

A Comparison of the Burden of Out-of-Pocket Health Payments in Denmark, Germany and Poland

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Abstract

It is important to monitor equity of access to health services in all countries. We assessed the levels of out-of-pocket (OOP) health spending in three European countries: Denmark, Germany and Poland. Using data from national databases (i.e., Statistics Denmark, German Socio-Economic Panel, and National Statistical Office of Poland) for the period 2000–2010, we applied common methods to assess the rate of households with 'catastrophic' OOP health spending and the concentration of health spending in income-ordered groups of citizens. 20.3 per cent of Polish households experienced 'catastrophic' expenditure defined by OOP health spending/income ratio >10 per cent, compared to 1.0 per cent of households in Germany and 3.2 per cent of households in Denmark. 8.8 per cent of Polish households experienced 'catastrophic' expenditure defined by OOP health spending/capacity to pay ratio >40 per cent, compared to 0.4 per cent of households in Germany and 0.8 per cent of households in Denmark. Concentration indexes for OOP on drugs in 2010 were 0.01978 and –0.114 for Denmark and Poland, respectively. The rate of households with 'catastrophic' OOP expenditure in Poland is much higher than in both Denmark and Germany; health spending in Poland is concentrated among the worst-off groups of citizens while in Denmark and Germany they are distributed more equitably.

Most European countries claim equity in health care to be a basic requirement for the organization of a health care system (e.g. Nord, 2012 for general issues; Mossialos et al., 2015 for the measures to reduce disparities in the sample of high-income countries).

Most studies (Wagstaff and Doorslaer, 1992; van Doorslaer et al., 2007; Leivea and Xu, 2008) on inequities in health care focus on two key areas: the prevalence of catastrophic health care burden and horizontal inequity. The first measures whether health care expenses exceed a certain share of household budget, while the second relates to the principle of equal treatment for equal medical need, irrespective of other characteristics such as income, race, or place of residence.

The notion of catastrophic health care payments was developed to describe the problem of excessive health care expenses as a proportion of household income. Such catastrophic OOPs have been the subject of various studies (Xu et al., 2003, 2010). Xu et al., 2003 were the first to compare catastrophic OOPs internationally using 1990s data from 59 countries.

Given the limited evidence regarding the existence of catastrophic health care payments in Poland, we analysed whether the financial burden related to access to health care services had improved or deteriorated over recent years. Poland, as a Central-Eastern European country transitioning to a market-based system (Sagan et al., 2011), tests new organisational and financial solutions. For example, the Act of 27 August 2004 on health care benefits financed from public funds (Government of Poland, 2004); HTA independent institution launched in 2005 (Sagan et al., 2011); and the Act of 12 May 2011 on the reimbursement of medicinal products, special purpose dietary supplements and medical devices (Government of Poland, 2011). While such solutions were designed mainly for public cost containment they may potentially threaten equity and financial protection. This study was conducted within the framework of an InterQuality project; two jurisdictions of project partners were selected as comparators for Poland: Denmark and Germany. These countries represent well established Western European health care systems (Denmark, Olejaz et al., 2012; Germany, Busse and Blümel, 2014). The objective of the study was to assess to which extent the burden of out-of-pocket (OOP) expenditure on drugs/health care is equally distributed across households in Poland versus Denmark and Germany.

Methods

Catastrophic health care payments

Following World Bank methodology (Xu et al., 2003), catastrophic health care payments are defined as those direct health care expenses of a household for which the fraction T/x exceeds a pre-specified threshold z , where T stands for the out-of-pocket (OOP) payments for the household in question, and x for the budget of a given household defined as either total disposable income or total expendi-

tures. Given availability of data sources, we used total disposable income as the measure of budget.

The catastrophic payment headcount ratio – the index H_{cat} – is based on the calculation of – for each household i – an indicator H_i , which equals 1, if $T_i/x_i > z$ and zero otherwise. Next, the ratio is simply the proportion of households exceeding the threshold, that is:

$$H_{cat} = \frac{1}{N} \sum_{i=1}^N H_i,$$

where N is the number of households.

The threshold z may vary from 5 per cent to 20 per cent of total household budget. Otherwise, z may be assessed at the level of 40 per cent of household capacity to pay (effective income remaining after basic subsistence needs being met). While these levels are arbitrary, we follow those commonly reported in the literature on catastrophic health payments ([Xu et al., 2003; O'Donnell et al., 2008; Wagstaff, 2008).

To take into account the extent to which catastrophic healthcare payments are concentrated amongst the poor or the better-off, the concentration index (CI) for H_{cat} was calculated. The concentration index along its standard error can be computed by the regression

$$2\sigma_R^2[h_i/\mu] = \alpha + \beta R_i + u_i,$$

where β provides the concentration index (CI), while h_i is the health spending for household i , μ the mean of household health spending, R_i the household's rank in the total consumption distribution, u_i the model's error term, and σ_R^2 the variance of the fractional rank variable (O'Donnell et al., 2008).

In principle, the concentration index quantifies the degree to which a distribution of a given health variable such as OOPs departs from proportionality.

The concentration index can be expressed in a graphical manner as well. The concentration curve plots the cumulative percentage of the health variable (y-axis) against the cumulative percentage of the population, ranked by living standards, beginning with the poorest, and ending with the richest (x-axis) (O'Donnell et al., 2008). The concentration index equals twice the area between the concentration curve and the line of equality (the 45° line running from the bottom-left corner to the top-right). When the curve lies above (below) the line of equality the concentration index is negative (positive) and indicates a disproportionate concentration of the given health variable (in our case – health OOP spending) among the poor (well-off).

Data sources and data availability

We compared the health care systems of the selected countries with regard to the burden of catastrophic OOP payments (total OOP and specific OOP for drugs). The value of H_{cat} index has been counted for thresholds (z) of 5 per cent,

10 per cent, 15 per cent and 20 per cent of total household income, and for thresholds of 30 per cent, 35 per cent, 40 per cent and 45 per cent of household capacity to pay (O'Donnell et al., 2008). These wide ranges of assessments allowed us to check the steadiness of point results as well as time trends.

For the analyses described above, the following data were utilized: (1) for health care spending – total out-of-pocket health care spending of the household (e.g. on drugs, on medical services, on private specialist visits, and on other services) – additional analysis was conducted for Denmark and Poland for spending on drugs; (2) for household budget – total income; and (3) as a proxy of the household's capacity to pay – total income decreased by food expenditure. For data for the households collected in the sources listed below, household size was taken into account by issuing the OECD equivalence scale: assigning a value of 1 to the first household member, of 0.7 to each additional adult and of 0.5 to each child.

Our study was performed on household level data from the national household registers or databases for the three countries studied (i.e., Statistics Denmark for Denmark,¹ the German Socio-Economic Panel (SOEP) for Germany,² and the National Statistical Office (GUS) for Poland³). The diversity of household data gathered on a regular basis in national databases needed to be carefully checked for their actual meaning which was provided by project partners.

Comparable data for total health OOP spending was found for the year 2009 (and not for any other years) for Germany and for 2010 for Denmark and Poland. For Poland and Denmark, more data were available, whereby detailed analyses for the years 2000, 2004, 2006 and 2010 could be performed.

Results

The sample sizes for the countries included in the analysis were (for years 2000, 2004, 2006 and 2010 respectively): for Denmark – 2728, 2449, 2564, 2607 households; for Poland 35,419, 31,401, 37,508 and 37,412 households; for Germany the data was only available from 2009, and this was available for 5105 households.

A cross-sectional comparison of catastrophic OOPs in Poland, Denmark and Germany

For Poland in 2010, more than 40 per cent of the households spent more than 5 per cent of their household income on health, while in more than 6 per cent of the households the health OOPs exceeded 20 per cent of income. The corresponding figures for Denmark (2010) are 10.6 per cent and 1.5 per cent, while for Germany (2009) they are 3.7 per cent and 0.2 per cent. The assessment against capacity to pay supports these findings (Figure 3).

According to the most commonly used level of catastrophic OOPs in relation to total income, (i.e. 10 per cent), the headcounts of households exceeding this threshold

were: 20.3 per cent, 3.2 per cent and 1.0 per cent for Poland, Denmark and Germany, respectively. When assessed against capacity to pay (CTP), 8.8 per cent of Polish households exceeded the most commonly used threshold of 40 per cent of health care spending to the CTP ratio in 2010, compared to only 0.4 per cent of German households and 0.8 per cent of Danish households (Figure 1a).

While the ratio of households with catastrophic spending in Poland turned out to be much higher than in the comparison countries, a question arose about their distribution. Regarding the catastrophic total out-of-pocket health spending, we calculated concentration curves for Germany 2009, Denmark 2010 and Poland 2010 (Figure 2a). In Poland catastrophic OOP are concentrated among the poor (i.e.

Figure 1. The percentages of households experiencing catastrophic out-of-pocket (OOP) total health care spending according to different definitions of "catastrophic" spending (10% of total income or 40 per cent of capacity-to-pay (CTP)): a. Comparison of Poland (2010), Germany (2009) and Denmark (2010); b. Trends in changes of catastrophic OOP defined as 10% of total income in Poland and Denmark in the years 2000, 2004, 2006 and 2010.

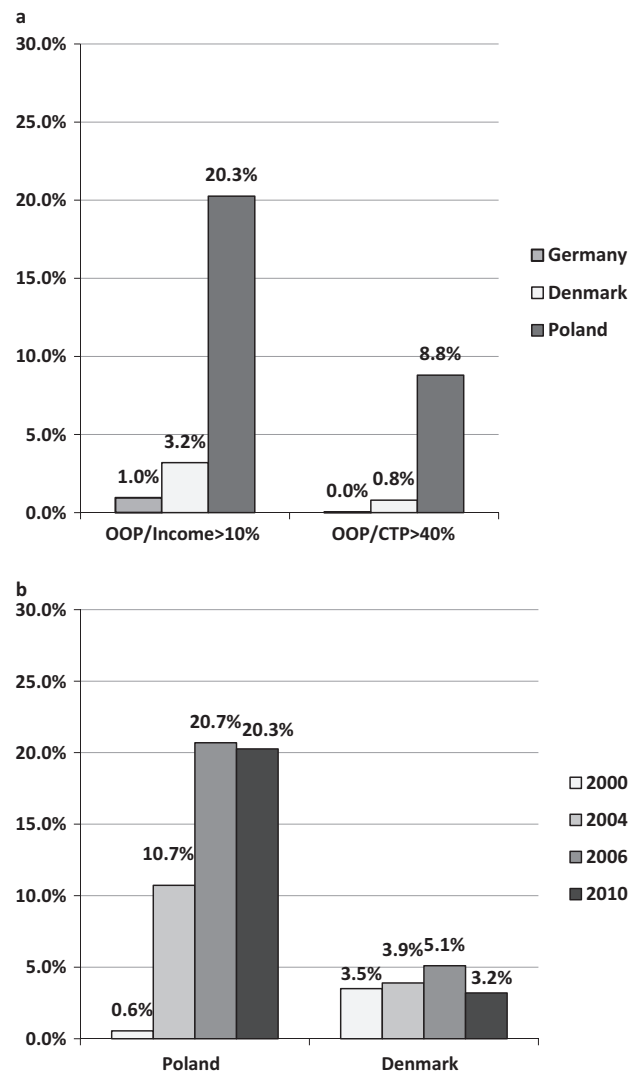
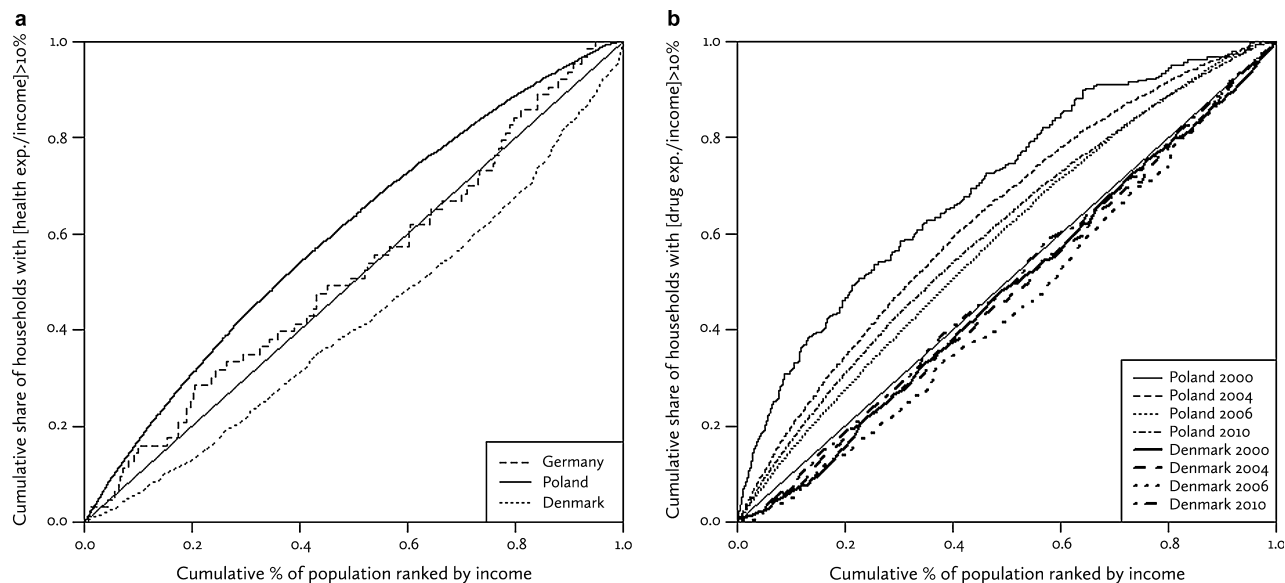


Figure 2. Concentration curves for the catastrophic out-of-pocket (OOP) indices (health OOP spending/total income): a. Comparison of the indices of total health OOPs in Poland (2010), Germany (2009) and Denmark (2010); b. Comparison of the indices of OOPs on drugs in Poland and Denmark in the years 2000, 2004, 2006, 2010.



poor households pay relatively more than rich ones), whereas in Denmark they are concentrated among the rich; the disparities in Germany are variable but close to the equity line.

Trends in catastrophic OOP health spending in Poland and Denmark 2000–2010

The ratio of total OOP health spending to household income was calculated for Poland and Denmark for the years 2000, 2004, 2006 and 2010 and analysed against the levels of 5–20 per cent of household income. The figures revealed different trends. For Poland in 2000, about 4 per cent of households experienced health spending above 5 per cent of income, while <0.1 per cent experienced health spending above 20 per cent of income. However, the respective values for 2004 were much higher: 27.3 per cent and 2.4 per cent. In 2006, the situation was even worse: 39.8 per cent and 7.0 per cent respectively. Our results show that during subsequent years in Poland, the share of health spending stabilized close to the level of 2006, which is remarkably high when compared to other European countries. These trends for catastrophic OOPs defined as 10 per cent of total income are shown at Figure 1b (see Figure 4 for more details).

For Denmark, the level of OOP spending appeared to be much the same year by year, as 12.1 per cent to 10.6 per cent of the households experienced health spending above 5 per cent of their income, while 2.2 per cent to 0.8 per cent of the households spent above 20 per cent of the income on health (Figure 1b for catastrophic OOPs defined as 10 per cent of total income; Figure 4 for more details). Although these figures were not as low as in Germany (Figure 3a), they were relatively stable; while some increase of

shares of households with catastrophic spending were found for 2006, they decreased in subsequent years.

About 60 per cent of OOP health expenditure in Poland is on drugs, 11–12 per cent for physician visits paid for privately, and 14–16 per cent for dental care (Table 1). These ratios were similar across the years. The structure of health care spending in Denmark (Table 1) is different, with only 28–35 per cent of out-of-pocket expenditure spent on drugs, low expenditure on physician care (1–2 per cent) and hospital care (2–3 per cent), and relatively high spending on dental care (30–36 per cent); this structure is stable year by year as well.

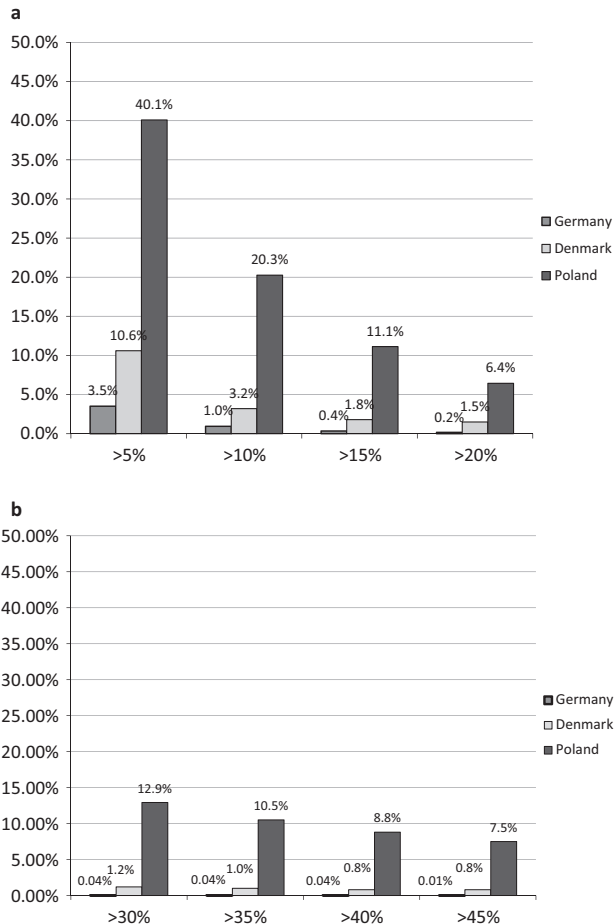
Catastrophic OOP spending on drugs in Poland and Denmark 2000–2010

Out-of-pocket spending on drugs in Poland as measured by the concentration index (CI) showed that the worst-off paid relatively more when related to income; this is confirmed by the negative concentration indexes (Table 2), which are statistically significant, and concentration curves remaining above the equity line (Figure 2b). In contrast, wealthier individuals spent relatively more on drugs than poorer individuals in Denmark in 2006 ($P < 0.05$), while in 2000, 2004 and 2010 this kind of spending demonstrated an equal distribution amongst society (CI index not statistically significant) (Table 2). Concentration curves support this finding (Figure 2b), as they are placed almost on the equity line.

Discussion

Our study revealed a high impact of health out-of-pocket spending on household budgets in Poland when compared

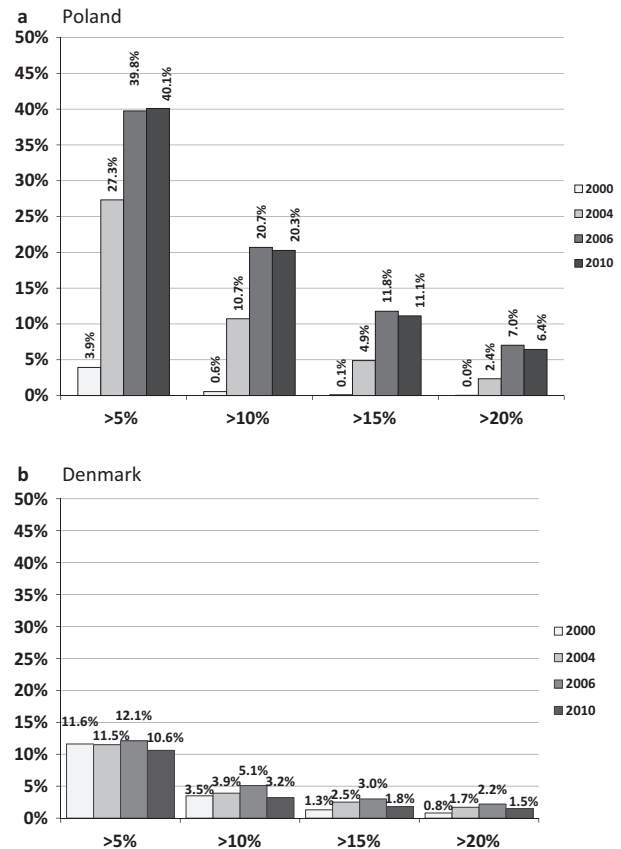
Figure 3. The percentage of households experiencing catastrophic out-of-pocket (OOP) total health care spending according to different definitions of 'catastrophic' spending: Germany 2009, Denmark 2010 and Poland 2010. a. Catastrophic spending defined by OOP health spending/income ratio (OY – percentage of households with health spending exceeding the threshold; OX – thresholds; the most commonly applied threshold for "catastrophic" spending is 10% of household budget). b. Catastrophic spending defined by OOP health spending/capacity to pay ratio (OY – percentage of households with health spending exceeding the threshold; OX – thresholds; the most commonly applied threshold for 'catastrophic' spending is 40 per cent of capacity to pay)



to Germany and Denmark. While in Poland catastrophic OOP were concentrated among the poor, such spending was concentrated among the wealthy in Denmark and almost equally distributed in Germany. For Denmark, the share of households experiencing catastrophic OOP spending on health care appeared higher than in Germany, although they were stable for 2000–2010 at the level of 3–4 times lower than in Poland. However, only 2009 data were available for Germany, so spending trends could not be estimated.

A significant increase in the share of households with catastrophic OOP health care spending was noted in Poland between 2000 and 2004 and this continued to grow until stabilization in 2006. There are several plausible explana-

Figure 4. Trends in changes of catastrophic out-of-pocket (OOP) health care spending in 2000, 2004, 2006 and 2010 ('catastrophic' spending defined by OOP health spending/income ratio; OY – percentage of households with health spending exceeding the threshold; OX – thresholds). a. Poland. b. Denmark



tions. By introducing reference prices at the end of the 1990s, originator drugs were grouped with respective generics and reimbursement had been set at the price of the cheapest (or almost the cheapest) drug in the group (PricewaterhouseCoopers, 2011; Gornicki, 2012). As generic substitution in Poland, though recommended, is rare, the patient co-payment has increased. As well the trade in over-the-counter drugs is high in Poland. Thus, while co-payment for reimbursed drugs is 32 per cent, the level of patient co-payment for all drugs bought is 67 per cent; in other European countries it ranges between 25 per cent and 49 per cent (data for year 2010) (PricewaterhouseCoopers, 2011). Additionally between 2003 and 2010, the value of the retail prescription market increased by 53.5 per cent (PricewaterhouseCoopers, 2011). This increase, which was partially covered by out-of-pocket by patients, likely reflects in part the rise of prices after Poland's accession to the European Union in 2004. According to OECD health data (OECD Health Statistics, 2014), while the share of OOPs in total health expenditure dropped between 2000 and 2010 by 26 per cent, the absolute OOP payments per capita (US\$PPP) grew by over 80 per cent, which imposed a significant burden on household budgets.

Table 1. Structure of out-of-pocket health care spending 2000-2010 for Poland and Denmark.

Year	Drugs		Physician care (GPs, specialists)		Dental care		Hospital stays		Other*	
	Denmark	Poland	Denmark	Poland	Denmark	Poland	Denmark	Poland	Denmark	Poland
2000	35%	58.7%	2%	15.1%	32%	15.4%	2%	1.0%	28%	9.7%
2004	29%	63.9%	1%	11.4%	33%	14.1%	3%	0.6%	34%	9.9%
2006	34%	62.1%	1%	11.5%	30%	15.8%	3%	0.8%	32%	9.7%
2010	28%	59.0%	1%	12.2%	36%	16.5%	1%	0.7%	33%	11.7%

*Other include: paramedical services (physiotherapists, chiropractors, psychologists, chiropodists/podiatrists), practitioners of traditional medicine (e.g. acupuncturists, reflexologists), glasses and contact lenses, therapeutic appliances.

Table 2. Concentration indices for out-of-pocket spending (OOPs) on drugs (Poland 2000-2010, Denmark 2000-2010).

Year	Concentration index for OOPs on drugs		95% Confidence Intervals		p	
	Denmark	Poland	Denmark	Poland	Denmark	Poland
2000	0.04686	-0.281	(-0.001, 0.095)	(-0.337, -0.226)	0.055	<0.001
2004	0.04974	-0.269	(-0.09, 0.109)	(-0.287, -0.250)	0.100	<0.001
2006	0.09810	-0.142	(0.034, 0.163)	(-0.152, -0.132)	0.003	<0.001
2010	0.01978	-0.174	(-0.028, 0.068)	(-0.185, -0.164)	0.420	<0.001

With respect to the Polish results, our findings are in line with the study by Luczak et al. (2012) which used the household panel 'Social Diagnosis'. That study found that the share of households spending more than 10 per cent of their income on drugs grew from 14.24 per cent in 2000 to 18.5 per cent in 2009. These high percentages were concentrated among poorer patients (with a CI of -0.4842 in 2009). While they accounted for the subpopulations of the retired and the chronically ill, they display growing values from 21.7 per cent in 2000 to 30.6 per cent in 2009 (with a CI of -0.2289, which implies a more equal concentration than in the general population).

Our study was not free from limitations. The study methodology was chosen to be as simple as possible – with income as proxy for household budget and income decreased by food expenditure as proxy for household capacity to pay – in order to apply common national data which were not gathered specifically for this analysis. Therefore, differences across countries occurred to some extent. To overcome this limitation evaluation against a wide range of thresholds for 'catastrophic' health OOP spending were performed to check the steadiness of the results.

Overall, our findings suggest that the health spending systems in Denmark and Germany are stable and keep out of pocket expenditure – and specifically drug expenditure – under control. We observed a high burden of OOP spending in Poland, and drug expenditures were concentrated among the less wealthy members of society. In Germany, health spending was distributed almost equally,

while in Denmark health OOP spending was concentrated among the wealthy, with drug spending almost equitably distributed.

Based on our results, a couple of recommendations for health policy makers are relevant. First, equity and fairness should be carefully considered as health policy strategic objectives in the process of decision making regarding financing new health care technologies from public funds. Next, ongoing monitoring of catastrophic out of pocket spending on health is strongly recommended for Poland. Furthermore, the German and Danish results (as well as results from other studies, e.g. Zare and Anderson, 2013) indicate that OOP for health can be kept under control. However, in order to understand the origins of disparities in access to health care, as well as its impact on the life expectancy of the citizens of a certain society, more in depth studies should be initiated. Such studies should aim for findings which can guide health policy makers in their efforts to reform the health care system.

Declaration of conflict of interest and ethical issues

Authors declared no conflict of interest.

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