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# Financial risk protection in private health insurance: empirical evidence on catastrophic and impoverishing spending from Germany's dual insurance system

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## Abstract

Financial risk protection from high costs for care is a main goal of health systems. Health system characteristics typically associated with universal health coverage and financial risk protection, such as financial redistribution between insureds, are inherent to, e.g. social health insurance (SHI) but missing in private health insurance (PHI). This study provides evidence on financial protection in PHI for the case of Germany's dual insurance system of PHI and SHI, where PHI covers 11% of the population. Linked survey and claims data of PHI insureds ( $n = 3105$ ) and population-wide household budget data ( $n = 42,226$ ) are used to compute the prevalence of catastrophic health expenditures (CHE), i.e. the share of households whose out-of-pocket payments either exceed 40% of their capacity-to-pay or push them (further) into poverty. Despite comparatively high out-of-pocket payments, CHE is low in German PHI. It only affects the poor. Key to low financial burden seems to be the restriction of PHI to a small, overall wealthy group. Protection for the worse-off is provided through special mandatorily offered tariffs. In sum, Germany's dual health insurance system provides close-to-universal coverage. Future studies should further investigate the effect of premiums on financial burden, especially when linked to utilisation.

**Keywords:** catastrophic health expenditure; forgone care; impoverishment; out-of-pocket payments; universal health coverage

## 1. Introduction

Financial risk protection – the protection of the population against financial burden when using health care – is one of the main goals of health systems (Murray and Frenk, 1999; World Health Organization, 2000). As part of the broader concept of universal health coverage (UHC), governments worldwide have expressed their commitment to achieve financial protection by adopting the United Nations' Sustainable Development Goals (SDGs) (World Health Organization, 2010; United Nations, 2015). The level of financial protection in a health system is assessed as the financial burden arising from out-of-pocket payments (OOPP), i.e. direct payments at the point of using care, such as user charges (Wagstaff, 2009). In contrast to prepayments, e.g. taxes, contributions or insurance premiums, OOPP are often unexpected and therefore reduce the financial resources to be spent otherwise. Thus, they might endanger a person's or household's standard of living (Berki, 1986; Wagstaff, 2009). The two internationally established

indicators to assess financial protection therefore compare a household's OOPP to its financial resources (Moreno-Serra, Thomson, and Xu 2013). The first indicator, catastrophic health expenditure (CHE), is defined as the share of OOPP on household resources exceeding a predefined catastrophic threshold (Berki, 1986; Wyszewianski, 1986; Wagstaff and van Doorslaer, 2003; Wagstaff and Eozenou, 2014). Household resources are either included entirely (budget share approach) or they are reduced by some measure of basic needs/subsistence expenditure not to be spent for health (capacity to pay – CTP approach). The most common thresholds for CHE are 10%, 25%, or 40%, depending on which approach is used (Hsu *et al.*, 2018). The second indicator, impoverishing health expenditure (IHE), is defined as OOPP pushing household resources (further) below a predefined poverty line (Wagstaff and van Doorslaer, 2003; Wagstaff and Eozenou, 2014). A potential problem with analyses of OOPP is that forgoing care, especially for financial reasons, may bias CHE and IHE indicators downwards. Forgoing care leads to (at least subjectively experienced) unmet needs for health care. Forgone care/unmet needs (both terms are used synonymously within this work in accordance with the international literature) should therefore always be considered alongside measures of financial protection to assess how many people refrain from accessing health care and thereby reduce their OOPP.

When discussing how financial risk protection can be reached in a health system, it is often referred to features like financial redistribution between insureds, which are present in social health insurance (SHI) and National Health Service (NHS) systems but missing in private health insurance (PHI) (Smith, 2013; Voorhoeve *et al.*, 2016). While Smith (2013) argues that PHI could in principle provide elements of financial protection as well, empirical evidence to further assess this link is lacking so far.

A specific feature of the German health system is the coexistence of substitutive PHI next to SHI. While insurance is mandatory for all permanent residents, access to substitutive PHI (providing full coverage, in contrast to supplementary or complementary 'add-on' PHI (Sagan and Thomson, 2016)) is restricted to mainly three groups: civil servants, the self-employed and employees exceeding a threshold of gross income (59,400€ per year in 2018) (Blümel *et al.*, 2020). Thus, PHI accounts for about 11% of the population (Statistisches Bundesamt (Destatis), 2020a). About 50% of the privately insured are civil servants (Verband der privaten Krankenversicherung, 2019). Civil servants are eligible for aid allowance, meaning health care expenses are to some extent reimbursed by the state (generally 50–80%, deductibles excluded). PHI is used to cover the gap arising from this *de facto* exclusion from SHI. For the other privately insured, an incentive to switch to PHI is the commonly lower contribution at a younger age, as premium payments depend on age as well as on health status upon enrolment, aside from tariff conditions. Deductibles in PHI are installed by insurance companies as well as for aid allowance and vary between insureds in both cases.

The dual health insurance system of SHI and PHI and its implications for care provision are regularly part of public and policy debates in Germany (Roman-Urrestarazu *et al.*, 2018). Following the entrance restrictions to PHI, the privately insured are on average wealthier and have higher educational achievements than the overall population, and they are healthier and predominantly male (Grunow and Nuscheler, 2014; Hoffmann and Koller, 2017; Hajek *et al.*, 2018; Luque Ramos *et al.*, 2018). Studies also found differences in provision of and access to services, e.g. easier access to ambulatory care specialists and shorter waiting times among the privately insured (Huber and Mielck, 2010; Klein and von dem Knesebeck, 2016; Stauder and Kossow, 2017; Luque Ramos *et al.*, 2018; Werbeck *et al.*, 2021). Of the studies assessing the financial protection within the German health system, two address PHI by including the type of insurance as an independent variable. While both studies found higher OOPP for PHI, one found higher financial burden and the other no significant difference in burden compared to SHI, when controlling for socioeconomics and health status. Burden was measured as OOPP to income ratio in both studies (Bock *et al.*, 2014; Bremer, 2014). However, both studies are restricted to people aged 50 and over and both use data from the early 2000s, since when the health system has undergone substantial reforms, including measures to strengthen financial protection (Blümel *et al.*, 2020).

In-detail analysis of financial protection in Germany is yet only available for households with statutorily insured members only (Siegel and Busse, 2018).

Therefore, the goal of this study is to assess the financial protection of households with privately insured members in Germany, including identification of possible gaps in protection. To measure prevalence of financial burden, CHE and IHE are computed according to the method proposed by the WHO Regional Office for Europe, which uses a CTP approach and integrates IHE into CHE. This revised approach was designed to account for high living standards in wealthy countries (Thomson *et al.*, 2016). It introduced new measures of basic needs expenditure and modified indicators to be more sensitive towards financial burden among the poor (Cylus *et al.*, 2018). Since the design of CHE and IHE is still a topic of ongoing discussion and reflects normative choices regarding (1) the level of catastrophic thresholds for CHE, (2) the utilisation of the CTP vs the budget share approach and (3) the poverty line employed for IHE, three additional analyses of CHE and IHE are performed (see Methods section) (Moreno-Serra *et al.*, 2013; Hsu *et al.*, 2018; Ataguba, 2021). These common indicators to assess financial protection are further complemented by the subjectively experienced financial burden from OOPP, and by the prevalence of unmet needs due to costs. Lastly, the financially burdened are compared to those without CHE and IHE regarding their socioeconomics, health and extent of financial burden to evaluate potential equity concerns and gaps in protection.

## 2. Methods

### 2.1 Data sources

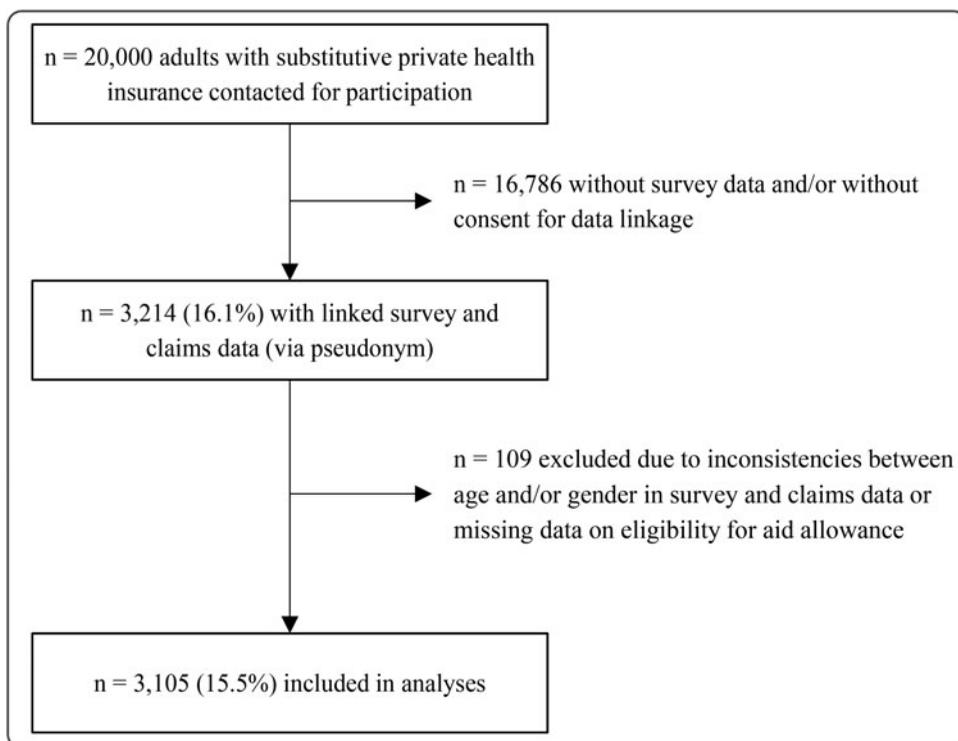
The main data used in the analyses were generated in the study “Integrating the Population Perspective into Health System Performance Assessment” (IPHA). In 2018, a cross-sectional survey was conducted among a stratified random sample of 20,000 people with substitutive PHI, aged 18 years and over. The sample was drawn from the largest PHI company in Germany, which is operating nationwide. The questionnaire assessed data on all intermediate (access, coverage, quality, safety) and final goals (improved health, responsiveness, social and financial risk protection, improved efficiency) of WHO’s Health Systems Framework (World Health Organization, 2007) as well as additional characteristics of the insured, such as socioeconomics. In addition to the survey, selected claims data on care utilisation and socio-demographics were provided by the insurance company and were linked with the survey data via pseudonym for all participants who gave their consent (see study protocol for details (Blümel *et al.*, 2020)). Figure 1 describes the process of sample selection for the analyses.

Inverse probability weights were calculated to account for non-response. They were combined with raking weights to adjust the sample to all adults with substitutive PHI in Germany ( $n = 7,339,000$ ) regarding age (eight strata, micro census data (Statistisches Bundesamt (Destatis), 2020a)) and eligibility for aid allowance by gender (four strata, Association of Private Health Insurers’ statistics (Verband der privaten Krankenversicherung, 2019)).

Microdata of the 2018 household budget survey (HBS; German sample survey of income and expenditure) with  $n = 42,226$  households were employed to calculate a nationwide standard amount of basic needs expenses to compute CTP per household and to be used as a poverty line, as described below (Forschungsdatenzentren der Statistischen Ämter des Bundes und der Länder, 2018; Statistische Ämter des Bundes und der Länder, 2019).

### 2.2 Employed variables

Variables used for the analyses (Table 1) can be categorised as (1) variables necessary for computation of CHE and IHE, (2) unmet needs due to costs as additional outcome and (3) household characteristics required for subgroup analyses (socioeconomics, health and subjective financial burden due to OOPP).



**Figure 1.** Flow chart of sample selection.

Since net income and amount of OOPP were assessed categorically, conversion to metric scale was necessary to compute CHE and IHE. For net income, the categories included in the survey were reproduced in the HBS data, and sets of mean values were computed by category and household size. This approach was found to produce sufficient estimates in earlier analyses (Stauder and Hüning, 2004). Amounts of OOPP were approximated using the middle between lower and upper boundary per category. Since no upper bound was available for the highest category, the 1.5-fold of the lower threshold was used. This heuristic approach was chosen due to lack of available data on the distribution of OOPP in PHI. Two sensitivity analyses were performed to examine the impact of differing distributions of OOPP: the approximated values were lowered (raised) by 15% and the open-ended category was multiplied by 1.25 (and 3).

### 2.3 Computation of catastrophic and impoverishing health expenditure

The revised method proposed by the WHO Regional Office for Europe uses a CTP approach for which a standardised amount is calculated considered necessary to cover a household's basic needs. This amount is defined as expenses for food, rent and utilities of households in consumption percentiles 25–35 of the total population (Thomson *et al.*, 2016, 2019). Usage of HBS data resulted in an average spending on basic needs of 5606€ per equivalent person and year in 2018. The OECD equivalence scale ('Oxford scale') was used for household size adjustment in accordance with the WHO Regional Office for Europe method (assigning a value of 1 to the first, 0.7 to other adults and 0.5 to children) (OECD, 1982). This standardised basic needs amount then was multiplied with the equivalence scale of each PHI household in the IPHA sample for backwards household size adjustment. Afterwards, a household's CTP was obtained by subtracting this household-specific basic needs amount from the household's net income. OOPP are considered

**Table 1.** Overview of variables used for analyses, by data source

<b>Household budget survey: German sample survey of income and expenditure (n = 42,226)</b>		
Number of household members: total	[Number (discrete)]	Calculation of equivalence scale for household size adjustment
Number of household members: children <14 years		
Household expenses for:	[€]	Calculation of a standardised basic needs amount/poverty line (person equivalent expenses of households in consumption percentiles 25–35)
Rent (without imputed rent)		
Utilities		
Food and non-alcoholic drinks		
Total consumption (without imputed rent)		
<b>IPHA project: adults with substitutive PHI from one insurance company in Germany (n = 3105)</b>		
<b>Survey data</b>		
Number of household members: total	[Number (discrete)]	Calculation of equivalence scale for household size adjustment
Number of household members: children <14 years		
Amount of monthly household net income	[11 categories]	Calculation of CTP by subtracting household size-adjusted basic needs
Household OOPP in the last twelve months (without prepayments and payments later reimbursed by the insurance company)	Yes/no	Main outcome CHE: ratio of OOPP to CTP or income IHE: ratio of [income-OOPP] to poverty line
If yes, amount of household OOPP	[8 categories]	
Unmet needs due to costs in the last 12 months (physician/dental care/hospital/drugs/allied health professions/medical aids/mental health/others)	Yes/no/ no need for care	Additional outcome
Subjective financial burden due to out-of-pocket payments (only among those with OOPP >0€)	Very strong/ strong/fair/ less strong/ not at all	Description of households in subgroup analyses
Self-assessed health	Very good/ good/fair/ bad/very bad	
Number of chronic conditions (lasting at least 6 months)	None/one/ several	
Highest educational attainment in school	[8 categories]	

Highest professional educational attainment	[13 categories]
Current employment status	[13 categories]
<b>Claims data</b>	
Eligible for aid allowance (civil servants)	Yes/no
Year of birth	[Year]
Gender	Female/male

PHI, private health insurance; OOPP, out-of-pocket payments; CTP, capacity to pay; CHE, catastrophic health expenditure; IHE, impoverishing health expenditure.

catastrophic either if they exceed 40% of the household's CTP or if CTP was negative in the first place. A negative CTP indicates the household's income was not sufficient to cover the hypothesised amount for basic needs.

This household-specific amount for basic needs also served as a poverty line to compute IHE, of which four categories exist (Thomson *et al.*, 2016): a household is classified as being (1) not at risk of impoverishment if its remaining income after OOPP is at least 120% of its poverty line, (2) at risk of impoverishment if this share is lower than 120%, (3) impoverished if it is below 100% (i.e. the household cannot meet its hypothesised basic needs anymore after having OOPP) and (4) further impoverished if its net income is below its poverty line even before subtracting OOPP (i.e. CTP is negative). By definition, (further) impoverished households also have CHE.

#### 2.4 Additional analyses

Three additional analyses were performed. Firstly, the 60% threshold of German median net income was employed as an alternative, relative poverty line. This national poverty line used within the European Union was 13,628€ per equivalent person and year in 2018 (Statistisches Bundesamt (Destatis), 2020b). Secondly, CHE was calculated using a 10% catastrophic threshold to the OOPP to income ratio. This budget share approach differs from the previous burden indicators in that the budget share approach does not necessarily imply that a household should be able to meet its basic needs before having to pay for health care. It is also widely used in the international literature, e.g. to track UHC in the SDGs (World Health Organization and The World Bank, 2017). Thirdly, catastrophic spending curves (i.e. cumulative incidence curves of CHE) were plotted to obtain a prevalence of CHE for various catastrophic thresholds, not only the original and commonly used 40% (Wagstaff, 2009; Hsu *et al.*, 2018, 2021). For this purpose, negative ratios of OOPP over CTP were set to 1, as these are households further impoverished by OOPP. Values greater than 1 were also set to 1, as these households are impoverished by OOPP and cannot meet their hypothesised basic needs anymore. For both categories, OOPP are catastrophic by definition and thus the choice of threshold values between 0% and 100% does not affect the prevalence of CHE.

#### 2.5 Statistical procedure

First, prevalence of CHE and IHE (in main, sensitivity and additional analyses) and of unmet needs due to costs was computed. Next, the characteristics of the financially burdened (i.e. those with CHE, including the (further) impoverished) in comparison to those not burdened were assessed, including prevalence of unmet needs due to costs, mean amount of OOPP, subjective financial burden due to OOPP, socioeconomics and health status. Statistical significance was assessed using 95% confidence intervals (CI). Subgroup differences were additionally evaluated using Pearson's  $\chi^2$  test and the adjusted Wald test at  $\alpha = 0.05$ , respectively. Data preparation and computation of indicators was done with IBM SPSS Statistics Version 26. Stata Version 15 was used to compute raking weights and for conducting the final analyses by using the *svy* commands to account for stratification and weighting. All results refer to the weighted dataset, and numbers of observations (unweighted sample sizes) are presented for additional information.

### 3. Results

#### 3.1 Sample characteristics

Of the final sample ( $n = 3105$ ; response rate: 15.5%), 61.0% were male, mean age was 53.9 years [standard deviation (SD): 16.2] and 49.9% were eligible for aid allowance in 2018 (Table 2). The vast majority (77.0%) had a tertiary education and mean household net income per month was

**Table 2.** Sample characteristics (weighted)

	%	<i>n</i>
Aid allowance ( <i>n</i> = 3105)		
Eligible (vs not eligible)	49.9	1518
Gender ( <i>n</i> = 3105)		
Male (vs female)	61.0	2016
Age ( <i>n</i> = 3105)		
Mean [standard deviation]	53.9 years [16.2]	
Education ( <i>n</i> = 3080)		
Low (ISCED 1-2)	1.9	48
Medium (ISCED 3-4)	21.1	556
High (ISCED 5-8)	77.0	2476
Employment status ( <i>n</i> = 3077)		
In employment	62.4	1670
Retired	30.7	1282
Other (unemployed, student, ...)	6.9	125
Household size ( <i>n</i> = 3076)		
Single household	15.9	500
Two members	48.0	1651
Three members	16.7	446
Four and more members	19.4	479
Household net income per month ( <i>n</i> = 3005)		
Mean [standard deviation]	5150€ [2564]	
Self-assessed health ( <i>n</i> = 3088)		
Very good/good (vs fair/bad/very bad)	75.1	2217
Number of chronic conditions ( <i>n</i> = 3092)		
None	45.0	1266
One	33.8	1069
Several	21.3	757
Household OOPP (yes/no) ( <i>n</i> = 3004)		
No (vs yes)	13.8	427
Amount of OOPP ( <i>n</i> = 2917)		
Mean [standard deviation]	504€ [719]	
Subjective financial burden due to OOPP ( <i>n</i> = 2544)		
Strong/very strong (vs fair/less strong/not at all)	10.8	276

*n* refers to the unweighted sample size; CI, confidence interval; OOPP, out-of-pocket payments (referring to the past twelve months); ISCED, International Standard Classification of Education.

5150€ [SD: 2564]. The most frequent household size was two members (48.0%) and 15.9% lived in single households. Three out of five (62.4%) were in employment (including self-employment), while 30.7% were retired. Three quarters of participants (75.1%) rated their health as (very) good,

although more than half reported either one (33.8%) or several (21.3%) chronic conditions. Average household OOPP were 504€ [SD: 719], including 13.8% of households with no OOPP in the previous 12 months. Of those with OOPP, 10.8% experienced a (very) strong financial burden due to OOPP.

### 3.2 Prevalence of financial burden and unmet needs

Households had an average CTP per equivalent person and year of 51,147€ [95% CI 49,849–52,445]. Prevalence of CHE was 1.0% [0.5–1.8], including 0.9% [0.5–1.7] of households further impoverished by OOPP and <0.1% [0.0–0.3] (one household) impoverished (Table 3). Only two households with CHE were neither impoverished nor further impoverished. Another 0.2% [0.1–0.7] were at risk of impoverishment. Prevalence of unmet needs due to costs was 7.2% [6.2–8.4] of all participants stating a subjective need for care.

In the two sensitivity analyses, mean OOPP change to 427€ [406–449] and 626€ [586–666], respectively. In sensitivity analysis 1 (lower OOPP), results for IHE change only marginally compared to the main analysis as only one household switches categories (Table 3). For CHE, results of sensitivity analysis 1 do not differ from the main analysis (1.0% [0.5–1.8]). In sensitivity analysis 2, also one household switches categories in IHE, while CHE changes to 1.4% [0.9–2.2].

Using the national poverty line of 60% of median net income results in an average CTP per equivalent person and year of 39,458€ [38,257–40,659]. Prevalence of CHE increases to 3.6% [2.8–4.7], including 2.8% [2.1–3.8] of further impoverished and 0.3% [0.2–0.6] impoverished households. An additional 2.5% [1.9–3.4] were at risk of impoverishment. The budget share approach indicates that 0.5% [0.3–0.8] of households spent more than 10% of their net income on OOPP.

Catastrophic spending curves in Figure 2 reveal that CHE is low even for small thresholds. At a threshold of 10%, for example, prevalence of CHE in the main analysis is 2.3%, whereas it is 1.9% in sensitivity analysis 1 and 2.7% in sensitivity analysis 2. The catastrophic spending curve of the national poverty line analysis is clearly distinguishable from the other curves. As for the main analysis, households impoverished and further impoverished account for a great fraction of all households with CHE, even at low thresholds. At a 10% threshold, for instance, prevalence of CHE is 6.3% while 3.1% of households are (further) impoverished. As all analyses found some households to be (further) impoverished, catastrophic spending curves do not drop to a prevalence of 0%.

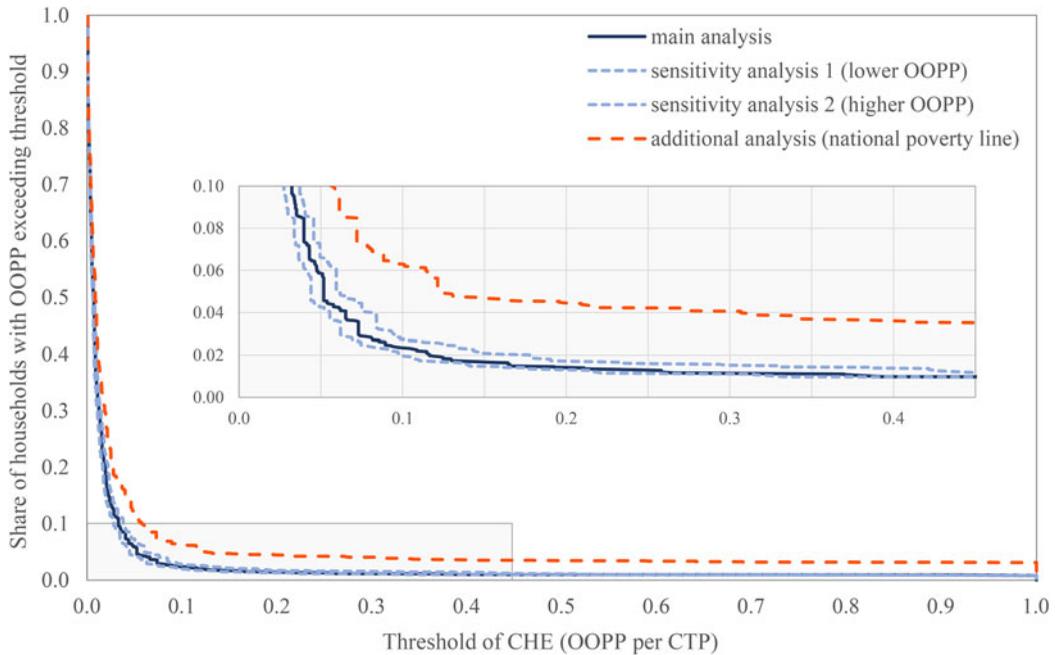
### 3.3 Characteristics of the financially burdened

For further examination of those with CHE, results from the analysis using the national poverty line were employed ( $n = 83$ ) since the sample size of households with CHE derived from the main analysis was considered too small for further analysis ( $n = 14$ ). Mean OOPP among households experiencing CHE was 795€ [549–1041], compared to 491€ [465–516] among households not experiencing CHE (Table 4). Average net household income of those with CHE was also substantially lower compared to their counterparts (1598€ [1375–1822] vs 5332€ [5229–5435]). Additional computation of person equivalent income quintiles showed that all households experiencing CHE were in the lowest quintile. Furthermore, 19.7% [11.8–30.9] of participants with and 6.7% [5.6–7.9] of participants without CHE reported unmet needs due to costs. Differences between the two groups are also found regarding socio-demographic characteristics, namely age, education and occupational status: those experiencing CHE had a mean age of 44.4 years [39.6–49.1], while it was 53.7 years [53.4–54.1] among the other group. Participants with CHE also had less often a high educational status (64.3% [50.6–76.0] vs 77.8% [75.8–79.7]) and were less often in employment (44.2% [32.2–56.8] vs 64.9% [62.9–66.8]), but more often students or unemployed (31.5% [19.5–46.6] vs 5.5% [4.4–6.8]), compared to participants without CHE.

**Table 3.** Prevalence of catastrophic and impoverishing health expenditure (main, sensitivity and additional analyses) and of unmet needs due to costs (weighted)

	Main analysis			Sensitivity analyses						Additional analyses					
				Lower OOPP			Higher OOPP			National poverty line			Budget share >10%		
	%	[95% CI]	<i>n</i>	%	[95% CI]	<i>n</i>	%	[95% CI]	<i>n</i>	%	[95% CI]	<i>n</i>	%	[95% CI]	<i>n</i>
Catastrophic health expenditure ( <i>n</i> = 2821)															
Yes (vs non-catastrophic/no OOPP)	1.0	[0.5–1.8]	14	1.0	[0.5–1.8]	14	1.4	[0.9–2.2]	26	3.6	[2.8–4.7]	83	0.5	[0.3–0.8]	19
Impoverishing health expenditure ( <i>n</i> = 2821) (vs not at risk/no OOPP)															
At risk of impoverishment	0.2	[0.1–0.7]	5	0.3	[0.1–0.7]	6	0.2	[0.1–0.6]	4	2.5	[1.9–3.4]	61			
Impoverished	<0.1	[0.0–0.3]	1	–		0	0.1	[0.0–0.3]	2	0.3	[0.2–0.6]	10			
Further impoverished	0.9	[0.5–1.7]	11	0.9	[0.5–1.7]	11	0.9	[0.5–1.7]	11	2.8	[2.1–3.8]	58			
Unmet needs due to costs ( <i>n</i> = 2864)															
Yes (vs needs met)	7.2	[6.2–8.4]	191												

Households with catastrophic health expenditure include the (further) impoverished; *n* refers to the unweighted sample size; CI, confidence interval; OOPP, out-of-pocket payments; all outcomes refer to the past twelve months.



**Figure 2.** Catastrophic spending curves (weighted).

CHE, catastrophic health expenditure, OOPP, out-of-pocket payments; CTP, capacity to pay; values of OOPP per CTP below 0 (i.e. households further impoverished) and above 1 (i.e. households impoverished by OOPP) were set to 1 as in both cases OOPP are catastrophic by definition.

Comparison of health statuses indicates a better self-assessed health and fewer chronic conditions among participants without CHE, but differences are not statistically significant. Eligibility for aid allowance also does not differ statistically significant (with CHE: 43.2% [31.1–56.1], without: 49.4% [47.3–51.5]). Lastly, 27.4% [18.8–38.0] of participants experiencing CHE rated their subjective financial burden due to OOPP as (very) strong, while the same was true for 10.2% [8.9–11.5] of those not experiencing CHE.

## 4. Discussion

### 4.1 Financial risk protection in German PHI

The goal of this study was to assess financial risk protection from health-related spending among households with privately insured members in Germany. With a prevalence of 1.0% of CHE, including the further impoverished 0.9% and the <0.1% impoverished households, financial burden due to OOPP can be considered low in German PHI. In a study using HBS data and applying the same method to German households comprising only SHI members, prevalence of IHE was similar (0.2% impoverished; 0.8% further impoverished), but CHE was more than twofold, compared to PHI (2.4%) (Siegel and Busse, 2018). Of the two previous studies explicitly considering PHI in Germany, one found higher burden among the privately insured and the other found no statistically significant difference between PHI and SHI. However, both studies controlled for socioeconomic and health characteristics and can therefore not be directly compared to the unadjusted rates for PHI/SHI (Bock *et al.*, 2014; Bremer, 2014).

When comparing the results internationally, prevalence of CHE in German PHI is as low as in the best ranked countries in a list of 24 European countries (Thomson *et al.*, 2019). CHE in these countries ranges between 1% and 17%, with German SHI ranking seventh lowest. Regarding IHE,

**Table 4.** Comparison of participants with vs without catastrophic health expenses (weighted)

	With CHE			Without CHE		
	%	[95% CI]	<i>n</i>	%	[95% CI]	<i>n</i>
Unmet needs due to costs ( <i>n</i> = 2624)						
Yes (vs needs met)	<b>19.7</b>	<b>[11.8–30.9]</b>	<b>17</b>	<b>6.7</b>	<b>[5.6–7.9]</b>	<b>159</b>
Household amount of OOPP ( <i>n</i> = 2821)						
Mean [95% CI]	<b>795€</b>	<b>[549–1041]</b>	<b>83</b>	<b>491€</b>	<b>[465–516]</b>	<b>2738</b>
Subjective financial burden due to OOPP ( <i>n</i> = 2387)						
Fair/less strong/not at all	<b>72.6</b>	<b>[62.0–81.2]</b>	<b>52</b>	<b>89.8</b>	<b>[88.4–91.1]</b>	<b>2074</b>
Strong/very strong	<b>27.4</b>	<b>[18.8–38.0]</b>	<b>30</b>	<b>10.2</b>	<b>[8.9–11.5]</b>	<b>231</b>
Aid allowance ( <i>n</i> = 2821)						
Eligible (vs not eligible)	<b>43.2</b>	<b>[31.1–56.1]</b>	<b>35</b>	<b>49.4</b>	<b>[47.3–51.5]</b>	<b>1325</b>
Age ( <i>n</i> = 2821)						
Mean [95% CI]	<b>44.3 y.</b>	<b>[39.6–49.1]</b>	<b>83</b>	<b>53.7 y.</b>	<b>[53.4–54.1]</b>	<b>2738</b>
Education ( <i>n</i> = 2806)						
Low/medium (ISCED 1-4)	<b>35.7</b>	<b>[24.0–49.4]</b>	<b>25</b>	<b>22.2</b>	<b>[20.3–24.2]</b>	<b>517</b>
High (ISCED 5-8)	<b>64.3</b>	<b>[50.6–76.0]</b>	<b>58</b>	<b>77.8</b>	<b>[75.8–79.7]</b>	<b>2206</b>
Employment status ( <i>n</i> = 2814)						
In employment	<b>44.2</b>	<b>[32.2–56.8]</b>	<b>38</b>	<b>64.9</b>	<b>[62.9–66.8]</b>	<b>1531</b>
Retired	<b>24.3</b>	<b>[16.3–34.7]</b>	<b>32</b>	<b>29.7</b>	<b>[28.0–31.4]</b>	<b>1104</b>
Other (unemployed, student, ...)	<b>31.5</b>	<b>[19.5–46.6]</b>	<b>13</b>	<b>5.5</b>	<b>[4.4–6.8]</b>	<b>96</b>
Household net income per month ( <i>n</i> = 2807)						
Mean [95% CI]	<b>1598€</b>	<b>[1375–1822]</b>	<b>83</b>	<b>5332€</b>	<b>[5229–5435]</b>	<b>2724</b>
Self-assessed health ( <i>n</i> = 2812)						
Fair/bad/very bad (vs very good/good)	<b>31.1</b>	<b>[21.8–42.1]</b>	<b>38</b>	<b>24.2</b>	<b>[22.5–26.0]</b>	<b>738</b>
Number of chronic conditions ( <i>n</i> = 2815)						
None	<b>35.3</b>	<b>[23.9–48.7]</b>	<b>26</b>	<b>45.4</b>	<b>[43.3–47.5]</b>	<b>1133</b>
One	<b>39.9</b>	<b>[28.0–53.2]</b>	<b>30</b>	<b>33.6</b>	<b>[31.7–35.7]</b>	<b>944</b>
Several	<b>24.8</b>	<b>[16.4–35.7]</b>	<b>27</b>	<b>21.0</b>	<b>[19.4–22.6]</b>	<b>655</b>

Results in bold indicate statistically significant group differences; *n* refers to the unweighted sample size; since the sample size of households with CHE derived from the main analysis was too small for further analysis (*n* = 14), results from the analysis using the national poverty line were employed (*n* = 83); CI, confidence interval, OOPP: out-of-pocket payments.

i.e. impoverished and further impoverished households, German PHI would rank fourth lowest, while numbers overall vary between 0.3% and 9.0% in Europe. The results of the additional analyses confirm low financial burden: catastrophic spending curves show that CHE is low in German PHI even for small catastrophic thresholds (e.g. it is 2.3% at a 10% catastrophic threshold). Furthermore, while 0.3% of households in the present study are impoverished by OOPP when utilising the 60% of median income poverty line, prevalence is 1.4% in the highest of four World Bank income groups and 2.3% worldwide (World Health Organization and The World Bank, 2021). Even more so, prevalence of CHE when using the budget share approach

and a 10% threshold is 0.5% in the current study, compared to 1.0% for Germany overall and 15.8% in the highest World Bank income group (Zawada *et al.*, 2017; World Health Organization and The World Bank, 2021).

The current study also assessed the prevalence of unmet needs to further explore how often the privately insured had forgone care due to costs in the preceding 12 months. This was reported by 7.2% among all respondents with a stated need. However, it must be noted that the concept refers to a subjective need for care and that not only ability but also willingness to pay may drive the decision to forgo healthcare. Both aspects likely bias this estimate of access restrictions. In the 2019 European Health Interview Survey, from which the survey question was taken, three quarters of the then 28 EU countries reported a higher prevalence of unmet needs compared to the current study, including Germany (13.2%) (European Commission, *n.d.*). Regarding differences between German PHI and SHI, no difference for unmet needs were found for people aged 50 and older when controlling for socioeconomic and health characteristics (Bremer, 2014). This is similar to the findings for financial burden, indicating the advantages of PHI compared to SHI found in the present study (i.e. lower unmet needs and lower financial burden from OOPP) might be solely attributable to better socioeconomic status and health. However, comparability of results is limited because of differences in included age groups and methodology, as well as a time span of 10+ years between data collections.

The second goal of the study was to identify possible gaps in protection among the privately insured. The most significant distinction between participants with and those without CHE is the more than threefold average income of the latter. All households experiencing CHE were in the lowest person equivalent income quintile. Other characteristics of participants with CHE are potentially related to this aspect, such as lower mean age, lower educational achievements and more often an employment status other than in employment or retired, i.e. unemployed, permanently unable to work or student. In addition to the income component, mean OOPP were higher among households with CHE as well, but the discrepancy is much less pronounced. Higher OOPP could in part be explained by differences in health status, which are present, but not statistically significant. Another reason might be differences in insurance tariffs, like lower coverage among those with CHE. A new aspect introduced by this study is to compare the results for CHE to the subjectively experienced financial burden due to OOPP. In the group with CHE, 27.4% rated their subjective burden as (very) strong, while 10.2% without CHE did so. Although this is a distinct group difference, the coherence between the two measures of financial risk protection can be considered small. When compared to SHI, CHE in PHI is more concentrated among lower income groups, since in SHI exemptions for OOPP exist for some groups and an overall cap based on income is in place (Siegel and Busse, 2018). Numbers for most other European countries point in the same direction (Thomson *et al.*, 2019). Nonetheless, prevalence of CHE is still much higher than average among social benefits recipients and others neither working nor in retirement in German SHI. In contrast to PHI, it is also concentrated among higher age groups.

#### 4.2 Implications for policy and further research

The results suggest the privately insured in Germany are generally well protected from financial burden due to high OOPP. Although OOPP are higher than in German SHI, they cause less often financial hardships, as access to PHI is restricted to civil servants, high earners and the self-employed, most of whom have higher incomes than the general population (Statistisches Bundesamt (Destatis), 2020a). Low prevalence of financial burden in German PHI might also be a result of previous reforms to strengthen financial protection among those less wealthy: insurance companies are obliged by law to provide standardised 'standard' and 'basic' tariffs with capped premiums, where service coverage and co-payments are similar to SHI. Access to these tariffs is restricted to higher age groups (starting at 55 or 65 years), to people below an income

threshold or social benefits receivers, and to people newly entering PHI. Additionally, an ‘emergency tariff’ covering very basic services must be offered to those unable to pay their premiums to impede total loss of health insurance. In 2018, the ‘emergency tariff’ was used by 1.2% of the privately insured and the ‘basic’ and ‘standard’ tariffs by 1.0% in total (Verband der privaten Krankenversicherung, 2019). However, since people using the ‘standard’ and ‘basic’ tariffs still have to pay OOPP similar to SHI, those OOPP might be high enough to be burdensome for some. Furthermore, almost all households experiencing CHE are further impoverished by OOPP. By definition of IHE, those households should not incur any OOPP at all to not be (further) burdened.

The current study might also bear implications for other countries with PHI systems. As financial risks from OOPP are low overall, and scope and quality of covered services are high, UHC might be achieved in German PHI. However, the results suggest this might be due to access restrictions allowing only a mostly wealthy minority of the population to enter PHI. At the same time, further risk selection and thus deterioration of financial sustainability within the SHI system, covering the majority and the less wealthy, is being prevented. By introducing the three mentioned obligatory tariffs, protection mechanisms for those less wealthy in PHI were created within the PHI system instead of outside the system (e.g. in SHI). Likewise, another protection mechanism was implemented as insurance companies are obliged by law to include savings for old age in premium payments to prevent large increases in health expenses with rising age. Lastly, switching from PHI to SHI is highly restricted and is only possible until the age of 55 to prevent moral hazard. German PHI is therefore close to what Smith (2013) described as how a PHI system had to be designed to achieve benefits of UHC. In contrast, one of his central arguments is that premiums must not be influenced by current health status or utilisation as this would be an implicit form of a user charge (Smith, 2013). This is not given in German PHI, as premiums may be partially refunded for non-utilisation. Premiums might still not contribute to financial burden in its original definition, because they are not unexpected and therefore do not endanger a person’s or household’s standard of living (Berki, 1986; Wagstaff, 2009). However, refunds for non-utilisation might bear other disadvantages, like incentivising forgoing useful care, e.g. prevention.

In future research, further aspects of financial risk protection in German PHI and beyond should be investigated. One of those is the role of premium payments for households/insureds. Although in this study only OOPP were considered potentially burdensome in accordance with the international literature, some argue that for achieving UHC and reaching equity in financing, contributions to insurance should be based on ability-to-pay instead of need (World Health Organization, 2014; Voorhoeve *et al.*, 2016). Since in this sense not only OOPP but also prepayments can lead to financial burden, it might be sensible to include prepayments when assessing CHE and IHE, possibly contrasting results with those obtained when considering OOPP only (Moreno-Serra *et al.*, 2013). This is especially the case when prepayments are related to utilisation or current health status, as in German PHI. Additionally, it is unknown whether rising premiums are, after the above-mentioned reform to include savings for old age in premium payments, still a topic of concern for some elderly. Another aspect to consider in future studies might be to further explore the role of the patients’ views on financial burden originating from health expenses in contrast to the established measures of CHE and IHE. Incorporating subjectively experienced financial burden might partly address the limitation of current methods of not being able to account for differences in spending preferences between individuals or households. That is, the concepts of IHE and CHE assume that OOPP are involuntary and non-discretionary, while this might not be the case for everyone (Wagstaff, 2009). As this study showed, subjective burden due to OOPP is not necessarily closely related to the objective measure of CHE. Further research is needed to explore how both concepts are associated and how exactly measuring subjective burden due to OOPP can provide additional valuable information to assess who is insufficiently protected from financial risks.

### 4.3 Strengths and limitations

The current study is the first in-detail assessment of financial risk protection among PHI households in Germany. When interpreting the results, three limitations should be considered with respect to the survey data collected within the IPHA project.

First, amount of OOPP and income were assessed categorically and had to be converted to metric scale for further analyses. For income, this was solved using HBS data of PHI households, which was found to produce sufficient results in earlier analyses (Stauder and Hüning, 2004). For OOPP, category centres were chosen and results of two sensitivity analyses are reported with minor changes in the results. Although the approaches are considered to produce valid results, the possibility of some remaining bias must be kept in mind.

Second, income is generally seen as a less reliable proxy for living standards, compared to consumption expenditure (Moreno-Serra *et al.*, 2013). Short-term income might underestimate household resources, especially for some (solo) self-employed or students, among others. Nonetheless, it has been shown that income is preferable over consumption in settings where borrowing is less relevant to fund OOPP, as is the case in Germany (Wagstaff, 2019).

A third aspect is the external validity, as only 3105 insureds (response rate 15.5%) from one company were surveyed. However, the company accounted for 27% of the privately insured in Germany in 2018 and the sample is representative for all adults in PHI regarding age, gender and eligibility for aid allowance, as weighting was used to correct for differences in survey participation between groups. Although tariff conditions and thus OOPP differ between insurance companies, differences are likely not large due to market competition between insurers. Similar amounts of OOPP when compared to SHI were also found in previous studies (Bock *et al.*, 2014; Bremer, 2014). Nonetheless, future studies using larger samples of different insurance companies should be conducted to confirm the results.

This current study further adds to the literature methodologically by applying and comparing different approaches to the implementation of catastrophic and impoverishing health spending.

## 5. Conclusions

Achieving UHC and protecting the population from high costs for health care is often being related to features of solidarity-based systems like pooling of funds, which aim at supporting the sicker and the less wealthy. This study shows that in the case of Germany, financial risk protection can be achieved within PHI. Financial burden from OOPP was found to be low in international comparison and lower than in German SHI. However, the findings cannot be easily transferred to other countries, as the results suggest a feature of Germany's PHI contributing to low financial burden from OOPP is its restriction to a small and overall wealthy share of the population, who mostly can afford comparatively high OOPP. Beyond that, policy measures were installed to protect the worse-off. These include the obligation to contract those people that are excluded from SHI and to offer special standardised tariffs for vulnerable groups. Overall, the findings suggest UHC is close-to-achieved in Germany's dual health insurance system. Future research should further investigate how well the currently used indicators capture financial burden, compared to the insureds' subjectively perceived burden.

## Data

The dataset of the IPHA project analysed during the current study is available upon reasonable request from the corresponding author. The data are not publicly available due to privacy restrictions. The dataset of the Household Budget Survey additionally analysed during the current study is available under <https://doi.org/10.21242/63211.2018.00.04.3.1.1> but restrictions apply to the availability of these data, which were used under license for the current study, and so are not publicly available.

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**Competing interest.** None.

**Ethical standards.** The study protocol of the IPHA project was approved by the ethics committee of Charité – Universitätsmedizin Berlin, Berlin, Germany (EA4/075/18). Consent to participate was given by each participant.

## References

- Ataguba JE (2021) Assessing financial protection in health: does the choice of poverty line matter? *Health Economics* **30**, 186–193. <https://doi.org/10.1002/hec.4172>
- Berki S (1986) A look at catastrophic medical expenses and the poor. *Health Affairs* **5**, 138–145. <https://doi.org/10.1377/hlthaff.5.4.138>
- Blümel M, Spranger A, Achstetter K, Maresso A and Busse R (2020) Germany: health system review. *Health Systems in Transition* **22**, i–273.
- Blümel Miriam, Röttger Julia, Köppen Julia, Achstetter Katharina and Busse Reinhard (2020) Integrating the Population Perspective into Health System Performance Assessment (IPHA): Study Protocol for a Cross-Sectional Study in Germany Linking Survey and Claims Data of Statutorily and Privately Insured. *International Journal of Health Policy and Management* **9**(9), 370–379. <http://dx.doi.org/10.15171/ijhpm.2019.141>
- Bock J-O, Matschinger H, Brenner H, Wild B, Haefeli WE, Quinzler R, Saum K-U, Heider D and König H-H (2014) Inequalities in out-of-pocket payments for health care services among elderly Germans – results of a population-based cross-sectional study. *International Journal for Equity in Health* **13**, 3. <https://doi.org/10.1186/1475-9276-13-3>
- Bremer P (2014) Forgone care and financial burden due to out-of-pocket payments within the German health care system. *Health Economics Review* **4**, 36. <https://doi.org/10.1186/s13561-014-0036-0>
- Cylus J, Thomson S and Evetovits T (2018) Catastrophic health spending in Europe: equity and policy implications of different calculation methods. *Bulletin of the World Health Organization* **96**, 589–664. <http://dx.doi.org/10.2471/BLT.18.209031>
- European Commission (n.d.) Eurostat Database. Indicator [Hlth\_ehis\_un2e].
- Forschungszentren der Statistischen Ämter des Bundes und der Länder (2018) Einkommens- und Verbrauchsstichprobe 2018 – Grundfile 3 (AAGSHB), SUF, Version 2. RDC of the Federal Statistical Office and the statistical offices of the Länder. <https://doi.org/10.21242/63211.2018.00.04.3.1.1>
- Grunow M and Nuscheler R (2014) Public and private health insurance in Germany: the ignored risk selection problem. *Health Economics* **23**, 670–687. <https://doi.org/10.1002/hec.2942>
- Hajek A, Bock J-O, Saum K-U, Schöttker B, Brenner H, Heider D and König H-H (2018) [Morbidity differences by health insurance status in old age]. *Gesundheitswesen (Bundesverband Der Ärzte Des Öffentlichen Gesundheitsdienstes (Germany))* **80**, 551–556. <https://doi.org/10.1055/s-0042-108584>
- Hoffmann F and Koller D (2017) [Different regions, differently insured populations? Socio-demographic and health-related differences between insurance funds]. *Gesundheitswesen (Bundesverband Der Ärzte Des Öffentlichen Gesundheitsdienstes (Germany))* **79**, e1–e9. <https://doi.org/10.1055/s-0035-1564074>
- Hsu J, Flores G, Evans DB, Mills A and Hanson K (2018) Measuring financial protection against catastrophic health expenditures: methodological challenges for global monitoring. *International Journal for Equity in Health* **17**(69). <https://doi.org/10.1186/s12939-018-0749-5>
- Hsu J, Majdzadeh R, Mills A and Hanson K (2021) A dominance approach to analyze the incidence of catastrophic health expenditures in Iran. *Social Science & Medicine* **285**, 114022. <https://doi.org/10.1016/j.socscimed.2021.114022>
- Huber J and Mielck A (2010) [Morbidity and healthcare differences between insured in the statutory ('GKV') and private health insurance ('PKV') in Germany. Review of empirical studies]. *Bundesgesundheitsblatt – Gesundheitsforschung – Gesundheitsschutz* **53**, 925–938. <https://doi.org/10.1007/s00103-010-1119-7>
- Klein J and von dem Knesebeck O (2016) [Social disparities in outpatient and inpatient care: an overview of current findings in Germany]. *Bundesgesundheitsblatt, Gesundheitsforschung, Gesundheitsschutz* **59**, 238–244. <https://doi.org/10.1007/s00103-015-2283-6>
- Luque Ramos A, Hoffmann F and Spreckelsen O (2018) Waiting times in primary care depending on insurance scheme in Germany. *BMC Health Services Research* **18**, 191. <https://doi.org/10.1186/s12913-018-3000-6>

- Moreno-Serra R, Thomson S and Xu K** (2013) Measuring and comparing financial protection. In Papanicolas I and Smith P (eds), *Health System Performance Comparison: An Agenda for Policy, Information and Research*. European Observatory on Health Systems and Policies Series. Berkshire: WHO, pp. 223–254.
- Murray C and Frenk J** (1999) *A WHO Framework for Health System Performance Assessment. Evidence and Information for Policy*. Geneva: WHO.
- OECD** (1982) The OECD List of Social Indicators.
- Roman-Urrestarazu A, Yang JC, Ettelt S, Thalmann I, Seguel Ravest V and Brayne C** (2018) Private health insurance in Germany and Chile: two stories of co-existence, segmentation and conflict. *International Journal for Equity in Health* **17**, 112. <https://doi.org/10.1186/s12939-018-0831-z>
- Sagan A and Thomson S** (2016) *Voluntary Health Insurance in Europe: Country Experience*. Copenhagen: WHO Regional Office for Europe on behalf of the European Observatory on Health Systems and Policies.
- Siegel M and Busse R** (2018) *Can People Afford to Pay for Health Care? New Evidence on Financial Protection in Germany*. Copenhagen: WHO Regional Office for Europe.
- Smith PC** (2013) Universal health coverage and user charges. *Health Economics, Policy and Law* **8**, 529–535. <https://doi.org/10.1017/S1744133113000285>
- Statistische Ämter des Bundes und der Länder** (2019) *Metadatenreport. Teil I: Allgemeine Und Methodische Informationen Zur Einkommens- Und Verbrauchsstichprobe (EVAS-Nummer: 63211,63221, 63231), Berichtsjahre 2008, 2013 Und 2018*.
- Statistisches Bundesamt (Destatis)** (2020a) *Angaben Zur Krankenversicherung (Ergebnisse Des Mikrozensus). Fachserie 13 Reihe 1.1. 2019*. Wiesbaden.
- Statistisches Bundesamt (Destatis)** (2020b) *Wirtschaftsrechnungen. LEBEN IN EUROPA (EU-SILC). Einkommen Und Lebensbedingungen in Deutschland Und Der Europäischen Union. Fachserie 15 Reihe 3. 2018*. Wiesbaden.
- Stauder J and Hüning W** (2004) Die Messung von Äquivalenzeinkommen Und Armutsquoten Auf Der Basis Des Mikrozensus. *Statistische Analysen Und Studien Nordrhein-Westfalen*, 9–31.
- Stauder J and Kossov T** (2017) [Selection or better service – why are those with private health insurance healthier than those covered by the public insurance system?]. *Gesundheitswesen (Bundesverband Der Ärzte Des Öffentlichen Gesundheitsdienstes Germany)* **79**, 181–187. <https://doi.org/10.1055/s-0042-104583>
- Thomson S, Evetovits T, Cylus J and Jakob M** (2016) Monitoring financial protection to assess progress Towards universal health coverage in Europe. *Public Health Panorama* **2**, 357–366.
- Thomson S, Cylus J and Evetovits T** (2019) *Can People Afford to Pay for Health Care? New Evidence on Financial Protection in Europe*. Copenhagen: WHO Regional Office for Europe.
- United Nations** (2015) *Transforming Our World: The 2030 Agenda for Sustainable Development*. New York.
- Verband der privaten Krankenversicherung** (2019) *Zahlenbericht 2018*. Köln: Verband der privaten Krankenversicherung e.V.
- Voorhoeve A, Ottersen T and Norheim OF** (2016) Making fair choices on the path to universal health coverage: a précis. *Health Economics, Policy and Law* **11**, 71–77. <https://doi.org/10.1017/S1744133114000541>
- Wagstaff A** (2009) Measuring financial protection in health. In Smith PC, Mossialos E, Leatherman S and Papanicolas I (eds), *Performance Measurement for Health Improvement. Experiences, Challenges and Prospects*. Cambridge: Cambridge University Press, pp. 114–137.
- Wagstaff A** (2019) Measuring catastrophic medical expenditures: reflections on three issues. *Health Economics* **28**, 765–781. <https://doi.org/10.1002/hec.3881>
- Wagstaff A and Eozenou P** (2014) CATA Meets IMPOV: a unified approach to measuring financial protection in health. Policy Research Working Papers. The World Bank. <https://doi.org/10.1596/1813-9450-6861>
- Wagstaff A and van Doorslaer E** (2003) Catastrophe and impoverishment in paying for health care: with applications to Vietnam 1993–1998. *Health Economics* **12**, 921–933. <https://doi.org/10.1002/hec.776>
- Werbeck A, Wübker A and Ziebarth NR** (2021) Cream skimming by health care providers and inequality in health care access: evidence from a randomized field experiment. *Journal of Economic Behavior & Organization* **188**, 1325–1350. <https://doi.org/10.1016/j.jebo.2021.05.028>
- World Health Organization** (2000) *The World Health Report 2000. Health Systems: Improving Performance*. Geneva: WHO.
- World Health Organization** (2007) *Everybody's Business: Strengthening Health Systems to Improve Health Outcomes: WHO's Framework for Action*. Geneva: WHO.
- World Health Organization** (2010) *World Health Report. Health Systems Financing: The Path to Universal Coverage*. Geneva: WHO.
- World Health Organization** (2014) *Making fair choices on the path to universal health coverage. Final Report of the WHO Consultative Group on Equity and Universal Health Coverage*. Geneva: WHO.
- World Health Organization and The World Bank** (2017) *Tracking universal health coverage: 2017 Global Monitoring Report*.
- World Health Organization and The World Bank** (2021) *Global Monitoring Report on financial protection in health 2021*. Geneva.

- Wyszewianski L** (1986) Financially catastrophic and high-cost cases: definitions, distinctions, and their implications for policy formulation. *Inquiry* **23**, 382–394.
- Zawada A, Kolasa K, Kronborg C, Rabczenko D, Rybnik T, Lauridsen JT, Ceglowska U and Hermanowski T** (2017) A comparison of the burden of out-of-pocket health payments in Denmark, Germany and Poland. *Global Policy* **8**(52), 123–130. <https://doi.org/10.1111/1758-5899.12331>

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