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Targeted User Fee Exemption for Equitable Access to Primary Healthcare Services for the Ultra-Poor

A multi-method study using the case of Burkina Faso

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DEDICATION

This dissertation is dedicated to my dear grandfather Jürgen Johannes. He advised me to invest in my education and inspired and motivated me to pursue an academic career. I hope he would be proud of me.

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List of abbreviations

African Maternal and Child Health Innovation Initiative	ACMHI
Antenatal care	ANC
Bamako Initiative	BI
Budget Impact Analysis	BIA
Catastrophic health expenditure	CHE
Centre Medical avec Antenne Chirurgicale (district-level hospital)	CMA
Community-based targeting	CBT
Community selection commitee	CSC
Confidence Interval	CI
Corona-Virus disease of 2019	COVID-19
Department of Infrastructures, Equipment and Maintenance	DIEM
Difference in differences model	DID model
Fixed effect	FE
Franc of the Communauté Financière Africaine	FCFA
Gross Domestic Product	GDP
International Development Research Centre	IDRC
International Society for Pharmacoeconomics and Outcomes Research	ISPOR
Low- and middle-income countries	LMICs
Marginal effects	ME
Millenium Development Goals	MDGs
Ministry of Health	MoH
Nongovernmental organisation	NGO
Open Data Kit software	ODK software
Organisation for Economic Co-operation and Development	OECD
Out-of-pocket expenditure(s)	OOPE
Out-patient-department	OPD

Performance-based financing	PBF
Primary healthcare	PHC
Primary healthcare facilities	CSPS (Centre de santé et de promotion sociale (Primary Healthcare Centers)
Principal Component Analysis	PCA
Proxy-mean-testing	PMT
Purchasing power parity	PPP
Régime d'assurance maladie universelle (universal health insurance scheme)	RAMU
Society for Studies and Public Health Research	SERSAP
Société de Gestion de l'Equipement et de la Maintenance Biomédicale - Management Company of Biomedical Equipment and Maintenance	SOGEMAB
Sustainable Development Goals	SDGs
United Nations	UN
United Nations Children's Fund	UNICEF
Universal Health Coverage	UHC
US-Dollar	USD
World Health Organization	WHO

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Introduction

Note: The doctoral student published aspects of this chapter in the following publications:

1. Beaugé, Y., De Allegri, M., Ouédraogo, S., Bonnet, E., Kuunibe, N., & Ridde, V. (2020). Do Targeted User Fee Exemptions Reach the Ultra-Poor and Increase their Healthcare Utilization? A Panel Study from Burkina Faso. *International Journal of Environmental Research and Public Health*, *17*(18), 6543.
2. Beaugé, Y., Ridde, V., Bonnet, E., Souleymane, S., Kuunibe, N., & De Allegri, M. (2020). Factors related to excessive out-of-pocket expenditures among the ultra-poor after discontinuity of PBF: A cross-sectional study in Burkina Faso. *Health Economics Review*, *10*(1), 1–11.
3. Beaugé, Y., Koulidiati, J.-L., Ridde, V., Robyn, P. J., & De Allegri, M. (2018). How much does community-based targeting of the ultra-poor in the health sector cost? Novel evidence from Burkina Faso. *Health Economics Review*, *8*(1), 19.

Health is a human right and one of the key drivers of economic growth and human development. However, in 2021 nearly 36 % of Africa's population continues to live in extreme poverty, and the human right to health has not yet become a reality for them. High reliance on out-of-pocket payments for healthcare services is still the predominant way for many low-and middle-income countries to finance their healthcare system. These payments force people, particularly the poor, to make difficult trade-offs between medical care to gain good health and other life necessities. This human development issue is being addressed by the 'Leaving no one behind' principle incorporated in the sustainable development agenda that bundles efforts towards a more inclusive, sustainable and resilient future for all. Amongst other actions, governments are pushed to formulate health financing policies that aim to progressively achieve Universal Health Coverage (UHC) and reach the furthest behind first.

Over the last decades, targeted user fee exemptions have gained prominence as a UHC-oriented health financing reform to facilitate access to healthcare for those often left behind. The exemptions are intended to remove the financial barrier for poor patients, increase health service utilization, reduce further impoverishment, and ultimately reduce premature mortality (Hatt et al., 2013). Despite the growing implementation of user fee exemptions and their proven beneficial effects on the general population, little scientific attention has been paid to the ultra-poor and whether their utilization of primary healthcare services and financial risk

protection effectively increases after their implementation. This lack of scientific evidence is mainly due to the unavailability of high-quality, timely and reliable data of this excluded population. Further, there is no assessment of the healthcare system cost at which first-level curative healthcare services can be delivered nationwide for the exempted ultra-poor. However, policymakers can only make decisions on the path to UHC, scale up pro-poor activities, and purchase services on their behalf if the information on the necessary public budget is available.

This doctoral dissertation aimed to address these knowledge gaps by using an extensive data set of ultra-poor people, who had been targeted and exempted within the context of the performance-based financing intervention in Burkina Faso. Ultra-poor were monitored before and after introducing targeted user fee exemptions to assess the effect of targeted user fee exemptions on their utilisation of healthcare services. Further, the study assessed the level of out-of-pocket expenditure and factors associated with excessive out-of-pocket expenditure among the ultra-poor. In addition, the dissertation used facility-based data to estimate the capital and recurrent cost of providing first-level curative services to the exempted ultra-poor and based on that, projected the cost and healthcare budget impact for providing first-level healthcare services to the exempted ultra-poor nationwide.

The introductory part of this dissertation describes the “Leaving no one behind” principle, which stands at the core of UHC and the agenda of sustainable development. The author briefly describes the vicious cycle of ill-health and poverty and the relevance of primary health care services. It is followed by a review of the barriers experienced by the poor to access primary health services and how targeted user fee exemptions emerged as a possible solution. The dissertation then summarizes the current evidence on the effects of targeted fee exemptions on healthcare services and financial protection of the poorest. The author continues with the relance of costing primary healthcare services for the ultra-poor to move towards UHC and leave no one behind. She further elaborates on the existing evidence on the cost of providing primary healthcare services to the exempted ultra-poor. The chapter continues with the identified research gaps and sets out the general and specific objectives of the study. Before moving onto the method chapter, the author briefly describes the research

setting Burkina Faso with its socio-economic and health system profile to better establish the study within its broader context.

1.1 Leaving no one behind within Universal Health Coverage

With the adoption of the Sustainable Development Goals (SDGs), all 193 united nations member states pledged to leave no one behind with their policies and measures and endeavours to reach the furthest behind first (UNDP, 2018). Development partners recognized that in the past, outdated indicators such as the average rates of progress were prioritized over people's lives, thereby threatening to leave the most disadvantaged irreversibly behind (UNDP, 2018). The SDGs came officially into force on the 1st of January 2016 (UN, 2016), succeeding the unfinished Millennium Development Goals (MDGs) (UNDP, 2021). Placing the leaving no one behind principle at the heart of the SDGs is very distinct from the preceding MDGs as the MDGs did not prioritize equity. The SDG declaration covers 17 primary goals with 169 sub-targets (UN, 2016). The agenda stimulates actions to end poverty, protect the planet, and ensure that all people live in peace and prosperity, targeting the year 2030 (UN General Assembly, 2015).

UHC is one of the core targets of the SDG declaration, listed under goal three that aims to ensure healthy lives and promote well-being for all at all ages (Odoch et al., 2021; UN, 2015). UHC is based on the principle that all people should access quality essential healthcare services without facing financial hardship (Odoch et al., 2021; UN, 2015). Essential healthcare services pertain to services that address the most important causes of disease and death (WHO, 2021f). The quality of these services should be such as to improve people's health sufficiently (WHO, 2021f). Protecting people from out-of-pocket expenditure (OOPE) reduces the risk of poverty and further impoverishment (WHO, 2021f). The treatment of an unexpected illness episode might otherwise force poor households to sell the few assets they might possess, borrow money or decide to forego the required healthcare (Leive & Xu, 2008; WHO, 2010b).

Goal three directly relates to the performance of the health system (Odoch et al., 2021). To ensure UHC is genuinely universal with a reduction in priority morbidities and mortality across all population groups, a functioning health financing system is needed that effectively

and efficiently uses scarce resources and equitably generates, pools and spends them (Kutzin, 2013; Odoch et al., 2021; Ottersen et al., 2017; UNDP, 2018). Thereby, health financing can influence the attainment of UHC in three ways through the equitable use of health services, provision of quality of care and financial protection (Kutzin, 2013; Odoch et al., 2021). These effects, in turn, are achieved through transparency, accountability, efficiency and equity in resource distribution (Kutzin, 2013; McIntyre et al., 2016; Odoch et al., 2021). These are the intermediate objectives of UHC (Odoch et al., 2021), which, however, remain a challenge in most sub-Saharan African countries (Umeh, 2018). Many of them are yet to reform their health financing systems in order to move in this direction and truly leave no one behind (Bayarsaikhan & Musango, 2016; Gautier & Ridde, 2017; Odoch et al., 2021; Umeh, 2018).

In order to measure progress towards the SDGs, a global indicator framework has been developed (United Nations, 2015a). The framework lists indicators for SDG three, which have a specific equity dimension (Buzeti et al., 2020). As such, indicator 3.8.1 implicitly stressed the need of collecting data on the progress of the most disadvantaged population, including their access to and coverage with essential health services (United Nations, 2015a). In addition, indicator 3.8.2 measures the proportion of the population with large OOPE on health as a share of total household expenditure or income (United Nations, 2015a). The indicator inherently acknowledges that those with low incomes are more prone to impoverishment due to OOPE (Buzeti et al., 2020; United Nations, 2015a). Despite these tailored indicators, critics argue that those often left behind might not even be in the position to utilize health services in the first place and are those off the charts of official statistics (Buzeti et al., 2020; Grépin et al., 2020). Individual studies on the most disadvantaged and excluded populations like the ultra-poor are thus deemed essential.

But who are these people often left behind? These are people living in vulnerable situations, including children, persons with disabilities, older persons or the extremely poor (United Nations, 2018), who do not have choices and opportunities to be part of and benefit from development progress (United Nations, 2018). This dissertation focuses on the people living in extreme poverty. To be very precise, the study focuses on the indigent, also called ultra-poor people, a notion that has emerged in particular from the Sub-Saharan African context (Soors et al., 2013). The distinction between extreme and ultra-poor is very important (Soors et al.,

2013) since, in Sub-Saharan Africa, over 40 % of the people live in extreme poverty (Khokhar, 2016). The World Bank defines extreme poverty as people who live on less than US-Dollar (USD) 1.90 a day (World Bank, 2021), the absolute international poverty line based on the value of goods needed to sustain one adult. Being indigent or ultra-poor is an advanced state of extreme poverty (Stierle et al., 1999). Ultra-poor lack the most basic necessities, such as food, shelter, safe drinking water, sanitation and knowledge and education (Marmot, 2006; Peters et al., 2008; United Nations, 2015b). They lack financial resources and social support systems that make it impossible to access and pay for essential health care services (United Nations, 2015b). With the emergence of the Corona-Virus disease of 2019 (COVID-19), the attainment of UHC has become even more crucial since, on a global scale, the number of people living in poverty has increased (Kharas & Dooley, 2021). Burkina Faso is amongst the ten most affected countries, where poverty is predicted to increase by the end of 2030 due to COVID-19 by 2.3 million people (Kharas & Dooley, 2021). The increase in poverty amplifies existing inequalities and makes the already conflict-torn population even more susceptible to ill health and poor health outcomes (Saalim et al., 2021).

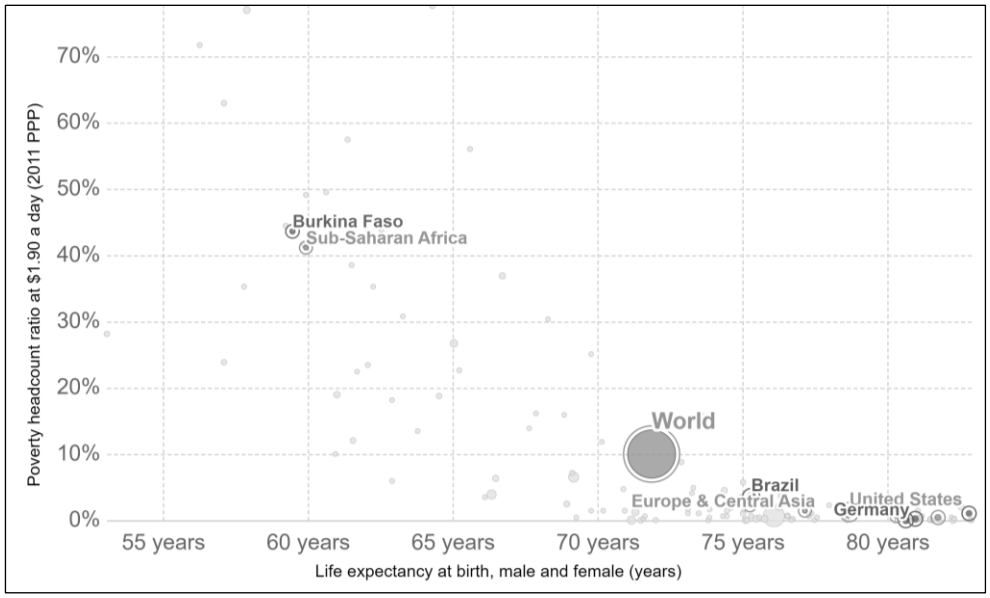
1.2 Ultra-poor have the worst health outcomes

Good health is one of the most critical determinants of leading a good life (OECD, 2019). However, the opportunities to lead a healthy life vary between and within countries (OECD, 2019). Decades of research show that inequalities in access to resources and power shape differences in health outcomes (WHO, 2013). Health inequality thereby refers to any measurable aspect of health that varies across individuals or groups (Arcaya et al., 2015). A variety of factors are associated with inequality in health, such as sex, age, economic status, education and place of residence or migrant status, race, ethnicity, caste, religion or other characteristics that can differentiate minorities (WHO, 2016d). The socioeconomic inequalities and the inherent phenomenon of the socio-economic gradient are the most pertinent factors for the poorest (WHO, 2016d).

The plethora of empirical evidence illustrates that health and disease follow a socio-economic gradient (Wagstaff, 2002), with the poorest continuously being in most disfavor (OECD,

2019). The relationship between socio-economic position (income, educational level, or occupational rank) and health is such that a lower socio-economic status corresponds with worse health outcomes such as elevated disease and mortality rates and reduced life expectancy (Arcaya et al., 2015; Gwatkin, 2000). The socio-economic gradient in health applies to all countries irrespective of the level of development or income (WHO, 2021e). Poor countries have worse health than wealthier countries (Wagstaff, 2002). Within countries, poorer people have worse health than wealthier people (Wagstaff, 2002; World Bank, 2004). According to the framework on the poverty-health vicious cycle developed by Wagstaff, the relationship reflects a two-way causality: Poverty increases the risk of ill-health, and ill-health increases the risk of falling or staying in poverty (Wagstaff, 2002). Especially for the poor, health is an essential economic asset since their livelihoods depend on it (WHO, 2003). When the breadwinner suffers from ill health or injury, the entire family may be impacted by the loss of income and the high OOPE to treat illness (WHO, 2003).

Figure 1 illustrates the toll poverty takes on human life. The figure shows the percentage of the population living on less than USD 1.90 a day versus the overall life expectancy for selected geographical regions (World Bank, 2021). A child born today in Germany will reach an average age of 81.57 (World Bank, 2021a), whereas a child born in Burkina Faso will reach the age of 61.58 (World Bank, 2021b). The poverty headcount ratio in Burkina Faso is above 40 %, meaning that over 4 out of 10 people live in extreme poverty to the point that life expectancy falls by 20 years compared to Germany.



(World Bank, 2021)

Figure 1. Extreme poverty headcount ratio in purchasing power parity (PPP) versus overall life expectancy at birth for selected countries and geographical regions

Investments into robust primary healthcare (PHC) systems that focus on health promotion and disease prevention are vital to break this vicious cycle of disease and poverty (WHO, 2019a). This approach follows sub-target eight of SDG three, that aims to reach UHC, including the protection from financial risks, and the provision of quality essential healthcare services and safe, effective, quality and affordable essential medicines and vaccines for all (United Nations, 2015a). Accordingly, also the people living in extreme poverty are meant to have access to quality PHC services without incurring financial hardship.

1.3 Relevance of primary healthcare, the definition of access and associated barriers

The Alma-Ata Declaration on PHC of 1978 was the most significant milestone of the twentieth century in international public health (WHO, 2021b). The declaration identified health as a human right and primary health care as the key to attaining Health for All. PHC was promoted as the core component of health systems. With the declaration, the World Health Organization (WHO) took a pivotal step towards basic health care and health

promotion. The governments of 134 countries adopted the Declaration of Alma Ata (WHO, 2018). They declared that the existing inequality in the health outcomes of people between and within countries is politically, socially and economically unacceptable (WHO, 2021b).

PHC is based on the principle of social justice and equality efforts and ultimately on the right to the highest attainable standard of health, as reflected in Article 25 of the Universal Declaration of Human Rights (WHO, 2021d). Article 25 contains the human right to suitable living conditions for oneself and the family, including sufficient food, clothing, shelter, health- and social care (WHO, 2021d). PHC entails three interrelated components that build synergies. The first component covers the importance of comprehensive, integrated health services that embrace primary care and public health goods, which are central to combat health inequity (WHO, 2021d). As such, comprehensive and universally accessible primary health services should be coordinated together with measures by other sectors that are related to national and community development (Kotwani & Danis, 2007). Secondly, PHC addresses the multi-sectoral policies and carries out actions to address the social determinants of health (WHO, 2021d). Last, PHC seeks to engage and empower individuals, families, and the broader communities to foster social participation, self-care and self-reliance in health (WHO, 2021d).

In October 2018, the manifested principles of the Alma Ata declaration got re-emphasised at the Global Conference on PHC in Astana, Kazakhstan, by the adoption of the new Astana declaration (Jungo et al., 2020; WHO, 2021c). The Astana declaration addressed current challenges related to renewing the political commitment to PHC. It also reemphasized the fundamentality of the PHC approach in UHC and the inclusion of the poorest (Jungo et al., 2020; WHO, 2021c).

Investments in PHC have significant macro-and microeconomic benefits for the general population but especially for the poorest (Kluge et al., 2018). On the macroeconomic level, improved population health through PHC has important implications on the entire life course (Kluge et al., 2018). Better antenatal, postnatal, and child health is associated with enhanced cognitive development during childhood (Case et al., 2005) and better health, higher productivity and income during adulthood (Goetzel et al., 2004). Better health in the elderly can reduce the social isolation (Løken et al., 2017) that poor people often experience as a

painful aspect of poverty (OPHI, 2021). Primary care can further improve their participation in the labour market (Løken et al., 2017). On the microeconomic level, PHC shows evident benefits at the interface between primary and secondary care. PHC can help reduce hospital admissions, readmission and the use of emergency care, which are not only costly to the broader healthcare system but often the most impoverishing aspects to rural households if the poor are in the position to use the services at all (Saksena et al., 2010). Further, PHC can address the current challenges imposed by the high prevalence of multimorbidity that is even greater among persons with low socioeconomic status (Schiøtz et al., 2017).

1.3.1 Access to primary healthcare and its different dimensions

Having discussed the importance of PHC, it is deemed most relevant for the ultra-poor to gain access to these healthcare services to improve their health outcomes. The dimension of access to healthcare and the experienced barriers by the ultra-poor are explained in the following section.

The term ‘access’ is not universally defined (Gulliford et al., 2002). In this dissertation the author refers to the definition of access as ‘the timely use of service according to need’ (Peters et al., 2008). The four primary dimensions of access to care, most relevant for rural populations, are 1. Geographic accessibility, 2. Availability, 3. Affordability and 4. Acceptability (Peters et al., 2008). Some authors have also added the dimension of 5. Accommodation (Penchansky & Thomas, 1981) and 6. Approachability (Levesque et al., 2013). The poor are the most disadvantaged across all dimensions of access to care (Peters et al., 2008). The geographic accessibility relates to the travel distance from the user to the primary care facility and reliable transportation; isolated populations like the ultra-poor often lack the transport means to overcome the distance to the healthcare provider. Availability refers to the relationship between the size or volume of the supply and demand of services (Penchansky & Thomas, 1981); rural and remote areas severely lack providers despite their high and complex disease profile compared to urban areas. Affordability is concerned associated with the relationship between the price of healthcare services and the patients' ability to pay (Penchansky & Thomas, 1981). This dimension also includes protecting patients from the economic consequences of these payments and potential arrangements (Peters et al.,

2008). Accommodation is about how resources at health facilities are organized to accept clients (e.g. appointment systems and waiting time) and the clients' ability to accommodate these factors (Levesque et al., 2013; Penchansky & Thomas, 1981). Approachability relates to the social and cultural factors that determine whether individuals can accept aspects of the service provision (Levesque et al., 2013). This dimension is critical because people from rural settings have unique ethnic, cultural or religious backgrounds that might go against that of healthcare providers (Levesque et al., 2013). For example, rural residents might prefer female practitioners over male practitioners but only have limited choices (Russell et al., 2013).

1.3.2 Overview of barriers to healthcare access with a focus on financial barriers

A comprehensive framework developed by Jacobs et al. (2011) based on work by Ensor & Cooper (2004) and Peters (2008) identifies that all barriers to access to care exist along the four main dimensions (1-4 explained above). The authors distinguish the barriers further by supply and demand-side factors (Ensor & Cooper, 2004; Jacobs et al., 2012; Peters et al., 2008) that originates from formulating appropriate health interventions. Demand-side factors relate to the ability of the individual, household or community to utilize health services. On the other hand, supply-side factors relate to elements of the broader health system that deter uptake of services. According to the framework, demand-side barriers relate to the indirect costs to the household, available transport, information on health care services or providers, education, household resources and willingness to pay, opportunity costs, cash flow within society, households' expectations, low self-esteem and little assertiveness, community and cultural preferences, stigma and lack of health awareness (Ensor & Cooper, 2004; Jacobs et al., 2012; Peters et al., 2008). Supply-side barriers can relate amongst other to the service location, qualification of health workers, staff absenteeism, opening hours, waiting time, late or no referral, costs and prices of services, including informal payments, private-public dual practices, the complexity of billing system and the inability for patients to know prices beforehand and staff interpersonal skills, including trust (Ensor & Cooper, 2004; Jacobs et al., 2012; Peters et al., 2008) **(Table 1)**.

These individual barriers can further be distinguished between financial and non-financial barriers. Since the dissertation primarily focuses on user fee exemptions which are part of the

affordability aspect of access to care, the author will only focus on the financial barriers in the following paragraph. For the sake of completeness, it ought to be noted that the remaining barriers and their distinct categorization by Jacobs et al. (2011) are also essential to assess access to care comprehensively.

Table 1. Overview of identified access barriers along supply and demand sides and four dimensions of access

Supply-side barrier	Demand-side barrier
Geographic accessibility	
Service location	Indirect costs to the household (transport)
	Means of transport available
Availability	
Unqualified health workers, staff absenteeism, opening hours	Information on health care services/providers
Waiting time	Education
Non-integration of health services	
Lack of opportunity (exclusion from services)	
Late or no referral	
Motivation of staff	
Drugs and other consumable	
Non-integration of health services	
Affordability	
Costs and prices of services, including informal payments	Household resources and willingness to pay
Private-public dual practices (patients are siphoned off from public facilities to health workers' private practices, where they may be subjected to more expensive, often irrational, treatments)	Opportunity costs
	Cash flow within society (borrowing money from community members)
Acceptability of healthcare services	
Complexity of billing system and inability for patients to know prices beforehand	Households' expectations
Staff interpersonal skills, including trust	Low self-esteem and little assertiveness
	Community and cultural preferences
	Stigma
	Lack of health awareness

(Jacobs et al., 2012 based on Ensor & Cooper, 2004 & Peters et al., 2008)

Affordability: Financial barriers to healthcare access

The affordability of services is considered one of the most critical factors determining access to healthcare (Peters et al., 2008). It is also the factor most directly associated with the dimension of poverty (Peters et al., 2008). Affordability thereby relates to the economic capacity of individuals or households to utilize services that include resources and their time (Levesque et al., 2013). Specifically, the affordability results from the direct and indirect costs of treatment (Levesque et al., 2013). While direct costs include expenses on treatment and drugs and related services, indirect costs include the opportunity cost related to the time spent by patient and caregiver, transport costs, and expenditures on food and accommodation (Levesque et al., 2013). There has also been an increased focus on informal direct payments that can be considered semi-official fees or 'under the counter' payments (Balabanova & McKee, 2002; Kankeu & Ventelou, 2016). Whether formal or informal, all these expenses are financial barriers to accessing care with severe economic consequences for the poor (Peters et al., 2008). These consequences include excessive out-of-pocket spending, borrowing of money, or selling assets, which can push people further into deeper poverty and debt (Peters et al., 2008). Two SDG related indicators measure the financial burden imposed by OOPE: 1 catastrophic health expenditure (CHE) and 2. impoverishment. In Sub-Saharan Africa, 71.06 million people (7.26 %, in 2015) incurred CHEs using the threshold of OOPE exceeding 10 % of the household budget (total consumption or income), and 17.44 million people (1.78 %, in 2015) incurred OOPE exceeding 25 % of the household budget (WHO, 2019a, 2021a). Using the absolute poverty line of USD 1.90 a day, the share of the impoverished was 1.3 % in 2015, which corresponds to 15 million people (WHO, 2019a, 2021a). Various interventions exist to protect patients from these severe economic consequences associated with the cost of illness, with user fee exemption becoming the most prominent for the chronically poor and socially excluded (Peters et al., 2008).

1.4 User fees fee exemptions to increase healthcare access for the poor in low- and middle-income countries

The following sub-sections explain the underlying theoretical perspectives of user fee exemptions, the two main implemented types of user fee exemptions, the history of user fee exemptions, and the current evidence on the effect of user fee exemptions on the ultra-poor.

1.4.1 Theoretical perspectives

The use of user fee exemptions in healthcare provision for the poorest is rooted in the theory of equity in healthcare financing and delivery that is in turn embedded within the general pursuit of social justice (Peter, 2001; Somerville, 2000).

Considerations about what is equitable in healthcare financing and delivery vary with definitions of social justice, with the egalitarian and the libertarian viewpoints being the most relevant (Wagstaff & van Doorslaer, 2000) in the current debates. Extreme libertarians view healthcare financing as a private matter (Wagstaff & Van Doorslaer, 2000). Services are delivered according to peoples' ability and willingness to pay (Wagstaff & Van Doorslaer, 2000). Any transfers to the poor are subjects to acts of charity. Libertarianism is the main base for private financed healthcare systems (Wagstaff & Van Doorslaer, 2000).

The egalitarian theory is most applicable to the implementation of public-funded healthcare systems and UHC-oriented health financing strategies such as user fee exemptions and thus deserves further elaboration (Lee & Park, 2015; Nunes et al., 2017). Egalitarians suggest that health care financing should be according to the ability to pay, and distribution of healthcare should be according to need (Wagstaff et al., 1991). Most developed countries, in particular European countries, accept this Egalitarians' principle of equal access to healthcare for all (Nunes et al., 2017). Also, Burkina Faso, amongst a few other LMICs in Sub-Saharan Africa, such as Malawi, and Zambia, increasingly relies on egalitarian values in the distribution of both public healthcare spending and overall healthcare spending (Rudasingwa et al., 2020). Different mechanisms are applied to address the remaining regional differences across socio-economic groups in these countries (Rudasingwa et al., 2020). The mechanism to reach the furthest behind through targeting is based on prioritarianism, where the highest priority is

given to the worst-off (Persad, 2019). Prioritarianism refers to the Rawlsian concept of social justice (Rawls, 1999), whereby the most vulnerable are treated differently and favourably (Gwatkin, 2000; Massé & Saint-Arnaud, 2003) compared to the general population. Drawing on Rawls concept of justice, Peters (2002) embeds the pursuit of health equity within the general pursuit of social justice and considers social inequalities in health unjust if they are the result of an unjust social structure, a society that disfavors the worst-off and benefits the better-off (Rawls, 1999). According to Peter (2001), understanding the underlying causes of social inequalities in health and people's health status plays a vital role in assessing how the basic social structure affects poor people and whether these social arrangements are just and equitable (Peter, 2001).

The empirical literature to date on equity in health financing has focused on how far health care is financed according to the ability to pay (Wagstaff & Van Doorslaer, 2000). Equity in health is usually measured through an assessment of vertical equity (redistribution of income, poor individuals pay less for health care than the rich) and horizontal equity (individuals with the same ability to pay, contribute the same) (Paul et al., 2019). Countries use different sources to finance their healthcare system with varying effects on vertical and horizontal equity. The payment mechanisms for health services can broadly be categorized into mandatory and voluntary mechanisms (WHO, 2013). Taxes, other government levies, and compulsory insurances are examples of mandatory mechanisms, but the contributions are calculated differently in each case (Wagstaff & Van Doorslaer, 2000; WHO, 2013). Taxes are assessed based on taxable income. Social insurance premiums are based on individuals' earnings, and private insurance premiums are based on the overall health status and risk factors, such as age, weight, preconditions, etc. (Wagstaff & Van Doorslaer, 2000; WHO, 2013). Voluntary insurance and OOPE at the time of service use belong to the voluntary payment mechanism (Wagstaff & Van Doorslaer, 2000; WHO, 2013). Individuals can basically choose whether to buy and pay healthcare services (Wagstaff & Van Doorslaer, 2000; WHO, 2013).

With a large share of total health expenditure on health, OOPE are considered inequitable and the most regressive mechanism to financing the healthcare system (WHO, 2019). The high reliance on OOPE impedes equity and, therefore, the move towards UHC (James et al., 2006).

However, in many LMICs, the provision of most adult curative services is still subject to the payment of user fees at the point of use since. User fees can be imposed on drugs, medical material, entrance fees or consultation fees. LMICs often continue to rely on OOPE because other financing mechanisms do not mobilize sufficient resources to provide the desired levels of healthcare for the entire population (Akin et al., 1987). Further, funds are often not raised through prepayment mechanisms, nor are they pooled to share healthcare costs at the time of illness (Akin et al., 1987; Preker & Carrin, 2004). The mobilized scarce resources due to inefficiencies within the healthcare system often do not generate value for money in terms of health care (Akin et al., 1987; Preker & Carrin, 2004). The poorest who have the worst health outcomes and need health care the most are the most affected by these bottlenecks (James et al., 2006; McIntyre et al., 2006) The high reliance on OOPE has impoverishing effects and creates healthcare barriers (James et al., 2006; McIntyre et al., 2006).

In the face of the reality of scarce resources, but the existing commitment towards UHC and leaving no one behind, targeted user fee exemptions are implemented to channel limited public resources towards the poorest and allow them to benefit disproportionately (Bitrán & Muñoz, 2000; Hanson et al., 2007; Mkandawire & UNRISD, 2005).

1.4.2 Types of user fee exemptions

Most implemented user fee exemptions (Honda, 2006; Newbrander et al., 2000) either target the socio-economic status or certain population groups/services. The first one aims to improve equity in access and equity in financing health services by reducing or eliminating OOPE for beneficiaries who cannot pay because of their low income. Practically speaking, through user fee exemptions, a beneficiary is entitled to obtain health services at certain health facilities without direct charges (Honda, 2006). The second type aims to reduce or eliminate OOPE for selected services only regardless of beneficiaries' income level (e.g., services for certain non- or communicable diseases) (Honda, 2006; Newbrander et al., 2000). This type may cover some of the poor but does not directly target the poor to deliver benefits to them (Honda, 2006; Newbrander et al., 2000). It generally aims to promote the consumption of important healthcare services with a low perceived value among the population (Honda, 2006). Both

types of user fee exemptions can be used individually or in combination (Newbrander et al., 2000). The user fee exemptions targeted to the poor (type 1) is the subject of this dissertation.

1.4.3 The emergence of user fee exemptions in low-and-middle-income countries

The implementation of user fee exemptions for the poor across low-and middle-income countries (LMICs) followed a long time after the launch of the Bamako Initiative (BI) in 1987 (Robert et al., 2012). The BI initially promoted the introduction of user fees (cost recovery) in developing countries to improve PHC, provide essential medicines and address the severe underfunding of the public health sector in many countries (Knippenberg et al., 2003). WHO and United Nations Children's Fund (UNICEF) initiated the BI with support from the World Bank in the spirit of the Alma Ata declaration (Asila Pangu, 1997), considering that sub-Saharan Africa was in a deep political and economic crisis affecting the health outcomes of its population (Paganini, 2004). Amongst others, high child mortality rates, rapidly increasing population, and the economy crashing debt obligations characterized this crisis (Paganini, 2004). The rationale of the BI was that people might be able and willing to pay for health care. The development partners argued that the demand for health care services might be relatively priced-inelastic and that user fees might increase revenue with only insignificant changes in health care utilization (Griffin, 1988). The BI intended to improve healthcare services' quality, efficiency, and equity (Akin et al., 1987) in the wake of partial cost recovery through a decentralized user fee system with community involvement (Ridde, 2011). The equity component was to be realized by redistributing income in an equitable way that allows the poor to utilize PHC services and ensures that they have greater access to care (Ridde, 2003).

While increasing essential drug use, user fees have led to a sharp decline in health service utilisation for the poorest in countries that signed up for and implemented the BI (James et al., 2006; Ridde, 2004). Under the BI, from the beginning, measures were to be implemented that exempted the poorest from user fees who could not pay for healthcare services. Governments, however, rarely resorted to these measures (Leighton & Diop, 1995; Ridde, 2008; Ridde & Morestin, 2011). If implemented, they were mostly ineffective (Leighton & Diop, 1995; Ridde, 2008; Ridde & Morestin, 2011). The proposed solution to counter these challenges was either abolishing user fees for everyone or using targeting to identify groups of people and

exempt them only from user fees (Leighton & Diop, 1995; Ridde, 2008; Ridde & Morestin, 2011).

Targeted user fee exemptions work by identifying those who will or will not be eligible for a given social program (Grosh, 1994). In the absence of universal criteria to define poverty and identify the poorest, countries worldwide adopted very different targeting methods to distribute user fee exemptions (Alatas et al., 2012). High-income countries generally used a form of means-testing and identified ultra-poor based on a certain income threshold (Alatas et al., 2012). Low-income countries instead used targeting strategies without direct income observation since this is very challenging in rural settings where many individuals work in the informal sector or are unemployed (Alatas et al., 2012). Such targeting strategies are proxy means testing (PMT) and community targeting (Alatas et al., 2012). PMT uses a standard algorithm to identify households' wealth. Community-based targeting (CBT), on the other hand, collects information on the wealth of community members from local leaders (Mkandawire & UNRISD, 2005).

Around the millennium, in light of the sharp decline in health service utilization among the poorest and the commitment of governments to achieve the MDGs, most African countries started to introduce user fee exemptions at the national level through policies, on a smaller scale through pilot projects or both (Ridde & Haddad, 2009). The first country was South Africa that abolished user fees for all PHC services in 1997 (Ridde & Haddad, 2009). The most renewed interest in user fee exemptions, however, only followed from the experience of Uganda (Meessen et al., 2011), which constitutes a landmark in the history of user fee exemptions. The country removed user fees and showed an increase in the utilization of services, particularly among the lowest quartile in the general population (Nabyonga et al., 2005). Countries such as Madagascar, Ghana, Mali, Senegal, Burkina Faso, Burundi, Niger, Lesotho, Benin, Tanzania and Marocco, amongst others, then followed their example gradually (Ridde & Haddad, 2009).

1.4.4 Current evidence on the effect of user fee exemptions on healthcare utilization and financial protection of the ultra-poor

Despite this growing implementation of user fee exemptions across LMICs since the millennium, little scientific attention has been paid to their effect on the ultra-poor population, distinct from the general poor population, described in subsection 1.1. The available literature is almost entirely silent about whether the ultra-poors' healthcare utilization and financial protection effectively increase after user fee exemptions are implemented. The following sub-section will summarize the available scientific evidence by looking at the effect of user fee exemptions on healthcare utilization and financial protection among the ultra-poor, first for Burkina Faso and then followed by other African countries.

The effects of user fee exemptions on utilization of healthcare services

Generally, the available evidence leans towards demonstrating positive outcomes, where user fee exemptions increase health service utilization for the general population (Cottin, 2018; Flink et al., 2016; Hardeman et al., 2004; Jacobs et al., 2007a; Jacobs & Price, 2006). However, findings are not directly comparable, as studies often have a different scope (policy versus pilot projects) and use distinct data (household or facility-based data) and methods (observational versus intervention study design. Most importantly, many studies assess the outcome for other vulnerable groups, such as children below the age of five or pregnant women (H. T. Nguyen et al., 2018; Ridde, Haddad, et al., 2013; Zombré et al., 2017). In Burkina Faso, only one study assessed the effect of user fee exemption on healthcare utilization among the ultra-poor. Atchessi et al. (2016) conducted a pre-post study in the Ouargaye district from 2010 to 2011 and reported that user fee exemption cards did not increase their healthcare utilisation (Atchessi et al., 2016a). Also, Lépine et al. (2018) found neutral effects of user fee exemption on the poors' health service utilization in Zambia by using a pooled synthetic control method (Lépine et al., 2018a). Most of the evidence showing an increase in service utilization originates from other African countries (Cottin, 2018; Flink et al., 2016; Hardeman et al., 2004; Jacobs et al., 2007a; Jacobs & Price, 2006). For example, one study in Cameroon used qualitative methods and explicitly investigated the relationship between systematic targeting of the poor and their utilization within a PBF program and

reported perceived improvements in access to health care (Flink et al., 2016). Cottin (2018) conducted a study in Morocco using a combination of propensity score matching with a panel Difference-in-Difference (DID) design and suggested a modest increase in health care utilization only for the poor living in rural areas over four years (2012 - 2015) (Cottin, 2018).

The effects of user fee exemptions on financial protection

To the author's knowledge, there has not been any study measuring OOPE among the targeted ultra-poor to track progress towards financial risk protection in Burkina Faso. Only a few studies are available that looked into the level and determinants of OOPE in Burkina Faso again for the general population. The level of OOPE was reported to range between FCFA 8404 (USD 17.4) (Beogo et al., 2016) and FCFA 9362.52 (USD 15.7) (Nakovics et al., 2019). Su et al. (2006) reported that as much as 14.6 % - 25.7% of the households from the lowest quartile in the general population in Nouna incurred catastrophic healthcare expenditure before implementing community-based health insurance (Su et al., 2006). None of these studies measured the extent to which ultra-poor are exposed to financial hardship through the use of health services, despite researchers highlighting the importance of monitoring such an outcome to secure the achievement of SDG three, targeting specific health for all (Grépin et al., 2020). The lack of evidence on the financial risk protection for the ultra-poor in Burkina Faso is comparable with other countries in sub-Saharan Africa and Asia. Only Jacobs et al. (2007) found that in Cambodia, fee exempted patients paid on average USD 4.3 per healthcare visit, USD 9 less than fee-paying patients (Jacobs et al., 2007b). Looking at evidence from Zambia, Masiye et al. (2016) and Lépine et al. (2017) reported an essential reduction in medical expenses for the general population after the introduction of the nationwide user fee removal (Lépine et al., 2018b; Masiye et al., 2016; Masiye & Kaonga, 2016). However, both highlighted that the effect of user fee exemptions might not reach the poorest proportionately.

1.5 Costing the provision of healthcare services towards universal health coverage

With governments having made their political commitment towards UHC, the implementing entities such as the ministries of health and finance are concerned about the costs at which

UHC, with its inclusion of the poor and most vulnerable, can be achieved (Barber et al., 2020). The costs of UHC are particularly relevant for LMICs since critical budget limitations exist when it comes to implementing UHC policies or measures (Paul et al., 2020). These limitations are linked to the overall limited fiscal space, with further questions about what area to prioritize without jeopardising others and how to improve the technical and allocative efficiency of the scarce resources directed towards health (Paul et al., 2020).

1.5.1 The relevance of country-specific costing of primary healthcare services for the ultra-poor

As mentioned in chapter 1.3, PHC is the cornerstone of UHC (Binagwaho & Ghebreyesus, 2019). PHC facilities represent the first contact point for more than eighty per cent of the population in LMICs with modern healthcare services (Flessa & Marschall, 2009). PHC facilities also represent the first entry to the healthcare system for the poorest if ultra-poor access the otherwise unaffordable services through user fee exemptions. Thus, the knowledge of the cost of first-level services (Flessa et al., 2011) and the development of realistic cost scenarios are deemed essential for any country's healthcare financing strategy to meet international goals on UHC (HEART, 2018). How can a country move towards UHC, reduce inequality, and build a fairer and more inclusive healthcare system if it isn't known how much is needed to efficiently provide PHC services to the poorest (Dalaba et al., 2017)? Many LMICs lack this information that can lead to non-transparent policy decisions and cost escalation in the provision of first-level services (Bahuguna et al., 2020). Lack of cost information, in particular, leaves governments with a reduced ability to purchase health services strategically, as cost information is the basis for informed pricing (Bahuguna et al., 2020; Luca & Paul, 2019; Mills, 2014). Strategic purchasing of services is an important pressure point because the way a health care system functions is such that the state purchases services with public funds on behalf of the public (Bahuguna et al., 2020). Accordingly, sound cost information provides the foundation for effective and efficient service delivery in the context of scarce resources (HEART, 2018). Furthermore, cost information enables further economic evaluations for informed decision-making on allocating resources between different

health services and technologies to ensure health value for money (Prinja et al., 2020; Tangcharoensathien et al., 2015).

The additional relevance of country-specific cost information to move progressively towards UHC is related to the problematic nature of the global normative health spending targets either measured in USD per capita (using economy-wide PPPs) or as a share of the Gross Domestic Product (GDP) (Barber et al., 2020). In 2010, the World Health Report suggested that low-income countries need to spend around USD 60 per capita to ensure their health system is capable of providing quality essential healthcare (WHO, 2010b). In a more recent publication, McIntyre and colleagues in 2017 suggested that countries instead need to spend at least five per cent of the domestic government expenditure on health to aspire for UHC (McIntyre et al., 2017). Such global normative health expenditure targets are problematic for several reasons (Barber et al., 2020). First, one must recall that global expenditure targets were developed primarily for advocacy purposes within the international community (Barber et al., 2020). They highlight the importance of health as a facilitator to national development and they generate political commitment (Barber et al., 2020). Although global targets may help mobilize donor funding and identify countries needing financial assistance, they were not intended to develop national revenue estimates or for national planning purposes (Barber et al., 2020). In situations where health budgets are limited, comparing current spending with global targets can be unrealistic (Barber et al., 2020). Second, focusing on pure indicators can mislead countries to believe that UHC is a target to achieve (Barber et al., 2020). UHC, however, is not a fixed threshold or an outcome that does not change over time (Barber et al., 2020). Third, every country has individual labour costs, capital costs of buildings, prices of medical products and health services, and insurance arrangements (Barber et al., 2020). The performance of healthcare systems also varies significantly between countries regardless of their healthcare budget (Barber et al., 2020).

In summary, the importance of cost information for effective, efficient and equitable health financing and service delivery for UHC and, beyond that, the inadequacy of global expenditure targets make a case for country-specific costing data for PHC with specific attention to those hardest to reach. Thus far, there is insufficient evidence on what LMICs are spending to provide PHC to the poorest and move towards UHC.

1.5.2 Current evidence on the cost of providing primary healthcare services to the ultra-poor in low -and middle-income countries

Evidence from Burkina Faso and other African countries on the cost of provision of primary healthcare mainly address the general population in urban or rural settings, which doesn't equal the marginalized group of the ultra-poor. Most of these studies either address the costs of disease-specific services (Storeng et al., 2008; Yugbaré Belemsaga et al., 2019), secondary or tertiary-level services or other population-specific services (children below the age of 5, pregnant and lactating mothers (Aliabadi et al., 2020; Cianci et al., 2014; Ilboudo et al., 2016; Newlands et al., 2008). Three studies addressed the cost of providing PHC in primary healthcare facilities (CSPS) for the general population in Burkina Faso. Flessa & Marschall (2009) estimated the cost of different PHC services in the district of Nouna (Flessa & Marschall, 2009) using data from 20 CSPS. Adopting a micro-costing approach, they calculated costs for general consultations but also delivery, immunisation, nursing care and other care. The costs for drugs were calculated separately (Flessa & Marschall, 2009). Flessa & Marschall (2009) assessed the average cost per general consultation ranging from USD 1.62 to USD 5.87 with an average cost concerning all facilities of USD 2.94 (Flessa & Marschall, 2009). The average cost per pharmacy attendance was calculated at USD 3.06. Mugisha et al. (2002) assessed the cost of different PHC services at four different PHC facilities in Nouna in 1999. The author calculated the cost of out-patient services for the rural population at USD 3.08 (Mugisha, Kouyate, Dong, et al., 2002). Drug costs were included. However, they were only allocated based on the value of consumption of the final categories (Mugisha, Kouyate, Dong, et al., 2002). In 2010, the WHO applied a bottom-up approach and estimated unit costs of International Dollars (PPP) 2.85 for one out-patient health visit at health centres in Burkina Faso within the WHO-CHOICE project (WHO, 2010a). This estimate includes all cost components except drugs and diagnostics for the general population. Another study from Burkina Faso's neighbour, Ghana, by Dalaba et al. (2017) also addressed the cost of providing health care services at PHC facilities (Dalaba et al., 2017). Dalaba et al. (2017) reported costs of USD 5.16 and USD 8.79 for outpatient-department (OPD) attendance (Dalaba et al., 2017) including costs for drugs. The former relates to the OPD attendance in Health Centres and the latter to Community-based Health Planning and Service facilities (CHPS) (Dalaba et al., 2017). Matsheke (2004) and Broomberg & Hees (1992) estimated the cost of PHC services in

South Africa also for the general population (Broomberg & Rees, 1993; Matsheke, 2004). Applying a micro-costing approach, Matsheke (2004) estimated the average cost per consultation at USD 4.18 in nine rural clinics (Matsheke, 2004). Broomberg & Rees estimated an average cost of only USD 2.03 using data from 1990 of one PHC facility in Soweto. (Broomberg & Rees, 1993). Agarwal and colleagues (2020) applied a top-down costing approach in 47 health centres across eight of the eleven regions of Ethiopia and calculated the recurrent cost per out-patient consultation at health centres at USD 2.72 (Agarwal et al., 2020).

1.6 Research gap and justification of the study

Based on the appraisal of the literature, the study identified and addressed three gaps in knowledge relating to targeted user fee exemptions: their effects on healthcare utilization, their potential to protect the ultra-poor from financial hardship and the cost implications for the healthcare system to provide first-level curative healthcare services to the exempted ultra-poor nationwide.

First, there is little evidence on the effects of targeted user fee exemptions on healthcare utilization among the ultra-poor. Most evidence from Burkina Faso and other African countries assesses the effect of user fee exemption for the general population (Cottin, 2018; Flink et al., 2016; Lépine et al., 2018b) (Lépine et al., 2018a) or other vulnerable groups (H. T. Nguyen et al., 2018; Ridde, Haddad, et al., 2013; Zombré et al., 2017). Only one study assessed the effect of user fee exemptions on the ultra-poor in Burkian Faso (Atchessi et al., 2016a). Underlying reasons for the underrepresentation of the ultra-poor in the economic literature are the poor living conditions and the accompanying difficulties in recruiting the ultra-poor for research. In addition, the few available studies on vulnerable groups either rely only on a small dataset only with limited generalizability of results or on repeated cross-sectional designs, which usually suffer from nonequivalence between control and intervention groups causing imprecise estimations of effects. Considering the scarcity of resources within the healthcare system in LMICs, such evidence on the impact of targeted user fee exemptions on utilization is crucial for decision-makers to assess whether the investment of public funding into user fee exemptions for the ultra-poor is justified.

Second, there is also a paucity of evidence on measuring OOPE among the targeted ultra-poor to track progress towards financial risk protection in Burkina Faso. Only a few studies are available that looked into the level and determinants of OOPE in Burkina Faso for the general population (Beogo et al., 2016; Nakovics et al., 2019; Su et al., 2006). None of these studies measured the extent to which ultra-poor are exposed to financial hardship through health service use. Given the prioritization of the principle of leaving no one behind within the 2030 agenda for sustainable development, it is crucial to closely track and understand the progress of the ultra-poor towards better financial protection and integrate the gained knowledge into the planning and prioritizing of future interventions. Studies are highly relevant to inform policymakers on the protective effect of targeted user fee exemptions from the cost of illness for the ultra-poor.

Third, although targeted user fee exemptions play a central role in the equitable access and equitable financing of PHC and towards UHC, there is no evidence on the costs of providing first-level healthcare services through user fee exemptions to the ultra-poor at the national level in Burkina Faso and other LMICs in Africa. Most evidence on the costs relates to the provision of certain healthcare services to the general population (Flessa & Marschall, 2009; Storeng et al., 2008; Yugbaré Belemsaga et al., 2019) or other population groups (Aliabadi et al., 2020; Cianci et al., 2014; Ilboudo et al., 2016; Newlands et al., 2008). This dissertation addressed this gap in knowledge by estimating the recurrent and capital cost of providing first-level curative services to the exempted ultra-poor and projecting the cost and healthcare budget impact for a national scale-up. Information on the relationship between capital and recurrent costs in the provision of first-level healthcare services to the ultra-poor, the cost drivers and the cost and budget impact is essential for decision-makers when developing, maintaining or scaling up exemption policies for the poor in light of UHC and the principle of leaving no one behind. Further, decision-makers need to know the cost of the services to be purchased on behalf of the poor and because public funds are being used that are already scarce. Of particular interest in the context of the provision of PHC services to the ultra-poor is the cost of one consultation, including the costs of drugs. While former studies from Burkina Faso and its neighbouring country Ghana have included drug cost in their calculations, these estimates were not very accurate due to the applied cost allocation method (Dalaba et al., 2017; Flessa & Marschall, 2009; Mugisha, Kouyate, Dong, et al., 2002).

However, robust drug cost information is essential since drugs are expected to represent one of the most critical cost drivers in user fee exemptions in a setting like Burkina Faso.

1.7 General and specific study objectives

General objective

The general objective of this dissertation was to assess the effect of targeted user fee exemptions on the utilization of healthcare services and the financial protection among the ultra-poor and to estimate the cost of providing first-level curative services to the exempted ultra-poor in Burkina Faso.

Specific objectives

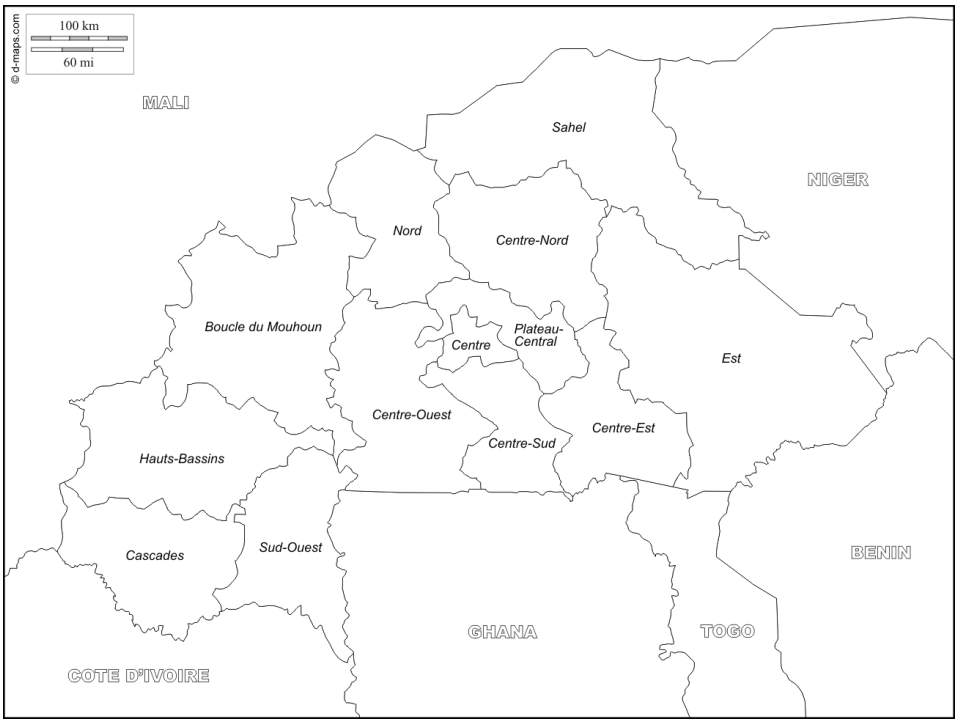
The specific objectives of the study were:

1. To establish the effect of targeted user fee exemptions on the utilisation of healthcare services among the ultra-poor
2. To assess the level of out-of-pocket expenditure and factors associated with excessive out-of-pocket expenditure among the ultra-poor
3. To estimate the capital and recurrent cost of providing first-level curative services to the exempted ultra-poor and project the cost and healthcare budget impact for providing first-level healthcare services to the exempted ultra-poor nationwide

1.8 The research setting Burkina Faso

Burkina Faso is one of the poorest countries in the world. It is a landlocked francophone country situated in West Africa with 19,19 million people (The World Bank, 2019b). It is landlocked by Mali, Niger, Benin, Ghana and Côte d'Ivoire. The 2019 human development index (HDI) for Burkina Faso is 0.452, classifying the country for rank 182 out of 189 into the low human development category. Burkina Faso has 13 administrative regions, illustrated in

Figure 2: Boucle du Mouhoun, Cascades, Centre, Centre-Est, Centre-Nord, Centre-Ouest, Centre-Sud, Est, Hauts-Bassins, Nord, Plateau-Central, Sahel, Sud-Ouest. (Government of Burkina Faso, 2016).



(D-Maps, 2021)

Figure 2. Administrative regions of Burkina Faso

In 2016, life expectancy at birth was 60 years (The World Bank, 2019a). The country's population is very young, with 59.1 % below the age of 20 years. The majority of the population (77.3 %) lives in rural areas (Government of Burkina Faso, 2011). Burkina Faso's economy depends on agriculture, forestry, livestock farming, and mineral resources exploitation (FAO, 2014). About 45 % of the population lives below the national poverty line of USD 1.90 a day (N. T. V. Nguyen & Dizon, 2017). The Northern region has the highest poverty incidence and accounts for 70.4 % compared with 9.6 % in the central region (Ministry of Health Burkina Faso, 2016). The total expenditure on health accounted for 5 % of the GDP in 2014 (WHO 2016b). The out-of-pocket spending in 2017 was estimated at 32 % of

the current total health expenditure (WHO, 2019b), especially exposing the ultra-poor to a high risk of financial catastrophe.

1.8.1 The healthcare system and financial risk protection

The public health care system is organized in a classical pyramidal model, structured in three levels providing primary, secondary and tertiary care (Ridde, Haddad, et al., 2010a). Primary healthcare centers, the so-called 'Centre de santé et de promotion sociale' (CSPS) provide the services at the primary level (Ridde, Haddad, et al., 2010a). These consist of a dispensary, a maternity center and an essential drug depot. District hospitals provide medical care at the secondary level and offer surgical services (Ridde, Haddad, et al., 2010a). Regional and national hospitals provide tertiary level healthcare services. A referral system ensures service provision across all levels of care (Ridde, Haddad, et al., 2010a). User fees apply to both consultations and medications and are still predominant at all levels of care (Ridde & Yaméogo, 2018).

According to the 2015 statistical yearbook, the public health system comprises 1836 public health facilities (4 university health centers, nine regional hospitals, 47 medical centers with surgical units, 39 medical centers, 1694 health and welfare centers and 43 offices for workers' health. A total of 451 health facilities and 716 pharmacies and dispensaries belong to the private health sector (AfDB, 2015)

At the time of the research, only about 10 % of the population was covered by a health insurance scheme that protects them from financial risk due to illness (F. Bocoum et al., 2018). This 10 % was mainly composed of state-employed officials, or military affiliates, that are covered through the "Caisse nationale de sécurité sociale", CNSS (National Fund for Social Security) or when retired by the "La caisse Autonome de retraite des Fonctionnaires (CARFO) du Burkina Faso" (Dong et al., 2004). The rural and ultra-poor did not currently enjoy insurance coverage (Dong et al., 2004). Community-based and private commercial health insurance only covered less than one per cent of the population (Zett & Bationo, 2011).

1.8.2 Health profile and current challenges to healthcare provision

Despite evident progress, the health situation in Burkina Faso is still characterized by a high burden of diseases and mortality rates and disparities in access to health care (MoH, 2011). The leading causes of death are lower respiratory infections, malaria, diarrheal diseases, strokes and pre-term complications, followed by ischemic heart diseases, meningitis, birth trauma, road injuries and HIV/AIDS (WHO, 2016b). Mothers and children depict two of the most vulnerable groups (MoH, 2011). The country has a high infant mortality rate of 64,1 deaths per 1.000 population, and the under-five mortality rate is 97.6 (UNICEF, 2014). In 2013, the maternal mortality ratio was 400/100,000 live births (WHO & UNICEF, 2014). The percentage of women attending at least four prenatal visits varies according to income (12 % in the poorest quintile and 32 % in the richest (WHO, 2016a).

These figures reflect the bottlenecks of health care in the country. The system suffers from inadequate coordination and insufficiently functioning health facilities. There is a lack of qualified health personnel and supporting staff at all levels (WHO, 2016c). Only 0.45 physicians, 3.57 nurses and 2.39 midwives are available for 10.000 people (AfDB, 2015). User fees contribute to low utilization rates in a context where quality is also an issue. This contributes to elevated mortality rates, especially among the ultra-poor (Ridde, Turcotte-Tremblay, Souares, Lohmann, Zombré, Koulidiati, Yaogo, Hien, Hunt, Zongo, et al., 2014).

1.8.3 The emergence of user fee exemption policies and pilot projects for the ultra-poor in Burkina Faso

The government of Burkina Faso decided to exempt the ultra-poor from paying for healthcare at the primary level in the context of the BI in the '90s but failed to execute the adopted policy (Comité préparatoire de l'Initiative de Bamako, 1992). The following years were characterized by new attempts to introduce explicit exemption policies for the ultra-poor. In the early 2000s, the government introduced explicit exemption policies for selected medical conditions (tuberculosis, HIV, malnutrition) and specific categories of the population (World Bank, 2010). In 2002, the government released a policy to remove user fees for antenatal care (ANC) (Ridde et al., 2011). The user fee reduction policy implemented in 2007 partially reduced user

fees for obstetric services and exempted the poorest women from paying any user fees for delivery services (Ministry of Health, Burkina Faso, 2016). In 2009, the government designed an exemption policy that allowed the most vulnerable to access preventive and curative services at public health facilities free of charge. Even though endorsed by legislation, the policy has rarely been effective in targeting the poorest quintile, partly due to chaotic implementation and insufficient funding (Ridde, 2015).

Pushed by civil society and donors, the government of Burkina Faso finally adopted the law on Universal Health Insurance (*loi sur l'assurance maladie universelle*) in September 2015. This significant milestone was reached only after the revolution that ended the almost three decades of rule by Blaise Compaoré. The law offered basic health protection for all its citizens with a uniform service basket (F. Bocoum et al., 2018). The government transformed the law in early 2016 into a momentous decree. It expanded the free access to health care by completely removing user fees for all services to pregnant and lactating women and children under the age of five (Agier et al., 2016; H. T. Nguyen et al., 2018). The decree also recognized the state's liability to pay the ultra-poor user fees and entailed that the state makes payments to the so-called 'management bodies'. The state, however, has not yet defined who these management bodies are (Kadidiatou et al., 2018). Hence the implementation of this component of the decree lags behind the political commitment.

Pilot-projects to target and exempt the ultra-poor in Burkina Faso

Before adopting the national decree, research teams together with non-governmental organizations (NGOs) took the lead with the permission of the Burkinabè government to implement exemption pilots on a smaller scale to improve the ultra-poors' utilization of health care services. The first pilot was set up in the Ouargaye district in 2008. The ultra-poor were selected based on a community-based process and received exemption cards (Ridde et al., 2010). In 2010, the German NGO HELP implemented a community-based selection of the poor in two rural districts (Dori and Sebba) and combined exemption measures with awareness-raising campaigns, community mobilization and the training of health facility staff (Simporé et al., 2013). In 2012, an adapted selection process was tested in a formal and an informal neighbourhood in Ouagadougou (Ridde, Rossier, et al., 2014). In 2014, Burkina Faso

received funding from the World Bank to test performance-based financing (PBF) with three different equity measures on a larger scale (Ridde, Turcotte-Tremblay, Souares, Lohmann, Zombré, Koulidiati, Yaogo, Hien, Hunt, & Zongo, 2014; Turcotte-Tremblay et al., 2017). Two of three equity measures entailed a targeted user fee exemption intervention with in-built financial incentives for the health care worker to treat the poor. Evidence on the equity impacts of these complex PBF components directed towards the ultra-poor is largely lacking. A full description of the PBF program with its different components is available elsewhere (Ridde, Turcotte-Tremblay, Souares, Lohmann, Zombré, Koulidiati, Yaogo, Hien, Hunt, Zongo, et al., 2014). In the next chapter, the author describes the main features of the user fee exemption intervention to impart to the reader a better understanding of the following research.

1.8.4 Study intervention: Targeted user fee exemptions within PBF context

In 2014, Burkina Faso embedded targeted user fee exemptions for the ultra-poor within the context of the PBF intervention in Burkina Faso. Ultra-poor were selected based on a community-based approach and provided an exemption card allowing them to access healthcare services free of charge. The intervention was implemented between 2014 and 2018 in eight health districts (Diébougou, Batié, Kongoussi, Kaya, Ouargaye, Tenkodogo, Gourcy, Ouahigouya) (Ridde, Turcotte-Tremblay, Souares, Lohmann, Zombré, Koulidiati, Yaogo, Hien, Hunt, Zongo, et al., 2014).

Ultra-poor identification and selection

CBT was used to identify up to 20 % of all individuals residing in the district as extremely poor. The Society for Studies and Public Health Research (SERSAP), a private for-profit consultancy agency, led the implementation of the CBT intervention (Ridde, Turcotte-Tremblay, Souares, Lohmann, Zombré, Koulidiati, Yaogo, Hien, Hunt, & Zongo, 2014; Turcotte-Tremblay et al., 2017)**.** The financial costs of the CBT intervention were estimated at USD 587,510 (Beaugé et al., 2018). Community selection committees (CSC) were set up across the districts at the village level (gender-balanced) to select the poor. The process started

in May 2014 and ended in January 2016. The community committees based the selection on their profound knowledge of the population guided only by the definition of an ultra-poor person as "someone who is extremely socially and economically disadvantaged, unable to care for himself (herself) and who is without internal or external resources" (Ridde, Haddad, et al., 2010b). The CSC compiled a list of the selected ultra-poor that testified their valid eligibility for user fee exemptions (Ridde, Haddad, et al., 2010b). A total of 102,609 were identified as ultra-poor (5.8 %) out of 1,745,789 inhabitants from the eight health districts (Beaugé, De Allegri, et al., 2020). The CBT process was estimated to cost 5.73 USD (financial costs) per identified ultra-poor person (Beaugé et al., 2018).

Exemption card mechanism and included benefit package

Upon the successful completion of the selection process (November 2015 – January 2016, depending on the district), every identified ultra-poor person was supposed to receive an exemption card. The card proved their indigent status and allowed them to access all services included in the PBF benefit package free of charge (Beaugé et al., 2018). However, evidence from the process evaluation indicated that not all initially selected ultra-poor received an exemption card. The PBF benefit package covered general curative consultations, maternal care services, and family planning (De Allegri et al., 2018). **Table 2** shows the population, number and percentage of identified ultra-poor and reception of exemption card by all eight districts.

Table 2. Population, number and percentage of identified ultra-poor, and reception of exemption card by all eight districts reported by the project management team

District	Population	Selected Ultra-Poor	Percentage of Selected Ultra-Poor (%)	Month Exemption Card Received by the District
Diébougou	69,062	6034	9	February 2016
Gourcy	132,280	5879	4	June 2016
Kaya	554,117	22,889	4	November 2015
Ouargaye	277,082	16,465	6	December 2015
Tenkodogo	216,190	18,769	9	December 2015
Kongussi	343,434	6076	2	November 2015
Ouahigouya	114,294	19,937	17	June 2016
Batie	39,330	6560	17	February 2016

Reimbursement procedure within PBF context

In two-thirds of the healthcare facilities, health workers received a lump sum to compensate for the loss of income from user fees in addition to the regular PBF fee-for-case payments (Ridde, Turcotte-Tremblay, Souares, Lohmann, Zombré, Koulidiati, Yaogo, Hien, Hunt, & Zongo, 2014). This lump sum was computed to be around the expected average cost of treatment. In about half of all selected facilities, health workers also received additional financial incentives to actively reach out to the ultra-poor and provide them services. These higher supply-side incentives were meant to increase the provider's motivation to treat the poor and were expected to substantially increase the revenues in the respective facilities. The ultimate aim was to increase the utilisation of services by the poor to a higher level in contrast to user fee exemptions alone. However, these higher incentives only pertained to services typically offered against payment of direct user charges at point of use (i.e., curative consultations, hospitalisations, delivery services, family planning). A list of the indicators for primary and secondary level facilities with the different prices for ultra-poor and nonpoor patients is provided in Appendix 1 and 2. The program did not cover transport costs to the facility in case of illness. The expiration date was not recorded on the exemption card. To deal

with issues of over-supply, as theorised by the PBF programme designer, a ceiling was imposed, whereby a maximum of 10 % of all consultations could be filed for reimbursement as offered to the ultra-poor. Once the ceiling was exceeded, providers were reimbursed based on the standard fee-for-case incentive rate for nonpoor patients. These payments ranged from FCFA 400 minimum (USD 0.7) for a basic consultation of an ultra-poor person by a nurse at the primary health care facility to FCFA 33500 (USD 56) for major surgery such as an appendectomy at the district hospital. In contrast to that, for the nonpoor, providers received FCFA 100 (USD 0.2) and FCFA 14500 (USD 25), respectively (Appendix 1 and 2). PBF unit prices were adjusted throughout the project life cycle in response to both project budget shortages and the implementation of the 2016 *gratuité* policy. A central organisational unit, the PBF Technical Service, was established to support the implementation of PBF and the health care facilities by developing and monitoring indicators, supervising audits, organising training workshops, and analysing performance data (Ridde, Yaogo, et al., 2018)

2 Methods

Note: The doctoral student published aspects of this chapter in the following publications:

1. Beaugé, Y., De Allegri, M., Ouédraogo, S., Bonnet, E., Kuunibe, N., & Ridde, V. (2020). Do Targeted User Fee Exemptions Reach the Ultra-Poor and Increase their Healthcare Utilization? A Panel Study from Burkina Faso. *International Journal of Environmental Research and Public Health*, *17*(18), 6543.
2. Beaugé, Y., Ridde, V., Bonnet, E., Souleymane, S., Kuunibe, N., & De Allegri, M. (2020). Factors related to excessive out-of-pocket expenditures among the ultra-poor after discontinuity of PBF: A cross-sectional study in Burkina Faso. *Health Economics Review*, *10*(1), 1–11.

This chapter has three sub-sections (2.1 to 2.3). The methods for study objective one and two are descripted in section 2.1. The description of the study population (2.1.1), data and its sources (2.1.2), the conceptual framework (2.1.3) and study variables (2.1.4) is done in combination for objective one and two. The analytical approach, however, differs for each objective and is described individually. For objective one the analytical approach is descripted in section 2.1.5, for objective two in section 2.1.6. Section 2.2 outlines the methods applied for objective three, including the study design and overall approach (2.3.1), data and its sources (2.3.2), the analytical approach to estimate the costs (2.3.3) and the budget impact (2.3.5). The methods chapter concludes with a description of the ethical considerations (2.3).

2.1 Study objective one and two

The first study objective was to establish the effect of targeted user fee exemptions on the utilisation of healthcare services among the ultra-poor. The second study objective was to assess the level of out-of-pocket expenditure and factors associated with excessive out-of-pocket expenditure among the ultra-poor. Both study objectives relied on the same study population, data source, conceptual framework and study variables, which are described hereafter.

2.1.1 Study population

The author conducted the study in Diébougou, Gourcy, Kaya and Ouargaye health district, four of the eight health districts in Burkina Faso where PBF was combined with targeting and exemption of the ultra-poor.

Diébougou is in the Bougouriba Province in the southwest region of Burkina Faso and has a total population of 139,824 (Institut national de la statistique et de la démographie (INSD), 2015). There are 24 functioning government healthcare facilities (4 dispensaries, 19 CSPS and one district hospital) with a total of eight general practitioners and two pharmacists (Ministère de la santé Du Burkina Faso, 2017). In 2016, the average annual number of healthcare contacts per inhabitant was 1.68 (Ministère de la santé Du Burkina Faso, 2017), which is higher than the country-wide average of 1.02 contacts. The CBT process identified 6034 people in Diébougou as ultra-poor in 2015, which related to about nine per cent of the district's population (SERSAP, 2015). In early February 2016, the district management received the exemption cards for further distribution via the CSPS to the ultra-poor.

Gourcy is located in the province of Zondoma in the centre-north region of Burkina Faso and has a total population of 227 912. There are 34 functioning government facilities (4 dispensaries, 29 CSPS and one district hospital) with five general practitioners and one pharmacist (Ministère de la santé Du Burkina Faso, 2017). In 2016, the average annual number of healthcare contacts per inhabitant was 1.14 (Ministère de la santé Du Burkina Faso, 2017). The CBT process identified 5879 people in Gourcy as ultra-poor in 2015 (Beaugé, De Allegri, et al., 2020), which related to about four per cent of the district's population. In June 2016, the district management received the exemption cards.

Kaya is located in the province of Sanmatenga in the centre-north region of Burkina Faso and has a total population of 395 812. Kaya has 41 functioning government facilities (3 dispensaries, 1 Infirmerie/SST, 38 CSPS and 1 CHR, one district hospital) with 15 general practitioners and six pharmacists (Ministère de la santé Du Burkina Faso, 2017). In 2016, the average annual number of healthcare contacts per inhabitant was 1.18 (Ministère de la santé Du Burkina Faso, 2017). The CBT process identified 22,889 people in Kaya as ultra-poor in 2015 (Beaugé, De Allegri, et al., 2020), which related to about four per cent of the district's

population. Kaya was one of the first districts to receive the exemptions cards in November 2015.

Ouargaye is located in the province of Koulpélogo in the centre-est region of Burkina Faso and has a total population of 362,918. Ouargaye has 32 functioning government facilities with four general practitioners and one pharmacist (Ministère de la santé Du Burkina Faso, 2017). In 2016, the average annual number of healthcare contacts per inhabitant was 1.20 (Ministère de la santé Du Burkina Faso, 2017). The CBT process identified 16,465 people in Ouargaye as ultra-poor in 2015 (Beaugé, De Allegri, et al., 2020), which related to about six per cent of the district's population. In December 2015, the district management received the exemption cards.

2.1.2 Data and their sources

The studies relied on a panel dataset of 1652 ultra-poor surveyed in the first round between February and April 2015, in the second round between February and March 2017 and in the third round in June 2019. During the first and second rounds, the respondents were residents in Diébougou, Gourcy, Kaya and Ouargaye health district (N=1652). The third round of the survey could only be maintained in Diébougou district (N=292). All of the respondents residing in the four districts were initially identified as ultra-poor by the community-based targeting process embedded within the PBF-programme **(see sections 1.8.4).**

Sampling technique

The respondents were selected using a multistage random sampling technique. The first stage involved the random selection of four out of eight PBF districts with CBT. These four districts comprised 1,032,541 inhabitants, of which 51,267 people were identified as ultra-poor by the CBT. The second stage was the random selection of communes and villages within each district. Villages were only included if they contained a minimum of 10 ultra-poor identified by the CBT. Fifty-eight villages met this criterion. The third stage involved selecting ultra-poor aged 18 and above and whose name was on the original ultra-poor list and were recruited for the survey.

Ultra-poor were excluded if they could not give informed consent or could not understand or answer survey questions. Further details on sampling procedures are described in two previous studies (Ouédraogo et al., 2017; Pigeon-Gagné et al., 2017), which assessed the characterization of the rural ultra-poor population and their mental health needs.

Data collection

The data collection tools were structured, closed-ended digital questionnaires. Data was collected using tablets by five trained enumerators fluent in the local language under the supervision of a study coordinator. The surveys included the following five sections: identification of the indigent sociodemographic characteristics, health and health service use, mental health and cognitive functioning. The interview duration was, on average, one hour.

To establish the effect of targeted user fee exemptions on the utilisation of healthcare services among the ultra-poor (objective 1), the author made use of the data collected in all four health districts during the first and second round of the survey. For assessing the factors associated with excessive OOPE (objective 2), the author used the data collected during the third round of the panel since information on OOPE was exclusively collected in 2019.

2.1.3 Conceptual framework

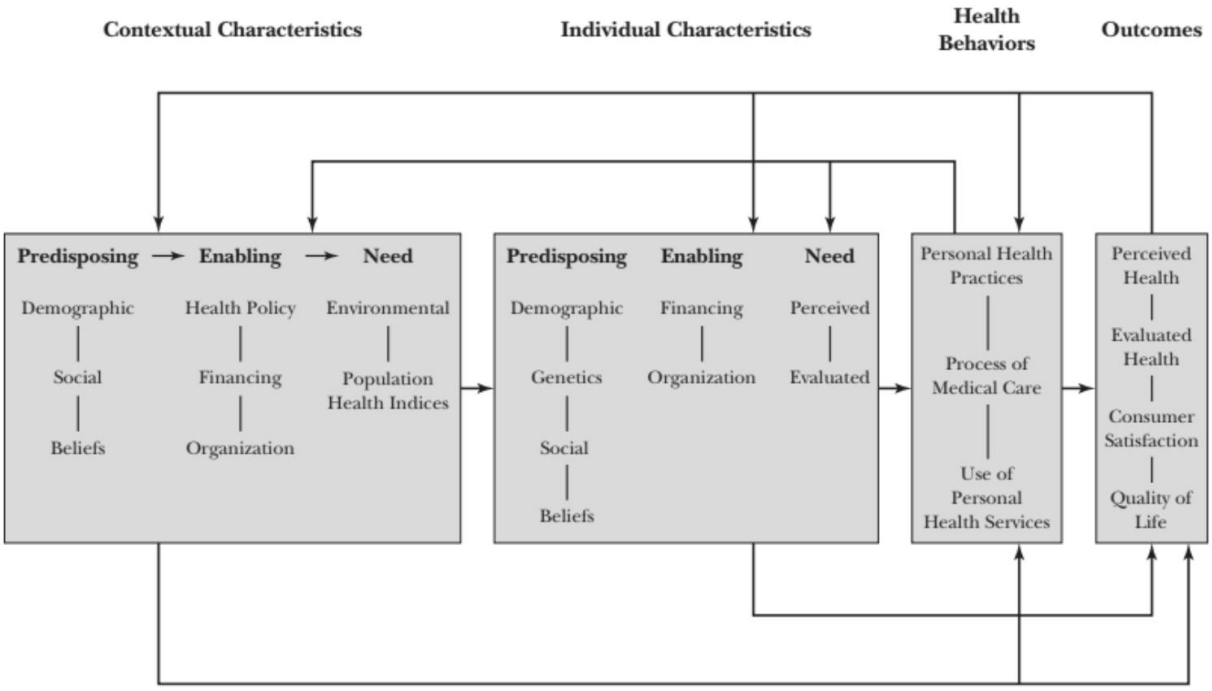
The author relied on Andersen's behavioral model to establish the effect of targeted user fee exemptions on the utilisation of healthcare services among the ultra-poor (objective 1) and assessing the determinants associated with excessive OOPE (objective 2).

Andersen behavioral model of health service use

The Andersen Behavioral model of health service use was developed in 1968 by an American health service researcher and sociologist, Ronald M. Andersen (Andersen, 1995). Initially, he developed the model to understand better how and why families use healthcare services (Andersen, 1995). Later, Andersen changed the unit of analysis to the individual (Andersen, 1995). The basic model suggests that people's health service utilisation is a function of their

predisposing, enabling and need factors (Andersen, 1995). Over the years, the model has been expanded numerous times. In its most recent form (illustrated in (Andersen, 1995; von Lengerke et al., 2014)

Figure 3), the model has evolved from the mere use of services to the inclusion of health outcomes and feedback loops representing the interrelationship of health outcome, predisposing and need factors, and health behavior (Andersen, 1995). Predisposing, enabling and need factors are further differentiated at both the individual and the contextual level (von Lengerke et al., 2014).



(Andersen, 1995; von Lengerke et al., 2014)

Figure 3. The re-revisited Andersen's behavioral model

Predisposing characteristics include demographic factors, e.g., age, gender, and social structure and individual health beliefs (Andersen, 1995). Social structure is related to the status of a person in the community that is traditionally assessed by their educational and occupational status and ethnicity (Andersen, 1995). Health beliefs refer to attitudes, values,

and knowledge about health and healthcare services (Andersen, 1995). Health beliefs influence perceptions of the need for healthcare services and their utilisation (Andersen, 1995).

Enabling factors include financial and organizational resources that are necessary to utilize healthcare services. Financial resources refer to the individual's wealth, family support, or exemption cards or access to health insurance. Organizational resources relate to the availability and the nature of the source of care for a given individual. E.g. the number, types, and location of health facilities and health professionals are organizational characteristics (Andersen, 1995). Other factors like the means of transportation, travel time and waiting time for healthcare can be included (Andersen, 1995).

Need factors are differentiated between perceived and evaluated need factors. Perceived need refers to how individuals rate their health, while the latter refers to an evaluation by a professional, e.g. healthcare provider (Andersen, 1995). The need perception can be influenced in both directions, positive and negatively, by the perceived severity of illness, access to health education programs, and availability of financial resources (Bradley et al., 2002).

Health behaviors refer to any personal practice such as diet, physical activity, or self-care that affects the individual's health status. Health behaviors also include medical care such as counselling or drug prescription and the behaviors of the healthcare providers towards the patients (Andersen, 1995).

Health outcomes can be either perceived or evaluated. Perceived health outcome refers to how individuals rate their health status, while the evaluated health status is based on the evaluation by health professionals. Satisfaction with the received healthcare services and quality of life are other important outcomes (Andersen, 1995).

2.1.4 Study variables

Outcome variables - Study objective one

To operationalize study objective one, the author defined two outcome variables. The first outcome variable (Model 1) was defined as 'the possession of user fees exemption card'. It was based on the survey question "Have you received a card about a year ago that you can present at the healthcare centre to receive care for free? – Yes or No". The possession of exemption card was used as a proxy for being entitled to free healthcare services at the healthcare centre.

The second outcome variable (Model 2) was defined as 'utilisation of healthcare services' and was based on those individuals who reported an illness in the last six months. This variable referred to whether the respondent went to the healthcare centre six months before the survey irrespective of what kind of services were used (in-patient or outpatient)—Yes or No. Healthcare centre refers to CSPS or district-level hospitals. The targeted exemptions cards were earmarked only for formal healthcare services provided by the CSPS or district-level hospitals.

The decision to look first at factors that determined the possession user fees exemption card was made to understand which individuals had been more or less likely to receive a card. The reason is that evidence from the process evaluation indicated that not all initially selected ultra-poor had effectively received an exemption card. The decision was motivated by the wish to provide a comprehensive picture of the effectiveness of the targeting.

Outcome variables - Study objective two

The outcome variable for the second study objective was 'excessive OOPE for formal healthcare services' without transportation costs (Model 3). Transportation costs were excluded because the user fee exemptions did not cover transportation costs. Formal healthcare services refer to curative healthcare services sought by the respondent either at the CSPS or district-level hospitals. As the dataset did not include household consumption or income data (study population = ultra-poor without financial means), it was not possible to measure catastrophic expenditures. The direct OOPE for formal healthcare of the ultra-poor

was dichotomized (0 = no excessive spending, 1=excessive spending). The category 0 = no excessive spending includes the zeros, i.e., the ones treated for free due to exemption cards, while the category ‘excessive spending’ captures OOPE above a given threshold (explained in section 2.1.6). The main explanatory variable was the exemption card. It is a dichotomized variable and refers to whether a respondent has received a user exemption card that he/she could present at the health centre to receive free care within the context of the PBF intervention.

Explanatory variables

Explanatory variables were selected based on the availability in the datasets and in accordance with the Anderson behavioral model of health service use as the analytical framework (Andersen, 1995). According to the framework, explanatory variables were grouped into predisposing, enabling and need-related factors (shown in **Table 3)**.

Table 3. Explanatory variables, their definition and measurement

Variables	Definition	Measurement
Outcome variables		
1. Study objective		
Possession of user fee exemption card	Individual's possessing an exemption card	Dichotomous
Utilisation of healthcare services	Individual's using healthcare services in the last six months	Dichotomous
2.Study objective		
Excessive OOPE on formal healthcare services	Individuals having expenditure greater than or equal to two times the median out-of-pocket expenditure	Dichotomous
Explanatory variables		
Predisposing factors		
Age	Individual's age in years	Continuous
Sex	Individual's gender	Dichotomous
Marital status	Individual's marital status	Dichotomous
Status in the household	Individual's status in the household	Dichotomous
Household size	Number of individuals in the same household	Continuous
Enabling factors		
Possession of user fee exemption card	Individual's possessing an exemption card	Dichotomous
Education	Individual's educational status	Dichotomous
Basic literacy	Individual's literacy status	Dichotomous
Distance	Euclidean distance between residential location of respondents and nearest healthcare center	Dichotomous
Need factors		
Health status	Individual's health status	Dichotomous
Disability	Individual's disability status	Dichotomous
Health district	Health district (Kaya is base category)	Categorical
Poverty index	Measure of individual's level of poverty (Poorest is base category)	Categorical
Time	Year of the panel	Dichotomous

Predisposing factors: Predisposing factors were age, household size, status in the household, sex and marital status. Age (in years) and household size (number of members) was a continuous variable. Sex was a dichotomous variable (male/female). Marital status was a categorical variable with five categories (single, monogamous married, married polygamous, widowed, divorced/separated). The original variable was transformed into a binary variable (All else and married) for multivariate analyses to expose the particular vulnerability associated with an unmarried status. Status in the household was a categorical variable with 11 categories (Household head; spouse; brother/sister; son/daughter; nephew/niece; Grandson/daughter; father/mother; cousin; son/daughter in law; mother/father-in-law; other parent; another link). This variable was dichotomized to express the superiority associated with being a household head.

Enabling factors: Enabling factors were educational level, basic literacy and distance to the health facility. Educational level was a categorical variable with 16 categories (1 none; 2 nursery school; 3 CP1 4 CP2; 5 CE1 6 CE2; 7 CM1; 8 CM2; 9 Sixième; 10 Cinquième; 11 Quatrième; 12 Troisième 13 Seconde; 14 Première; 15 Terminale; 16 Supérieur). As done by previous studies performed in a rural African context (Atchessi et al., 2014), the original variable educational level was transformed into a binary variable (no education and education). Less than six per cent of the study samples (ultra-poor population) received any form of education. The category 'Education' contained all those respondents who attained higher education than a nursery school. Basic literacy was defined as the ability to write and was a dichotomous variable (Yes/No). The variable distance was dichotomized to reflect the standard of having a primary health facility within and outside a radius of five km as set by the World Health Organisation. For Model 2, user fee exemption card possession was added as a dichotomous variable (Yes/No). Suppose respondents had been identified as ultra-poor but did not receive their exemption card due to a default in the system. In that case, they could not prove their ultra-poor status and were thus theoretically not eligible for free services. They were coded as respondents without an exemption card (exemption card – 0). This information was self-reported.

Need factors: Need factors were self-rated perceived health and disability. Self-rated perceived health was a categorical variable (good, medium, bad). The variable was

transformed into a binary one (All else/Good). Disability was a dichotomous variable (Yes/No).

For objective one, the district was added as another explanatory variable (1 = Kaya; 2 = Ouargaye; 3 = Diébougou; 4 = Gourcy). This was done due to slight variations in the implementation of the targeting and exemption mechanism across the districts (e.g., transportation of exemption cards to respective districts at different time points (shown in **).** This could have impacted the utilisation of healthcare services by the ultra-poor. Time dummies (0 = 2015: 1 = 2017) were created to control for time variations of the dependent variable across the panels.

Information about the ultra-poors' assets was not available in the first and second but in the third round of the survey. Thus, only for objective 2, the author computed a poverty index using Principal Component Analysis (PCA) on durable asset ownership and housing characteristics specific for this rural location. This approach allowed classifying the ultra-poor from the poorest (1) to the least poor (3) to capture their socio-economic differences.

Concerning the out-of-pocket expenditure, it was expected that women, the uneducated, unmarried and respondents in the lowest category are more vulnerable towards an increased risk of excessive spending (Su et al., 2006; Xu et al., 2006). An older age, bad health status and a disability were also expected to contribute to an elevated risk of excessive spending. Increased age and a bad health condition contribute to a higher need for healthcare (Brinda et al., 2014; Nakovics et al., 2019). Greater household size was expected to contribute to an elevated risk of excessive spending since they might experience more illness (Su et al., 2006). At the same time, large households are more likely to have elderly in their union who carry an elevated risk for healthcare. Exemption card ownership was expected to lower the probability of excessive spending (Ameur et al., 2012). Prior work has indicated that household heads are more likely to seek care and incur higher OOPE than other household members, as their health is essential for the household's survival (Chen et al., 1981; Mugisha, Kouyate, Gbangou, et al., 2002; Sen & Östlin, 2008). Living remotely from the health facility was expected to be positively associated with excessive spending since ultra-poor seek formal healthcare at remote health facilities when illness is already very severe requiring complex treatment (Masiye et al., 2016; Mchenga et al., 2017).

The author relied on different analytical approaches to answer objectives one and two. The analytical approach for study objective one is described in the following section 2.1.5. The analytical approach for objective two is explained in section 2.1.6.

2.1.5 Analytical approach - study objective one

The analysis of the first objective began with a descriptive and comparative analysis to determine the characteristics of each study sample at baseline (2015) and endline (2017) separately. The Chi-square, the t-test and the two-sample Kolmogorov-Smirnov test were used to determine whether the baseline and follow-up sample had identical statistical distributions. The significance level was set at $\alpha \leq 0.05$.

Second, two distinct models were used to a) assess factors that determine the possession of user fees exemption card (Model 1); and b) determine the effect of this card possession on healthcare service utilisation among those who reported an illness six months before the surveys (Model 2). The choice of working with two separate models (accounting in the second model for all possible observable confounders identified in the first one) resulted from the fact that the dataset did not provide a valid instrument for the application of an effective two-part joint model (Achen, 1986; Certo et al., 2016). Having defined a binary outcome variable for both models (Yes/No), a multiple logistic regression was fitted for Model 1 and a panel regression analysis using a random-effects model for panel data using two time periods (2015 and 2017) for Model 2.

For Model 1, the author performed a multiple logistic regression analysis using only data from the second round of the panel (2017) (during the first round of the survey in 2015, nobody could have received an exemption card yet). The estimated model is of the form:

$$y^* = X'\beta + \sigma \qquad (1) y = 1 \; if \; y^* \text{ and 0 otherwise}$$

where $y^* = 1$ for exemption card possession X' is a vector of explanatory variables; β is a vector of coefficients; and σ is the random error term.

For Model 2, the author performed a regression analysis using a random-effects model (Bell et al., 2019; Bell & Jones, 2015) clustered at the individual level and restricted to individuals reporting an illness episode in the preceding six months using the first round (2015) and second round of the panel data (2017). The estimated model is of the form:

$$y_{it}^{*} = X_{it}'\beta + \epsilon_{it}, i = 1, \ldots., n; t = 1, \ldots., T \qquad (2)$$

$$y_{it} = 1 \; if \; y_{it}^{*} \text{ and 0 otherwise}$$

where $y_{it}^{*} = 1$, for utilisation of health care services and for illness reporting for individual i in period t; X_{it}' is a vector of explanatory variables; β is a vector of coefficients; and $\in_{it}$ is the random error term.

Usually, a fixed-effect model (FE) is the preferred choice when working with repeated observations for the same subject for analyzing the impact of a variable of interest that varies over time. FE allows for minimizing the potential for unobserved heterogeneity and omitted variable bias (Hill et al., 2019). However, a significant limitation of FE is that one cannot assess a reliable effect if one has insufficient variability over time in the predictor variable (Hill et al., 2019). For this analysis, the author had to select a random instead of a fixed-effect estimation due to too little variation in the main explanatory variable—card possession (given the structure of the distribution campaign). The specification by Greene (Greene, 2003) for analyzing unbalanced panels was followed.

Model 1 and 2 were estimated by using the same set of explanatory variables. In Model 2, the possession of exemption card was the main explanatory variable, used as a proxy for being entitled to free healthcare services at the healthcare centre. The coefficients were estimated with a 95% CI (Confidence Interval).

Additionally, the respondents were geolocated to understand patterns in the distribution of the exemption cards that is useful to better discuss the findings of the effects of the user fee exemption card on the utilization of healthcare services. The information was integrated into the Geographic Information System' ESRI ArcGis' version 10.6 (ESRI Inc., Redlands, California, USA). The Euclidean distances were estimated between each respondent and the nearest healthcare centre, using direct lines (Talen, 2016). The point analysis (location of

ultra-poor) and the kernel density estimator method were applied (Banos & Huguenin-Richard, 2000). The densities represent the concentration of selected ultra-poor within a radius of 2000 m.

The analysis was operationalized using the statistical package STATA version 15.0 (Stata Corp, Lakeway Drive, College Station, TX, USA).

2.1.6 Analytical approach - study objective two

For the analysis of the second objective, the author made use of the data collected during the third round of the panel (N=292) since information on OOPE was exclusively collected in 2019. The truncated sample of respondents was used who utilized formal healthcare services at the healthcare facility conditional upon illness reporting in the prior six months (N=110). The underlying reason was that user fee exemption cards were earmarked only to healthcare services provided by formal healthcare facilities.

First, descriptive statistics were applied to identify sample distribution for all variables included in the analysis. The author calculated the mean, standard deviation (SD), median, range values for OOPE on formal healthcare services, transportation to receive formal healthcare services and overall OOPE. All expenditure variables were recorded in FCFA (FCFA 1 = 0.0017 USD). Extreme values of the dataset were first graphically investigated by using boxplots. After verifying the validity of the values with the study coordinator and enumerators, the author did not screen out and included in the dataset three illness episodes, which had resulted in OOPE above FCFA 100,000 (USD 173). The nature of these extreme values was cross-checked with the study coordinator and enumerators, who confirmed their validity. These extremely high OOPE refer to ultra-poor who had been evacuated for surgeries. The costs were covered by family and, in particular, by adult children living abroad (Ivory Coast and Ghana). Although these poor people received external support and might not comply with the previously mentioned definition of ultra-poor, they were initially identified as such and therefore not excluded from the regression analysis as they are accurate representations of community reality. The author displayed mean OOPE using four different

scenarios: OOPE, including zeros and outliers, excluding only zeros, excluding only extreme values and excluding zeros and extreme values.

However, the author used the dichotomized variable 'Excessive OOPE on formal healthcare services' for the regression analysis. Three different thresholds were used: 1. "high expenditure", 2. "medium-high expenditure", and 3. "extremely high expenditure". Threshold 1 was used for the main model and threshold 2 and 3 for sensitivity analysis. As done by authors in previous studies (Laokri et al., 2018), "High expenditure" was defined as having expenditure greater than or equal to two times the median; "Medium-high expenditure" as having expenditure greater than or equal to the median; and "Extremely high expenditure," as having expenditure greater than or equal to three times the median.

Since the outcome of interest was classified as binary, $y_i = \begin{cases} 1 \; if \; y^* > 0 \\ 0 \quad otherwise \end{cases}$; where $y^* = x_i\beta + \mu_i$ (1), multivariate logistic regression was performed to investigate the factors related to excessive OOPE among the ultra-poor on formal healthcare services for a single illness episode within the last six months. From equation (1), y^* is the observed excessive healthcare expenditure, x_i represents individual respondent characteristics, β is the coefficients of x_i while μ_i is a symmetrically distributed error term. Following the literature (Cameron & Trivedi, 2009; Culyer et al., 2000), equation (1) was estimated using the maximum likelihood estimation procedure, and the marginal effects were calculated for each x_i to derive the magnitudes of the effect of the individual characteristics on the probability of a respondent incurring excessive healthcare expenditure while holding all other covariates constant.

As previously done for objective 1, the respondents were again geolocated. Their GPS information was transferred into a Geographic Information System to better understand patterns between the residential location of the respondents and CSPS. The point analysis (location of ultra-poor) and the kernel density estimator method were applied. The densities represent the concentration of selected ultra-poor within a radius of 2,000m.

The analysis for the second objective was also operationalized using the statistical package STATA version 15.0 (Stata Corp, Lakeway Drive, College Station, TX, USA).

2.2 Study objective three

The third study objective was to estimate the capital and recurrent cost of providing first-level curative services to the exempted ultra-poor. Secondly, using the derived recurrent cost per consultation, the study aimed at projecting the cost and healthcare budget impact for providing first-level healthcare services to the exempted ultra-poor nationwide.

2.2.1 Study design and overall approach

The author relied on two different approaches to answer the study objectives. To estimate the average capital and recurrent cost of providing first-level curative services to the exempted ultra-poor, the author conducted a retrospective micro-costing study. It is a retrospective study because the costs were determined ex-post by relying mainly on health facility records. The study only estimates the capital and recurrent costs of providing curative services to the exempted ultra-poor at the CSPS level (first-level consultation) without relating them to the consequences. The capital cost of a curative consultation includes both, building costs and equipment costs. The recurrent cost includes resources consumed during the face-to-face consultations such as consultation fees, human resources, laboratory testing and prescribed drugs. To determine both the capital and recurrent costs of the intervention, the author used a mix of bottom-up and top-down micro-costing.

To project the cost and healthcare budget impact for providing first-level healthcare services to the exempted ultra-poor nationwide, the author conducted a budget impact analysis. Given the nature of a costing study, the study does not address issues related to the quality of care.

The author adopted the health system perspective. The definition of the health system includes the Ministry of Health (MoH) in its efforts to provide first-level curative healthcare services to the exempted ultra-poor. The perspective of the health system rather than the societal perspective was adopted because of its relevance for informing the government and its future decisions on social protection policies for the ultra-poor.

The base year of the cost analysis was 2019. All costs incurred before the year 2019 were adjusted for inflation. The average exchange rate for the year 2019 was used to convert values from FCFA (Central French African Francs) to USD (1 FCFA = USD 0.0017).

2.2.2 Data and their sources

Data on resource consumption

The study relied on data from two different sources to extract information on resource consumption: health facility survey for capital costs and medical registries for recurrent costs.

A health facility survey was used to extract the information on building size and equipment (capital costs). The health facility survey was conducted in 32 CSPS, private non-profit structures), distributed across eight health districts and four regions (North, Hauts-Bassins, Est and Centre South). The objective of the survey was to collect the information on the resource consumption of capital costs concerning the provision of both delivery care services and out-patient care for children under five years old. For the purpose of this dissertation, the author extracted from this survey only data on building size and equipment for general consultations and other characteristics of the facilities such as name, region, district, facility opening date).

The survey was administered for three months from March until May 2019 by 20 trained enumerators fluent in the local language under the supervision of two study coordinators. The majority of the enumerators were final year medical students. The survey was conducted with key informants such as the CISSE and the Administrative and Financial Manager (former district manager) and triangulated with the information provided by the facility manager. The survey included the following three sections: general information on health facilities, information on building (maternity ward and consultation room), information on equipment used for childcare and general consultations, and information on overheads. The surveys were completed over one or more days within two weeks. Paper-based survey responses were transferred to Excel.

Secondly, the author relied on medical registries to estimate what recurrent resources were consumed by the ultra-poor. The study used data from medical registries of 15 CSPS and 1 CMA in Diébougou district covering the years 2015-2018. In total, 2086 medical records of

ultra-poor patients were collected. Patient registries contained clinical and non-clinical information. Additionally, contextual data from each health facility was collected, including the number of health staff, health positions and the average time of consultation. The data collection took place in February/March 2020. Ten enumerators collected the paper-based information and transferred it to Excel.

Since the PBF intervention with its user fee exemption component for the ultra-poor was only fully functional in 2016, the years 2015, 2017 and 2018 (N=561) were excluded, resulting in a sample of 1525 records. As a second step, patient records of children below five years (N=115) were excluded because they were covered by the gratuité policy that was introduced in 2016. Records with missing values were excluded (N=24). Records from the CMA were excluded (N=6). Finally, 1380 ultra-poor patient records from January 2016 – December 2016 treated at the CSPS were used.

Data on unit costs and useful life years

Unit cost information for basic consultations was extracted from the fee structure of healthcare facilities.

A complementary data collection was conducted to collect information on the average price for prescribed drugs from pharmacy registries in August 2020, covering 10 CSPS in Diébougou. A predefined drug list matrix was used. The drug list matrix was based on the entries in the medical records and listed all drugs from A – Z prescribed for the ultra-poor. This data collection was carried out by one enumerator.

The human capital approach was applied to calculate the human resource costs. For nurses, midwives and mobile health workers, the author extracted salary information from data collected within the framework of the PBF endline impact evaluation specific for the Diébougou district. The salary for medical doctors and pharmacists was adopted from literature (Y. Bocoum et al., 2009) since PBF data did not have income information on these two staff categories. Salary calculations were based on the average gross monthly salary. A working month consisting of 22 working days and 8 hours per day was used to calculate the mean salary rate per minute for health staff. The average consultation time for an ultra-poor

patient was reported by each health facility and ranged from 5 – 30 min. The average time spent by a pharmacist was estimated to be 5 min.

An interview with an expert from the MoH - Department of Infrastructures, Equipment and Maintenance (DIEM) was carried out to estimate both the average cost of building a CSPS (104 million FCFA without equipment) and the useful life years of a building (25 years). The average size of a CSPS (499.83 square meters) was derived from construction plans. The total building costs were allocated using the step-down method. The author used square meters occupied for consultations (245 square meters) from the construction plan as a base for allocating the total cost of building a CSPS to the service of providing healthcare to the poor. The unit costs and useful life years of equipment were estimated by applying and triangulating information from two different ministry structures: 1. DIEM and 2. Société de Gestion de l'Equipement et de la Maintenance Biomédicale - Management Company of Biomedical Equipment and Maintenance (SOGEMAB). Straight-line depreciation was used, whereby the value of the item was divided by its useful life years. Equipment with a defined value below FCFA 15,000 (USD 25.50) was depreciated at once.

2.2.3 Cost analysis

The cost analysis proceeded in subsequent steps. First, the author analyzed the cost of -level consultation provision while keeping the differentiation between capital and recurrent costs. According to Green (1999) and Creese (1994), capital costs are one-off expenditure or inputs that lasts more than one year, such as buildings or land. On the other hand, 'recurrent costs are the costs of maintaining and operating a given programme once the initial, one-off investment has been completed (Waddington & Thomas, 1988)'. An excellent example of recurrent costs are pharmaceuticals that are prescribed for each patient.

In total, six cost categories were identified: (1) Building costs, (2) equipment costs, (3) consultation fee, (4) pharmaceuticals, (5) human resources and (6) Overheads.

The quantity of laboratory testing for the ultra-poor at the CSPS level was insignificant and thus excluded from the analysis.

The author applied resource consumption accounting to analyze the costs (Levin, 1995).

The CostIt tool, which the WHO developed, was used to analyze the building costs. CostIT is a software designed to record and analyze cost data. The author entered the purchase price of 1 CSPS, the useful life years, the total square meter of the surface area and the area occupied for basic consultations to derive the total capital costs of 1 CSPS used for basic consultations for one year.

The author traced what equipment had been used in 32 CSPS to deliver basic consultations to analyse equipment costs. Each piece of equipment was listed for each CSPS individually, and the unit costs were attached. The life years of the respective equipment was used for deprecation. The equipment costs from each CSPS were summed and then divided over the total number of CSPS to retrieve the average annualized equipment costs for one CSPS.

Overheads for the capital cost of 20 % were added to account for the indirect administrative expenses.

The following cost formula was applied to estimate the average capital cost of providing healthcare services to one ultra-poor: $C_{pc} = \frac{C_t}{NC}$ ……. (1), where C_{pc} is capital cost per consultation, C_t is the total capital cost and NC is the total number of consultations.

To retrieve recurrent costs, the author traced all resources that had been consumed for the 1380 consultations by the ultra-poor. Second, the monetary value was attached to these resources. Third, to derive the total costs of providing first-level consultations to the ultra-poor, the author multiplied the unit costs by the quantity of the resources consumed. Overheads for recurrent costs of 20 % were added to account for the indirect administrative expenses.

The following cost formula was applied to estimate the average recurrent cost of providing healthcare services to one ultra-poor: $Rc_{pc} = \frac{RC_t}{NC}$ …… (2), where Rc_{pc} is recurrent cost per consultation, RC_t is total recurrent cost , and NC is as defined in equation (1) above.

The following cost formula was applied to estimate the total costs of providing first-level curative healthcare services to the ultra-poor, capturing both the capital and recurrent costs: $TC_{pc} = C_{pc} + Rc_{pc}$ …… (3).

A two-way sensitivity analysis was conducted to test how total values may change depending on drug costs and overheads variations. Instead of using the mean drug expenditure of FCFA 657.68, the author applied the mean (FCFA 657.68) + 1SD (FCFA 545.36) and the mean (FCFA 657.68) + 2SD (1090.72) for sensitivity analysis. At the same time, the author adapted the overhead rate for the capital and recurrent costs and increased it for the sensitivity analysis by 5%, from 20 % to 25 %.

2.2.4 Budget impact analysis

Using the cost data from above, the author conducted a budget impact analysis to model the financial impact of providing first-level curative healthcare services to the exempted ultra-poor nationwide on the Burkinabe healthcare budget.

Analytical framework

'A budget impact analysis (BIA) is an economic assessment that estimates the financial consequences of adopting a new intervention (HERC, 2021)' without taking health consequences directly into account (Wolowacz et al., 2017). A BIA is considered an essential part of the process of a health technology assessment (Leelahavarong, 2014). Health technology can refer to any medicinal product (medical device, equipment or supply), medical and surgical procedures or public health intervention (prevention, screening, diagnosis, treatment, and rehabilitation) (Banta et al., 1981). A BIA for a new health intervention aims to assess the impact that introducing the new intervention for eligible patients would have on the specific budget (Wolowacz et al., 2017). The results of BIA are used, with varying levels of impact on decision-making, to 1. make inferences about the affordability of a new intervention under the given budget constraints, 2. to determine by how much annual budgets are likely to increase for an existing intervention and to plan for these changes, and 3. to provide the basis for public or private funding requests (J. Mauskopf & Earnshaw, 2016).

Development of the analytical framework

First, the analytical framework of the BIA needs to be developed, which determines the overall approach for the analysis (Wolowacz et al., 201 7). The analytical framework requires a good understanding of the health system in question and the interrelationship between individual health system characteristics (Wolowacz et al., 2017). The following key aspects are essential when populating an analytical model for a health intervention: eligible population, time horizon, the potential uptake of new intervention and the budget holder cost perspective (Wolowacz et al., 2017). According to the guidelines developed by the International Society for Pharmacoeconomics and Outcomes Research (ISPOR) (J. Mauskopf et al., 2007), BIAs can be conducted using a simple cost calculator approach because budget holders can easily use it and adapt input parameters. More complex models (such as Markov-modelling, decision-tree or event simulation modelling) might be necessary if changes occur in the treatment or disease-related outcomes of an intervention within the model's time horizon (J. Mauskopf et al., 2007). Since BIAs include a substantial level of uncertainty, scenario analysis is recommended that reflects plausible ranges in key assumptions (J. Mauskopf et al., 2007). The scenario analysis should be data-driven or based on likely ranges for each parameter (J. Mauskopf et al., 2007).

Key elements:

Eligible population: The first key element in a budget-impact analysis is the population who will be eligible to receive the health intervention (J. Mauskopf & Earnshaw, 2016). The correct estimation of the size of the eligible population is the most influential determinant of the expected cost of the intervention from the perspective of the budget holder (J. Mauskopf et al., 2007).

Time horizon is the second most important element, which should be in accordance with the budgeting time-span by the budget holder (J. Mauskopf & Earnshaw, 2016). Thus, BIA results should be presented for the period that is most relevant to the budget holder (J. Mauskopf et al., 2007). While budgets are usually done on an annual basis, the analytical framework should allow for shorter and longer time spans to provide a more holistic picture (J. Mauskopf et al.,

2007). Typically, BIAs are conducted for a short time span ranging from 1 - 5 years (J. Mauskopf et al., 2007).

Uptake of a new intervention is at the core of any BIA (J. Mauskopf & Earnshaw, 2016). Since the uptake is usually not known at the time of analysis, authors can rely on data from similar interventions and similar populations (Sullivan et al., 2014). It depends on the local context whether simple rates or non-linear functions should be used (Sullivan et al., 2014). Data on usage can be drawn from, e.g., registries, claim databases or local surveys (Sullivan et al., 2014). Researchers should address the uncertainty surrounding the uptake forecasts within the sensitivity analysis (Brodtkorb et al., 2017). Furthermore, analysts need to pay attention to the current treatment context and need to define whether the new intervention supplements or replaces an existing intervention or whether non has been in place before (Wolowacz et al., 2017).

Budget holder cost perspective: BIAs need to define the cost perspective of the budget holder who uses the produced results (Wolowacz et al., 2017). The cost types considered in a BIA depend on the specific budget holder in the jurisdiction of interest (Wolowacz et al., 2017). While providers of services might be particularly interested in the cost of producing services, payers (e.g. private insurers), on the other hand, might be more interested in reimbursement rates (Wolowacz et al., 2017). Depending on the budget holder, cost categories to be included could vary from direct costs (administration, monitoring, drugs, diagnostics), personal costs to indirect costs (productivity loses), patients out-of-pocket expenditure, and informal care costs (Wolowacz et al., 2017). While some costs might have fixed and variable components, a BIA should only include the variable or recurrent costs if the fixed cost is not expected to change during the anticipated analysis time horizon (Wolowacz et al., 2017).

Adaptation of the analytical framework to the study

The model framework for the study was developed following the above-mentioned guidelines on BIA for healthcare interventions (J. Mauskopf et al., 2007, 2017; Sullivan et al., 2014). In the following sub-section, the author describes the adaptation of the framework to her study.

The model framework developed by the author is illustrated in **Figure 4.** The perspective of the healthcare system in Burkina Faso was applied. Other isolated user fee exemption schemes for the ultra-poor were not considered, as this would introduce significant complexity to the model. Accordingly, the model assumption was that no alternative active intervention for the ultra-poor is available. For this analysis, the author used a basic cost-calculator model, where the service volume is multiplied by its unit costs per consultation to estimate the total costs over a 1-year period. The model was operationalized using Microsoft Excel 2019 (Microsoft, Redmond, WA). All costs were presented in USD.

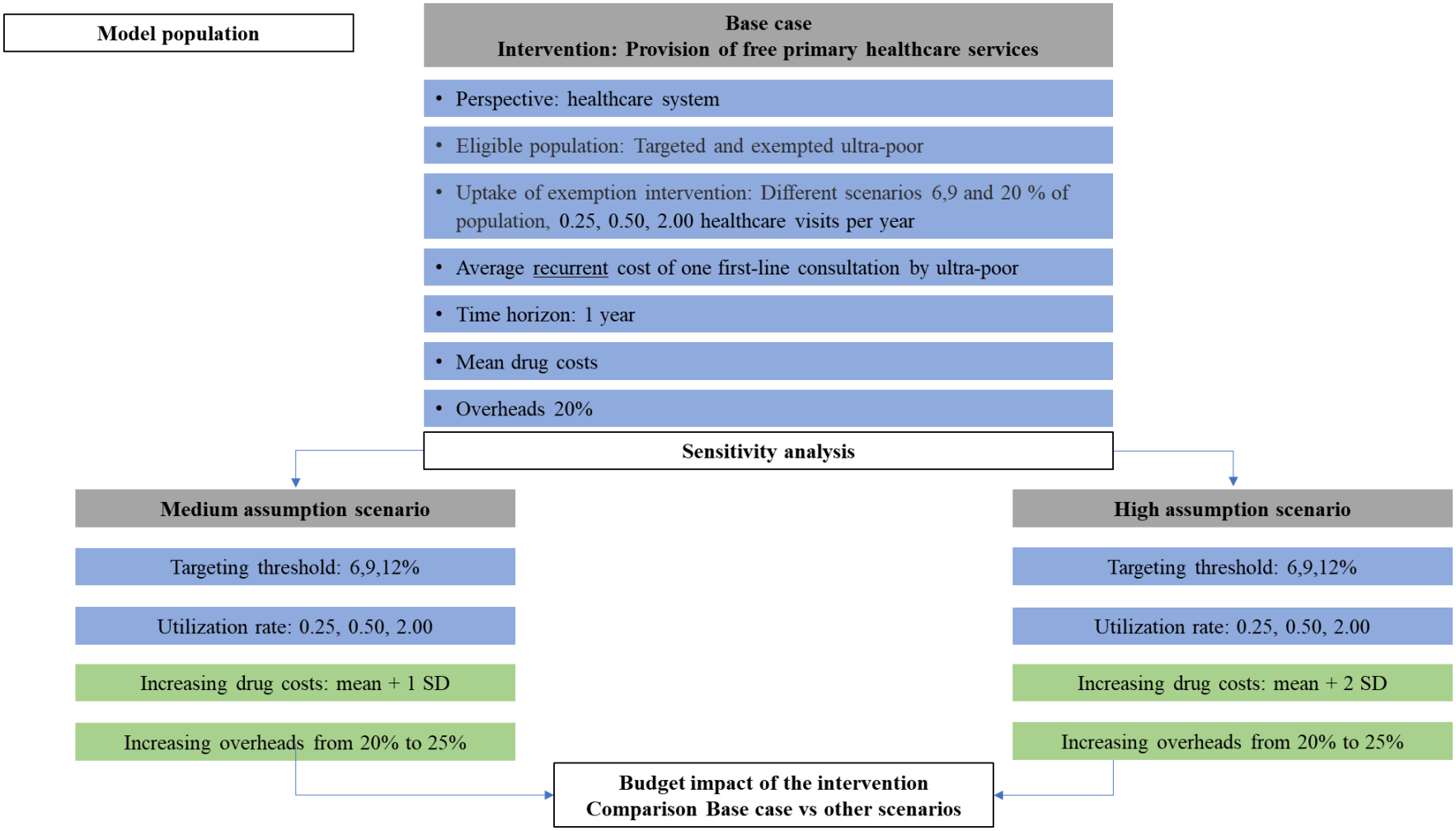


Figure 4. Own graphical illustration of the developed conceptual framework for Budget impact analysis

Notes: Scenario names are dark grey; the green box indicates where the scenario differs from the base case. The white box indicates economic endpoints.

Model Inputs

The four main model inputs are explained in the following sub-sections.

Eligible Population

The population considered in the model consisted of 6 %, 9 % and 20 % of the total population in Burkina Faso who are assumed to be eligible for targeted user fee exemptions. In 2019, the total population of Burkina Faso was 21,510,181. The estimated population number in the budget was 1.2 million (6 % of the population), 1.9 million (9 % of the population) and 4.3 million (20 % of the population). The different variations in the targeting threshold are closely related to present public discussions and applications in SSA. The threshold of 6 % was used as a community threshold. On average, 6 % of the population in the intervention districts was identified as ultra-poor by the community-based targeting process. The threshold of 9 % illustrates the extremely poor. The application of the 20 % threshold originates from the measure of income inequality, meaning the concept of the 'bottom 20 % of the population', the poorest income quintile.

Time frame

In the model, the author adopted a time-span of 1 year as this is in accordance with the period of the national healthcare budget of Burkina Faso, which is provided annually.

Uptake of the intervention

Data on the current intervention uptake was derived from medical registries in Diébougou district that contain data on first-level healthcare services provided to identified ultra-poor in 2016. The author estimated that the ultra-poor in Diébougou district had on average 0.25 healthcare contacts per capita per year. The BIA framework is limited to this calculated utilisation rate. The calculated consultation rate was doubled and quadrupled to reflect a likely increase in the uptake of the intervention.

Costs

Data on the recurrent cost per first level consultation was obtained from the authors own cost assessment described in sections **2.2.3.** The recurrent costs are divided into four main categories: consultation fee, drug costs, human resources and other administrative expenses. The author used the derived average recurrent cost per consultation to compute the budget impact.

Model output

The primary output of interest was the total annual recurrent cost.

Scenario analysis

The author calculated a medium and high assumption scenario reflecting the alternative values for drugs and overheads from the cost assessment above while also considering different thresholds of population coverage (6%, 9%, and 20% of the population) and different utilization rates among the targeted ultra-poor (0.25; 0.50 and 2.00 healthcare contacts per capita per year).

2.3 Ethical consideration and funding

Ethical clearance was granted by the Comité National d'Éthique pour la Recherche en Santé (CNERS) in Burkina Faso (Decision No. 2019-01-004).

This research was a joint collaboration between the Institut de Recherche pour le Développement Paris, France and the Heidelberg Institute of Global Health. It was funded by the European Union Delegation in Burkina Faso within the framework of a EuropeAid project devoted to Capacity Building for Analysis and Policy Research.

3 Results

Note: The doctoral student published aspects of this chapter in the following publications:

1. Beaugé, Y., De Allegri, M., Ouédraogo, S., Bonnet, E., Kuunibe, N., & Ridde, V. (2020). Do Targeted User Fee Exemptions Reach the Ultra-Poor and Increase their Healthcare Utilization? A Panel Study from Burkina Faso. *International Journal of Environmental Research and Public Health*, *17*(18), 6543.
2. Beaugé, Y., Ridde, V., Bonnet, E., Souleymane, S., Kuunibe, N., & De Allegri, M. (2020). Factors related to excessive out-of-pocket expenditures among the ultra-poor after discontinuity of PBF: a cross-sectional study in Burkina Faso. *Health Economics Review*, *10*(1), 1–11.

This chapter presents the study results in line with the research objectives. There are three main sub-sections. Sub-section 3.1 presents the results on the factors associated with the receipt of user fee exemption cards and the effect of card possession on the utilisation of healthcare services (objective 1). It is followed by the description of the results on the level of OOPE and factors associated with excessive OOPE among the ultra-poor (objective 2). Sub-section 3.3 then turns attention to the average capital and recurrent cost of providing first-level curative services and the necessary budget to provide first-level curative healthcare services to the exempted ultra-poor nationwide (objective 3).

3.1 Factors associated with the receipt of user fee exemption cards, and the effect of card possession on the utilisation of healthcare services (Objective 1)

Of the 1652 (100%) respondents recruited for the baseline survey, 1260 (76.27%) completed the follow-up survey in 2017. In 2017, 124 (32%) respondents were lost to follow up, and 144 (37%) were physically absent on repeated visits. Respondents who were unable to take part in the follow-up survey were excluded from the study: 10 (3%) suffered from an illness; 5 (1%) were at an advanced age; 8 (2%) were mentally sick; 6 (1%) had a hearing handicap; 90 (23%) were deceased, and 5 (1%) refused to respond to the questionnaire. The number of observations available for the analysis was 1652 in 2015 and 1260 in 2017, resulting in an unbalanced panel data set of 2912 observations.

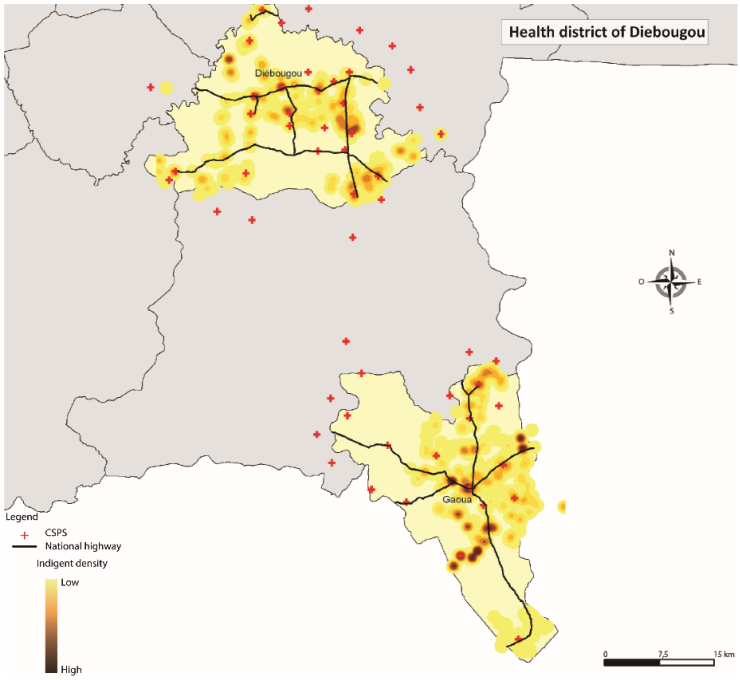
3.1.1 Descriptive statistics

Table 3 reports the descriptive and comparative statistics for all variables included in the analysis for 2015 and 2017. At baseline, the mean age of the sample was 55.13 years (SD = 16.96), with 67.6 % being females. The majority of the respondents lived in Diébougou district (33.17%), were not literate (93.70%), had no education (94.79%); and indicated that they were not suffering from any form of disability (76.45%). About 60% were married, 42.80% were head of the household, and 75.85% lived within the 5 km radius to the nearest healthcare centre. There was a high geographical concentration of the selected respondents around the area of a CSPS in Diébougou, Gourcy, Kaya and Ouargaye **(Figures 5, 6, 7 and 8).** There was generally a lower geographical concentration the further the respondents lived from a CSPS. During the follow-up survey, at least 75.51% of the respondents reported the user fee exemption card's receipt (card possession). Comparing the reported frequencies of 2015 with those of 2017, there was a significant difference for the variables age (p = 0.00), household size (p = 0.00), perceived health (p = 0.01), illness-reporting (p = 0.00) and utilisation of healthcare services (p = 0.05). The average household size in 2015 was 1.61 (SD = 1.58) members compared to 2.57 (SD = 1.97) in 2017. A total of 19.49% of the respondents in 2015 reported being in good health compared with 23.49% of respondents in 2017 (p = 0.01). In 2015, 70.70% of the respondents reported at least one illness episode in the last six months, compared with 62.78% of respondents in 2017 (p = 0.00). At baseline, 64.21% reported utilising healthcare services at the healthcare centre, compared with 59.92% at follow-up (p = 0.05).

Table 3. Comparison of the study sample characteristics 2015 and 2017

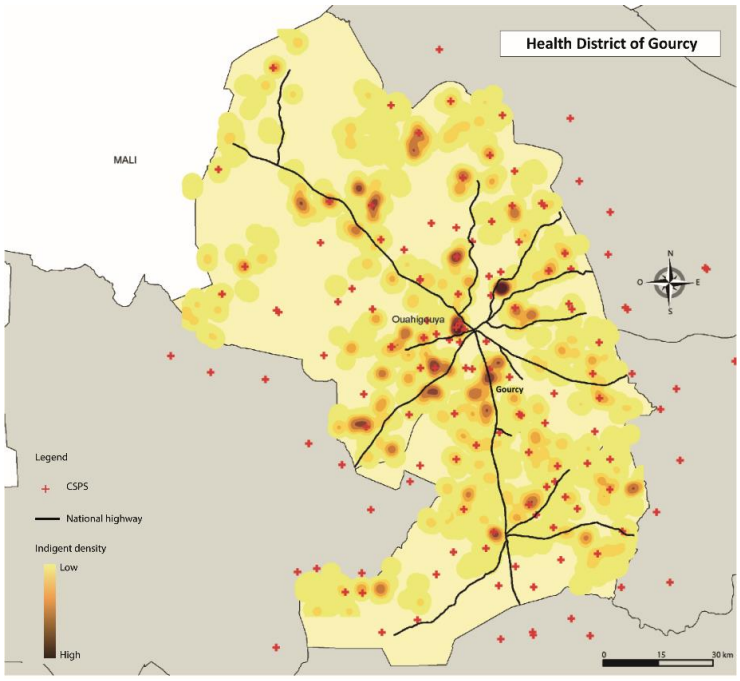
Variables		2015 (N = 1652)		2017 (N = 1260)		Chi2 and t-Test	KS-Test	
Outcome		Frequencies	%	Frequencies	%	*p*-value	D-value	*p*-value
Illness reporting								
	No	484	29.30	469	37.22	0.00	0.08	0.00
	Yes	1168	70.70	791	62.78			
Health service utilisation								
	No	418	35.79	317	40.08	0.05	0.08	0.00
	Yes	750	64.21	474	59.92			
Predisposing factors								
Age		55.13 (mean)	16.96 (SD)	57.22 (mean)	16.95 (SD)	0.00 (t-test)	0.10	0.00
Gender								
	Male	535	32.38	403	31.98	0.82	0.00	1.00
	Female	1117	67.62	857	68.02			
Marital Status								
	All else	678	41.04	491	38.97	0.26	0.02	0.92
	Married	974	58.96	769	61.03			
Household head								
	No	945	57.20	711	56.43	0.68	0.01	1.00
	Yes	707	42.80	549	43.57			
Household size		1.61	1.58	2.47	1.97	0.00	0.20	0.00
Enabling factors								
Exemption card possession								
	No	1652	100.00	306	24.29	NA[1]	0.76	0.00
	Yes	0	0.00	954	75.51			
Education								
	No	1566	94.79	1187	94.21	0.49	0.01	1.00
	Yes	86	5.21	73	5.79			
Basic literacy								
	No	1548	93.70	1187	94.21	0.57	0.01	1.00
	Yes	104	6.30	73	5.79			
Distance to the nearest healthcare centre								
	< 5 km	1253	75.85	940	74.60	0.44	0.01	1.00
	> 5 km	399	24.15	320	25.40			
Need factors								
Health status								
	All else	1330	80.51	964	76.51	0.01	0.04	0.20
	Good	322	19.49	296	23.49			
Disability								
	No	1263	76.45	992	78.73	0.15	0.02	0.85
	Yes	389	23.55	268	21.27			
Additional variables								
Health District								
	Kaya (1)	400	24.21	283	22.46	0.41	0.12	0.98
	Ouargaye (2)	423	25.61	354	28.10			
	Diébougou(3)	548	33.17	412	32.70			
	Gourcy (4)	281	17.01	211	16.75			
Time								
	2015	1652	100.00	0	0.00	NA	NA	NA
	2017	0	0.00	1260	100.00			

[1] NA indicates not applicable



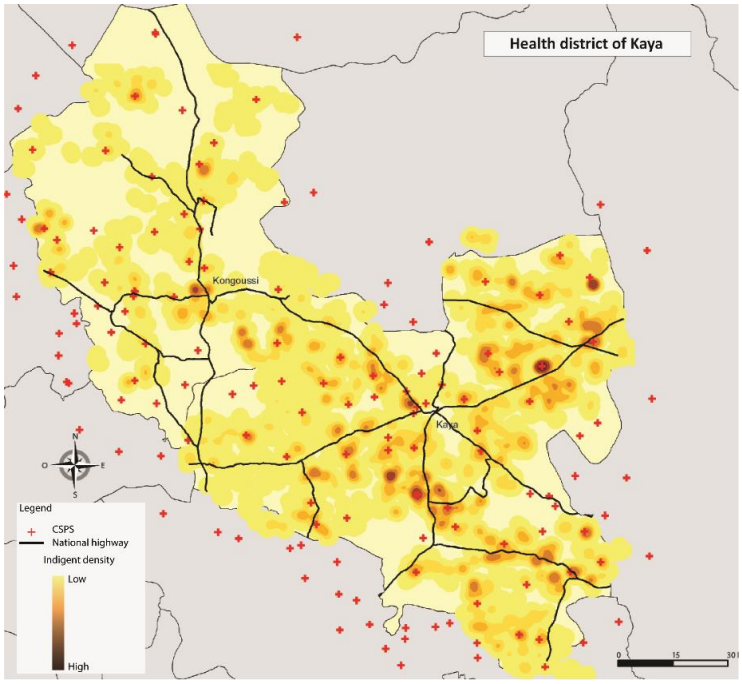
(Illustration in (Beaugé, De Allegri, et al., 2020))

Figure 5. Geographical concentration of the respondents in Diébougou



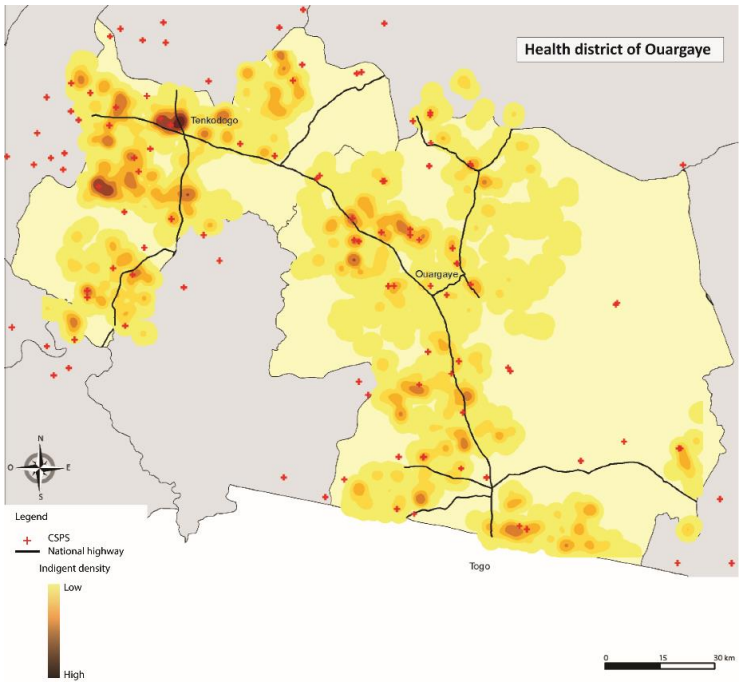
(Illustration in (Beaugé, De Allegri, et al., 2020)

Figure 6. Geographical concentration of the respondents in Gourcy



(Illustration in (Beaugé, De Allegri, et al., 2020)

Figure 7. Geographical concentration of the respondents in Kaya



(Illustration in (Beaugé, De Allegri, et al., 2020))

Figure 8. Geographical concentration of the respondents in Ouargaye

3.1.2 Regression model on user fee exemption card possession (Model 1)

Table 4 presents the results of the model identifying the determinants of user fee exemption card possession (Model 1). Basic literacy (p = 0.03), distance below 5 km to the nearest healthcare centre (p = 0.02) and the residency in the health district Diébougou (p = 0.00) and Gourcy (p = 0.01) were positively associated with card possession. Age, sex, marital status, status in the household, household size, education, perceived health and disability were not significant determinants of card possession.

Table 4. Regression model on exemption card possession

Variable	Regression Coefficient (β)	Std Error	*p*-Value	[95% CI]	
Predisposing factors					
Age	0.00	0.00	0.98	-0.01	0.01
Sex	-0.19	0.19	0.31	-0.56	0.18
Marital status	-0.07	0.17	0.69	-0.39	0.26
Status in the household	-0.23	0.17	0.18	-0.57	0.10
Household size	0.06	0.04	0.11	-0.01	0.14
Enabling factors					
Education	-0.14	0.38	0.72	-0.88	0.61
Basic literacy	-0.77	0.37	0.03	-1.49	-0.06
Distance to the nearest healthcare centre	-0.38	0.15	0.02	-0.68	-0.07
Need factors					
Perceived health	0.22	0.17	0.19	-0.11	0.56
Disability	0.04	0.18	0.81	-0.32	0.41
Health district (Kaya reference)					
Ouargaye	-0.09	0.18	0.59	-0.44	0.25
Diébougou	1.31	0.20	0.00	0.09	1.70
Gourcy	1.75	0.28	0.01	1.20	2.31
_cons	0.81	0.42	0.06	-0.02	1.65

3.1.3 Regression model on service use (conditional upon reporting ill) (Model 2)

Table 5 presents the results of the random-effects model predicting utilisation of healthcare services conditional upon illness reporting in relation to the possession of a user fee exemption card while controlling for all other explanatory variables (Model 2). No association was found

between possession of user fee exemption card and the utilisation of healthcare services (p = 0.73). In addition, education, basic literacy, marital status and distance were also not associated with the utilisation of healthcare services. Being the household head (p = 0.00), being male (p = 0.04), and greater household size (p = 0.02) were positively associated with utilizing healthcare services, while better-perceived health was negatively associated. In contrast, having a disability (p = 0.00) and being advanced in age (p = 0.00) was negatively associated with utilizing healthcare services.

Table 5. Regression model on service use (conditional upon reporting ill)

Variable	**Regression Coefficient (β)**	**Std Error**	***p*-Value**	**[95% CI]**	
Predisposing factors					
Age	-0.01	0.00	0.00	-0.02	-0.01
Sex	-0.31	0.15	0.04	-0.61	-0.01
Marital status	0.17	0.13	0.17	-0.07	0.42
Status in the household	0.42	0.13	0.00	0.16	0.68
Household size	0.08	0.03	0.02	0.01	0.14
Enabling factors					
Possession of user fee exemption card	-0.07	0.20	0.73	-0.45	0.32
Education	0.45	0.35	0.20	-0.24	1.14
Basic literacy	-0.25	0.1	0.42	-0.85	0.35
Distance to the nearest healthcare centre	0.00	0.13	0.97	-0.25	0.26
Need factors					
Perceived health	-0.56	0.18	0.00	-0.92	-0.203
Disability	-0.37	0.13	0.00	-0.63	-0.121
Health district (Kaya reference)					
Ouargaye	0.95	0.18	0.00	0.60	1.30
Diébougou	0.14	0.16	0.38	-0.17	0.45
Gourcy	0.10	0.18	0.58	-0.25	0.45
Time	-0.26	0.18	0.16	-0.62	0.10
_cons	1.12	0.34	0.00	0.45	1.79
/lnsig2u	-0.57	0.50		-1.54	0.41
sigma_u	0.75	0.19		0.46	1.23
rho	0.15	0.06		0.06	0.31
LR test of rho = 0: chibar2(01)	5.93				
Prob >= chibar2	0.01				

3.2 Level of out-of-pocket expenditure and the factors that are associated with excessive out-of-pocket expenditure among the ultra-poor (Objective 2)

3.2.1 Descriptive statistics

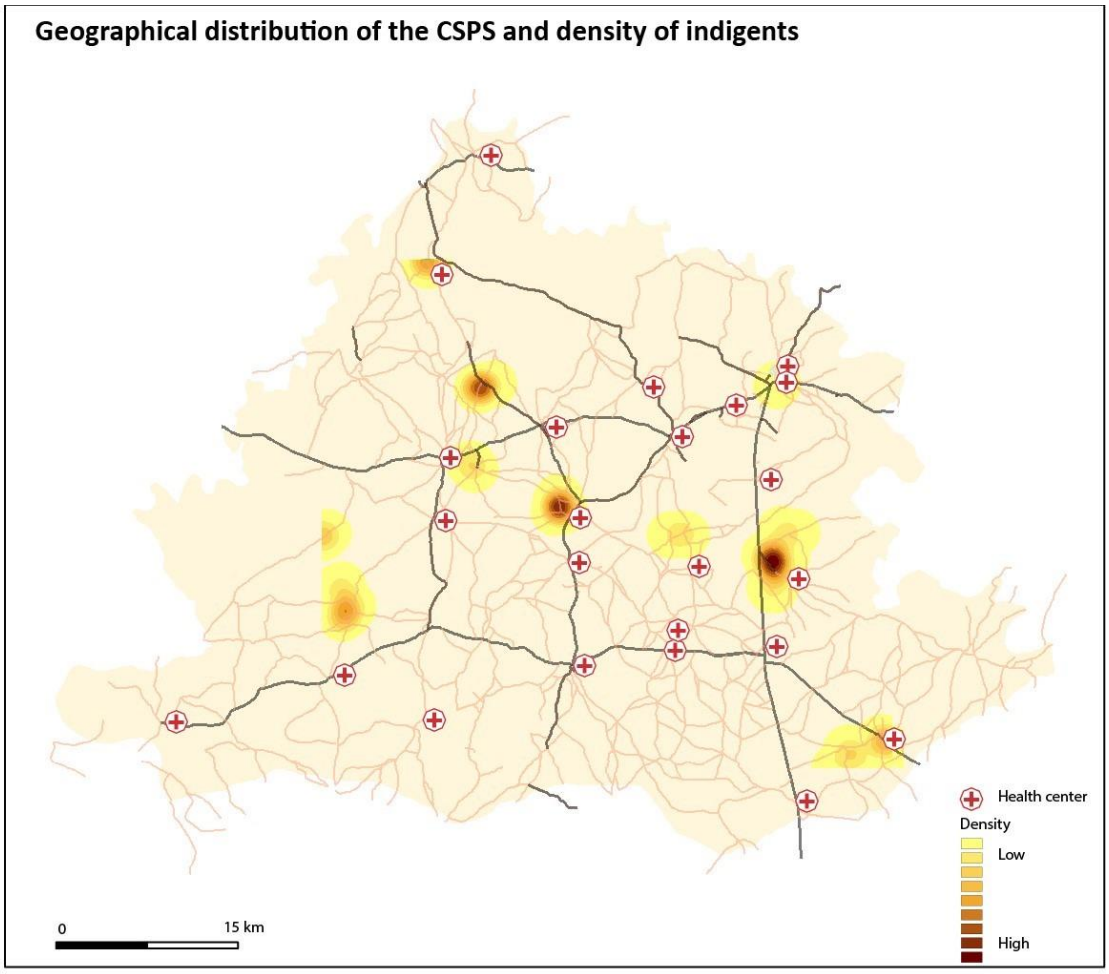
Table 6 provides descriptive statistics, frequencies and percentages for the study sample.

Table 6. Descriptive statistics

Variable		N	%
Excessive OOPE on healthcare services when utilizing formal health care			
	No	11	7.27
	Yes	99	92.73
Exemption card			
	No	18	16.36
	Yes	92	83.64
Sex			
	Male	43	39.09
	Female	67	60.91
Educational level			
	No education	96	87.27
	Education	14	12.73
Marital Status			
	All else	53	48.18
	Married	57	51.82
Relation to the household head			
	All else	75	68.18
	Head of household	35	31.82
Perceived Health			
	All else	89	80.91
	Good	21	19.09
Disability			
	No	80	72.73
	Yes	30	27.27
Poverty Index			
	Poorest	32	29.09
	Medium poor	38	34.55
	Least poor	40	36.36
		Mean	Sd
Age (in years)		55.11	18.67
Household size		14.25	11.54
Distance to nearest healthcare centre (in km)		4.45	4.75

Sample: N = 110 individuals (100%)

The majority of the sample, 60.91%, were females with a mean age of 55.11 years. Only 12.73% attained formal education. Half of the sample was married. About one-third of the study sample was the household head. Being in good health was reported by only 19.09% and being disabled by 27.27%. Respondents lived in rather big households with an average of 14 household members, which is typical for rural Burkina Faso. Over 80% reported having received an exemption card. 29.09% belonged to the poorest, 34.55% to the medium poor and 36.36% to the least poor category. The mean distance from the respondent's home to the nearest healthcare facility was 4.45 km. Figure 9 illustrates the mixed picture of the geographical concentration, whereby some of the respondents are concentrated around the primary healthcare facilities and remote areas.



(lllustration in (Beaugé, Ridde, et al., 2020)

Figure 9. Geographical distribution of the CSPS and ultra-poor

3.2.2 OOPE on formal healthcare services and transportation

Table 7 illustrates the mean OOPE for formal healthcare, transportation and the total OOPE for respondents who reported an illness episode within the last six months. The information is shown for four possible scenarios:

Table 7. OOPE for formal healthcare services and transportation in FCFA

OOPE	N	%	Mean	SD	Median	Min	Max
1. Scenario: Including zeros and outliers							
Formal healthcare	110	100.00	20424.45	81552.69	5000	0	700000
Transport	49	26.77	2134.18	2377.49	1400	0	12000
TOTAL	110	100.00	21375.14	82647.95	5050	0	710000
2. Scenario: Excluding only outliers [a]							
Formal healthcare	107	97.27	8847.57	10838.98	5000	0	60000
Transport	48	43.64	1928.65	1912.758	1400	0	10000
TOTAL	110	100.00	9447.86	11196.48	5000	0	62000
3. Scenario: Excluding only zeros [b]							
Formal healthcare	99	90	22693.84	85704.95	5100	500	700000
Transport	48	43.64	2178.646	2381.975	1450	500	12000
TOTAL	102	92.73	23051.62	85631.19	5850	500	710000
4. Scenario: Excluding zeros and outliers [c]							
Formal healthcare	96	87.27	9861.35	10999.28	5000	500	60000
Transport	47	42.73	1969.68	1911.96	1400	500	10000
TOTAL	102	92.73	10188.87	11298.93	5600	500	62000

Note: Of the 110 respondents using formal healthcare services, 11 reported zero expenditures.

a excluding three observations through trimming top 3 % cutoff =60000 for formal healthcare; excluding one observation through trimming top 3 % cutoff = 10000 for transport

b excluding 11 observations with zeros for formal healthcare and excluding one observation with zeros for transport

c excluding 11 observations with zeros for formal healthcare; excluding one observation with zeros for transport: excluding three observations through trimming top 3 % cutoff =60000 for formal healthcare; excluding one observation through trimming top 3 % cutoff = 10000 for transport

The mean OOPE for formal healthcare services when including zeros (exempted ultra-poor were supposed to be treated for free) for n = 110 was FCFA 20424.45 (USD 34.72) while FCFA 2134.18 (USD 3.62) was spent on transportation for n = 49. In comparison, when excluding zeros and extreme cases, the OOPE on formal healthcare services for n = 96 was FCFA 9861.35 (USD 16.76), while FCFA 1969.68 (USD 3.35) was spent on transportation for

n = 47. For scenario 1, the total amount was FCFA 21375.14 (USD 36.34) and FCFA 10188.87 (USD 17.32) for scenario 4. The median OOPE across the two scenarios amounted to about FCFA 5000 - 5850 (USD 8.50 – 9.95).

Table 8 illustrates the prevalence of excessive expenditure among the ultra-poor and the average OOPE for the different thresholds. Using the high expenditure threshold, 29.09% of the respondents with an illness episode had excessive expenditures.

Table 8. Prevalence of excessive expenditure and mean OOPE for different thresholds

Excessive OOPE threshold	**No. of respondents**	**% of respondents with illness N=110**	**Mean high OOPE for formal healthcare services mean (SD) in FCFA**
High expenditure	35	29.09	56762.86 (138984.3)
Medium high expenditure	58	52.73	36684.91 (110213.7)
Extremely high expenditure	27	24.55	70316.67 (156285.4)

3.2.3 Regression model on factors related to excessive OOPE

Table 9 presents the results of the logistic regression exploring the factors associated with excessive OOPE at the individual level. The table shows the results from the main model using ≥ two times the median OOPE as a cut-off point for high expenditure.

Table 9. Regression model exploring the factors related to excessive OOPE at the individual level

Variable	**Main model = Excessive OOPE on formal health care services** N=110							
	Regression coefficient	*p*-value	[95% CI]		Marginal effects	*p*-value	[95% CI]	
Exemption card owner	-1.787	**0.025**	-3.350	-0.224	-0.279	**0.014**	-0.503	-0.057
Female	-2.072	**0.003**	-3.440	-0.705	-0.324	**0.000**	-0.501	-0.148
Educated	-1.703	0.158	-4.068	0.662	-0.267	0.145	-0.625	0.092
Married	0.192	0.738	-0.932	1.315	0.030	0.738	-0.146	0.206
Head of household	-0.943	0.160	-2.256	0.371	-0.148	0.146	-0.346	0.051
Good health status	-1.913	0.084	-4.082	0.256	-0.299	0.074	-0.628	0.030
Having a disability	0.295	0.593	-0.787	1.377	0.046	0.592	-0.122	0.215
Age	0.036	0.061	-0.002	0.074	0.006	**0.047**	0.000	0.011
Household size	-0.030	0.211	-0.078	0.017	-0.005	0.199	-0.012	0.002
Distance	-0.080	0.195	-0.201	0.041	-0.012	0.184	-0.031	0.006
Poverty Index (vs. 1 = poorest)								
2= Medium poor	0.069	0.914	-1.175	1.313	0.010	0.914	-0.174	0.194
3= Least poor	0.568	0.383	-0.709	1.844	0.089	0.371	-0.105	0.283
_cons	0.886	0.616	-2.577	4.348				
LR chi2(12)	33.71							
Prob >= chibar2	0.001							

Having an exemption card had a protective effect against excessive OOPE in this ultra-poor population. The probability of incurring excessive OOPE decreased by 28% for those who received an exemption card. The author also found that the likelihood of excessive OOPE decreased by 32% if the respondent was a woman. All other factors included in the main model were insignificant. The results remained stable throughout the two models chosen for sensitivity analysis, where the author used the medium and extreme high expenditure threshold.

Interestingly, the factor age significantly increased the probability of incurring an excessive expenditure only in models 2 and 3 (see **Table 10 and Table 11**). In the main model, age was insignificant. The results also remained stable when excluding the three extreme cases (see **Table 12**).

3.2.4 Sensitivity analysis

Table 10. Sensitivity analysis: Results from the regression model exploring the factors related to excessive OOPE at the individual level using a Medium-high expenditure threshold

Variable	2nd model = Excessive OOPE on formal healthcare services N=110							
	Regression coefficient	*p*-value	[95% CI]		Marginal effects	*p*-value	[95% CI]	
Exemption card	-1.305	**0.051**	-2.614	0.004	-0.267	**0.037**	-0.518	-0.017
Female	-1.325	**0.024**	-2.472	-0.178	-0.271	**0.013**	-0.486	-0.057
Educated	-0.282	0.740	-1.942	1.379	-0.058	0.739	-0.397	0.282
Married	0.464	0.324	-0.459	1.388	0.095	0.316	-0.091	0.281
Head of household	-0.406	0.453	-1.465	0.653	-0.083	0.449	-0.298	0.132
Good health status	0.893	0.139	-0.289	2.076	0.183	0.125	-0.051	0.417
Having a disability	0.081	0.869	-0.884	1.047	0.017	0.869	-0.181	0.214
Age	0.037	**0.024**	0.005	0.069	0.008	**0.014**	0.002	0.014
Household size	0.011	0.600	-0.030	0.052	0.002	0.598	-0.006	0.011
Distance	0.024	0.650	-0.078	0.126	0.005	0.649	-0.016	0.026
Poverty Index (vs. 1 = poorest)								
Medium poor	-0.227	0.673	-1.282	0.828	-0.047	0.673	-0.264	0.170

Least poor	0.007	0.991	-1.103	1.116	0.001	0.991	-0.226	0.229
_cons	-0.449	0.769	-3.437	2.540				
LR chi2(12)	21.22							
Prob >= chibar2	0.047							

Table 11. Sensitivity analysis: Results from the regression model exploring the factors related to excessive OOPE at the individual level using Extreme high expenditure threshold

Variable	**3nd model = Excessive OOPE on formal healthcare services** N=110							
	Regression coefficient	*p*-value	[95% CI]		Marginal effects	*p*-value	[95% CI]	
Exemption card	-1.635	**0.046**	-3.240	-0.029	-0.230	**0.034**	-0.442	-0.017
Female	-1.740	**0.017**	-3.166	-0.313	-0.244	**0.008**	-0.425	-0.064
Educated	-1.862	0.193	-4.666	0.942	-0.262	0.182	-0.646	0.123
Married	0.365	0.560	-0.861	1.591	0.051	0.558	-0.120	0.223
Head of household	-0.644	0.367	-2.043	0.755	-0.090	0.362	-0.284	0.104
Good health status	-1.415	0.211	-3.633	0.802	-0.199	0.204	-0.506	0.108
Having a disability	0.615	0.284	-0.511	1.741	0.086	0.276	-0.069	0.242
Age	0.041	**0.055**	-0.001	0.083	0.006	**0.042**	0.000	0.011
Household size	-0.016	0.520	-0.066	0.033	-0.002	0.517	-0.009	0.005
Distance	-0.052	0.423	-0.178	0.075	-0.007	0.419	-0.025	0.010
Poverty Index (vs. 1 = poorest)								
Medium poor	0.009	0.989	-1.308	1.327	0.001	0.989	-0.172	0.174
Least poor	0.468	0.494	-0.873	1.809	0.066	0.484	-0.120	0.253
_cons	-0.779	0.678	-4.463	2.905				
LR chi2(12)	27.57							
Prob >= chibar2	0.006							

Table 12. Sensitivity analysis: Results from the regression model exploring the factors related to excessive OOPE at the individual level, excluding the three extreme cases where ultra-poor had to accommodate over 100.000 FCFA to cover their healthcare costs

Variable	Main model = Excessive OOPE on formal healthcare services N=107							
	Regression coefficient	*p*-value	[95% CI]		Marginal effects	*p*-value	[95% CI]	
Exemption card owner	-1.969	**0.017**	-3.586	-0.350	-0.295	**0.008**	-0.512	-0.078
Female	-2.168	**0.003**	-3.618	-0.717	-0.325	**0.000**	-0.505	-0.145
Educated	-1.646	0.179	-4.048	0.755	-0.247	0.166	-0.595	0.102
Married	0.085	0.888	-1.094	1.264	0.013	0.888	-0.164	0.189
Head of household	-0.947	0.171	-2.304	0.410	-0.142	0.158	-0.339	0.055
Good health status	-1.779	0.112	-3.972	0.414	-0.267	0.103	-0.587	0.053
Having a disability	0.206	0.721	-0.924	1.336	0.031	0.720	-0.138	0.200
Age	0.040	**0.053**	-0.001	0.081	0.006	**0.039**	0.000	0.012
Household size	-0.035	0.164	-0.084	0.014	-0.005	0.150	-0.012	0.002
Distance	-0.093	0.158	-0.223	0.036	-0.014	0.144	-0.033	0.005
Poverty Index (vs. 1 = poorest)								
Medium poor	0.211	0.753	-1.100	1.521	0.0293	0.751	-0.152	0.210
Least poor	0.746	0.272	-0.585	2.078	0.1105964	0.252	-0.079	0.300
_cons	0.822	0.656	-2.789	4.432				
LR chi2(12)								
Prob >= chibar2								

3.3 Capital and recurrent cost of providing first-level curative services to the exempted ultra-poor and the cost and budget impact of providing first-level curative services to the exempted ultra-poor nationwide (Objective 3)

Sub-section 3.3 presents the results on the capital and recurrent cost of providing one first-level curative consultation to the exempted ultra-poor and the cost and budget impact of providing first-level curative services to the exempted ultra-poor nationwide.

3.3.1 Descriptive statistics

In line with the overall costing approach, the analysis of the capital and recurrent cost of providing one first-level consultation to the ultra-poor was based on two different data sources. The facility-based survey was used to analyze capital costs, and medical records were used to analyze recurrent costs. The descriptive statistics of each dataset are described hereafter.

Facility-based survey: The analysis of the consumption of capital costs (building size and equipment) included all 32 CSPSs (22 rural and 10 urban facilities) across eight districts. The eight districts were: Seguenega, Yako, Dafra, Houndé, Pama, Bogande, Saponé and Kombissiri. The opening year of the study CSPSs varied widely, ranging back from 1950 (CSPS de Tounouma in Dafra) to 2017 (CSPS Urbain in Saponé). The total consultations per facility year also varied widely, between 2934 in CSPS Yanga and 44913 in CSPS Ouezinville. On average, a facility had 13396 consultations per year **(see Table 13)**.

Table 13. Descriptive statistics facility-based survey

Region	District	CSPS	Consultations per year
Nord	District de Seguenega	CSPS de Inou	2559
Nord	District de Seguenega	CSPS Urbain	22298
Nord	District de Seguenega	CSPS de Gambo	24222
Nord	District de Seguenega	CSPS de Ramsa	6780
Nord	District de Yako	CSPS du secteur 04	12397
Nord	District de Yako	CSPS du Secteur 05	16399
Nord	District de Yako	CSPS de Dourou	3280
Nord	District de Yako	CSPS de Bouria	5171

Hauts-Bassins	District de Dafra	CSPS de Tounouma	26997
Hauts-Bassins	District de Dafra	CSPS de Santidougou	5085
Hauts-Bassins	District de Dafra	CSPS de Yegueresso	7384
Hauts-Bassins	District de Dafra	CSPS de Ouezinville	44913
Hauts-Bassins	District de Houndé	CSPS de Berebe	15503
Hauts-Bassins	District de Houndé	CSPS de Karaba	11303
Hauts-Bassins	District de Houndé	CSPS Urbain	32246
Hauts-Bassins	District de Houndé	CSPS de Kiere	7027
Est	District de Pama	CSPS de Koalou	6231
Est	District de Pama	CSPS de Kompienbiga	14893
Est	District de Pama	CSPS Urbain	22143
Est	District de Pama	CSPS de Kompienga	29296
Est	District de Bogande	CSPS de Tangaye	5486
Est	District de Bogande	CSPS de Waalin	24422
Est	District de Bogande	CSPS de Badori	17669
Est	District de Bogande	CSPS Notre Dame	7894
Centre-Sud	District de Saponé	CSPS Urbain	14706
Centre-Sud	District de Saponé	CSPS Saponé-marché	4574
Centre-Sud	District de Saponé	CSPS de Sambin	4990
Centre-Sud	District de Saponé	CSPS de Kayao	5934
Centre-Sud	District de Kombissiri	CSPS de Lamzoudou	7768
Centre-Sud	District de Kombissiri	CSPS de Gana	9084
Centre-Sud	District de Kombissiri	CSPS de Yanga	2934
Centre-Sud	District de Kombissiri	CSPS de Tuili	7076
Total number of consultations			**428664**

Medical records: The analysis of the recurrent cost included 1380 medical records of 15 CSPS. The mean age of the total sample was 51 years ranging between 5 years and 96 years. The entire sample comprised 421 (30.51%) male records. Most consultations were carried out in February (12.97%), followed by January (11.88) and July (10.07%). Slightly more consultations (54.93%) were sought during the dry season (December - May), compared to 45.07% during the rainy season (June – November). The CSPS with the most records was Diouloura with 16.67%. The CSPS with the fewest records was Konstabla. Drugs were prescribed for all consultations (100.00%). The mean consultation time was 20.67 minutes, with an SD of 7.75. **Table 14** provides the summary statistics.

Table 14. Descriptive statistics dataset medical records

Variables		(N = 1380)	
Age		51 (mean)	21.65 (SD)
Gender			
	Male	421	30.51
	Female	959	69.49
CSPS			
	Bamako	92	6.67
	Bapla	124	8.99
	Bondigui	204	14.78
	Dankoble	11	0.80
	Diassara	12	0.87
	Diouloura	230	16.67
	Dolo	209	15.14
	Konsabla	6	0.43
	Nabere	47	3.41
	Nahiredon	81	5.87
	Niceo	48	3.48
	Saptan	19	1.38
	Tioyo	216	15.65
	Wan	71	5.14
	Werinkera	10	0.72
Length of consultation			
		20.67 (mean)	7.75 (SD)
Month of consultation			
	January	164	11.88
	February	179	12.97
	March	137	9.93
	April	102	7.39
	Mai	99	7.17
	June	124	8.99
	July	139	10.07
	August	114	8.26
	September	106	7.68
	October	79	5.72
	November	60	4.35
	December	77	5.58
Prescription of pharmaceuticals			
	No	0	100.00
	Yes	1380	0.00

3.3.2 The average cost of providing one single first-level curative consultation to the ultra-poor in Burkina Faso

Table 15 reports the detailed estimates of the average cost of providing one single first-level curative consultation to the ultra-poor in Burkina Faso for the time-horizon of 1 year. The capital cost of providing one single first-level curative consultation was estimated at USD 0.59. When adding the recurrent cost of USD 2.58, the total average cost per consultation was estimated to be USD 3.17.

Table 15. The average cost of providing one single first-level curative consultation to the ultra-poor in Burkina Faso

The average cost of providing one single first-level curative consultation to the ultra-poor in Burkina Faso	
Time Horizon 1 YEAR	
	Cost per consultation in USD
I. Capital costs	
Building costs	0.26 USD
Equipment costs	0.23 USD
Fixed Overheads 20%	0.10 USD
Total Capital Cost	**0.59 USD**
II. Recurrent costs	**Cost per consultation in USD**
Consultation costs	0.34 USD
Drug costs	1.12 USD
Human resource costs	0.69 USD
Variable overheads 20%	0.43 USD
TOTAL Recurrent Cost	**2.58 USD**
GRAND TOTAL CAPITAL AND RECURRENT COST PER CONSULTATION	**3.17 USD**

Distribution of total cost

The relative distributions in % are presented separately for the cost types and cost categories to get a sense of which group of costs drives the total cost of providing one single first-level curative consultation to the ultra-poor,

Distribution of total cost by cost type

Figure 10 below illustrates how the total cost is distributed by cost type in %. With 81.39%, recurrent costs make the most considerable portion of the total costs. The capital costs account for 18.61%.

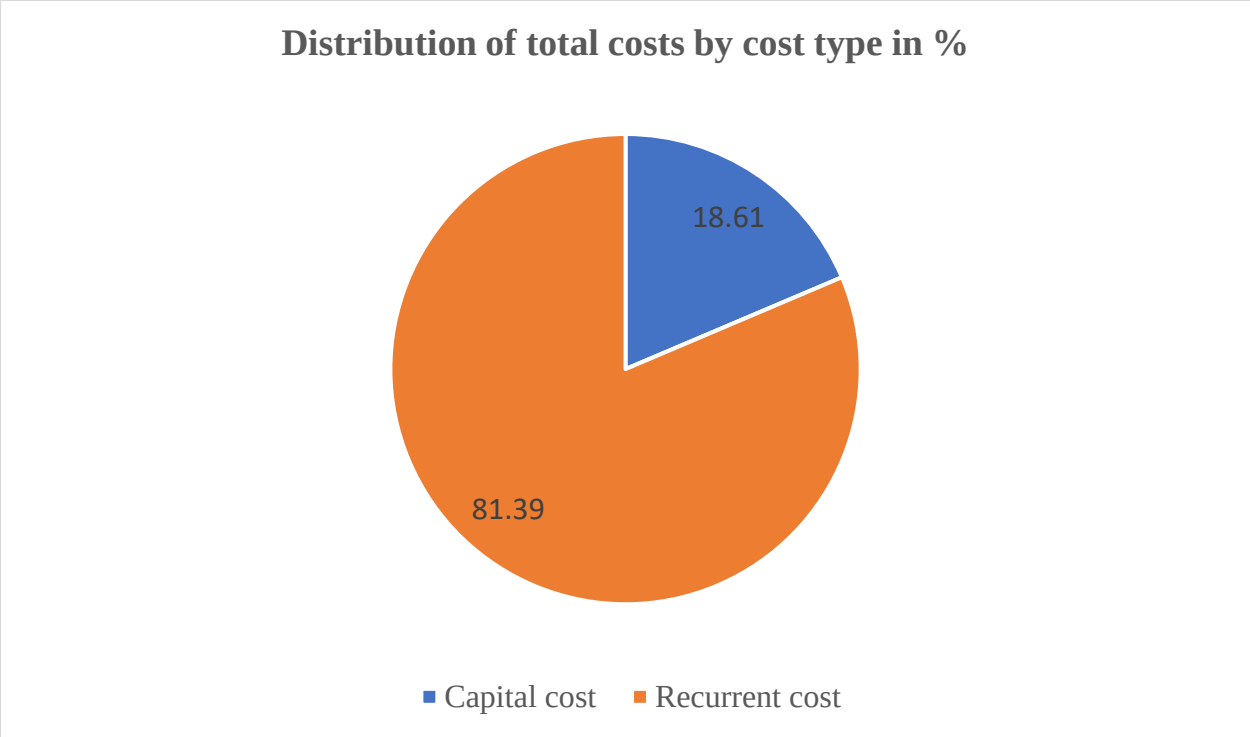


Figure 10. Distribution of costs by cost type in %

Distribution of total cost by cost category

Figure 11 illustrates how the total cost is distributed by cost category in %. The top two cost drivers of providing health care to the ultra-poor were drug costs (35.33%) and human resources (21.77%). Administrative expenses accounted for around 17% of overall costs. These were followed by consultations costs (10.73%), building costs (8.20%) and equipment costs (7.25%).

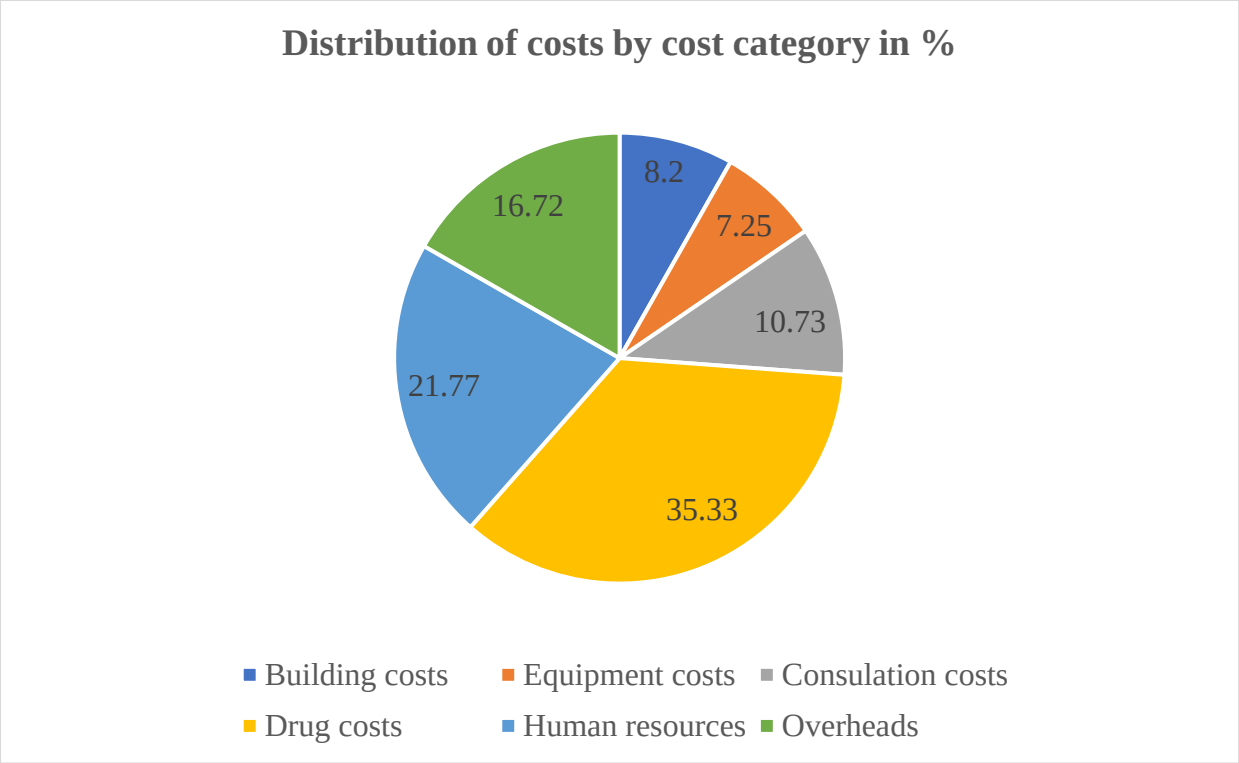


Figure 11. Distribution of costs by cost category in %

3.3.3 Budget impact analysis

Table 16 presents the expected annual recurrent cost of providing first-line curative services to the ultra-poor, considering a cost per consultation of USD 2.58 (Base case scenario) and different implementation thresholds. The expected annual recurrent cost varies substantially as a function of the proportion of population targeted and the number of expected curative contacts. Assuming a target population of 6% and 0.25 curative contacts per capita per year, the annual costs of providing first-level curative consultation to the ultra-poor would be USD 832,225.81 at the national level, equivalent to 0.22 % of Burkina Faso's national healthcare budget in 2019. Expanding the target population to 20% and 0.50 curative contacts per capita per year would result in a cost of USD 5,548,172.

Table 16. National budget impact analysis applying different targeting thresholds and population coverage (Base case scenario)

Cost category	Base case: Targeting threshold 6% of the population:1,290,611	% of healthcare budget	Medium assumption scenario: Targeting threshold 9% of the population: 1,935,916	% of healthcare budget	High assumption scenario Targeting threshold 20% of the population: 4,302,036	% of healthcare budget
Utilisation 0.25						
Consultation costs	USD 109,833.69		USD 164,750.54		USD 366,112.31	
Drug costs	USD 361,177.91		USD 541,766.87		USD 1,203,926.37	
Human resources	USD 222,509.91		USD 333,764.86		USD 741,699.70	
Variable overheads 20%	USD 138,704.30		USD 208,056.45		USD 462,347.67	
TOTAL RECURRENT COST IN USD	**USD 832,225.81**	**0.22**	**USD 1,248,338.72**	**0.33**	**USD 2,774,086.04**	**0.74**
Scenario 2: Utilisation 0.50						
Consultation costs	USD 219,667.38		USD 329,501.07		USD 732,224.61	
Drug costs	USD 722,355.82		USD 1,083,533.73		USD 2,407,852.74	
Human resources	USD 445,019.82		USD 667,529.73		USD 1,483,399.39	
Variable overheads 20%	USD 277,408.60		USD 416,112.91		USD 924,695.35	
TOTAL RECURRENT COST IN USD	**USD 1,664,451.63**	**0.44**	**USD 2,496,677.44**	**0.66**	**USD 5,548,172.09**	**1.48**
Scenario 3: Utilisation 2.00						
Consultation costs	USD 878,669.53		USD 1,318,004.30		USD 2,928,898.44	
Drug costs	USD 2,889,423.28		USD 4,334,134.93		USD 9,631,410.95	
Human resources	USD 1,780,079.27		USD 2,670,118.90		USD 5,933,597.56	
Variable overheads 20%	USD 1,109,634.42		USD 1,664,451.63		USD 3,698,781.39	
TOTAL RECURRENT COST IN USD	**USD 6,657,806.50**	**1.77**	**USD 9,986,709.76**	**2.66**	**USD 22,192,688.35**	**5.91**

3.3.4 Sensitivity analysis

Section 3.3.4.1 provides the results from the sensitivity analysis on the average cost of providing one single first-level curative consultation to the ultra-poor in Burkina Faso. It is illustrated how the average cost changes by varying the drug cost and the overhead percentage. This new average cost is then applied to recalculate the national budget impact, shown in section 3.3.4.2.

3.3.4.1 The Average cost of providing one single first-level curative consultation to the ultra-poor in Burkina Faso

Table 17 reports the two-way sensitivity analysis results estimates of the average cost of providing one single first-level curative consultation to the ultra-poor in Burkina Faso. Specifically, varying the drug cost from 1.12 USD to USD 2.05 and the overhead percentage from 20% to 25% changed the total average cost per consultation from USD 3.17 to USD 4.45.

Table 17. Two-way sensitivity analysis I: The average cost of providing one single first-level curative consultation to the ultra-poor in Burkina Faso

The average cost of providing one single first-level curative consultation to the ultra-poor in Burkina Faso	
Time Horizon 1 YEAR	
	Cost per consultation in USD
I. Capital costs	
Building costs	0.26 USD
Equipment costs	0.23 USD
Fixed Overheads 25%	0.12 USD
Total Capital Cost	**0.61 USD**
II. Recurrent costs	**Cost per consultation in USD**
Consultation costs	0.34 USD
Drug costs (mean and 1 SD)	2.05 USD
Human resource costs	0.69 USD
Variable overheads 25%	0.77 USD
TOTAL Recurrent cost	**3.84 USD**
GRAND TOTAL CAPITAL AND RECURRENT COST PER CONSULTATION	**4.45 USD**

Table 18 reports the two-way sensitivity analysis results estimates of the average cost of providing one single first-level curative consultation to the ultra-poor in Burkina Faso. Varying the drug cost from USD 1.12 to USD 2.97 and the overhead percentage from 20% to 25% changed the total average cost per consultation from USD 3.17 to USD 5.61.

Table 18. Two-way sensitivity analysis II: The average cost of providing one single first-level curative consultation to the ultra-poor in Burkina Faso

The average cost of providing one single first-level curative consultation to the ultra-poor in Burkina Faso	
Time Horizon 1 YEAR	
	Cost per consultation in USD
I. Capital costs	
Building costs	0.26 USD
Equipment costs	0.23 USD
Fixed Overheads 25%	0.12 USD
Total Capital Cost	**0.61 USD**
II. Recurrent costs	**Cost per consultation in USD**
Consultation costs	0.34 USD
Drug costs (mean and 2 SD)	2.97 USD
Human resource costs	0.69 USD
Variable overheads 25%	1.00 USD
TOTAL Recurrent cost	**5.00 USD**
GRAND TOTAL CAPITAL AND RECURRENT COST PER CONSULTATION	**5.61 USD**

3.3.4.2 Budget impact scenario analysis

Table 19 presents the results from the medium assumption scenario analysis, applying a recurrent cost of USD 3.84 per consultation. Assuming a target population of 6% and a curative consultation rate of 0.25, the annual costs of providing first-level curative consultations to the ultra-poor would be USD 1,240,278.26 at the national level, equivalent to 0.33 % of Burkina Faso's national healthcare budget in 2019. Expanding the target population to 20% and the curative consultation rate to 0.50 would result in a cost of USD 8,268,521.73, equivalent to 2.20 % of Burkina Faso's national healthcare budget in 2019.

Table 19. Budget impact medium assumption

Cost category	Targeting threshold 6% of the population:1,290,611	% of healthcare budget	Targeting threshold 9% of the population: 1,935,916	% of healthcare budget	Targeting threshold 20% of the population: 4,302,036	% of healthcare budget
Utilisation 0.25						
Consultation costs	USD 109,833.69		USD 164,750.54		USD 366,112.31	
Drug costs	USD 659,879.01		USD 989,818.51		USD 2,199,596.69	
Human resources	USD 222,509.91		USD 333,764.86		USD 741,699.70	
Variable overheads 25%	USD 248,055.65		USD 372,083.48		USD 826,852.17	
TOTAL RECURRENT COST IN USD	**USD 1,240,278.26**	**0.33**	**USD 1,860,417.39**	**0.50**	**USD 4,134,260.87**	**1.10**
Utilisation 0.50						
Consultation costs	USD 219,667.38		USD 329,501.07		USD 732,224.61	
Drug costs	USD 1,319,758.02		USD 1,979,637.02		USD 4,399,193.39	
Human resources	USD 445,019.82		USD 667,529.73		USD 1,483,399.39	
Variable overheads 25%	USD 496,111.30		USD 744,166.96		USD 1,653,704.35	
TOTAL RECURRENT COST IN USD	**USD 2,480,556.52**	**0.66**	**USD 3,720,834.78**	**1.00**	**USD 8,268,521.73**	**2.20**
Utilisation 2.00						
Consultation costs	USD 878,669.53		USD 1,318,004.30		USD 2,928,898.44	
Drug costs	USD 5,279,032.06		USD 7,918,548.09		USD 17,596,773.54	
Human resources	USD 1,780,079.27		USD 2,670,118.90		USD 5,933,597.56	
Variable overheads 25%	USD 1,984,445.22		USD 2,976,667.82		USD 6,614,817.39	
TOTAL RECURRENT COST IN USD	**USD 9,922,226.08**	**2.64**	**USD 14,883,339.12**	**3.96**	**USD 33,074,086.93**	**8.80**

Table 20 presents the results from the high assumption scenario analysis, applying a recurrent cost of USD 5.00 per consultation. Assuming a target population of 6% and curative contacts per capita per year of 0.25, the annual costs of providing first-level curative consultations to the ultra-poor would be USD 1,614,197.26 at the national level. Expanding the target population to 20% and the curative contacts per capita per year to 0.50 would result in a cost of USD 10,761,315.10, equivalent to 2.86 % of Burkina Faso's national healthcare budget in 2019.

Table 20. Budget impact high assumption scenario

Cost category	Targeting threshold 6% of the population:1,290,611	% of healthcare budget	Targeting threshold 9% of the population: 1,935,916	% of healthcare budget	Targeting threshold 20% of the population: 4,302,036	% of healthcare budget
Utilisation 0.25						
Consultation costs	USD 109,833.69		USD 164,750.54		USD 366,112.31	
Drug costs	USD 959,014.21		USD 1,438,521.32		USD 3,196,714.04	
Human resources	USD 222,509.91		USD 333,764.86		USD 741,699.70	
Variable overheads 25%	USD 322,839.45		USD 484,259.18		USD 1,076,131.51	
TOTAL RECURRENT COST IN USD	**USD 1,614,197.26**	**0.43**	**USD 2,421,295.90**	**0.64**	**USD 5,380,657.55**	**1.43**
Utilisation 0.50						
Consultation costs	USD 219,667.38		USD 329,501.07		USD 732,224.61	
Drug costs	USD 1,918,028.42		USD 2,877,042.64		USD 6,393,428.08	
Human resources	USD 445,019.82		USD 667,529.73		USD 1,483,399.39	
Variable overheads 25%	USD 645,678.91		USD 968,518.36		USD 2,152,263.02	
TOTAL RECURRENT COST IN USD	**USD 3,228,394.53**	**0.86**	**USD 4,842,591.79**	**1.29**	**USD 10,761,315.10**	**2.86**
Utilisation 2.00						
Consultation costs	USD 878,669.53		USD 1,318,004.30		USD 2,928,898.44	
Drug costs	USD 7,672,113.69		USD 11,508,170.54		USD 25,573,712.31	
Human resources	USD 1,780,079.27		USD 2,670,118.90		USD 5,933,597.56	
Variable overheads 25%	USD 2,582,715.62		USD 3,874,073.44		USD 8,609,052.08	
TOTAL RECURRENT COST IN USD	**USD 12,913,578.12**	**3.44**	**USD 19,370,367.18**	**5.15**	**USD 43,045,260.39**	**11.45**

4 Discussion

Note: The doctoral student published aspects of this chapter in the following publications:

1. Beaugé, Y., De Allegri, M., Ouédraogo, S., Bonnet, E., Kuunibe, N., & Ridde, V. (2020). Do Targeted User Fee Exemptions Reach the Ultra-Poor and Increase their Healthcare Utilisation? A Panel Study from Burkina Faso. *International Journal of Environmental Research and Public Health, 17*(18), 6543.
2. Beaugé, Y., Ridde, V., Bonnet, E., Souleymane, S., Kuunibe, N., & De Allegri, M. (2020). Factors related to excessive out-of-pocket expenditures among the ultra-poor after discontinuity of PBF: a cross-sectional study in Burkina Faso. *Health Economics Review*, *10*(1), 1–11.

Following the order of the three study objectives, the discussion unfolds over three sub-sections. Accordingly, sub-section 4.1 discusses the key findings related to factors associated with the effect of card possession on the utilisation of healthcare services.; sub-section 4.2 discusses the findings related to the level of OOPE and factors associated with excessive OOPE among the ultra-poor, and sub-section 4.3 discusses the estimated capital and recurrent cost of providing one first-level curative consultation to the exempted ultra-poor and the cost and estimated budget impact of providing first-level curative services to the ultra-poor nationwide in Burkina Faso. The discussion in each sub-section is structured as follows: summary and interpretation of the key findings, discussion of the key findings in light of existing evidence, policy implications and methodological considerations.

4.1 Effect of card possession on the utilisation of healthcare services

4.1.1 Summary and interpretation of key findings

The study makes an important contribution to the existing evidence using an extensive panel data set of ultra-poor respondents (N = 1260). These respondents were monitored before and after the introduction of targeted user fee exemptions. The study examined which factors were associated with the receipt of user fee exemption cards and the effects of this card possession on the utilisation of healthcare services. Compared with the use of single cross-sectional

designs, which usually suffer from nonequivalence between control and intervention groups, the study was able to draw a more precise estimation of effects. Considering the methodological advantages of the applied research design, this dissertation offers valuable guidance to governments and donors who aim to exempt the poorest from user fees.

A core finding is that the majority of the identified ultra-poor (75.51%) received the exemption cards whereby the possession of exemption cards was positively associated with basic literacy, distance below 5 km to the nearest healthcare centre and the residency in the health district Diébougou and Gourcy. Contrary to the original hypothesis, the findings indicated that the possession of the exemption cards did not increase their utilisation of healthcare services. Being the household head, being male, having bad perceived health, lower age, absence of a disability and greater household size were positively associated with utilising health services.

4.1.2 Discussion of key findings

The findings seem to contradict the conclusions drawn from previous studies performed in other settings that suggested a substantial increase in service use by the poor after the introduction of either user fee exemptions at the national level or targeted user fee exemptions implemented on a smaller-scale project basis (Cottin, 2018; Flores et al., 2013; Garchitorena et al., 2017; Jacobs et al., 2007a; Lagarde et al., 2012; Ridde, 2015). For instance, a multilevel interrupted time series analysis of routine monthly utilisation statistics during 2006 - 2013 examined the impact of Cambodia's Health equity fund on the utilisation of public health facilities. The study demonstrated an increase in the utilisation of primary and secondary care services by the poor (Jacobs et al., 2007a). However, the national scheme in Cambodia also addresses non-financial barriers and provides beneficiaries reimbursements for transportation costs to the healthcare facility or daily food allowances for caretakers (Jacobs et al., 2007a), which has not been the case in Burkina Faso. Evidence from several west African countries on pilot fee-exemption interventions has also generally drawn positive results and demonstrated a rise in service utilisation among the poor (Abdu et al., 2004; Flores et al., 2013; Garchitorena et al., 2017; Ridde, 2015). A recent study by Cottin (2018) relied on a combination of propensity score matching with panel DID and estimated a modest positive effect of a

nationwide fee waiver programme on healthcare utilisation by the poor in Morocco (Cottin, 2018). However, none of these studies on the poor used a panel-level design to measure the effect of user fee exemptions.

The findings are consistent with prior studies assessing the effects of targeted user fee exemptions for the poor. For instance, using a pooled synthetic control method, Lépine et al. (2018) reported that the user fee removal in Zambia had not resulted in increased healthcare utilisation by the ultra-poor (Lépine et al., 2018a). Compared with Cambodia's land area of 181,035 km^2, Zambia is four times bigger (land area: 752,618 km^2), an important characteristic that might have contributed to the differences in the impact of the user fee removal across the countries since the population (Cambodia: 15 million; Zambia 17 million) is spread over a larger area making access to healthcare services more difficult. Atchessi et al. (2014) conducted a pre-post study in Ouargaye (Burkina Faso). They reported an increase in health service utilisation among the ultra-poor from 2010 to 2011, which was not associated with exemption cards' distribution (Atchessi et al., 2016a). In line with the study findings (Beaugé, De Allegri, et al., 2020), Atchessi et al. (2016) also argue that sociocultural factors such as gender and cultural beliefs and transportation might have been more influential determinants.

Role of Intervention Design and Implementation Failures

To better understand why the possession of user fees exemption cards did not increase the utilisation of healthcare services by the ultra-poor, the findings need to be interpreted in relation to the context of the intervention and its implementation.

First, it is crucial to consider that implementers had to reduce the reimbursements price levels (including the financial incentives to reach out to the poor) for all services twice due to budgetary constraints (Turcotte-Tremblay et al., 2017). Looking at the first 18 months of implementation (January 2014 to May 2016), Turcotte-Tremblay et al. (2017) reported that some healthcare providers were dissatisfied with the compensation received for treating the ultra-poor. They argued that since this population is affected by multiple morbidities, case-based lump-sum reimbursements set around the average cost of treatment were insufficient to

cover their actual health provision costs (Turcotte-Tremblay et al., 2017). Therefore, it was hypothesized that providers perceived incentives as being too small, and providers were not motivated enough to take the initiative to attract the ultra-poor to the facilities as intended by the PBF programme. The results from the author's micro-costing study (objective 3) partially support this hypothesis. The estimated recurrent cost of providing one fist-level consultation to the ultra-poor was at USD 1.75 (base-case without human resource cost). A comparison of this micro-costing estimate with the reimbursement levels under the PBF programme shows that providers got on the first sight roughly reimbursed what they spent per first-level consultation for the ultra-poor. Under the PBF intervention, providers were reimbursed between USD 1.50 and USD 1.80 on average per first-level outpatient visit. However, the scenario analysis from the micro-costing study (objective 3) further revealed that the upper boundary of the cost per first-level consultation could also reach USD 3.97 (high assumption scenario without human resource cost and adjusted overheads) for the ultra-poor. This cost estimate suggests that the reimbursed price per outpatient visit under the PBF programme could indeed have been too low to cover the true treatment need of the ultra-poor jeopardizing the effectiveness of the intervention. When looking closer at the cost results, also the question arises whether healthcare providers might have capped the service provision at the reimbursement rate level. For an effective user fee exemption intervention, policy maker are advised to use micro-cost results as a basis for a better evidence-driven exchange with healthcare providers on reimbursement price levels also taking into account the complex morbidity profile of the ultra-poor, which drives especially the drug costs up. Appendices 1 and 2 show the list of quantity indicators included in the PBF design.

Additionally, due to significant delays in reimbursements, some healthcare facilities charged poor patients irrespective of their exemption card (Turcotte-Tremblay et al., 2017). At the same time, it needs to be noted that 25% of the initially identified ultra-poor have never received an exemption card, especially those living remotely from the health facility and those being less literate. It is thus not surprising that the intervention impact lags behind expectations. These circumstances suggest a need for adherence to implementation guidelines and a concentration of efforts to reach those remote from the healthcare centre.

Another design element that might explain the reported lack of effectiveness of the intervention relates to the possibility of gaming/fraud by healthcare providers that can occur as an unintended consequence of PBF. This concern has led PBF designers to introduce a ceiling that rationed the services delivered to the ultra-poor in the targeted districts to a maximum of 10% of all consultations in health facilities (Fritsche et al., 2014; Ministère de la Santé Burkina Faso, 2013; Ridde, Turcotte-Tremblay, Souares, Lohmann, Zombré, Koulidiati, Yaogo, Hien, Hunt, & Zongo, 2014). To better understand this decision, it is important to recall that the initial identification and targeting process allowed up to 20% of the individuals in the health facility catchment area to be identified as ultra-poor and eligible for an exemption card. The community selection committees, however, only selected between 5% and 10%. Only a very high incidence of disease would lead the ultra-poor to account for more than 10% of all services provided. The imposition of the ceiling might have cautioned providers towards healthcare provision for the poor, resulting in the observed limited access rather than acting only as a deterrent to fraud and gaming, as initially expected. It is interesting to note that a parallel study looking specifically at misreporting suggests that contrary to expectations, extensive gaming and fraud are unlikely to have taken place in this setting. The study observed discrepancies in quantity reporting that were generally small and equally oriented towards under- and over-reporting (Kuunibe et al., 2019).

Equity to Access to Healthcare is in the Eye of the Beholder

The fact that the study found no significant effect of the user fee exemption cards on the health service utilisation undoubtedly questions the design and content of the intervention, especially if one takes into account the financial and economic costs of identifying each ultra-poor beneficiary (USD 6 and USD 12 respectively) (Beaugé et al., 2018). Furthermore, the user fee exemption was not a standalone project but embedded within a broader PBF intervention that already complemented demand-side (user fee exemptions) by supply-side incentives (PBF) aimed at addressing inequalities in access to care more holistically. It is especially against this background that these findings are alarming, although they echo results from previous studies that show that equity measures implemented alongside PBF fell short of reducing the equity gaps (Allegri et al., 2018; Lannes et al., 2016; Mwase et al., 2020; Ridde, Gautier, et al., 2018)

with few exceptions (Binyaruka et al., 2018; Flink et al., 2016). The implications of these results for implementers and the government are that existing PBF strategies need to be better customised to fit the specific needs of the poor. User fee exemptions indeed represent a first step toward narrowing the equity gap. However, to receive the anticipated outcome and not waste resources, it is vital that future research explores and informs policymakers about the role and contribution of all relevant financial and non-financial barriers to healthcare access for the poor (Thiede & Koltermann, 2013).

Interestingly enough, the findings suggested that in this specific context, it is not only the financial but the individual dispositions such as the position in the household, household size, perceived health status, age and the existence of a disability that might be more influential determinants of health service utilisation among the poor. This is in line with the theoretical models and frameworks that explain the complex nature of access to care and the multiple determinants of health service utilisation (Andersen, 1995; Levesque et al., 2013; Robert et al., 2017). All of them stressed that access to and the utilisation of healthcare services are dependent on not just the financial means of the poor.

4.1.3 Policy implications of key findings

Despite the well-known complexity of the issue, policymakers and donors often tend to overemphasise the importance of financial access, as its degree of mutability is high as opposed to, e.g., changing norms and social structures. Yet, equity to access to care is in the eye of the beholder (Andersen, 1995), and it is ultimately the ultra-poor who can determine best what factors explain their utilisation. Hence, to promote equitable access to healthcare, global health actors and governments must take local contexts into account and adapt to these realities when designing public health interventions and, ultimately, policies (Aboagye et al., 2019; Thiede & Koltermann, 2013). To guide policy, future research with the application of mixed-method approaches needs to focus on assessing the local perspective on the role and interrelation of various financial and nonfinancial barriers to access and utilisation comprehensively.

In light of the result that poor women were less likely than poor men to utilize services, one complementary strategy to the existent measures could address gender inequalities through empowerment-based interventions better since women remain to have limited decision-making power in this particular study context (Nanda, 2002). To radically improve women's capability to make health decisions, governments will have to go beyond mere reforms within the healthcare sector and introduce social and economic policies that strengthen women's positions in society as a whole (Samb & Ridde, 2018). A barrier-focused intervention could train patient navigators within the PHC system who link between the poor and healthcare providers by determining barriers to utilisation of services and coordinating and facilitating needed care (Wells et al., 2017). The approach might be particularly effective for females and the elderly; the study highlighted their decreased likelihood of utilising healthcare services. Another critical factor in increasing utilisation rates is breaking down the transportation barrier, which remains a significant challenge for the ultra-poor.

4.1.4 Methodological considerations

The findings should be interpreted in light of the study limitations. First, the study suffered from a high attrition rate, which resulted in a follow-up sample that became moderately biased towards having healthier participants and thus lower illness reporting and health service utilisation compared to its baseline counterpart. Sample attribution also entails the loss of a certain degree of statistical power. This attrition, however, appears inevitable given that prior research has indicated that the ultra-poor are more likely to be people of older age. These people experience severe illness or disability (Ouédraogo et al., 2017). Second, the initial analytical approach had to be changed due to too little variation in the main explanatory variable ‘Possession of user fee exemption card’. The study applied a random instead of a fixed-effect model, an approach that would have also allowed to control unobservable individual time-variant characteristics. However, having applied clustering at the individual level, the study obtained comparably accurate estimations. Third, the dataset might have been subject to illness reporting bias (Pokhrel et al., 2010). As previously done by Schoeps et al. (2015) (Schoeps et al., 2015), the study controlled for all possible observable confounders to

limit the extent to which working with the truncated sample of individuals having reported an illness episode might have affected the effect estimation.

Similarly, it would have been desirable to address the potential effect of endogeneity of user fee exemption card possession on the estimates by applying an effective two-part joint model. Still, due to the inability to identify in the dataset a valid instrument (Certo et al., 2016), it was not possible to do so. Furthermore, the study relied on self-reported information on illness and utilisation of healthcare services which are not 100% flawless. Lastly, data were collected retrospectively with a recall period of six months. Hence, the information on illness reporting and utilisation of healthcare services was subject to recall biases.

4.2 Level of out-of-pocket expenditure and factors associated with excessive out-of-pocket expenditure among the ultra-poor

4.2.1 Summary and interpretation of key findings

This dissertation makes a unique contribution to the existing literature by investigating OOPE among the ultra-poor in Burkina Faso, a segment of society who lives in extreme poverty, is hardest to reach and thus often neglected within the scientific landscape as data is hardly available on these excluded individuals (Ridde et al., 2019). Accordingly, even a small dataset as handled by the author is precious to closely track and understand the progress of these people and integrate the gained knowledge into the planning and prioritizing of future interventions to leave no one behind as envisioned in the 2030 agenda for sustainable development. This dissertation is the first, which assesses the magnitude of OOPE on formal healthcare services among targeted and exempted ultra-poor people. In light of the surprisingly high expenditure of the ultra-poor, the author also aimed at estimating the factors that explain the ultra-poor peoples' probability of incurring the excessive OOPE. The study's findings offer valuable practical and political implications for countries currently moving towards a national health insurance scheme with the aspiration also to include the weakest members of the society. Yet, due to the small sample size, the result should be interpreted with caution.

The first crucial finding of the study was that 90% of the study population incurred expenditure above zero, while only 10 % reported zero expenditure. Most striking is that these identified and former exempted "ultra-poor" had to pay a substantial total mean of FCFA 23051.62 (USD 39.19) towards expenses to cover their formal healthcare costs for a single illness episode within the last six months. The study also reveals that almost half of those who seek formal healthcare services (45%) incurred a positive expenditure on transport costs with an average of FCFA 2178.65 (USD 3.70). Possessing an exemption card decreased the probability of incurring excessive OOPE by 28 percentage points. Furthermore, a positive association between age and excessive spending for formal healthcare services has emerged from the findings.

4.2.2 Discussion of key findings

There is an obvious discrepancy between the author's OOPE estimate of FCFA 23051.62 (USD 39.19) and the estimates by previous studies. Beogo et al. (2016) assessed the mean OOPE for public health services among individuals living in the capital of Burkina Faso at FCFA 8404 (USD 14.29) (Beogo et al., 2016). Nakovics et al. (2019) used household-level data for 24 districts (a third of the country) and calculated the overall OOPE of FCFA 9362.52 (USD 15.92) (irrespective of the type of care used) for the general rural population (Nakovics et al., 2019). The lowest socio-economic quintile in the study done by Nakovics reported OOPE at the same level as the rest of the population (Nakovics et al., 2019). The discrepancy between the author's estimate and those of previous studies might be due to the fact that the author included three extreme but validated cases where ultra-poor got evacuated for surgery with extremely high accompanying costs. When the author removed these cases, the mean was calculated at FCFA 10188.87 (USD 17.32), almost matching the reported mean by Beogo et al. (2016) and Nakovics et al. (2019). Irrespective of the approach taken, both amounts USD 39.19 and USD 17.32 impose a dramatic economic burden on the ultra-poor people who already live below the national poverty line of USD 1.90 a day (World Bank, 2020). Additionally, these numbers are a demonstration of the current inequitable health financing mechanisms in Burkina Faso.

Moving onto the second key finding, the author illustrated that not only do more ultra-poor incur transport costs, but at the same time, the average cost is 27 % higher than what the general residents in rural Burkina Faso pay for transport for healthcare (FCFA 1670.83) (USD 2.84) (Nakovics et al., 2019). This finding seems entirely plausible at first sight as it is known that ultra-poor usually live socially isolated in remote areas (Ridde, Bonnet, et al., 2013) and do not own private vehicles (e.g. bicycle, motorbike or donkeys) to get to the health center and that might lead to an increased need to use other means of transport that drives costs up. The map (Figure 9) of the distribution of the CSPS and density of indigents also demonstrated the geographical remoteness. However, when comparing the mean difference of the general rural resident and the identified ultra-poor from their residential spot to the nearest health facilities, there is not a big difference which makes the author assume that the distance alone might not be the main driver of the transport costs. Instead, the author assumes that their old age, the seriousness of the illness and a possible late-stage of seeking care (not able to walk, stand, sit alone without assistance) might demand that ultra-poor be transported in a specific way, e.g. making it necessary to have accompanied transportation with a borrowed vehicle (involving fuel costs) (Atchessi et al., 2014, 2016b; Kadio, 2013).

Looking specifically at the results of the regression models, it was striking to see that the exemption card, which respondents received in early February 2016 in Diébougou within the PBF intervention (3 years before the data collection), decreased the probability of incurring excessive OOPE by 28 percentage points. This finding shows the potential of the exemption in achieving financial protection for the poorest, which is a key objective of Burkina's first health financing strategy (2017 - 2030). It is remarkable, especially against the background, that the intervention ended in June 2018 with the end of the World Bank funding, where healthcare providers received last program reimbursements in January 2018. The data collection started almost exactly one year after the official end of the project. While further qualitative studies are needed to clarify the specific reasons for this positive development, initial field feedback pointed towards the core of goodness in healthcare workers and their uptake of program ownership in relation to the user fee exemptions after discontinuity of PBF. Indeed, it is assumed that some health workers continue to feel responsible for their community's health and show compassion and kindness towards the ultra-poor. As a result, they might encourage support actions in conjunction with the management committees or an autonomous manner,

provide the minimum package of healthcare services to the ultra-poor. The author also refers to the exemption policy implemented by the government in 2009, which demonstrated that only asking health workers at the primary level to exempt the ultra-poor was never successful. An enabling mechanism (exemption cards) combined with goodwill is necessary to allow the exemptions to be turned into practice. Similar developments have been noted by Ridde & Girard (2004), who described that some health personnel, in their good graces, continued to ensure exemption for healthcare for identified ultra-poor (Ridde & Girard, 2004). This is in line with Seppey et al. (2017), who described that after discontinuity of PBF in Mali, it is mainly the activities with a higher degree of autonomously driven motivation that are more sustainable (Seppey et al., 2017). In the case of user fee exemptions, healthcare workers might be driven to continue to provide services to the ultra-poor even in the absence of project funding because doing so corresponds with their beliefs and values of equity, charity, justice and solidarity.

The reported positive association between age and excessive spending for formal healthcare services is unsurprising and coherent with the broad literature on OOPE (Mugisha, Kouyate, Gbangou, et al., 2002) since an increasing age is a predisposing factor leading to higher rates of (multi)-morbidity and disability (Audain et al., 2017; WHO, 2020). Therefore, older people make substantial use of formal health services (Agyemang-Duah et al., 2020), require special diagnostics and consequently incur higher expenses (Atchessi et al., 2016b; National Research Council, 2001). Similarly, the author expected males to be more likely to spend excessively on formal healthcare services. The reasons are three-fold: first, Burkina Faso has been implementing several user fee exemptions and removal mechanisms and policies targeting women, including the launch of the *gratuité* policy in April 2016 to cover the healthcare fees for preventive and curative care for pregnant and lactating women, which makes excessive spending less likely (Ministère de la Santé Burkina Faso, 2016). Secondly, as males are usually the breadwinner and their health essential for households' survival, they might use formal healthcare services more compared to ultra-poor women (Chen et al., 1981; Mugisha, Kouyate, Gbangou, et al., 2002; Sen & Östlin, 2008). Atchessi et al. (2016) pinpointed the prevailing power inequalities in gender relationships in this particular setting in Burkina Faso, where decision-making power is usually with the men (Atchessi et al., 2016b), putting women

into a subordinate social position affecting their access to scarce resources (Sen & Östlin, 2008).

4.2.3 Policy implications of key findings

The present study emphasizes that exemption cards had a protective effect against excessive OOPE despite the end of the intervention, which shows the relevance of free care for a vulnerable population. Policymakers must recognize the unique needs of the ultra-poor for better tailored financial protection. A specific examination of service patterns of the ultra-poor is needed; the provision of enhanced and broadened coverage considering the elevated risks due to multimorbidity and chronic diseases of this sub-population is a logical consequence. Without considering these realities when allocating budgets, there is little prospect of making healthcare truly inclusive for the people living on the margin of society.

4.2.4 Methodological considerations

Although the study provides novel findings on OOPE amongst the ultra-poor, the author needs to acknowledge certain limitations. First, the author acknowledges the relatively small size of the sample, and this necessitates a careful interpretation of the results. Yet, she deems the results as essential since ultra-poor are severely understudied. The author recommends replicating the study on a larger sample, albeit logistically complex. Secondly, no study has been conducted so far on the accuracy of the selection and targeting process (teasing out false-positive cases) of this specific scheme. Hence, the author had no means of deciding on the inclusion or exclusion of single cases. However, the author carried out several sensitivity analyses by excluding extreme cases and using different thresholds for excessive expenditure. Results stayed robust throughout. Thirdly, the study used self-reported information on illness reporting and expenditure data that could have been subject to recall bias; hence the author cannot assure 100% accuracy of this data. Due to restrictions by the dataset, the author was not able to disaggregate OOPE from other cost items other than general spending on formal healthcare services and transportation. Despite these limitations, this dissertation provides essential evidence on the economic burden of OOPE on the ultra-poor.

4.3 Estimated capital and recurrent cost of providing one first-level curative services to the exempted ultra-poor and the projected annual cost and healthcare budget impact for a national scale-up

4.3.1 Summary and interpretation of key findings

There is a lack of knowledge on the associated price tag of providing first-level curative healthcare services to the ultra-poor in SSA countries which poses a challenge in financial planning, decision-making and resource allocation. This dissertation makes an essential contribution to the limited evidence by using the real-world example of Burkina Faso to estimate the capital and recurrent costs associated with providing one first-level curative service to the ultra-poor. The study further projects the cost and budget impact of providing first-level curative services to the exempted ultra-poor nationwide. Evidence on the cost of purchasing PHC services is deemed essential for policymakers and implementers alike, as governments are increasingly transitioning from passive to more strategic purchasing mechanisms. The analysis raises awareness to pursue a sustained change in budget allocations towards the most vulnerable population - the ultra-poor.

By applying a micro-costing approach, the capital and recurrent cost of providing one first-level curative consultation to the ultra-poor were estimated to range between USD 0.59 - USD 0.61 and USD 2.58 - USD 5.00, respectively. This accumulates to a total cost range of USD 3.17 - USD 5.61 per one first-level curative consultation. The estimated annual recurrent cost varies substantially as a function of the proportion of population targeted and the number of expected curative contacts. When assuming a target population of 6% and 0.25 healthcare contacts per capita per year, the annual recurrent costs of providing first-level curative services to the exempted ultra-poor nationwide in Burkina Faso were estimated to be between USD 832,225.81 USD and USD 1,614,197.26, representing between 0.22 to 0.43 % of the Burkinabè health budget. However, the expected annual expense was very sensitive to changes in the health utilization rate and population coverage.

4.3.2 Discussion of key findings

In addition to (1) the total cost per one first-level consultation in this discussion, the author will elaborate on (2) the share of capital and recurring costs of the total cost and (3) the dominating cost drivers. Section 4.3.3 continues with the policy recommendations.

(1) Total cost per one first-level consultation ranges between USD 3.17 and USD 5.61

The estimated total cost (capital and recurrent) between USD 3.17 and USD 5.16 per one first-level consultation is generally in line with prior limited evidence. However, a direct comparison of results is difficult since the bulk of available studies addresses the general population and not the marginalized group of the ultra-poor. Mugisha et al. (2009) assessed the cost of out-patient services at PHC facilities in Nouna at USD 3.08 (Mugisha, Kouyate, Dong, et al., 2002), which almost matches our lowest estimate of USD 3.17. Another study from Burkina Faso's neighbour, Ghana, by Dalaba et al. (2017) also addressed the cost of providing health care services at primary health facilities (Dalaba et al., 2017). Dalaba et al. (2017) reported costs of USD 5.16 and USD 8.79 for outpatient-department (OPD) attendance (Dalaba et al., 2017). The former relates to the OPD attendance in Health Centres and the latter to Community-based Health Planning and Service facilities (CHPS) (Dalaba et al., 2017).

When interpreting the results, the reader must also consider that the study focused exclusively on the capital and recurrent costs of providing one first-level consultation to the ultra-poor. Hence, this cost assessment did not account for selecting and identifying the ultra-poor that preceded the provision of PHC services. Beaugé et al. (2018) calculated the total cost of the community-based targeting approach implemented from May 2014 to January 2016 to select the ultra-poor (Beaugé et al., 2018). The authors estimated that the identification of one beneficiary incurred a financial cost of USD 5.73 (Beaugé et al., 2018). When designing healthcare policies and budgeting healthcare services for the ultra-poor, policymakers have to consider both amounts 1) the cost of selecting one beneficiary and 2) the cost of providing first-level consultations. While the cost of selecting is mainly a one-off intervention, the cost of providing services will be recurring annually and depend primarily on the number of beneficiaries and the utilisation rate.

(2) The share of capital and recurring costs of the total cost

The fact that the recurrent cost accounted for the most significant proportion of cost (81.39%) is congruent with what was reported in the study mentioned above in Ghana, where recurrent expenditure accounted for about 80% of total costs in both the HCs and CHPS facilities.

(3) Drug cost accounted for the largest proportion of cost followed by human resources

The fact that the drug cost accounted for the largest proportion of cost (35.33%) followed by human resources (21.77%) differs from the above-mentioned studies from Ghana and Burkina Faso (Mugisha, Kouyate, Dong, et al., 2002). Previous evidence from Burkina Faso showed that drug costs were found to be only the second-largest cost driver (Mugisha, Kouyate, Dong, et al., 2002). Dalaba and colleagues calculated the cost for several PHC services and only allocated the total drug cost to individual cost centers based on the value of consumption by the final cost categories (Mugisha, Kouyate, Dong, et al., 2002). This makes the calculation of cost rather imprecise. That drug cost accounted for the largest proportion of cost in our study was expected since the ultra-poor are a population with a complex morbidity profile who seek healthcare at a very late stage that might require complex drug treatment. Beauge et al. (2020) demonstrated in their study on the level and factors associated with excessive OOPE that ultra-poor spend a high amount of OOPE to cover their healthcare costs (Beaugé, Ridde, et al., 2020).

4.3.3 Policy implications of key findings

To understand the policy implications of our findings, one needs to relate the results to Burkina Faso's fiscal context and the proposed health financing mechanism to accelerate progress towards UHC.

Impact on the national health budget

Burkina Faso allocated 10.95 % of the government budget to health in 2018, which is about 1.40 % less than 2016 but even more interesting, 4.05 % short of what the government agreed

to under the infamous Abuja Declaration in 2001. In absolute terms, Burkina Faso's MoH held a total budget of 221,053 million FCFA (USD 375,790,100) in the fiscal year 2018. Now, the critical question for policymakers in light of the analysis is: Which of the constructed hypothetical budget scenarios is closest to reality or at which should one aim at and how will it impact fiscal space:

Looking at the base-case scenario, and providing first-level consultations to 6 % of the total population with 0.25 healthcare contacts per capita per year, the intervention would only absorb with a range between 0.20 % and 0.43 % a very small proportion of the national healthcare budget, at a recurrent cost range of USD 2.58 USD to USD 5.00 per consultation. Increasing the utilization to 0.50 and 2.00 while holding the targeting threshold constant would result in 0.44 % - 0.86 % and 1.77 % - 3.44 % of the healthcare budget, respectively. The targeting threshold of 6 % may seem comparably low. However, during the project-based implementation of community-based targeting in eight districts in Burkina Faso, it has been found that distinguishing ultra-poor beyond that point is difficult. Originally, implementers planned to identify and exempt between 15 % and 20 % of the population from user fees, which, however, failed.

Turning to the highest-assumption scenario, and assuming a provision of first-level consultations to the bottom 20 % of the population with two healthcare contacts per capita per year, the intervention would absorb between 5.91 % and 11.45 % of the total annual budget for health. While two healthcare contacts per capita per year are an aspiring goal (Starfield et al., 2005; WHO, 2008) and should thus be budgeted for, the current study suggested that the utilization rate among the rural ultra-poor is with 0.25 healthcare contacts per year only one-fifth of the utilisation among the general population (1.18 contacts). Further, an immediate increase in the utilisation of services by the poor in Burkina has also not been observed after the introduction of user fee exemptions. The underlying reasons are the constraints on the overall utilisation caused by a wide range of patient-level factors, especially in the rural setting such as (low education and social stigma) and provider- and system-level factors (e.g., finite supply of medical professionals and resources at CSPS).

To conclude, across all hypothetical scenarios, the budget impact of providing first-level curative healthcare services to the exempted ultra-poor nationwide on the overall national

health budget is below twelve per cent. This suggests the likely affordability of providing first-level consultations through user fee exemptions for the exempted ultra-poor society at large in Burkina Faso. However, which of the discussed hypothetical scenarios might be most relevant depends on the long-term goals of the budget holder and their willingness to pay or their ability to pool and attract funding.

Investing in PHC for the ultra-poor using the capitation-based payment mechanism

Undoubtedly, the produced evidence on the budget impact of providing first-level consultations to the exempted ultra-poor is vital for informed decision-making for countries to leave no one behind, the central promise of the SDGs. Nevertheless, Burkina Faso and other countries alike cannot simply spend their way to attain UHC even if the estimated budget is known and predicted to be relatively low. Substantial increases in domestic financing for PHC might be necessary to ensure the sustainability of such interventions to meet the SDGs' global targets. As of 2019, Burkina Faso already allocated about 42% of the government spending on health to PHC and has continued to increase its contribution, demonstrating its true commitment. However, it might be challenging to reallocate the available funds required for PHC for the exempted ultra-poor since only a few lobbyists promote the interests of the ultra-poor. Given the economic context of Burkina Faso and the additional constraints caused by the Covid-19 pandemic, raising additional resources might also be challenging.

However, policymakers could implement the intervention gradually, reflecting what is considered affordable and increasing the targeting threshold step by step. Assuming financial resources could be made available through reallocation or third-party donations, the author proposes leveraging strategic purchasing and buying PHC services from healthcare providers through capitation-based payments. This shift in payment mechanism would comply with the third axis of Burkina Faso's National Health Financing Strategy for Universal Health Coverage 2018-2030, which calls for developing mechanisms for strategic purchasing of benefits and services. The author further proposes that a designated purchasing agency could use the estimated cost per the first-level consultation as a starting point for discussing purchasing PHC for the ultra-poor. Payments could be modified based on a quality score for each facility also to address deficits in quality of care.

4.3.4 Methodological consideration

The following study limitations need to be considered: First, the cost estimates were derived from a limited number of health facilities in one district only. Given the large variability in utilisation rates across health facilities in Burkina Faso, this could have led to an under- or overestimation of costs. To account for this study limitation, the author applied different utilisation rates in the scenario analysis. However, it is recommended that similar costing studies are conducted on a larger scale. Second, the provided treatment mix to ultra-poor might not reflect the quality standard of care PHC facility staff also offer to non-poor patients. Practitioners might have only treated the current conditions without underlying multi-morbidities and might have only spent what they had. Thus, the author cannot rule out that providers might have rationed healthcare services for the ultra-poor. To address this limitation, the author triangulated data from different sources. She compared the resource consumption by the ultra-poor below the age of 5 years with micro-costing study on health service use among children from the general population at the same age. Resource consumption of the poor and non-poor children was largely matching. However, an underestimation of costs due to this underlying problem cannot be fully ruled out. Third, in the absence of drug prices based on dosage, the author had to apply for all observations, average drug prices for adults, despite the fact that 11 % of the sample were children between the ages of 5 and 15. The author varied the applied drug prices to one and two standard deviations around the mean for sensitivity analysis to account for this study limitation.

5 Conclusion

Note: The doctoral student published aspects of this chapter in the following publications:

1. Beaugé, Y., De Allegri, M., Ouédraogo, S., Bonnet, E., Kuunibe, N., & Ridde, V. (2020). Do Targeted User Fee Exemptions Reach the Ultra-Poor and Increase their Healthcare Utilization? A Panel Study from Burkina Faso. *International Journal of Environmental Research and Public Health*, *17*(18), 6543.
2. Beaugé, Y., Ridde, V., Bonnet, E., Souleymane, S., Kuunibe, N., & De Allegri, M. (2020). Factors related to excessive out-of-pocket expenditures among the ultra-poor after discontinuity of PBF: A cross-sectional study in Burkina Faso. *Health Economics Review*, *10*(1), 1–11.

By using the real-world example of Burkina Faso and relying on a multi-method approach, the author addressed two complementary aspects of access to healthcare for the ultra-poor: the utilization of healthcare services and the financial protection of the ultra-poor (effect of user fee exemptions on utilization and financial protection). Additionally, the author estimated the cost of providing one first-level consultation to the exempted ultra-poor and, based upon that, projected the cost and budget impact of providing first-level services to the exempted ultra-poor nationwide.

In particular, the study found that the utilisation of healthcare services by the ultra-poor was not responsive to the introduction of targeted user fees exemption. This finding, however, does not undermine the importance of such strategies to pursue Universal Health Coverage per se. Instead, the implication is that there are other more or equally important underlying barriers to universal healthcare access than financial ones, especially in settings where initial inequalities are large. Based on the findings, the author recommends policymakers gain a precise local understanding of the relevant barriers of access to healthcare services for the ultra-poor and initiate dialogue with healthcare providers to find common ground on reimbursement price levels. Further, it is essential to prepare carefully, plan, and implement user fee exemptions for the ultra-poor along with additional demand-side measures such as patient navigation to address all relevant barriers to healthcare access simultaneously.

Secondly, the study found that exemption cards had a protective effect against excessive out-of-pocket expenditures despite the end of the intervention, which showed the relevance of free

care for a vulnerable population. Nevertheless, the ultra-poor had to spend a high amount of Out-of-pocket expenditures to cover their healthcare costs. Out-of-pocket expenditures among the ultra-poor were at about the same level as people from higher socio-economic groups, which demonstrated the unfairness of the current health financing schemes in Burkina Faso. When including valid extreme values, the ultra-poor, on average, had even higher expenditure than the general population, most likely due to their old age, illness severity, and complex medical profiles. Policymakers must recognize the unique needs of the ultra-poor for better tailored financial protection. A specific examination of service patterns of the ultra-poor is needed; the provision of enhanced and broadened coverage considering the elevated risks due to multimorbidity and chronic diseases of this sub-population is a logical consequence.

Thirdly, the study estimated the capital cost of providing one first-level curative consultation to the ultra-poor between USD 0.59 and USD 0.61 and the recurrent cost between USD 2.58 and USD 5.00, accumulating to a total of USD 3.17 - USD 5.61. The major cost drivers were drug costs and human resources. Across all hypothetical budget scenarios, the impact of providing first-level services to the exempted ultra-poor nationwide on the overall national health budget was below 11.45 % and thus relatively low. Given that the intervention would only absorb a fraction of the overall budget, the study concluded the likely affordability of providing first-level services to the exempted ultra-poor society at large in Burkina Faso as long as governments or donors are willing to make trade-offs and pay the price. To further advance towards leaving no one behind, Burkina Faso's policymakers could consider piloting a capitation-based system to reimburse providers for providing first-level services to the ultra-poor.

In conclusion, this dissertation sheds more light on the central role of targeted user fee exemptions in the equitable access to primary healthcare services for the ultra-poor. The findings substantiate that targeted user fee exemptions are vital and offer protection against excessive out-of-pocket expenditures but would benefit from a combination with other measures to effectively increase the utilization of services for this marginalized population. The produced evidence on the cost per first-level consultation for the ultra-poor is critical for policymakers to set the correct reimbursement levels for healthcare providers for treating the ultra-poor. Further, the estimated cost and budget impact are essential for Burkina Faso and

other low and middle incomes alike to develop, maintain or scale up exemption policies for the ultra-poor in light of the principle of leaving no one behind within Universal Health Coverage.

Additional research is needed, which 1) applies mixed-method approaches to assess the local perspective of the ultra-poor on the role and interrelation of various financial and non-financial barriers to accessing and utilizing healthcare services; 2) uses robust study designs for impact evaluation of user fee exemptions: e.g., researchers should strive to compare poor vs. non-poor whenever possible; 4) adopts qualitative methods to clarify the specific reasons for the protective effect of the exemption cards on excessive out-of-pocket expenditure despite the end of the intervention; 5) replicates the study with a larger sample size of ultra-poor across different regions in Burkina Faso.

6 Summary

Note: The doctoral student published aspects of this chapter in the following publications:

1. Beaugé, Y., De Allegri, M., Ouédraogo, S., Bonnet, E., Kuunibe, N., & Ridde, V. (2020). Do Targeted User Fee Exemptions Reach the Ultra-Poor and Increase their Healthcare Utilization? A Panel Study from Burkina Faso. *International Journal of Environmental Research and Public Health*, *17*(18), 6543.
2. Beaugé, Y., Ridde, V., Bonnet, E., Souleymane, S., Kuunibe, N., & De Allegri, M. (2020). Factors related to excessive out-of-pocket expenditures among the ultra-poor after discontinuity of PBF: a cross-sectional study in Burkina Faso. *Health Economics Review*, *10*(1), 1–11.

Introduction and rationale

The ultra-poor are the most vulnerable and underserved population in sub-Saharan Africa with limited access to health care services. Producing scientific evidence on the exemption from user fees for this population is considered highly relevant also in light of the agenda of sustainable development and the focus on leaving no one behind. Nevertheless, the ultra-poor have remained an underrepresented group in the scientific landscape, primarily because of the difficulties in reaching them. The study contributed to filling this gap by estimating the effects of user fee exemptions on healthcare utilization, their potential to protect the ultra-poor from financial hardship and the cost implications to the healthcare system when providing first-level services through user fee exemptions to the ultra-poor nationwide. The ultra-poor had been targeted and exempted within the context of the performance-based financing intervention in Burkina Faso. Ultra-poor were selected based on a community-based approach and provided with an exemption card allowing them to access healthcare services free of charge.

Specifically, the first study objective was to establish the effect of user fee exemptions on the utilisation of healthcare services. The second study objective was to assess the level of out-of-pocket expenditure and factors associated with excessive out-of-pocket expenditure among the ultra-poor. The third study objective was to estimate the capital and recurrent cost of providing one first-level curative consultation to the exempted ultra-poor and estimate the cost and healthcare budget impact for a national scale-up.

Materials and methods

In line with the study objectives mentioned above, the thesis consists of three components. The first study component relied on a panel data set of 1652 randomly selected ultra-poor from Diébougou, Gourcy, Kaya and Ouargaye health district. Logistic regression was applied on the end line data to identify factors associated with the receipt of user fee exemption cards. Random-effects modelling was applied to the panel data to determine the effect of the card possession on healthcare service utilisation among those who reported an illness six months before the surveys. The second study component consisted of a descriptive analysis of out-of-pocket expenditure on formal healthcare services using cross-sectional data from the Diébougou district only. Multivariate logistic regression was performed to investigate the factors related to excessive out-of-pocket expenditure among the ultra-poor. For study component three, the author conducted a micro-costing study by extracting resource consumption data from the medical records of 1380 ultra-poor patients in 15 CSPS in Diébougou in 2016. Using the derived recurrent cost per the first-level consultation, the author conducted a budget impact analysis for providing first-level consultations to the exempted ultra-poor nationwide, considering different thresholds of health service utilisation and population coverage.

Results

First, the study found that out of the ultra-poor surveyed in 2017, 75.51% received exemption cards. Basic literacy (p = 0.03), living within 5 km from a healthcare centre (p = 0.02) and being resident in Diébougou or Gourcy (p = 0.00) were positively associated with card possession. Card possession did not increase health service utilisation (= 0.07; 95% CI = 0.45; 0.32; p = 0.73).

Second, the study detected that with an average of FCFA 23051.62 (USD 39.18), the ultra-poor had to supplement a significant amount of out-of-pocket expenditure to receive formal healthcare services at public health facilities, although services were supposed to be free. The probability of incurring excessive out-of-pocket expenditure was negatively associated with being female ($\beta = -2.072$, $p = 0.00$, $ME = -0.324$; $p = 0.000$) and having an exemption card

($\beta = -1.787$, $p = 0.025$; ME = − 0.279, $p = 0.014$). Third, the study estimated the capital cost of providing one first-level curative consultation to the ultra-poor to range between USD 0.59 - USD 0.61 and the recurrent cost between USD 2.58 and USD 5.00, accumulating to a total of USD 3.17 - USD 5.61. A nationwide delivery of first-level services to the bottom 6 % of the population, assuming 0.25 healthcare contacts per capita per year, would result in an annual expense between USD 832,225.81 and USD 1,614,197.26. This annual expense represents 0.22 to 0.43 per cent of the Burkinabè health budget. However, the expected annual expense was very sensitive to changes in the health utilization rate and population coverage.

Conclusions and recommendations

The study provides evidence that targeted user fee exemptions for the ultra-poor need to be better designed and implemented to effectively increase health service utilisation. Complementing demand-side strategies could guide the ultra-poor in overcoming all barriers to healthcare access. The study further demonstrated that user fee exemptions are yet associated with reduced out-of-pocket expenditure for the ultra-poor, showing the importance of free care for this marginalised population. The ultra-poor people's elevated risk due to multi-morbidities and severity of illness need to be considered when allocating resources to address existing inequalities better and improve financial risk protection. Last, the study found that providing first-level services for the exempted ultra-poor at the national level is likely to be affordable. To further advance towards leaving no one behind, Burkina Faso could consider piloting a capitation-based system to remunerate primary healthcare providers for providing first-level services to the ultra-poor.

7 Zusammenfassung

Einleitung und Begründung

Die Ultra-Armen sind die am stärksten gefährdete und unterversorgte Bevölkerungsgruppe in Afrika südlich der Sahara mit begrenztem Zugang zu Gesundheitsdiensten. Die Erstellung von wissenschaftlicher Evidenz über die Gebührenbefreiungen für diese Bevölkerungsgruppe wird daher als äußerst relevant angesehen. Dennoch sind die Ultra-Armen in der wissenschaftlichen Landschaft eine unterrepräsentierte Gruppe geblieben, vor allem wegen der Schwierigkeiten, sie zu erreichen. Die Studie trug dazu bei, diese Lücke zu schließen, indem sie die Auswirkungen von Gebührenbefreiungen auf die Inanspruchnahme des Gesundheitswesens und ihr Potenzial zum Schutz vor finanzieller Not untersuchte. Darüber hinaus wurden die Kostenfolgen für das Gesundheitssystem geschätzt, die bei der Bereitstellung von Erstkonsultationen durch Gebührenbefreiungen für die Ärmsten auf nationaler Ebene entstehen. Die Ultra-Armen wurden im Rahmen der Intervention zur leistungsbezogenen Finanzierung in Burkina Faso auf der Grundlage eines gemeindebasierten Ansatzes ausgewählt und mit einer Gebührenbefreiungskarte ausgestattet, die ihnen den kostenlosen Zugang zu Gesundheitsdiensten ermöglichte.

Konkret war das erste Studienziel, den Effekt von Gebührenbefreiungen auf die Inanspruchnahme von Gesundheitsdienstleistungen zu untersuchen. Das zweite Ziel der Studie war es, die Höhe der Out-of-Pocket-Ausgaben und die Faktoren, die mit übermäßigen Out-of-Pocket-Ausgaben bei den Ultra-Armen verbunden sind, zu ermitteln. Das dritte Ziel der Studie war die Ermittlung der Kapitalkosten und der laufenden Kosten für die Bereitstellung einer kurativen Konsultation der ersten Stufe für die befreiten Ultra-Armen. Darüber hinaus wurde die Auswirkung auf das Gesundheitsbudget bei einer landesweiten Ausweitung der Maßnahme geschätzt.

Materialien und Methoden

In Übereinstimmung mit den oben genannten Studienzielen besteht diese Arbeit aus drei Komponenten. Die erste Studienkomponente stützte sich auf einen Paneldatensatz von 1652 zufällig ausgewählten Ultra-Armen aus den Gesundheitsdistrikten Diébougou, Gourcy, Kaya und Ouargaye. Eine logistische Regression wurde auf die Endliniendaten angewandt, um Faktoren zu identifizieren, die mit dem Erhalt von Gebührenbefreiungskarten in Verbindung stehen. Eine Modellierung mit zufälligen Effekten wurde auf die Paneldaten angewandt, um den Effekt des Kartenbesitzes auf die Inanspruchnahme von Gesundheitsdiensten unter denjenigen zu bestimmen, die sechs Monate vor den Erhebungen angaben, krank gewesen zu sein. Die zweite Studienkomponente bestand aus einer deskriptiven Analyse der Out-of-Pocket-Ausgaben für formale Gesundheitsdienstleistungen unter Verwendung von Querschnittsdaten nur aus dem Distrikt Diébougou. Eine multivariate logistische Regression wurde durchgeführt, um die Faktoren zu untersuchen, die mit überhöhten Out-of-Pocket-Ausgaben bei den Ultra-Armen zusammenhängen. Für Studienkomponente drei führte die Autorin eine Mikrokostenstudie durch, indem sie Daten zum Ressourcenverbrauch aus den Krankenakten von 1380 ultra-armen Patienten in 15 CSPS in Diébougou im Jahr 2016 extrahierte. Basierend auf den wiederkehrenden Kosten pro Erstkonsultation, analysierte die Autorin die jährlichen Kosten einer Bereitstellung von medizinischer Grundversorgung für befreite ultra-arme Patienten auf nationaler Ebene und errechnete die Auswirkungen auf das Gesundheitsbudget. Bei den Berechnungen wurden verschiedene Schwellenwerte für die Inanspruchnahme von Gesundheitsdiensten und die Abdeckung der Bevölkerung berücksichtigt.

Ergebnisse

Zunächst ergab die Studie, dass von den im Jahr 2017 befragten Ultra-Armen 75,51 Prozent einen Befreiungsausweis erhielten. Grundlegende Lese- und Schreibkenntnisse ($p = 0,03$), ein Wohnort innerhalb von 5 km von einem Gesundheitszentrum entfernt ($p = 0,02$) und ein Wohnsitz in Diébougou oder Gourcy ($p = 0,00$) waren positiv mit dem Kartenbesitz assoziiert. Der Kartenbesitz erhöhte nicht die Inanspruchnahme von Gesundheitsleistungen ($p = 0,07$; 95% CI = 0,45; 0,32; $p = 0,73$). Zweitens stellte die Studie fest, dass die Ultra-Armen mit

durchschnittlich 23051,62 FCFA (39,18 USD) einen erheblichen Betrag an Out-of-Pocket-Ausgaben aufbringen mussten, um formelle Gesundheitsdienste in öffentlichen Gesundheitseinrichtungen in Anspruch zu nehmen, obwohl die Dienste eigentlich kostenlos sein sollten. Die Wahrscheinlichkeit, übermäßige Out-of-Pocket-Ausgaben zu tätigen, war negativ damit verbunden, weiblich zu sein (β = - 2,072, p = 0,00, ME = - 0,324; p = 0,000) und eine Befreiungskarte zu besitzen (β = - 1,787, p = 0,025; ME = - 0,279, p = 0,014). Drittens schätzte die Studie die Kapitalkosten für die Bereitstellung einer kurativen Konsultation der ersten Stufe für die Ärmsten auf 0,59 USD bis 0,61 USD und die wiederkehrenden Kosten auf 2,58 USD bis 5,00 USD, die sich zu einem Gesamtbetrag von 3,17 USD bis 5,61 USD summieren. Eine landesweite Versorgung der untersten 6 Prozent der Bevölkerung mit medizinischer Grundversorgung würde unter der Annahme von 0,25 Praxisbesuchen pro Kopf pro Jahr zu jährlichen Ausgaben zwischen 832.225,81 USD und 1.614.197,26 USD führen. Diese jährlichen Ausgaben entsprechen 0,22 bis 0,43 Prozent des Burkinabè Gesundheitsbudgets. Die erwarteten jährlichen Ausgaben reagierten jedoch sehr empfindlich auf Veränderungen in der Inanspruchnahme von Gesundheitsdiensten und der Bevölkerungsabdeckung.

Schlussfolgerungen und Empfehlungen

Die Studie liefert Belege dafür, dass gezielte Gebührenbefreiungen für die Ultra-Armen besser konzipiert und umgesetzt werden müssen, um die Inanspruchnahme von Gesundheitsleistungen effektiv zu erhöhen. Ergänzende Strategien auf der Nachfragseite könnten die Ultra-Armen bei der Überwindung aller Barrieren beim Zugang zur Gesundheitsversorgung unterstützen. Die Studie zeigte weiter, dass die Gebührenbefreiungen dennoch mit reduzierten Out-of-Pocket-Ausgaben für verbunden sind, was die Bedeutung einer kostenlosen Versorgung für diese marginalisierte Bevölkerung zeigt. Das erhöhte Risiko der Ultra-Armen bedingt durch Multimorbiditäten und der Schwere von Erkrankungen, muss bei der Zuteilung von Ressourcen berücksichtigt werden, um bestehende Ungleichheiten besser auszugleichen und die finanzielle Risikoabsicherung zu verbessern. Abschließend stellte die Studie fest, dass die Bereitstellung von medizinischer Grundversorgung für die gebührenbefreiten Ärmsten auf nationaler Ebene wahrscheinlich erschwinglich ist. Um dem

Ziel näher zu kommen, niemanden zurückzulassen, könnte Burkina Faso die Einführung eines auf Kopfpauschalen basierenden Systems in Erwägung ziehen, mit dem Anbieter von Erstkonsultationen für die Behandlung der Ärmsten entlohnt werden.

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PUBLICATIONS

First author publications directly related to the doctoral thesis:

1. Beaugé, Y., De Allegri, M., Ouédraogo, S., Bonnet, E., Kuunibe, N., & Ridde, V. (2020). Do Targeted User Fee Exemptions Reach the Ultra-Poor and Increase their Healthcare Utilization? A Panel Study from Burkina Faso. International Journal of Environmental Research and Public Health, 17(18), 6543.

2. Beaugé, Y., Ridde, V., Bonnet, E., Souleymane, S., Kuunibe, N., & De Allegri, M. (2020). Factors related to excessive out-of-pocket expenditures among the ultra-poor after discontinuity of PBF: a cross-sectional study in Burkina Faso. Health Economics Review, 10(1), 1–11.

Forthcoming publications:

1. Beaugé, Y., Bonnet, E., Ridde, V., Souleymane, S., Kiendrébéogo, J. A., Nguyen, H.T., & De Allegri, M. (2020). Is leaving no one behind affordable? The case of providing primary healthcare services to the exempted ultra-poor in rural Burkina Faso

First author publications not directly related to the doctoral thesis:

1. Beaugé, Y., Koulidiati, J.-L., Ridde, V., Robyn, P. J., & De Allegri, M. (2018). How much does community-based targeting of the ultra-poor in the health sector cost? Novel evidence from Burkina Faso. *Health Economics Review*, *8*(1), 19. https://doi.org/10.1186/s13561-018-0205-7

Book chapter

1. Beaugé, Y., De Allegri, M., Ouédraogo S, Bonnet E., Ridde V. (2021). L'utilisation des services de santé par les indigent-e-s du Burkina Faso. Vers une couverture sanitaire universelle en 2030? [Internet]. ESBC; 2021. p. 827. Available from: https://scienceetbiencommun.pressbooks.pub/cus/\

2. Beaugé, Y., De Allegri, M., Ouédraogo, S., Bonnet, E., Ridde, V. (2021). Les dépenses excessives de santé des indigent-e-s après l'arrêt du FBR au Burkina Faso. Vers une couverture sanitaire universelle en 2030? [Internet]. ESBC; 2021]. p. 827. Available from: https://scienceetbiencommun.pressbooks.pub/cus/

ANNEXES

Appendix 1 - List of quantity indicators included in PBF design (primary health care facility)

No	Indicator	Basic Purchase Price in FCFA
1a	Number of new patients age 5 or older in curative consultation	100
1b	Number of new patients age 5 or older in curative consultation - moderate subsidy for ultra-poor patient	400
1c	Number of new patients age 5 or older in curative consultation - high subsidy for ultra-poor patient	600
2a	Number of new patients under the age of 5 in curative consultation	150
2b	Number of new patients under the age of 5 in curative consultation - moderate subsidy for ultra-poor patient	500
2c	Number of new patients under the age of 5 in curative consultation - high subsidy for ultra-poor patient	700
3a	Number of days of hospitalisation	250
3b	Number of days of hospitalization - moderate subsidy for ultra-poor patient	700
3c	Number of days of hospitalization - high subsidy for ultra-poor patient	1100
4	Number of counter-references received	1010

No	Indicator	Basic Purchase Price in FCFA
5	Number of children fully vaccinated	300
6	Number of pregnant women who have received two or more doses of tetanus vaccine	250
7	Number of pregnant women (new and repeat visits) in antenatal care consultation	400
8	Number of women in postnatal consultation (6–8 days and 6–8 weeks post-delivery)	500
9	Number of deliveries performed	1510
10	Number of women (new and repeat visits) in family planning consultation using oral or injectable contraceptives	605
11	Number of women (new and repeat visits) in family planning consultation using long-term methods (IUD or implant)	1210
12	Number of new patients aged 0–11 months in growth monitoring consultation	100
13	Number of patients aged 12–23 months in growth monitoring consultation	250
14	Number of children aged 6–59 months treated for moderate acute malnutrition	300
15	Number of children aged 6–59 months treated for severe acute malnutrition without complications (SAM)	600

No	Indicator	Basic Purchase Price in FCFA
16	Number of home visits affected	3000
17	Number of clients having benefitted from voluntary HIV testing and counselling (excluding pregnant women) tested in the context of PMTCT)	500
18	Number of pregnant women having benefitted from voluntary HIV testing and counselling in the context of PMTCT	500
19	Number of HIV-positive mothers having benefitted from complete prophylactic anti-retroviral treatment	2500
20	Number of newborns to HIV-positive mothers treated	3000
21	Number of people living with HIV under antiretroviral treatment	1000
22	Number of pulmonary tuberculosis cases (new and relapse) detected	6000
23	Number of tuberculosis cases (all types) treated and declared cured or treatment terminated	8500

Burkina Faso CFA franc.

Appendix 2 - List of quantity indicators included in PBF design (Hospital)

No	Indicator	Basic Purchase Price in FCFA
1a	Number of outpatient visits age 5 years or older	220
1b	Number of outpatient visits age 5 years or older - ultra-poor patient	675
2a	Number of outpatient visits sick children age 29 days to 59 months	670
2b	Number of outpatient visits sick children age 29 days to 59 months - ultra-poor patient	1350
3	Number of neonatal emergencies	2100
4	Number of counter references carried out	900
5a	Number of days of hospitalisation	340
5b	Number of days of hospitalisation - ultra-poor patient	4480
6a	Number of major surgeries (hernia, peritonitis, appendicitis, occlusion, other laparotomies, hydrocele, USG, open fracture trimming) performed	14,500
6b	Number of major surgeries (hernia, peritonitis, appendicitis, occlusion, other laparotomies, hydrocele, GEU, open fracture trimming) performed - ultra-poor patient	33,500
7	Number of eutocic deliveries completed	3250
8	Number of caesarean sections performed	6500

No	Indicator	Basic Purchase Price in FCFA
9	Number of obstructed deliveries performed (Caesarean section excluded)	5000
10	Number of pregnant women (new and old registered) seen in prenatal consultation	325
11	Number of postnatal consultations performed	900
12	Number of women supported for abortion	3250
13	Number of children 0–59 months cared for severe acute malnutrition with complication	10,000
14	Number of people who have been voluntarily screened for HIV infection (excluding women screened for PTME)	675
15	Number of pregnant women screened for HIV infection in PMTCT	675
16	Number of HIV+ pregnant women put on prophylactic ARV protocol	1100
17	Number of new-borns of HIV+ women being cared for	1100
18	Number of new cases of HIV-infected	2250
19	Number of PvVIH under ARV monitored	11,000
20	Number of TPM+ cases detected during the month	11,000
21	Number of tuberculosis cases (any form) treated and declared cured or treatment completed	22,500

No	Indicator	Basic Purchase Price in FCFA
22	Number of women (old and new) seen during the month in consultation with FP and users of oral contraceptives or injectables	1750
23	Number of women (old and new) seen during the month in consultation with FP and users of long-term methods (IUD and implant)	3250
24	Number of users (old and new) seen during the month in consultation with FP and CCV users (tubal ligation and vasectomy)	11,000

CURRICULUM VITAE

YVONNE BEAUGÉ

PROFILE

I am a highly-motivated global health researcher with extensive experiences in economic evaluation of complex health interventions in Africa, with a particular focus on healthcare access for underserved populations. My research is inspired by the values of universal health coverage with its pursuit of equity in health.

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M.Sc. in International Health with a focus on health economics
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Heidelberg University, Research Group Health Economics and Health Financing, Research Associate
September 2016 – May 2017, Student assistant
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Quantitative analysis / Impact analysis / Economic evaluation of health interventions / Writing policy briefs for decision-maker in Burkina Faso

Gesellschaft für Internationale Zusammenarbeit (GIZ) Kathmandu, Nepal, Intern
April 2016 – July 2016
Support to the Health Sector Support Programme,
Development of Evaluation and quality assessment of digital solutions developed for Social health insurance

NeuroCure - Cluster of Excellence, Neuroscience Research Center Charité Berlin, Student Assistant
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Work for different public health insurances in Germany, reimbursement specialist
2007 - 2010

PROFESSIONAL TRAINING AND SHORT COURSES

Participant of the International Summer school 'Global health and poverty' Goettingen'
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Advanced training on applied economic evaluation in health care at the University of Bergen in Norway
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LANGUAGE SKILLS

English: Fluent
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SCHOLARSHIPS AND AWARDS

Oktober 2018 Poster award winner for great presentation skills
Fifth Global Symposium on Health Systems Research Advancing health systems for all in the SDG era Liverpool, UK

Mai 2018 Scholarship Summer school 'Global health and poverty'
Georg- August Universität Goettingen, Germany

2012 Deutschlandstipendium, Neubrandenburg, Germany

VOLUNTEER EXPERIENCES ABROAD

Participant of volunteer programme of the Federal Ministry for Economic Cooperation and Development (1 full year)
2013 – 2014

Volunteer in a public hospital in Ghana (3 months)
2012

PUBLICATIONS

ORIGINAL ARTCILES

1. Beaugé, Y., Ridde, V., Bonnet, E., Souleymane, S., Kiendrébéogo, J. A., De Allegri, M. Is leaving no one behind affordable? The case of delivering free primary healthcare services to the exempted ultra-poor in rural Burkina Faso (FORTHCOMING)

2. Beaugé, Y., De Allegri, M., Ouédraogo, S., Bonnet, E., Kuunibe, N., Ridde, V., 2020a. Do Targeted User Fee Exemptions Reach the Ultra-Poor and Increase their Healthcare Utilisation? A Panel Study from Burkina Faso. International Journal of Environmental Research and Public Health 17, 6543. https://doi.org/10.3390/ijerph17186543

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POLICY BRIEFS

1. La sélection communautaire à grande échelle au Burkina Faso coûte environ 7.000 F CFA par indigent. Beaugé, Y., Ridde, V., Allegri, M, 2018

2. L'exemption du paiement des soins à grande échelle pour les indigents n'a pas permis une amélioration de leur utilisation des services de santé au Burkina Faso, Beaugé, Y., Allegri, M, Bonnet, Emmanuel, Ridde, V. ,2019

3. Le coût moyen par consultation pour soigner gratuitement les indigents dans une zone rurale du Burkina Faso est de 894 F CFA, 2020 Beaugé, Y., Ridde, V., Bonnet, E., Allegri, M, 2021

Presentation at conferences:

1. 10th annual meeting of the German Health Economics Association (dggö, 2018 Economics and Medicine in Dialogue, Hamburg Germany, March 5-6, 2018. How much does community-based targeting of indigents in the health sector cost? Novel evidence from Burkina Faso. **Oral presentation**

2. Fifth Global Symposium on Health Systems Research Advancing health systems for all in the SDG era Liverpool, UK – October 8-12, 2018. How much does community-based targeting of indigents in the health sector cost? **Poster presentation,** *Poster award winner*

3. 2021 International Health Economics Association - IHEA Virtual Conference. July 12-15, 2023. Is Leaving No One behind Affordable? The Case of Delivering Free Primary Healthcare Services to the Exempted Ultra-Poor in Burkina Faso. **Poster presentation**

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EIDESSTATTLICHE VERSICHERUNG

1. Bei der eingereichten Dissertation zu dem Thema

‘Targeted User Fee Exemption for Equitable Access to Primary Healthcare Services for the Ultra-Poor. A multi-method study using the case of Burkina Faso’

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