardize the care experiences of the uninsured who are often the poorest populations. Finally, the low payment rates for first-level hospitals, the bottom of the insurance service delivery system, may create incentives for unnecessary referrals to high levels of care and may worsen the bypassing challenges.

While Tanzania has many years of experience implementing its national health insurance scheme, we found that the country faces similar challenges to those that Zambia faces in the design phase of its health insurance scheme. In both countries, we found that delays in reimbursements are a significant burden that affects inputs for quality of care. Some of the contributing factors for the delays are lack of competent staff for claims process and mechanisms for claims processes-electronic vs. paper-based. We also found that higher-level health facilities benefit more from health insurance due to members' preferences for higher levels of care. There is also a strong focus on improving members' care experiences through an extensive selection of public and private providers, but its benefits are distributed inequitably across geographical areas. Similar to in Zambia, health insurance in Tanzania has improved access to high-cost services. However, unlike Zambia, Tanzania's NHIF payment mechanism has incentivized adherence to the national clinical guideline by reimbursing only treatments that follow guidelines. However, the reduction in NHIF benefit entitlements over the years has dissatisfied its beneficiaries. Although the NHIF had its challenges, the quality of services and benefits are perceived to be much better than the improved community health fund (iCHF), which targets the informal sector. In chapter 8, we found that the low perception of iCHF was due to governance factors, such as the failure of the insurance design to support greater access to medicines and weak accountability of revenue generated from premiums.

The findings summarized above on the impact of health insurance reform in LMICs on the quality of care raises a number of important policy and research issues that are summarized below.

10.2 Policy implications of findings and recommendations

Health insurance may not be sufficient as a UHC goal for quality strategy

The research findings from this thesis suggest that health insurance programs can improve quality of care. NHI can contribute to improved quality care by integrating the public and private health sectors, incentivizing providers for evidence-based care and generating data from insurance claims to monitor quality. On the population side, health insurance can increase users' choices of providers, improve access to high-level and higher-quality facilities, and improve care experiences. However, there may also be negative consequences that corroborate the concerns raised by researchers, and countries that attempt to scale up insurance programs should carefully reexamine them as a means to UHC goals.

First, our research findings indicate that countries need to consider the equity implications of health insurance programs. The benefits of high-quality care may be skewed towards the better-off individuals

who are more likely to enroll in health insurance, which goes against UHC goals. This disparity may exacerbate the existing socioeconomic inequalities in the quality of services (Haemmerli et al., 2021, Fink et al., 2021, Nunes et al., 2014, Arsenault et al., 2018). Furthermore, if countries are not careful, public providers may be incentivized to use more public resources meant for insured and uninsured populations on insurance beneficiaries that they perceive as vital for their financial sustainability. Another equity challenge is the rural-urban differences in accessing high-level facilities and private providers included in the health insurance to compensate for the challenges in public health facilities. Similar to Tanzania and Zambia, urban areas in many LMICs, have more choices in different public providers than rural areas (Ouma et al., 2018, Carrasco-Escobar et al., 2020). Due to market demand, urban areas also have more private health providers and pharmacies. Therefore, those in urban areas may have increased choices in provider selection and perhaps higher-quality providers than those in rural areas. Individuals in rural areas may have to decide on the cost of time or transportation to these health facilities unless insurance programs consider reimbursing transportation costs or reducing the contributions to the program for those in rural areas.

Second, the quality challenges in the health system may be too enormous for even a well-designed insurance program to overcome. In many LMICs, the Ministry of Health or another agency outside of health is responsible for regulating and procuring human resources, essential medicines, and equipment (Sheikh et al., 2013, Sheikh et al., 2015), and their reforms are out of the control of health insurance agencies. For example, in Ghana, despite implementing its national health insurance for many years, out-of-pocket health expenditure is still very high and the poor quality of care has been shown to be a contributing factor (Agyepong and Adjei, 2008, Kotoh et al., 2018c). While Tanzania and Zambia have addressed drug shortages by including private pharmacies, this solution may not be efficient as the tariffs for the private sector are higher than the public sector. Consequently, for health insurance to effectively influence the quality of care, it must rely on a health system with high-quality investments. In the next section, the factors that countries need to consider before implementing health insurance as a strategy for UHC are presented. These factors are recommended with the acknowledgment that there is no single pathway for optimally using health insurance as a UHC strategy, and countries are different with specific political, economic, and health system contexts that shape their policies. Furthermore, health insurance programs are distinct in their design features and have different contexts. However, based on the findings, there are systemic issues that countries need to consider if they intend to use health insurance as a strategy to achieve equitable access to high-quality care.

Factors to consider before adopting health insurance for access to equitable quality health services

Before a country embarks on the journey to adopt health insurance as a policy for UHC, it needs to consider addressing some of the governance and health financing challenges documented in this thesis, as well as the recent literature on strategic purchasing arrangements and quality of care (World Health Organization, 2022, Prinja et al., 2023).

First, based on the findings in chapters 7 and 9, where we found that despite insurance, health facilities are still struggling with inadequate financial resources for quality inputs such as drugs and equipment,

countries may need increased government health spending to ameliorate the quality of care and health outcomes. Evidence has shown that increased government expenditures in health systems and improvements in quality are associated with reduced mortality (Chireshe and Ocran, 2020, Bokhari et al., 2007). Although countries have signed commitments to increase funding for health, such as the Abuja target of allocating 15% of the government budget to health, most have yet to achieve these goals. In many countries, the health sector receives the largest share of the government budget besides debt repayments and education (Behera and Dash, 2019). Furthermore, the recent COVID-19 pandemic has exacerbated macroeconomic conditions diverting public resources to debt repayments and decreasing overall government spending (Federspiel et al., 2022). Ultimately, increasing government funding for health would require leaders to make an intentional, political, and ethical decision to use tax revenues to ensure that its poorest populations have equal access to quality services as the elite. The question then is how to convince governments to increase spending on health.

Second, another crucial factor is the better use of existing resources. In Zambia and Tanzania, the findings show that although health insurance may increase financial resources in health facilities, it is not sufficient for health facilities to close the gaps for quality inputs due to the irregularity of government grants from the Ministry of Finance. The unpredictability of resources has been shown to stem from the public financial management system-'institutions, policies, and processes that govern the use of public funds that are not aligned with health financing priorities' (Cashin et al., 2017). A strong public financing management system with predictable budget allocations and timely execution of budget can ensure that resources reach health facilities as intended (Kristensen et al., 2019). Corruption practices such as informal payments, theft of drugs and supplies, inappropriate procurement, and diversion of patients to private health facilities may also contribute to inefficiencies (Onwujekwe et al., 2019, Pieterse and Lodge, 2015). If these persisting governance issues are not confronted or mitigated, the same challenges may materialize in a new health insurance, which intends to raise additional resources for the sector. For example in Zambia, there have been numerous reports of mismanagement of funds in the health system, and within less than four years of operation, similar issues have been reported at its health insurance agency. Inefficiencies can also arise from the allocation of public spending to non-priority services. Similar to our findings in Zambia, it has been shown in other LMICs that hospitals and specialized care receive more from government health expenditure neglecting primary health care (PHC) services that are grossly constrained by drug shortages, limited staff, low-quality diagnostics and infrastructure (Hanson et al., 2022). Meanwhile, with the double burden of NCDs and communicable diseases (CDs), PHC is viewed as an efficient and equitable platform to prevent their risk factors, coordinate the long-term management of chronic conditions and even manage some of the CDs (Hanson et al., 2022). However, introducing health insurance without carefully addressing the misallocation of funds to PHC may further neglect the funding of preventive services and underserved populations.

Third, countries need to reflect on the design of their service delivery and its unintended effects on a health insurance program. Achieving this goal requires leadership at all levels and health agencies to share the same vision for equitable quality (Kruk et al., 2018a). Health services designed based on

geographical access rather than health needs would be challenging for inequitable access to health insurance benefits. Furthermore, high-quality PHC can prevent and manage conditions at its level while delineating critical conditions to hospital care. This high quality PHC would require having sufficient quality inputs coupled with clinical quality. These investments in quality could potentially increase people's confidence, trust in the public sector, and deter them from bypassing to higher-levels of care and the private sector. In addition, an effective referral policy and the right balance of gatekeeping measures that integrate care at all levels of care are also critical in discouraging the overuse of unnecessary care at higher-level facilities (Greenfield et al., 2016).

Finally, a critical element to evaluate all these investments is high-quality data for quality measurement. In many countries, parallel information systems exist that are inefficient and not interoperable (Wagenaar et al., 2016). Health information systems and digital technologies that can track various quality of care dimensions are necessary. Another possible solution for data generation is to harness partnerships such as the health data collaborative to improve the availability and the quality of data to inform policies.

Addressing these issues could ensure that health system can propel health insurance to achieve its quality goals and potentially improve service utilization and financial protection (Fiestas Navarrete et al., 2019). The recommendations highlight the tremendous efforts countries must make within their health system without considering the other essential elements, such as macroeconomic and employment formality conditions necessary for health insurance. The question that emerges is how long countries should wait to have their health systems ready to implement an insurance program. Arguments can be made that it took Germany over 50 years to achieve 'universal health coverage'. However, it is critical to note the unique historical context of Germany or any other place used as a lesson. The German social health insurance began as a financial protection mechanism for a targeted group rather than as a policy to move closer to UHC. Countries must understand that the policy direction selected should be based on their desired outcomes and outputs and then design solutions suitable for their context.

Way forward for countries that have already adopted health insurance

The results presented in this thesis also show very strongly that implementation of already established health insurance programs still require major improvements for quality of care. Countries may consider initiating or continuing to make efforts to improve supply-side interventions mentioned above or use lessons learned from their previous health policies to guide reforms. All countries even those in high-income settings, such as Germany, and the UK (Majeed et al., 2018, Busse et al., 2017) have a long way to go in improving the quality of care. It is crucial to be flexible and use new evidence to guide and adapt the health system to support health insurance program. These countries with established insurance programs would need to consider the design features of insurance programs that can improve the quality of care based on the recommendations below.

First, in order to develop quality improvement strategies, it seems important for countries to adopt a comprehensive approach to monitoring quality of care in their accreditation and supervision tools by

considering broader quality dimensions. Accreditation tools and supervision checklists heavily focused on structural inputs can incentivize providers to prioritize these inputs that may not necessarily lead to a higher quality of care or health outcomes (Leslie et al., 2017b). Therefore, there should be efforts to include processes of care indicators, such as patient care experiences, safety and competent care, and clinical outcomes on accreditation and monitoring tools.

Second, as reimbursements from health insurance are critical for quality inputs, insurance authorities may need to consider making efforts to reduce reimbursement delays. Both insurance authorities and providers play a role in causing these delays. However, insurers can take leadership in adopting efficient tools for claims process and verification of claims to ensure accurate information and reduce delays.

Finally, countries could take advantage of the opportunity provided by claims data to monitor the quality of care and clinical outcomes. Large data generation is one of the positive effects of a health insurance program that includes both public and private providers. It may not only be important for detecting fraud and claim submission errors but as a complementary mechanism to monitor the quality of services and providers' behavior. Insurance management authorities may not have the capacity or the resources to undertake such an extensive evaluation of their claim, so providing the necessary access to researchers is crucial to ensure that claims data is used to its fullest potential.

10.3 Implications for research and recommendations

Balance of quality of care indicators to evaluate

To hold health systems accountable to its people, there may be a need to routinize the evaluation of health system performance through its impact on health and account for the quality of services provided. Routine data collection on health system performance can allow monitoring of changes over time and evaluate the impacts of different policy interventions on performance. The study on the effects of health insurance has reflected this need by the paucity of rigorous evidence on quality of care and the lack of a systematic approach to monitoring quality. Even for the outcomes of care dimension, the evaluation of insurance on patient-reported outcome measures, satisfaction with care, and confidence in the health system is limited in the literature. Evaluation of these outcome indicators is imperative as they are intrinsically valuable to patients and may drive service utilization and health insurance enrollment (Larson et al., 2019).

Evidence has shown that structural inputs of care, such as infrastructure, are not associated with clinical quality (Leslie et al., 2017b), and their presence alone is insufficient for high-quality care. It is thus also important to evaluate the impact of health insurance on other dimensions of quality care. Nevertheless, improving structural inputs seems to be one of the main objectives of health insurance agencies and governments, as was found in the thesis. Therefore, researchers should test the theory of change of insurers to assess whether health insurance has had any positive effects on health facilities.

Another crucial aspect in measuring quality of care that researchers may need to focus on is the impact of health insurance on the processes of care, which comprise experiences of care and the clinical quality of care. Measuring processes of care can be through direct observation, exit interviews or standardized

patients (Aujla et al., 2021). In Tanzania and Zambia, we found that they have designed their NHI to improve the care experiences of their members by reducing wait times and having better infrastructure. It will be crucial for researchers to evaluate the impact of health insurance on the experiences of care for both insured and uninsured populations. It is also essential to determine quantitatively whether the insured and uninsured receive the same quality of care as providers alluded to in our qualitative studies. Furthermore, increased evidence on clinical quality may draw the attention of health insurance agencies to develop strategies to incentivize their improvement.

Empirical studies: Robust study designs suitable for determining the effectiveness on health insurance and quality of care

Evaluation of the impact of health insurance on the quality of care needs rigorous studies that can accurately assess the causal effects. Randomized control trials (RCTs) are the ideal study designs for determining these effects. In high-income countries, well-known RCTs are the Oregon and Rand health insurance experiments, and studies from these experiments have been able to evaluate the quality of services accessed through the insurance (Aron-Dine et al., 2013, Baicker et al., 2013). In LMICs, similar experiments have been conducted in Nicaragua and the Philippines (Shimkhada et al., 2008b, Thornton et al., 2010). However, these RCTs targeted insurance for specific groups or included other quality improvement initiatives and may not be representative of national health insurance programs. Therefore, it limits the generalization of the findings of these experiments to the general population. The research findings demonstrated that the implementation of these insurance programs is complex, and their influence depends not only on their designs, but also on multiple other factors within the health system. Alternative, robust study designs that can adapt to the real-world settings of national health insurance programs are needed. Quasi-experimental or carefully designed randomized trials that account for the insurance rollout may accurately evaluate the impact of health insurance on quality.

In my own work, I found it beneficial to use qualitative studies that employ multiple sources, such as key-informant interviews and document reviews, to enhance understanding of the implementation of health insurance programs. To increase the ‘trustworthiness’ of research findings that use key informants for highly-sensitive topics such as national health insurance, which can be perceived as criticism of the government, researchers must build trust with the participants to ensure that the research reflects their lived experiences with the program or the context. Therefore, interviewers should possess both experiences in conducting qualitative interviews and authenticity that policymakers perceive as trustworthy. Researchers who work within the health system and have close collaborations with policymakers may be likely to be perceived as genuine or trustworthy (Koon et al., 2012).

More quality data sources for determining effects on structural quality and processes of care

Evaluating the effects of health insurance on structural inputs and processes of care requires data from carefully designed studies. One probable explanation for researchers focusing more on outcomes of care rather than on other aspects of quality indicators is because of the availability of such information in DHS (Demographic Health Survey) and MICS (Multiple Indicator Cluster Survey), which are publically accessible. Other surveys, which include structural and processes of care indicators such as Service

Provision Assessment (SPA) is from a few countries, and the Service Availability and Readiness Assessment (SARA) is not publicly available. Moving forward, there should be more initiatives to expand data generation to be able to hold insurance programs more accountable for their effects on health care quality.

Another key data source for assessing the quality of care by providers is insurance claims data. However, researchers can only use this data if health insurance agencies provide access. Anecdotal evidence suggests that researchers face challenges accessing even anonymized and aggregated forms of this data. This challenge is likely due to the need for insurers to protect the use of their data. Although the process is unclear, there needs to be open data to allow researchers to use this data as one of the tools to evaluate the quality of care. By working together, researchers and insurance agencies can identify ways to provide access to this data while protecting the privacy and security of patients and their data. Increased access to claims data would give researchers another valuable resource to monitor progress toward improving the quality of care.

Further work

Based on the current findings, future work might consider several areas. We discuss them below.

i. Equality in the quality of services and health insurance status

The qualitative findings presented in chapters 7 and 9 indicate that the insured populations may receive higher quality of care in terms of better care experiences. However, we need quantitative studies to corroborate these findings including the clinical quality they receive. Additionally, during the study periods in both countries, those in the higher-socioeconomic group and have social influence (public sector employees) were more likely to be in the enrolled in the health insurance. We know from other studies that poorer women receive worse antenatal care, and pay less for care (Fink et al., 2021, Sharma et al., 2017, Arsenault et al., 2018). However, there is little evidence about inequities in the quality of other types of health care. As Tanzania moves to a single health insurance, and Zambia expands its insurance to the poorest groups, it will be important to determine whether health insurance status could mediate the relationship between patients' socioeconomic status and the quality of services.

ii. Assessing health insurance on health care seeking

The findings from both countries suggest high rates of bypassing primary health care levels to higher-level providers. Health insurance agencies need to develop strategies to mitigate this bypassing. It would be interesting to assess whether health insurance is a driver of appropriate referral behavior and identify implementation strategies in which health insurance has facilitated effective gatekeeping behavior and identify the enabling factors. Additionally, it would be vital to determine which specific factors – e.g., demographics (socioeconomic status, area of residence, age) health conditions, and characteristics of health facilities near the insured patients are associated with care seeking at higher levels. Furthermore, if insured patients use primary health care, in which sector (public vs. private) are they more likely to utilize their services?

iii. Rural-urban differences in healthcare use and health expenditures

The findings suggest that based on the service delivery design in both countries, individuals with health insurance in rural areas may have fewer choices in seeking care. It is important to assess the differences in health service utilization between rural and urban populations. Moreover, it would be important to assess differences in unmet healthcare needs between these two populations.

iv. Political economy of establishing national health insurance in LMICs

The analysis conducted in both countries did not consider the political economy factors that could have influenced the establishment and design features of the health insurance programs. For example, in Zambia, the qualitative findings alluded to the political influence in the governance of the insurance authority. It would be vital to conduct further research on this issue. It would be interesting to know why Zambia selected a deduction of 1% contribution from employees despite its goal of using health insurance to increase additional resources for improving the quality of services. Additionally, it would be useful to understand the factors that propelled Zambia to establish its NHI at the specific period when its indicators for financial protection and service coverage were far better than the regional average and why it decided to focus on the formal sector rather than the informal sector in the early phase of the insurance implementation.

10.4 Personal reflections

The back and forth with health financing policies

During the historical review of health financing policies, I observed that the debates regarding the suitable mechanism to finance health in LMICs to improve access, coverage, and financial protection have been running for many decades. For example, the introduction of user fees and their removal from the current buzz of national health insurance and performance-based financing programs have all been contentious amongst policymakers and development partners. Politicians seeking elections with health experts and development partners pursuing UHC for its inherent value have driven these recent reforms toward UHC. Yet, while these reforms may have intrinsic benefits and have been successful in other parts of the world, their implementations in LMICs generally seem to have mixed results and concerns about sustainability and integration. The challenges raised by my research are not new. The factors impeding the success of previous and current health financing reforms have been consistently related to challenges in health system quality, such as drug supply systems, infrastructure quality, sufficient competent workforce, health information systems, and governance structures. I believe improving the quality of these existing structures should be highly prioritized, along with these complementary financing mechanisms. Ultimately, national governments would need to lead the work of health system quality. The question again is how governments can be held accountable to not only focus on visible reforms such as health insurance or the construction of new health centers across rural areas, but also on improvements that may not lead as directly to improved health outcomes. I believe there needs to be technical experts and researchers who are bold enough to use scientific evidence to guide politicians and advocate for quality improvements for all and not support reforms purely based on the interests of

political leaders. These quality improvements would require a long-term approach, and so it is therefore important for countries to have a long-term multilateral vision that does not deviate based on the political party in power.

Measuring quality: from whose perspective?

As an individual classically trained in the social sciences, I cannot conclude this thesis without discussing my positionality as a researcher, especially on the quality of care- a concept based on cultural values and expectations. Positionality is an integral component of qualitative research due to its interpretative nature. Researcher positionality is a reflexive statement by researchers to describe how their personal and theoretical beliefs and social context (social class, race, nationality, and previous career) can influence the research process and interpretations of their findings. I describe my positionality statement in the next paragraph.

I was born and raised in Ghana and moved to the United States in my mid-teens. The U.S. is also where I completed most of my studies. As a researcher, I am aware of the biases I bring due to my positionality as a cultural hybrid with my Ghanaian roots and American upbringing. I acknowledge that the conceptualization of quality of care for the thesis is from an American perspective by selecting two frameworks led by American researchers. However, I tried to be mindful of my privilege and attempt not to let my assumptions interfere with the research findings. In addition, other researchers in LMICs have also used these frameworks, and I believe the elements of these frameworks of evidence-based and safe care should be the inherent values of all health systems. My research is driven by the belief that high-quality care should not only be accessible to the few elites who can afford big hospitals or even travel outside to high-income countries to seek better care. Acknowledging my positionality related to the quality of care helps to clarify my theoretical lens and the interpretation of the research findings.

10.5 Conclusion

The research conducted in this thesis intended to contribute to a better understanding of the implementation of health insurance and the quality of care-a critical dimension of UHC. This thesis provided evidence on equity and quality of care within health insurance programs in LMICs. Despite the efforts by governments, health insurance programs are not reaching the targeted underserved populations and are predominantly supporting better-off population groups. Additionally, the systematic review of the impact of health insurance on the quality of care revealed that health insurance schemes in low-income settings appear not to affect the quality of care. If health insurance programs expect to provide additional resources to address quality of care challenges, our findings indicate they do not do so. Furthermore, if health insurance programs were designed to change providers' behavior to improve processes of care, the results show there is little impact.

The research in Tanzania and Zambia scrutinizes their health system contexts to reveal implications on the insurance's ability to influence the quality of care. Challenges, such as bypassing the primary health care level due to the perceived quality of care and shortages of quality inputs, could hinder the goals of health insurance programs. Insurance programs can mitigate some of these health system challenges

through their design features, but some of these challenges may be outside of their control and will need reforms by leaders to promote high-quality health systems.

In terms of the design features of health insurance, insurance programs should consider balancing the different dimensions of quality of care to ensure providers are not incentivized to focus on improving structural inputs of care, which may not lead to a higher quality care. There is also a strong need to use data, such as data from claims and routine health information systems, to monitor the quality of care and use them as learning vehicles to redesign insurance programs for high-quality care and change providers' behavior.

Chapter 11 References

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