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Does the implementation of UHC reforms foster greater equality in health spending? Evidence from a benefit incidence analysis in Burkina Faso

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ABSTRACT

Introduction Burkina Faso is one among many countries in sub-Saharan Africa having invested in Universal Health Coverage (UHC) policies, with a number of studies have evaluated their impacts and equity impacts. Still, no evidence exists on how the distributional incidence of health spending has changed in relation to their implementation. Our study assesses changes in the distributional incidence of public and overall health spending in Burkina Faso in relation to the implementation of UHC policies.

Methods We combined National Health Accounts data and household survey data to conduct a series of Benefit Incidence Analyses. We captured the distribution of public and overall health spending at three time points. We conducted separate analyses for maternal and curative services and estimated the distribution of health spending separately for different care levels.

Results Inequalities in the distribution of both public and overall spending decreased significantly over time, following the implementation of UHC policies. Pooling data on curative services across all care levels, the concentration index (CI) for public spending decreased from 0.119 (SE 0.013) in 2009 to −0.024 (SE 0.014) in 2017, while the CI for overall spending decreased from 0.222 (SE 0.032) in 2009 to 0.105 (SE 0.025) in 2017. Pooling data on institutional deliveries across all care levels, the CI for public spending decreased from 0.199 (SE 0.029) in 2003 to 0.013 (SE 0.002) in 2017, while the CI for overall spending decreased from 0.242 (SE 0.032) in 2003 to 0.062 (SE 0.016) in 2017. Persistent inequalities were greater at higher care levels for both curative and institutional delivery services.

Conclusion Our findings suggest that the implementation of UHC in Burkina Faso has favoured a more equitable distribution of health spending. Nonetheless, additional action is urgently needed to overcome remaining barriers to access, especially among the very poor, further enhancing equality.

WHAT IS ALREADY KNOWN?

⇒ The last two decades have been characterised by the implementation of Universal Health Coverage (UHC) policies aimed at increasing access to care and financial protection for all.

⇒ These UHC policies have largely proven to be effective in increasing equity in health service utilisation, but little is known on their distributional effects on public and overall health spending.

WHAT ARE THE NEW FINDINGS?

⇒ In Burkina Faso, inequalities in the distribution of public and overall spending decreased substantially, but did not disappear completely between the early 2000s and 2017, due to the implementation of UHC policies.

⇒ Equality gains were more marked for public than for overall spending and for care delivered at first level than at second-level facilities.

WHAT DO THE NEW FINDINGS IMPLY?

⇒ UHC policies can be effective in increasing equality in the distribution of both public and overall health spending.

⇒ Policy action is needed to ensure that a fully egalitarian or even a pro-poor distribution is achieved, at least for public spending.

INTRODUCTION

The posture assumed by the Sustainable Development Goals (SDG) reinforces the central role of health as a key element of human development, calling for further investments in health as part of a concerted effort to overcome poverty and inequalities worldwide. Specifically, SDG3 calls for the achievement of 'universal health coverage (UHC), including financial risk protection, access to quality essential healthcare services and access to safe, effective, quality and affordable essential medicines and vaccines for all'.[1] SDG3 reminds the global community that further advancements in health, and hence in wealth, are mediated not only by advances in medical technology and clinical practice, but also, and

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more importantly so, by improvements in health system structures and practices, especially in low and middle-income countries (LMICs). Affordable access to quality healthcare is an essential prerequisite to achieving better health. In turn, affordable access to quality healthcare is only possible within the framework of sufficiently funded and efficiently functioning health systems that can ensure an equitable distribution of health benefits across their population.[2]

It follows that LMICs and their development partners are called to increase their investments towards health system strengthening by working to remove barriers to access healthcare due to affordability, distance and poor quality that have long characterised health service provision in these contexts. The path to UHC appears to be varied, and the tools implemented to strengthen health systems have been largely dependent on context-specific socioeconomic and cultural elements.[3] Countries and their development partners have invested in combining a wide array of strategies, such as user fee removal, targeted voucher schemes, social health insurance, and results-based financing, to foster UHC progress.

Evidence is growing on the ability of these various reforms to improve affordable access to quality healthcare, reduce financial hardship due to ill health and ultimately improve health.[4–8] Nevertheless, most impact analyses generate aggregate impact measures, often falling short of indicating whether a given reform has had different effects on people belonging to different social groups. The risk is that the improvements reported mask inequities due to socioeconomic status, location of residency or gender. The limited available evidence appears to indicate that below the surface of the progress reported over the last few years in relation to the objectives set by the Millennium Development Goals first and by the SDGs afterwards, access to basic healthcare services, healthcare spending and both child and maternal mortality continu to be largely unequally distributed across and within LMICs, with the poor enjoying less access to services, facing more regressive health payments and experiencing higher mortality rates than the least poor.[9 10]

Furthermore, the evidence is lacking as to whether the investments made to foster UHC have altered spending on health at a national level, increasing the distributional incidence of this spending to benefit the poor rather than the least poor. A few studies have relied on an economic tool, Benefit Incidence Analysis (BIA), to explore distributional incidence of health spending in selected LMICs. BIA studies in Kenya, Ghana, Cambodia, however, largely report on single cross-sectional assessments, providing a snapshot into the distributional incidence of health spending rather than reflecting changes over time-related to implementing UHC reforms. We identified only three studies in Asia[11–16] and one in Africa[17] that applied the distributional incidence of health spending over only two different time points; but to the best of our knowledge, no study expanded its analysis to a longer period. Additionally, most existing BIA studies have focused exclusively on assessing the distributional incidence of public spending, largely neglecting other spending sources, such as donor and private spending, including private out-of-pocket spending on public services, which make up a substantial proportion of the health budget in many LMICs.[18 19]

Our study aimed to fill these existing knowledge gaps by assessing changes in the distributional incidence of both public and overall health spending in Burkina Faso. More specifically, we aimed to investigate the distributional incidence of health spending for two sets of services, institutional delivery and curative services, and for different levels of care, outpatient and inpatient. Our ambition has been to relate the changes observed over time in the distributional incidence of health spending to the implementation of reforms fostering progress towards UHC. At the time of the study, to the best of our knowledge, no BIA of health spending had ever been conducted in Burkina Faso.

METHODS

Study setting

Burkina Faso is a landlocked country located in West Africa, with a population of 21 million. In 2019, the country's Gross Domestic Product (GDP, i.e. the total monetary value of all finished goods and services in a country over one year) per capita stood at US$787, placing it among the world's poorest countries.[20] The 2019 Human Development Index ranked Burkina Faso 182 out of 188 countries.[21]

Despite substantial improvements over the course of the last few years, health indicators still largely lag behind regional averages. Life expectancy is at 62 years.[21] Maternal and under-five mortality are estimated at 320/100 000 and 88/1000 live births, respectively.[22] Malaria, acute respiratory infections and diarrhoea still account for the largest proportion of child mortality, often coupled with an underlying situation of malnutrition, with nearly 25% of all children being classified as stunted.[22] Health service delivery is organised in a three-tier system, with primary facilities (Centre de Santé et Promotion Sociale) located in rural areas; district hospitals located in each district capital; and regional and national referral hospitals located in the regional capitals and the national capital Ouagadougou.[23] Public facilities provide the vast majority of health services.[24]

The health sector suffers from a generalised lack of resources. Total health expenditure is estimated at 5% of GDP, equivalent to Purchasing Power Parity US$109. Government expenditure amounts to 58% of total health expenditure, including contributions by development partners being estimated at 23% of this total. Private health expenditure is substantial as user charges continue to be applied, with more than 80% of all private expenditure on health not being channelled through prepaid and pooled mechanisms.[25] The poor health outcomes described above are largely the result of low access to services, with people largely under-using the

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care they need. The literature has consistently reported that geographical barriers, due to the scarcity of health facilities, and financial barriers, due to user charges, continue to hamper access to healthcare services.[26–28]

Over the years, the country has put in place several health financing reforms aimed at fostering progress towards UHC, with a particular focus on maternal and child care. Specifically, in 2002, the Ministry of Health abolished user fees for antenatal care services and then in 2007 introduced a policy, generally referred to as SONU (soins obstétricaux and néonataux d'urgence), aimed at strengthening the provision of obstetric and newborn services. An essential element of SONU was introducing an 80% subsidy for all population groups and a 100% subsidy for the poorest for delivery services. Although the policy was not as effective in reducing out-of-pocket payments as initially expected,[29–32] evidence indicates that it resulted in substantial increases in health service utilisation.[33]

In 2014, the Ministry of Health, with financial and technical support from the World Bank, expanded an existing performance-based financing (PBF) pilot intervention from 3 to 15 out of 63 districts, combining traditional PBF with three different equity measures. Results from the impact evaluation point at modest and not homogenous effects, well below the expectations, which had been placed on the programme.[27 34] In June 2016, the Ministry of Health launched the so-called *gratuité*, that is, a free healthcare programme targeting specifically pregnant and lactating women and children under 5 years old.[35] In addition, starting in 2009, the government prescribed that the worst-off (*les indigents*) should be fully exempted from paying user fees for all preventive and curative services provided by public facilities, but a study indicated that healthcare providers rarely apply this disposition also due to lack of knowledge.[36]

Conceptual approach and study design

Our study uses BIA to examine how equality in health spending has evolved in Burkina Faso. Given the impossibility of applying BIA in a strictly speaking longitudinal manner due to the nature of the methodology and of the available data, we describe our study as quasi longitudinal. More specifically, as displayed in figure 1, we repeated the BIA at three different time points to explore changes in the distributional impact of health spending in relation to the different health financing reforms implemented in the country.

Furthermore, in line with the proposition postulated by McIntyre and Ataguba,[37] our work considered both public and overall spending on health, leading to the estimation of two different sets of measures. The former one hereafter referred to as Public Spending BIA, captures the distributional impact of government spending, including aid received as budget support, on healthcare to measure to what extent different socioeconomic groups have benefited from government subsidies in the health sector over time. The latter one, hereafter referred to as Overall Spending BIA, builds directly on the methodological guidance provided by McIntyre and Ataguba to capture the distributional impact of overall spending on health, including contributions made by donors, including bilateral, multilateral and private aid earmarked for specific health interventions and by households (in the form of out-of-pocket spending). The decision to carry out these two parallel analyses stemmed from the recognition that while it is important to monitor the equity implications of government spending captured by the former analysis, it is equally important to assess the equity implications of overall health system performance captured by the latter analysis.[37] For completeness, we also examined the distributional impact of donor spending alone.

Moreover, conscious that the reforms implemented over time targeted different users and different services, we addressed the distributional impact of health spending separately for curative health services and institutional deliveries. In addition, for each set of services, we computed both stratified estimates to account for levels of care, differentiating benefit incidence measures for public primary healthcare centres versus public hospitals and pooled ones, aggregating information across levels of

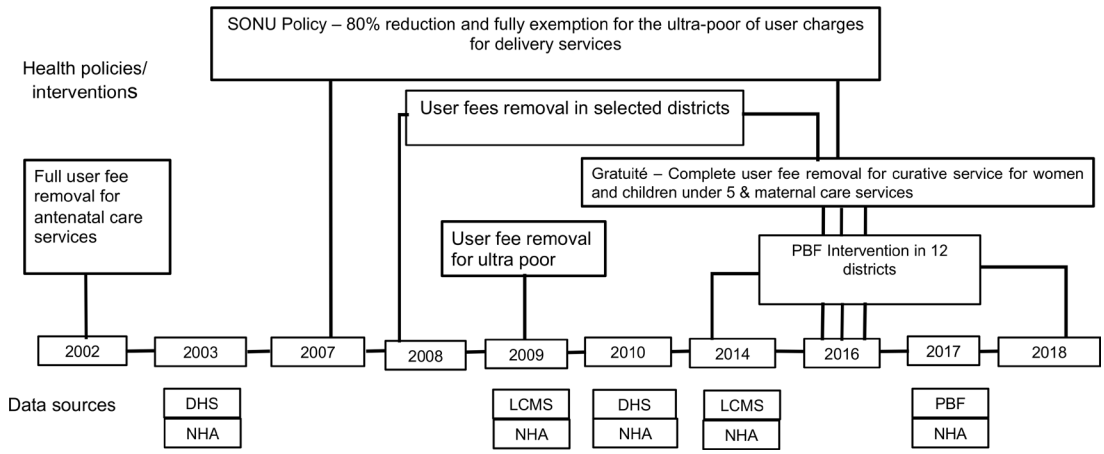

Figure 1 Policy reforms and data sources mapped in relation to one another. DHS, demographic health survey; LCMS, living conditions monitoring survey; PBF, performance based financing survey; NHA, national health accounts.

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care. Given the data at our disposal, we could not include care availed and spending incurred at private facilities. However, one needs to consider that private health service provision remains very limited in Burkina Faso and concentrates almost exclusively in urban centres.[25]

Data sources

The computation of BIA relies on two sets of data: data on health service utilisation stratified by socioeconomic status and data on the cost of health services. We derived information on health service utilisation stratified by socioeconomic status from three different sources: Enquete Multisectorielle Continue (EMC equivalent to Living Standard Measurement Study); Demographic and Health Surveys (DHS) and the population-based survey conducted within the framework of the impact evaluation of the PBF programme implemented in the country between 2014 and 2018, hereafter referred to as the PBF survey. In line with the literature,[38] we derived information on health services cost from the recurrent health expenditure data reported in the National Health Accounts (NHA).

Household surveys

Details of both the EMC and the DHS sampling and data collection procedures have been described elsewhere.[39 40] In brief, both the EMC and the DHS are nationally representative repeated cross-sectional surveys conducted by the National Statistical Office with assistance from either the World Bank (EMC) or the US Agency for International Development (DHS). The EMC focuses on assessing households' living conditions, including socioeconomic status and health service utilisation. The DHS focuses more specifically on maternal care, including an institutional delivery indicator.

Due to the lack of a nationally representative sample capturing the utilisation of curative health service and/or institutional delivery, we relied on the 2017 round of the PBF survey for the computation of the most recent health service utilisation estimates. Sampling and data collection procedures have been described in detail elsewhere.[41] In brief, the PBF survey collected information on a wide range of health outcomes, including utilisation of curative and maternal care services, in 8 out of 13 regions. Since regions were not randomly selected for inclusion in the study, PBF survey data cannot be considered fully representative at country level. Nonetheless, the PBF survey represents the only recent large-scale survey reporting individual-level information on health service utilisation and allowing for stratification by socioeconomic status after 2015. As such, it was the best data source at disposal for a BIA in Burkina Faso.

Table 1 illustrates which datasets were used for which year and for which service and briefly describes the corresponding sampling strategy.

National Health Accounts

NHA provide detailed information on the financial flow related to healthcare in a country, using a standardised

Table 1 Summary information on population survey data employed in the study

Health service utilisation indicator	Household survey	Year	When the survey was conducted	Sampling strategies
Use of curative services by level of care and stratified by socio-economic status	Enquête Multisectorielle Continue (EMC equivalent to Living Standards Measurement Study)	2009	January–December 2009	Stratified two-stage sampling technique: In the first stage, the primary units or enumeration areas (EAs) were drawn to probability proportional to the number of households counted in the EA (for a total of approximately 900 EAs) across all 13 regions. In the second stage, 12 households were drawn in equal probability in each of the enumeration areas (for a total of approximately 11 000 households).
		2014	January–December 2014	
Use of institutional delivery by level of care and stratified by socio-economic status	Demographic and Health Survey	2003	June–November 2003	Stratified two-stage sampling technique: In the first stage, population clusters or areas of agglomeration were randomly drawn (for a total of approximately 600 clusters) across all 13 regions. In the second stage, households were drawn with equal probability in each cluster (for a total of approximately 15 000 households).
		2010	May 2010–January 2011	
Use of curative services and institutional deliveries by level of care and stratified by socio-economic status	Performance-Based Financing Survey	2017	April to June 2017	Stratified two-stage sampling technique: In the first stage, one village was drawn at random from the list of all villages attached to each primary health facility included in the sample of the PBF impact evaluation (for a total of 523 villages) across eight regions. In the second stage, 15 households per village were drawn at random from all households including at least one woman with a history of pregnancy in the last 2 years (for a total of approximately 7850 households).

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framework called System of Health Accounts. To derive unit costs for curative health services and institutional deliveries, we extracted data on three sources of health spending in NHA: recurrent public health spending, donor health spending and household out-of-pocket expenditures (OOPE). Information could be differentiated by the typology of service (ie, curative services and institutional delivery) and by the level of care (ie, hospital vs primary care centre). For our analysis, to ensure accurately matching unit costs and utilisation data, we used NHA from each of the years for which we also had utilisation data, derived from either the EMC, the DHS or the PBF survey. This means that our analysis relies on year-specific unit cost estimates.

Variables and their measurement

Healthcare utilisation by socioeconomic status

Following general methodological guidance on BIA,[37] first, we estimated healthcare utilisation at different levels of care (and for institutional deliveries and curative services separately) for each wealth quintile, with quintile 1 being the poorest and quintile 5 being the least poor; and then annualsed healthcare utilisation by multiplying the estimate obtained from our data by 1 for institutional delivery (given a recall period of 12 months in both DHS and PBF survey) and by either 26 or 13 for curative services (given a recall period of 14 days in the EMC and of 28 days in the PBF survey, respectively).

We relied on different wealth measures to stratify utilisation rates by socioeconomic status. EMC data allowed for wealth to be assessed using consumption expenditure; DHS and PBF data allowed for wealth to be assessed using the same set of variables to derive an asset-based measure.

Unit cost

We applied the constant unit subsidy assumption to estimate public and donor unit costs.[42] We relied on the constant unit cost assumption to estimate OOPE unit costs. This estimate was adjusted to reflect differences by quintile, using data derived from the study on OOPE conducted by Nakovics *et al*.[43] The study had used the baseline round of the PBF survey to estimate OOPE for curative services and their distribution across socioeconomic strata in a sample of 7844 households distributed across eight regions. Given that the study was conducted under the leadership of the lead author, we had access to the raw dataset and could verify the data needed for this BIA analysis. This adjustment was motivated by the awareness that OOPE differs by quintiles; it follows that ignoring the distribution of OOPE across quintiles would have resulted in an overestimation of OOPE among the lower income groups.

Following the constant unit subsidy/cost assumption, the unit subsidy/cost for healthcare level í is equal to total subsidies/expenditure for healthcare level í divided by total healthcare utilisation for healthcare level í.

$$T_j \equiv \sum_{i=0}^{n} U_{ij} \frac{S_i}{U_i} \equiv \sum_{i=0}^{n} \frac{U_{ij}}{U_i} S_i$$

where T_j is the value of the total health subsidy/cost imputed to the socioeconomic group j. U_{ij} represents the number of health visits (utilisation of care) of socioeconomic group j at healthcare level or health facility type í, and U_i is the total healthcare visits at that healthcare level or health facility type by the different socioeconomic groups and $\frac{S_i}{U_i}$ is the unit subsidy/cost of healthcare provision at level í, which is assumed to be constant at that level of care. S_i is the government, donor and household OOPE health spending.[44]

Analytical approach

First, across all analysis sets, we estimated the distribution of financial benefits accrued by different socioeconomic groups as follows:

$$B_{ij} = P_{ij} \ / \ P_j * S_j$$

where B_{ij} is a benefit incidence for socioeconomic group *i* at the level of care *j*, P_{ij} is the number of people in socioeconomic *i* using health services at the level of care *j*, P_j is the total of people using health services at the level of care *j and* S_j is the share of health expenditure at the level of care *j*.

Our estimates are presented as concentration indexes (CIs), which quantify the degree of wealth-related inequality and is defined as two times the area between the concentration curve and the line of equality.[42]

The standardised CI (C_h) is estimated as follows:

$$C_h = \frac{2\mathrm{Cov}\ (h_i, R_i)}{\mu}$$

where h_i is the health variable (eg, healthcare utilisation) for individual í, μ is the mean of health variable, R_i is individual i's fraction socioeconomic rank and Cov (h_i, R_i) is the covariance. We used convenient regression to allow the calculation of the SEs of the CI. The formula is:

$$2\sigma_R^2 \left[\frac{h_i}{\mu}\right] = \alpha + \beta R_i + \varepsilon_i$$

where $2\sigma_R^2$ is the variance of the fractional rank variable. β is the estimator of the CI.

The CI takes a negative (positive) value when the concentration curve lies above (below) the line of equality, indicating a pro-poor (pro-least poor) distribution of the health variable. If there is no wealth-related inequality, the CI is zero. Given that the CI handles the wealth quintiles as being ordered along a continuous scale, when using the term pro-poor or pro-least-poor hereafter, we do not refer to a specific quintile, but to the overall direction of the distribution being more in favour of lowest (Q1-Q2) or highest (Q4-Q5) quintiles. We adjusted the CI by the sampling weights of the EMC and DHS household surveys to scale up our estimates to the national population.

Second, to test whether the concentration curve dominates (lies above) or is dominated (lies below) by the line of the equality at all its ordinates, we computed the test

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Table 2 Benefit incidence of public spending on curative care

Year	2009	2014	2017	Diff. 2014–2009	Diff. 2017–2014	Diff. 2017–2009
Level of care	CI (SE)	CI (SE)	CI (SE)	CI (SE)	CI (SE)	CI (SE)
All public health facilities (inpatient and outpatient care)	0.119[a]*** (0.013)	0.186[a]*** (0.010)	−0.024[b]* (0.014)	0.067*** (0.016)	−0.210*** (0.015)	−0.143*** (0.016)
Inpatient care (hospitals)	0.261[a]*** (0.046)	0.525[a]*** (0.049)	0.237[a]*** (0.047)	0.264*** (0.068)	−0.288*** (0.050)	−0.024 (0.056)
Outpatient care	0.108[a]*** (0.013)	0.152[a]*** (0.010)	−0.049[a]*** (0.014)	0.044*** (0.017)	−0.0201*** (0.016)	−0.157*** (0.017)

Dominance test: a=dominance, b=non-dominance, c=curves cross.
*, **, ***statistically significant at the 10%, 5% and 1% levels, respectively.
CI, concentration index; Diff., difference.

of the dominance of the concentration curve against the 45 degree line of equality at a 5% significant level.[42]

Last, to ensure that our BIA results would be consistent and not biased by the fact that for 2017, we used data from an own survey conducted only in a subportion of all regions (in the absence of a nationally representative dataset), we conducted a sensitivity analysis, comparing national estimates to only estimates from these eight regions also for the prior years.

Patients and public involvement

Since the study is based exclusively on secondary data, patient and public involvement were not applicable. Before being published, results were disseminated in-country using a digital webinar platform, with opportunities for policymakers and civil society representatives to participate and comment on emerging findings.

RESULTS

Descriptive findings reporting utilisation values and corresponding unit subsidies/costs are reported in online supplemental appendix 1.

Tables 2 and 3 report findings from the BIA pertaining to curative services for public and overall spending, respectively. At baseline in 2009, distributional inequalities for curative services were generally greater for overall spending than for public spending, although not substantially so. Over time, we observe a significant decrease in inequality for both public and overall spending, with the CI for all levels of care pooled moving from 0.119 (SE 0.013) in 2009 to −0.024 (SE 0.014) in 2017 (table 1A—public spending) and from 0.222 (SE 0.032) in 2009 to 0.105 (SE 0.025) in 2017 (table 1B—overall spending). The decrease observed, however, is more remarkable for public than for overall spending. Public spending on both levels of care (but not dominant) and spending on outpatient services becoming significantly pro-poor and only public spending on inpatient care at hospital level continuing to display a pro-least-poor distribution. Contrary to this pattern, overall spending on curative services remained pro-least-poor in 2017, with only the CI value for outpatient care being pro-poor (but not dominant).

Tables 4 and 5 report findings from the BIA pertaining to institutional delivery for public and overall spending, respectively. Contrary to what observed for curative services, at baseline in 2009, we do not observe that distributional inequalities are substantially higher for overall compared with public spending. With a CI of 0.584 (SE 0.092) for public spending and a CI of 0.403 (SE 0.075) for overall spending, inequality at baseline in 2003 was particularly marked for deliveries at public hospitals. Both sets of results indicate a substantial and significant decrease in inequality over time, with the CI

Table 3 Benefit incidence of overall health spending on curative care

Year	2009	2014	2017	Diff. 2014–2009	Diff. 2017–2014	Diff. 2017–2009
Level of care	CI (SE)	CI (SE)	CI (SE)	CI (SE)	CI (SE)	CI (SE)
All public health facilities (inpatient and outpatient care)	0.222[a]*** (0.032)	0.256[a]*** (0.019)	0.105[a]*** (0.025)	0.034 (0.037)	−0.151*** (0.028)	−0.117*** (0.033)
Inpatient care (hospitals)	0.252[a]*** (0.045)	0.349[a]*** (0.037)	0.231[a]*** (0.048)	0.097 (0.059)	−0.118 (0.052)	−0.021 (0.057)
Outpatient care	0.156[a]*** (0.013)	0.160[a]*** (0.010)	−0.012[b] (0.144)	0.004 (0.016)	−0,172*** (0.015)	−0.168*** (0.017)

Dominance test: a=dominance, b=non-dominance, c=curves cross.
*, **, *** statistically significant at the 10%, 5% and 1% levels, respectively.
CI, concentration index; Diff., difference; SE, standard errors.

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Table 4 Benefit incidence of public spending on institutional delivery

Year	2003	2010	2017	Diff. 2010–2003	Diff. 2017–2010	Diff. 2017–2003
Healthcare provider	CI (SE)	CI (SE)	CI (SE)	CI (SE)	CI (SE)	CI (SE)
All public health facilities (hospitals and health centres)	0.199[a]*** (0.029)	0.155[a]*** (0.021)	0.013[a]*** (0.002)	−0.044 (0.036)	−0.142*** (0.012)	−0.186*** (0.015)
Public hospitals	0.584[a]*** (0.092)	0.406[a]*** (0.068)	0.078[a]** (0.031)	−0.178 (0.115)	−0.328** (0.078)	−0.506*** (0.050)
Public health centres	0.161[a]*** (0.031)	0.128[a]*** (0.023)	0.009[a]*** (0.003)	−0.033 (0.038)	−0.119*** (0.013)	−0.152*** (0.016)

Dominance test: a=dominance, b=non-dominance, c=concentration curve and line of equality cross.
*, **, ***statistically significant at the 10%, 5% and 1% levels, respectively.
C!, concentration index; Diff., Difference; SE, standard errors.

for all deliveries moving from 0.199 (SE 0.029) in 2003 to 0.013 (SE 0.002) in 2017 (table 2—public spending) and from 0.242 (SE 0.032) in 2003 to 0.062 (SE 0.016) in 2017 (table 3—overall spending). In spite of the substantial and significant decrease in inequality observed over time, the CI values for 2017 indicate that equality or a pro-poor distribution was not achieved for any of the indicators captured by our analysis. Only the CI value for public spending on institutional delivery at public health centres (CI 0.009, SE 0.003) came very close to the line of equality, while all other CI values continued to display a pro-least poor distribution of both public and overall spending.

Results from the BIA on donor spending alone are also reported in the appendix, since, due to the need to resort to the unit cost assumption, they replicate findings from the public spending (online supplemental appendix 2). Results from the sensitivity analysis, confirming results from the main analysis, are reported in online supplemental appendix 3.

DISCUSSION

Our study makes an important contribution to the literature on UHC, being the first to present a quasi-longitudinal analysis of the distributional incidence of public and overall health spending in Burkina Faso and examining curative and maternal care services separately. In addition, our BIA study is only the second one conducted at the national level in the West-African region, following one substantially older study assessing the distributional incidence of health benefits in the mid-2000s in Ghana.[45] While we acknowledge our inability to conduct a true longitudinal analysis, given the intrinsic limitations related to the BIA methodology and to the data available, we trust in the unique value of our study, being the first one explicitly addressing changes in the distributional incidence of health spending over time in relation to the implementation of UHC reforms.[18] However, before we appraise our findings, it is important to note that the nature of the analysis we have conducted makes it impossible to attribute the effects observed to anyone specific UHC reform. We can only relate the observed patterns in distributional incidence to the UHC policies implemented in Burkina Faso, but cannot estimate the contribution made by each policy to increased/decreased inequality in spending, especially since some of those, such as PBF and *gratuité*, were implemented in parallel. Only an experimental setting would allow attributing changes in distributional incidence to a specific health policy. Therefore, our appraisal is rooted in our prior research and extensive knowledge of the country and largely emerged as the result of discussions with local policymakers engaged during early dissemination events.

Table 5 Benefit incidence of overall health spending on institutional delivery

Year	2003	2010	2017	Diff. 2010–2003	Diff. 2017–2010	Diff. 2017–2003
Healthcare provider	CI (SE)	CI (SE)	CI (SE)	CI (SE)	CI (SE)	CI (SE)
All public health facilities (hospitals and health centres)	0.242[a]*** (0.032)	0.195[a]*** (0.036)	0.062[a]*** (0.016)	−0.047 (0.048)	−0.133*** (0.029)	−0.180*** (0.026)
Public hospitals	0.403[a]*** (0.075)	0.259[a]*** (0.065)	0.095[a]*** (0.031)	−0.144 (0.100)	−0.164* (0.053)	−0.308*** (0.054)
Public health centres	0.173[a]*** (0.031)	0.112[a]*** (0.024)	0.024[a]*** (0.003)	−0.061 (0.039)	−0.088*** (0.013)	−0.149*** (0.016)

Dominance test: a=dominance, b=non-dominance, c=concentration curve and line of equality cross.
*, **, ***, statistically significant at the 10%, 5% and 1% levels, respectively.
CI, concentration index; Diff., difference; SE, standard errors.

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The first finding deserving attention relates to the substantial decrease in inequality in both public and overall health spending observed over time across all measures included in our analysis, for both curative services and institutional delivery. This suggests that the investments made in the various health policies, from SONU to *gratuité*, shifted resource allocation to reach poorer segments of society more effectively. This is an impressive finding, for which a country as poor as Burkina Faso with a limited health budget should be praised, especially because both the SONU and the *gratuité* reforms were internally driven and almost exclusively financed through direct national budget allocation.[35] It ought to be noted that since our measure of inequality captures service utilisation and service cost at once, the shift observed towards decreasing inequality over time is largely a reflection of the increase in service use across all socioeconomic strata promoted by these policies and widely documented in prior literature.[29 30 34]

Beyond the overall positive decrease in inequality observed over time, it is equally important to note that, by 2017, a pro-poor distribution was observed on three measures, namely, public spending on outpatient curative services, public total spending on curative service, and overall public spending on outpatient curative services. In 2017, all other measures continued to display a pro-least-poor distribution, although of much smaller magnitude than what observed in the 2000s. This pattern is likely explained by the introduction of the *gratuité*, removing payments at the point of use for curative services for children under 5. Moreover, a similar pattern has been observed before in Zambia,[17] one of the very few countries where a BIA had been conducted on two consecutive time points. This finding is also consistent with what has emerged in the systematic review by Asante *et al*, indicating that the distribution of health benefits continues to be largely pro-least-poor across LMICs.[18 46] Similarly, to what observed in Zambia, our findings draw attention to the fact that while progress towards equality in health benefits in Burkina Faso has been substantial, the path towards achieving UHC is still not complete, and additional measures are needed to ensure further equality gain. In particular, in line with the concept of proportionate universalism,[47] investments explicitly targeted towards reaching the ultrapoor are needed to ensure that at least the distribution of public health spending turns pro-poor. In support of this argument, parallel research in the country indicates that access to care by the ultrapoor remains particularly low,[48] largely because several services continue to be subjected to the payment of user charges, resulting in high OOPE among this particularly vulnerable group.[49] We postulate that the investments needed to compensate for current inequalities can be implemented as public subsidies covering the full cost of care for targeted ultrapoor and/or as direct cash transfers to empower them with the means necessary to overcome additional costs associated with seeking care, such as transport.[46]

The fact that inequalities in health spending remain larger for higher levels of care for both curative services (ie, inpatient services) and institutional deliveries (ie, deliveries in hospitals) does not appear surprising and is again aligned with what has emerged in the BIA systematic review conducted by Asante *et al*[18] as well as observed later in Zambia.[17] This finding provides evidence confirming that one's ability to benefit from the health system's investments is closely tied to one's ability to access the services towards which these investments are made. Prior literature has clearly indicated a marked tendency towards investing in secondary rather than primary care, although the former is much less accessible than the latter to poor populations in sub-Saharan Africa.[50] In order to ensure greater equality in the distribution of health benefits also at higher levels of care, governments need to strengthen referral systems and implement concrete strategies to remove any financial and non-financial barrier to access.[51] This is essential to ensure that choice of level of care is guided by one's health needs and not by one's ability to overcome the financial and non-financial barriers associated with care seeking.

Similarly, it is not surprising that the distributional incidence of overall spending was less pro-poor than the distributional incidence of public spending. Appraising this finding in relation to prior evidence is not possible since prior studies have not considered the two approaches in parallel. In line with our findings, in their work applying the comprehensive BIA methodology in South Africa, Ataguba and McIntyre also identify a pro-least-poor distribution of health benefits.[52] The discrepancy we captured in distributional incidence between public and overall spending is largely driven by the inclusion of OOPE in the measurement since OOPE tend to be higher among individuals of higher socioeconomic status.[53–55] In appraising this finding, it is important to note that our analysis captures service use and spending at public facilities exclusively. Given the small size of private health market, relevant cost information on OOPE in the private sector is not included in NHA.

Moreover, the least-pro-poor distribution we observed for most measures relevant to the assessment of overall spending clearly indicates that the Burkinabè health financing system is still highly reliant on user charges, even for services, such as institutional delivery, which should be in principle be delivered universally free of charge.[32] Furthermore, the pro-least poor distribution we observed for overall spending suggests that only those who can afford to pay end up using certain services. Both considerations are problematic and challenge the status quo of health policy in the country. On the one hand, our findings call into question the fidelity of implementation of current policies, such as the *gratuité*, in ensuring free access to delivery services. On the other hand, our findings also clearly point to the need to expand the current free healthcare policy to include a broader range of services and enlarge population coverage beyond the

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most immediate vulnerable groups. Both actions are likely to decrease inequality, narrowing the gap between public and overall estimates in the distributional incidence of health spending.

Methodological considerations

In spite of its innovative approach as the first quasi-longitudinal BIA conducted on both public and overall spending in the region, we need to acknowledge some limitations affecting our analysis. First, due to the lack of nationally representative data, our 2017 analysis relies on data derived from a restricted survey carried out in 8 out of 13 regions. Although we have conducted a sensitivity analysis, we cannot fully exclude that the results would have been different if a nationally representative survey was used to capture our outcomes of interest. Second, we need to acknowledge the bias that might arise from relying on different socioeconomic status measures, depending on the survey being used. We recognise that comparability across measures would have been enhanced had we relied on a single measure of socioeconomic status, but again, data at our disposal made it impossible for us to do so. Nonetheless, we wish to point out at the fact that recent evidence from similar settings has indicated the high level of comparability across different measures of socioeconomic status,[56 57] including expenditure and asset-based measures. Hence, we trust that this limitation imposed by data availability does not threaten the validity of our findings. Third, having applied the constant unit subsidy approach, we might have masked differences in unit cost that apply to care accessed by people of different socioeconomic status. Similarly, we might have masked differences in unit costs across regions and districts, without knowing to what extent these differences also mask differences in quality of service delivery. However, the data at our disposal did not allow for any further differentiation in the computation of unit costs. Fourth, our analysis does not capture health service utilisation and spending outside the public sector. Due to the private sector's relatively small role in Burkina Faso, relevant data on unit cost were not contained in the NHA, leaving us with no choice, but limiting the analysis to the public sector. Finally, our analysis does not capture inequities, but more simply inequalities derived from the distributional incidence of health spending. As such, our analysis overlooks differences in health status that may exist between the poorest and the least poor. While our approach is aligned with current research practice,[18] further analysis relying on more comprehensive data is urgently needed to move from an analysis of inequalities to one of the inequities.

CONCLUSIONS

Our work has highlighted how in Burkina Faso, the distributional incidence of both public and overall spending has become increasingly less pro-least-poor in relation to the introduction of UHC policies. This represents an important finding, demonstrating that UHC reforms can act as a catalyst of change, actively promoting greater equality. Nonetheless, the fact that for most services and for most levels of care, the distribution of both public and overall spending remain pro-least-poor denotes that the path to equity is still long. Additional policy efforts are needed to identify and implement strategies to enhance access to all services and across levels of care for all, especially for the very poor, as the only means to secure greater equity.

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Contributors MDA, VR and EB defined the research questions and the corresponding study design. MR, EY and PAS acquired data and prepared them for analysis. MDA, MR and EY defined the analytical strategy. MR and EY carried out the analysis, with support from MDA. All authors contributed to the redefinition of the analytical strategy, as preliminary findings emerged, and to the interpretation of the findings. MDA drafted the manuscript, with support from all authors. All authors read and approved of the final manuscript. MDA acts as guarantor, having taken primary responsibility over data use, analysis, and manuscript writing.

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Data availability statement Data may be obtained from a third party and are not publicly available. With the exception of the 2014 and 2017 household survey data (available on the World Bank depository following a request), all data used for this study are secondary data provided to the study team by government institutions. Hence, access to data needs to be negotiated directly with these institutions. The authors do not retain authority to forward data to a third party.

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Appendix 1 – descriptive values (share of annual visits by socio-economic status & unit subsidies) used for public & overall Benefit Incidence Analysis

Curative services

Table A1.1 Proportion of annual visits by quintile and related unit subsidy (CFA) of public spending on curative services (2009; 2014; 2017)

Year	2009 (n = 57,018)					2014 (n = 72,616)					2017 (n = 52, 680)				
		Inpatient care(hospitals)		Outpatient care			Inpatient care(hospitals)		Outpatient care			Inpatient care(hospitals)		Outpatient care	
Population(Pop.) quintile	Pop. share (%)	Share of annual visits (%)	Unit subsidy	Share of annual visits (%)	Unity subsidy	Pop. share (%)	Share of annual visits (%)	Unit subsidy	Share of annual visits (%)	Unity subsidy	Pop. share (%)	Share of annual visits (%)	Unity subsidy	Share of annual visits (%)	Unity subsidy
1 (Poorest)	19.93	6.76	20,079.73	13.39	143.69	18.93	2.65	6,768.30	12.21	1,013.59	20.07	12.67	11,670.87	24.07	1,577.90
2	20.43	15.76	20,079.73	17.36	143.69	19.62	7.65	6,768.30	16.16	1,013.59	19.94	12.67	11,670.87	20.24	1,577.90
3	20.91	15.42	20,079.73	21.15	143.69	20.53	11.68	6,768.30	20.96	1,013.59	20.05	17.33	11,670.87	19.41	1,577.90
4	20.08	33.98	20,079.73	24.78	143.69	21.79	18.33	6,768.30	23.99	1,013.59	19.96	26.00	11,670.87	16.35	1,577.90
5 (Least poor)	18.66	28.09	20,079.73	23.32	143.69	19.13	59.69	6,768.30	26.69	1,013.59	19.98	31.33	11,670.87	19.92	1,577.90

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Table A1.2 Proportion of annual visits by quintile and related unit subsidy and unit cost (CFA) of overall spending on curative services (2009; 2014)

Year	2009 (n = 57,018)							2014 (n = 72,616)						
		Inpatient care (hospitals)			Outpatient care				Inpatient care (hospitals)			Outpatient care		
Population quintile	Pop. share (%)	Share of annual visits (%)	Public&donor unit subsidy	OOPE Unit cost	Share of annual visits (%)	Public &donor unity subsidy	OOPE Unit cost	Pop. share (%)	Share of annual visits (%)	Public &donor unit subsidy	OOPE Unit cost	Share of annual visits (%)	Public & donor unity subsidy	OOPE Unit cost
1 (Poorest)	19.93	6.76	2,624,600.59	8,140.34	13.39	596.12	270.93	18.93	2.65	715,358.49	36,056.64	12.21	127,135.31	266.15
2	20.43	15.76	2,624,600.59	2,563.62	17.36	596.12	148.11	19.62	7.65	715,358.49	8,445.01	16.16	127,135.31	136.07
3	20.91	15.42	2,624,600.59	1,151.33	21.15	596.12	602.17	20.53	11.68	715,358.49	28,233.67	20.96	127,135.31	535.32
4	20.08	33.98	2,624,600.59	3,216.79	24.78	596.12	602.17	21.79	18.33	715,358.49	10,194.03	23.99	127,135.31	265.06
5 (Least poor)	18.66	28.09	2,624,600.59	5,180.66	23.32	596.12	417.08	19.13	59.69	715,358.49	4,261.05	26.69	127,135.31	324.21

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Table A1.3 Proportion of annual visits by quintile and related unit subsidy (CFA) of overall spending on curative services (2017)

Year		2017 (n = 52, 680)					
		Inpatient care (hospitals)			Outpatient care		
Population quintile	Pop. share (%)	Share of annual visits (%)	Public&donor unit subsidy (Thousand)	OOPE (Thousand)	Share of annual visits (%)	Public &donor unity subsidy	OOPE
1 (Poorest)	20.07	1,221,767.95	12.22	8,485.31	24.07	426.27	150.76
2	19.94	1,221,767.95	12.22	5,739.57	20.24	358.44	121.28
3	20.05	1,221,767.95	12.22	21,400.63	19.41	343.75	645.25
4	19.96	1,221,767.95	12.22	8,086.43	16.35	289.55	434.29
5 (Least poor)	19.98	1,221,767.95	12.22	9,133.91	19.92	352.78	485.07

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Institutional delivery

Table A1.4 Proportion of annual visits by quintile and related unit subsidy (CFA) of public spending on institutional delivery (2003; 2010; 2017)

Year		2003 (n = 41,520)					2010 (n = 56,173)					2017 (n = 15,914)			
		Public hospitals		Public health centers			Public hospitals		Public health centers			Public hospitals		Public health centers	
Population quintile	Population share %	Share of annual visits (%)	Unit subsidy	Share of annual visits (%)	Unity subsidy	Pop. share %	Share of annual visits (%)	Unit subsidy	Share of annual visits (%)	Unity subsidy	Pop. share %	Share of annual visits (%)	Unit subsidy	Share of annual visits (%)	Unit subsidy
1 (Poorest)	23.71	8.47	2,066.23	15.04	73.67	19.17	4.72	4,553.60	12.10	44.79	20.01	18.73	290.02	19.28	285.27
2	15.62	4.24	2,066.23	14.31	73.67	19.24	8.49	4,553.60	15.82	44.79	20.04	17.82	290.02	19.98	285.27
3	19.28	4.48	2,066.23	16.25	73.67	19.75	20.75	4,553.60	19.60	44.79	19.96	19.94	290.02	20.18	285.27
4	20.20	14.28	2,066.23	27.13	73.67	21.02	26.42	4,553.60	25.48	44.79	20.02	16.31	290.02	20.53	285.27
5 (Least poor)	21.20	68.52	2,066.23	27.26	73.67	20.82	39.62	4,553.60	27.00	44.79	19.97	27.19	290.02	20.03	285.27

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Table A1.5 Proportion of annual visits by quintile and related unit subsidy and unit cost (CFA) of overall spending on institutional delivery (2003; 2010)

Year		2003 (n = 41,520)						2010 (n = 56,173)						
		Public hospitals			Public health centers				Public hospitals			Public health centers		
Population quintile	Pop. share (%)	Share of annual visits (%)	Public&donor unit subsidy	OOP Unit cost	Share of annual visits (%)	Public unity subsidy	OOP Unit cost	Pop. share (%)	Share of annual visits (%)	Public &donor unit subsidy	OOPE Unit cost	Share of annual visits (%)	Public & donor unity subsidy	OOP Unit cost
1(Poorest)	23.71	8.47	168,042.45	128.03	15.04	7,320.48	18.29	19.17	4.72	2,462.18	61.46	12.10	12,132.23	16.92
2	15.62	4.24	168,042.45	64.09	14.31	7,320.48	17.40	19.24	8.49	2,462.18	110.55	15.82	12,132.23	22.12
3	19.28	4.48	168,042.45	67.72	16.25	7,320.48	19.76	19.75	20.75	2,462.18	270.21	19.60	12,132.23	27.40
4	20.20	14.28	168,042.45	215.85	27.13	7,320.48	32.99	21.02	26.42	2,462.18	344.04	25.48	12,132.23	35.63
5 (Least poor)	21.20	68.52	168,042.45	1,035.74	27.26	7,320.48	33.14	20.82	39.62	2,462.18	515.93	27.00	12,132.23	37.75

Note. There is no donor subsidy to public health centers in 2003 NHA

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Table A1.6 Proportion of annual visits by quintile and related unit subsidy and unit cost (CFA) of overall spending on institutional delivery (2017)

Year	2017 (n = 15,914)						
		Public hospitals			Public health centers		
Population quintile	Pop. share (%)	Share of annual visits (%)	Public&donor unit subsidy	OOPE	Share of annual visits (%)	Public &donor unity subsidy	OOPE
1 (Poorest)	20.01	18.73	203,069.95	280.12	19.28	15, 793.57	6.14
2	20.04	17.82	203,069.95	266.51	19.98	15, 793.57	6.36
3	19.96	19.94	203,069.95	298.22	20.18	15, 793.57	6.42
4	20.02	16.31	203,069.95	243.93	20.53	15, 793.57	6.54
5 (Least poor)	19.97	27.19	203,069.95	406.65	20.03	15, 793.57	6.38

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Appendix 2 - Benefit incidence analysis of donor spending

Table A2.1 Benefit incidence of donor spending on curative care

Year	**2009**	**2014**	**2017**
Level of care	CI (SE)	CI (SE)	CI (SE)
All public health facilities (inpatient and outpatient care)	0.119[a]*** (0.013)	0.186[a]*** (0.010)	-0.024[b]* (0.014)
Inpatient care (hospitals)	0.261[a]*** (0.046)	0.525[a]*** (0.049)	0.237[a]*** (0.047)
Outpatient care	0.108[a]*** (0.013)	0.152[a]*** (0.010)	-0.049[a]*** (0.014)

Note: Diff.: difference; CI= concentration index; SE= standard errors; dominance test: a = dominance, b= non-dominance, c= curves cross
*, **, *** statistically significant at the 10%, 5%, and 1% levels, respectively

Table A2.2 Benefit incidence of donor spending on institutional delivery

Year	**2003**	**2010**	**2017**
Health care provider	CI (SE)	CI (SE)	CI (SE)
All public health facilities (hospitals and health centers)	0.199[a]*** (0.029)	0.155[a]*** (0.021)	0.013[a]*** (0.002)
Public hospitals	0.584[a]*** (0.092)	0.406[a]*** (0.068)	0.078[a]** (0.031)
Public health centers	0.161[a]*** (0.031)	0.128[a]*** (0.023)	0.009[a]*** (0.003)

Note: Diff.: difference; CI= concentration index; SE= standard errors; dominance test: a = dominance, b= non-dominance, c= concentration curve and line of equality cross
*, **, *** statistically significant at the 10%, 5%, and 1% levels, respectively

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Appendix 3 – Sensitivity analysis – analysis limited to the eight regions included also in PBF dataset

Curative services

Table A3.1a Benefit incidence of public spending on curative care in Burkina Faso in 8 regions

Year	**2009**	**2014**	**2017**
Health care provider	CI (SE)	CI (SE)	CI (SE)
All public health facilities (inpatient and outpatient care)	0.079[a]*** (0.018)	0.242[a]*** (0.012)	-0.024[a]* (0.014)
Inpatient care (hospitals)	0.221[a]*** (0.060)	0.532[a]*** (0.048)	0.237[a]*** (0.047)
Outpatient care (all health facilities)	0.072[a]*** (0.019)	0.223[a]*** (0.014)	-0.049[a]*** (0.014)

Note: CI= concentration index; SE= standard errors; dominance test: a = dominance, b= non-dominance, c= curves cross
, **, * statistically significant at the 10%, 5%, and 1% levels, respectively*

Table A3.1b Benefit incidence of overall health spending on curative care in Burkina Faso in 8 regions

Year	**2009**	**2014**	**2017**
Health care provider	CI (SE)	CI (SE)	CI (SE)
All public health facilities (inpatient and outpatient care)	0.177[a]*** (0.037)	0.292[a]*** (0.019)	0.105[a]*** (0.025)
Inpatient care (hospitals)	0.209[a]*** (0.058)	0.363[a]*** (0.043)	0.231[a]*** (0.048)
Outpatient care (all health facilities)	0.125[a]*** (0.018)	0.236[*]*** (0.014)	-0.012[b] (0.144)

Note: CI= concentration index; SE= standard errors; dominance test: a = dominance, b= non-dominance, c= curves cross
, **, * statistically significant at the 10%, 5%, and 1% levels, respectively*

Institutional delivery

Table A3.2a Benefit incidence of public spending on institutional delivery in Burkina Faso in 8 regions

Year	**2003**	**2010**	**2017**
Health care provider	CI (SE)	CI (SE)	CI (SE)
All public health facilities (hospitals and health centers)	0.145[a]*** (0.042)	0.111[a]*** (0.024)	0.013[a]*** (0.002)
Public hospitals	0.503[a]*** (0.144)	0.285[a]* (0.112)	0.078[a]** (0.031)
Public health centers	0.112[a]** (0.044)	0.104[a]*** (0.025)	0.009[a]*** (0.003)

Note: CI= concentration index; SE= standard errors; dominance test: a = dominance, b= non-dominance, c= curves cross
, **, * statistically significant at the 10%, 5%, and 1% levels, respectively*

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Table A3.2b Benefit incidence of overall health spending on institutional delivery in Burkina Faso in 8 regions

Year	**2003**	**2010**	**2017**
Health care provider	CI (SE)	CI (SE)	CI (SE)
All public health facilities (hospitals and health centers)	0.173[a]*** (0.048)	0.227[a]*** (0.049)	0.062[a]*** (0.016)
Public hospitals	0.32[a]** (0.127)	0.388[a]*** (0.091)	0.095[a]*** (0.031)
Public health centers	0.110[a]*** (0.042)	0.048 (0.031)	0.024[a]*** (0.003)

Note: CI= concentration index; SE= standard errors; dominance test: a = dominance, b= non-dominance, c= curves cross
, **, * statistically significant at the 10%, 5%, and 1% levels, respectively*