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Markus Luengen, Martin Siegel, Karl Lauterbach

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Authors:

Lungen, Markus§

Siegel, Martin§

Lauterbach, Karl W§ and Member of German Parliament

§ Institute for Health Economics and Clinical Epidemiology

University Hospital Cologne

Gleueler Str. 176-178

50935 Cologne/ Köln

Germany

Phone ++49-221-4679-0

Fax ++49-221-4302304

Corresponding author

Lungen, Markus

Markus.Luengen@uk-koeln.de

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1 Abstract

The well documented social gradient in health in the developed world will not just disappear on its own. Tackling health inequalities by introducing a universal coverage healthcare system recently became an important notion in the U.S. Using cross-sectional data from Germany which has maintained its compulsory egalitarian healthcare system for more than fifty years now, we apply logistic and negative binomial regression to uncover utilization behavior patterns under universal coverage. We find that lower education and unemployment raise the risks for all diseases under consideration. Unemployment increases the chance of contacting a physician, while income and education do apparently not affect the healthcare utilization behavior. Those diseases concentrated among unemployed and less educated, however, are associated with intensified healthcare utilization. We conclude that universal coverage may make access to healthcare easier for those facing the worst health; the unemployed and lower educated.

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2 Background

Universal coverage is widely understood as a compulsory health insurance or national health system providing access to a core bundle of healthcare services for all people in a state, regardless of their social, economic, or health status [1]. While the egalitarian approach is common in most European countries [2], introducing universal coverage to tackle health inequities recently became an important notion in the United States [3]. Besides the political and ethical debate, economic arguments include the statement that poor population health contributes to social and economic instability [4].

It is widely agreed that health inequality will not just disappear from the developed world on its own. Mackenbach (2006) compares low and high socioeconomic status groups in several developed countries over the last decades and finds growing health inequalities. He argues that the growing gap may partly result from the fact that privileged groups gained health benefits and healthy life years considerably faster than the deprived [5]. Analyzing panel data from the UK, Balia & Jones (2008) find that the concentration of adverse health behaviors among the deprived contributes substantially to the observed inequalities in morbidity and mortality to the detriment of the poor [6].

The present paper aims to uncover the patterns of healthcare utilization under universal coverage. For this purpose, we use German cross-sectional survey data because Germany has maintained its compulsory health insurance system, including free choice of and access to general and specialist practitioners (at least until 2004, when a fee of 10 € per three month for access to a physician was introduced), low copayments and an egalitarian supply of health services, for more than fifty years now. We use logistic regression models to describe the distribution of risks for obesity, chronic cardiovascular and lung diseases, and diabetes mellitus. Using a two-part model, we then analyze the utilization behavior in terms of general

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and specialized physician consultations. We focus on the issue of whether inequalities persist in the German egalitarian system and thereby contribute to the ongoing discussion of whether universal coverage may be a promising step toward an equitable distribution of health.

3 Data and Methods

We use cross-sectional data from the 2002 sample of the Health Care Access Panel (HCAP), a voluntary mail survey conducted by TNS Infratest Health Care. Excluding people younger than 25 (to obtain reliable socioeconomic information) and dropping individuals with missing information leaves us 39,553 observations. We fit logistic and negative binomial count models using maximum-likelihood estimation techniques and compute heteroscedasticity-consistent standard errors.

4 The impact of education and income on health

We evaluate the impact of socio-economic aspects on health to identify possible reasons for persisting health inequalities outside the healthcare system. Table 1 presents the results from the logistic regression (to economize on space, we refrain from presenting the results for age and sex as demographic controls in both tables; these are available from the authors on request). Adjusted Wald tests demonstrate that education has a statistically significant influence on the risks for obesity and diabetes mellitus, while income influences the risks for obesity as well as chronic cardiovascular and lung diseases. We find that lower education and unemployment seem to raise the risks for all diseases under consideration. Unemployed individuals have the highest risk for obesity while having estimated risks comparable to the retired for cardiovascular conditions, diabetes mellitus, and lung diseases. As the healthiest groups are the lowest and highest income quintiles, we cannot support the notion of an

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explicit income gradient. The estimated risks for the considered diseases do not differ between the compulsory and privately insured; an exception is obesity, where the privately insured have a significantly lower risk.

One may consider a lower socioeconomic status coinciding with less consumption of resources at a given health status as a possible explanation for the persistence of health inequalities. We hence draw our attention to the utilization of resources in the healthcare system. Table 2 presents the estimation results for healthcare utilization. The table contains both stages of the two-part model for both general and specialized practitioner visits. From an insignificant estimate for the odds ratio of obesity in terms of general practitioner visits, for instance, one may conclude that the shares of individuals contacting a general physician do not differ between the obese and non-obese. The incidence ratios (IRR) provide information about the influence of certain characteristics on the predicted number of doctor visits. For example, considering the result for the unemployed in terms of general practitioner visits, one may expect the unemployed to see their physician approximately one and a half times more often than employed people after the first contact was made.

The chance for making first contact with a general practitioner does not differ significantly between the educational levels, and according to the performed Wald F-test, the set of dummies is not jointly significant. While no difference between house workers and the employed can be observed, the unemployed exhibit an almost 30 percent increased chance of contacting a general practitioner. Although income is statistically significant, we do not observe a clear gradient. All diseases under consideration increase the odds for contacting a general practitioner; however, obesity does not. These results change somewhat when we consider the number of doctor visits as the intensity of utilization. Higher education significantly decreases the estimated number of doctor visits. The unemployed use the healthcare system 50 percent more than the employed and even more than the retired.

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Although significant, income yields no obvious gradient. Obesity and chronic conditions apparently increase the need for doctor consultations. The privately insured do not show different utilization intensity compared with people who have compulsory health insurance. We find that people with lower educational status are less likely to contact a specialized practitioner. Again, while houseworkers appear to have no different odds for a first visit, we estimate significantly increased odds for unemployed and retired. Income exhibits no unique gradient. While the first, fourth, and fifth quintiles are not (statistically) different, the second and third quintiles have lower chances of making first contact with a specialized practitioner. Whether one be privately insured or under the compulsory health insurance system seems to make no difference for the probability of contacting a specialized practitioner. Obesity does not significantly change the odds for contacting a specialized practitioner; however, the considered diseases do.

The results for the numbers of visits do not differ much from those for the chances of contacting a specialized physician. The major difference is that income does not have a significant influence on the number of visits. Obesity increases the predicted number of visits significantly once a first contact is made.

5 Concluding remarks

Analyzing health distribution and healthcare utilization behavior, we find persisting health and healthcare inequalities in Germany despite the fact that its healthcare system has a long-established universal coverage. With unemployment remaining a substantive risk factor, one may consider getting people into jobs to be the essential approach toward a reduction of health inequalities. Considering education as a substantive factor for the risk of unemployment, the educational system may be seen as a second major determinant for the distribution of health and longevity within a society. One may conclude that important parts of inequalities in societies stems from factors outside the health care system. Relieving

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hurdles for access to care and thereby increasing utilization may reduce health disparities. One may, however, expect that substantial differences related to unemployment and education will remain. Effective preventive action should therefore include both, labor market and educational interventions.

It is important to mention that universal coverage apparently raises the utilization among those groups that may benefit most: the ill and unemployed. Those facing the worst health are able to seize healthcare services as required. However, receiving the full number of visits involves some limitations. Our data provide no evidence on the quality of care, the physicians' skills, or the treatment outcomes. It may be that people with higher income are able to choose better-performing health services.

It is well documented in the literature that education influences lifestyle and health behavior considerably. The influence of education on health found in our data may therefore be transmitted through the so-called lifestyle factors (see [6]).

Although the concept of universal coverage may not be perfectly able to relieve the consequences of illness, we conclude that it should be considered an important step toward health equity or at least toward an equitable access to healthcare.

6 Author Contributions

ML concept and design, drafting, and critical revision

MS data analysis and interpretation, statistics, and critical revision.

KL critical revision, approval of the article

No conflict of interests.

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Table 1: Comparing the risk for diseases over socioeconomic subgroups

socioeconomic risk for certain conditions								
	obesity		chronic cardiovascular conditions		lung diseases		diabetes	
factor	OR	p-Value	OR	p-Value	OR	p-Value	OR	p-Value
lower educational level	1.340	0.000	1.038	0.462	1.038	0.615	1.315	0.015
medium educational level	reference category							
higher educational level	0.811	0.000	0.954	0.402	0.948	0.494	1.089	0.524
employed	reference category							
unemployed	1.485	0.000	1.417	0.000	1.352	0.002	2.324	0.000
retired	1.186	0.049	1.470	0.000	1.550	0.000	2.003	0.000
house worker	1.188	0.006	1.193	0.010	1.082	0.421	1.256	0.110
1st income quintile	reference category							
2nd income quintile	1.235	0.001	1.294	0.000	1.327	0.002	1.225	0.140
3rd income quintile	1.143	0.022	1.115	0.091	1.133	0.158	1.198	0.191
4th income quintile	1.043	0.489	1.060	0.382	1.001	0.990	0.945	0.704
5th income quintile	0.861	0.019	0.961	0.555	0.960	0.657	0.923	0.593
private health insurance	0.762	0.000	0.893	0.082	0.983	0.866	0.961	0.816

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Table 1: Healthcare Utilization; chance of first contact and numbers of visits

healthcare utilization								
	general practitioners				specialized practitioners			
	chance for first contact		number of visits		chance for first contact		number of visits	
factor	OR	p-Value	IRR	p-Value	OR	p-Value	IRR	p-Value
lower educational level	0.926	0.164	1.072	0.001	0.901	0.005	1.051	0.065
medium educational level	reference category							
higher educational level	0.951	0.316	0.940	0.002	1.044	0.233	0.924	0.003
employed	reference category							
unemployed	1.296	0.029	1.492	0.000	1.197	0.004	1.346	0.000
retired	1.413	0.003	1.467	0.000	1.470	0.000	1.297	0.000
house worker	0.993	0.939	1.188	0.000	1.067	0.233	1.009	0.815
1st income quintile	reference category							
2nd income quintile	0.749	0.000	1.103	0.000	0.768	0.000	1.078	0.036
3rd income quintile	0.943	0.400	1.071	0.009	0.831	0.000	1.064	0.103
4th income quintile	1.040	0.567	1.022	0.336	0.976	0.569	1.048	0.144
5th income quintile	0.880	0.055	0.988	0.645	0.959	0.359	1.007	0.828
private health insurance	0.702	0.000	0.962	0.157	0.929	0.092	1.070	0.069
obesity	0.999	0.983	1.083	0.000	1.041	0.358	1.058	0.035
chronic cardiovascular conditions	4.162	0.000	1.382	0.000	1.398	0.000	1.165	0.000
lung disease	2.391	0.000	1.413	0.000	1.587	0.000	1.251	0.000
diabetes	1.532	0.052	1.456	0.000	1.552	0.000	1.114	0.059

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