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Socioeconomic distribution of GP visits following patient choice reform and differences in reimbursement models: Evidence from Sweden

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ABSTRACT

Objective: This study aims to analyse changes in the socioeconomic distribution of GP visits following primary care patient choice reform, and to compare their magnitude and direction in pure capitation, versus capitation/activity-based mixed, provider reimbursement settings.
Methods: We compute absolute and relative concentration indices using total population registry data from three Swedish counties (N∼3.6 million) two years pre, to two years post, reform. We decompose the indices by the contribution of first, non-recurrent and recurrent visits, and compare their changes in the different provider reimbursement settings.
Results: In all three counties, the number of visits increased for all population groups. Increases were larger, and distributional changes more pro-poor, in the county with mixed reimbursement. Visit increases were mostly driven by recurrent and, especially, non-recurrent, visits, which were increasingly pro-poor in all counties in absolute, but not in relative, terms. First visits either became decreasingly pro-poor, or did not change significantly. Exclusion of high users removed the pro-poor patterns in the two counties with pure capitation.
Conclusions: The reform led to increased access to GP visits, but implied small changes in their socioeconomic distribution. In combination with provider reimbursement models with incentives for higher visit volumes, changes were more pro-poor over time, but it is not clear whether this was at the expense of reduced visit length or content.

1. Introduction

In the last decades, market oriented reforms have become popular measures for policy makers to improve access and efficiency in publicly funded health care systems [1–3]. The reforms comprise several interconnected elements; increased private provision of care, competition between health care providers, changes in provider reimbursement, and patient choice [1]. Policy makers view patient choice as both an intrinsic desirability, and an instrument to increase competition, access and quality of care [1,4–6].

The impact of patient choice may be different for different socioeconomic groups [3,7]. Whilst socioeconomically weaker individuals on average have higher levels of ill health and need for care [8,9], they may be less inclined to make informed choices, have lower health literacy and fewer choice options [10]. On the other hand, choice opens up a way to exit dissatisfactory providers within the tax-funded system (i.e. without having to substitute for privately financed care), which may particularly benefit socioeconomically weaker individuals [6]. The evidence of the relative importance of these effects is scarce, and little is also known about the socioeconomic distribution of any access improvements or visit increases induced by patient choice [5,6,11].

A challenge to studying these effects is that patient choice interacts with other features of the health care system. For example, the design of provider reimbursement may dampen or amplify any visit increases induced by patient choice [12]. Overall, reimbursement through capitation creates incentives to keep visit levels low (underproduction), whilst activity-based reimbursement creates incentives to overproduce visits [13–15]. Few studies

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have addressed the effects of reimbursement models for different socioeconomic groups [16], and none has to our knowledge considered its possible combined effects with patient choice.

The interest of this study is patient choice in primary care. Primary care is seen as an important arena to level out health inequities [17] and, contrarily to specialist visits, tend to be more accessible for relatively poor individuals [18–25]. In primary care, there is also no preceding care level that filters or facilitates individual choice. The policy relevance in studying the socioeconomic effects of patient choice in primary care is clear, but to date there are few empirical studies.

This study aims to analyse changes in the socioeconomic distribution of general practitioner (GP) visits following primary care patient choice reform, and to compare the magnitude and direction of these changes in pure capitation, versus capitation/activity-based mixed, provider reimbursement settings. For that purpose, we study the development of GP visits in the three largest Swedish counties, before and after the Swedish patient choice reform.

2. Setting

2.1. Institutional background

Sweden has a tax-financed and universal coverage health care system, where a high degree of decentralisation creates regional variation in policy and organisation. Twenty-one elected county councils are responsible for financing, purchasing and (in-house or contracted) provision of care. There is a national annual co-payment ceiling of € 130, and doctors are typically salaried rather than individually contracted and - reimbursed.

Prior to patient choice reform, all counties had a community oriented primary care system of centrally planned, multi-professional centres with geographically defined uptake areas. These centres could be privately operated (and financed through public procurement), but local markets were in practice monopolies, as patients had limited opportunities to choose a provider outside their uptake area. The system put strong focus on equity but struggled with limitations in access and low utilisation levels compared to other countries [12,26]. Patient choice was motivated as an instrument to increase access, by facilitating provider entry and competition, and as a desirable goal in its own right [27]. A national law made it mandatory for all counties to offer patient choice in primary care by 2010 [28], but there was regional variation in the implementation timing, as some counties started already in 2007 [12].

2.2. Policy content

Three main policy components were shared across counties: (1) entry restrictions were removed, i.e. primary care providers who met certain basic criteria were allowed to set up practice without geographical restrictions, (2) individuals could choose to enlist to any practice, and (3) all practices received public funding on equal terms through a patient voucher system ('the money follows the patient'). Most counties chose a provider reimbursement model that resembled the pre reform fixed payments based on characteristics of the population in the uptake area - but now the basis for capitation was the number of enlisted individuals, typically adjusted for age, sex, socioeconomics and/or disease burden. Stockholm however stood out by implementing larger changes to the reimbursement design. The capitation share was lowered, and 60 per cent (unadjusted) per visit payments were introduced [12].

In sum, there was a shared but sequential implementation of patient choice across counties, and a differing design of provider reimbursement.

2.3. Policy effects

Quantitative follow-up of reform effects is scarce, but we know that the reform resulted in increases in the number of providers, primarily in densely populated areas [29]. People were generally positive to the possibility to choose, but much fewer utilized it in practice [30]. Studies from two counties show that the probability of making a first visit increased less for vulnerable groups (those with family income below the median, and those in poorer mental health and/or living in more deprived areas) [31,32]. There are no published studies on the full socioeconomic distribution of visits, or studies accounting for the differences in provider reimbursement design across counties.

3. Materials and methods

3.1. Study design

We use the inter county variation in reform timing to assess if reform implementation coincided with changes in the socioeconomic distribution of GP visits, independently of implementation date. We compare two counties where provider remuneration was only through capitation (Skåne and Västra Götaland), to one county with a capitation/activity-based mixed reimbursement model (Stockholm). We centre data around the reform date in each county (1 May 2009, 1 October 2009 and 1 January 2008 respectively [12]), and cover the period from two years before, to two years after the reform year (defined as the period +/− 6 months from the respective reform date, graphical depiction in Appendix 1 in Supplementary material). This design allows us to differentiate between shared developments across all three counties – regardless of reform timing or reimbursement – as well as diverging patterns across counties or reimbursement models. The idea is that a shared pattern more likely is attributable to patient choice, whilst a specific development in the capitation/activity-based mixed county more likely is attributable to reimbursement design.

3.2. Materials

3.2.1. Total population register data

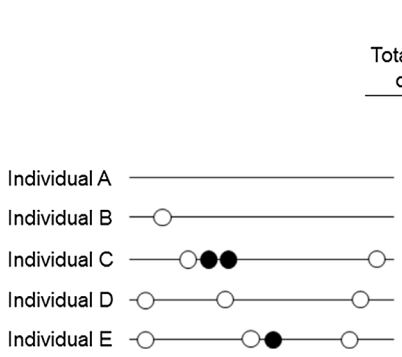
We use individual level registry data from Statistics Sweden on all adults (25 years of age or older) residing in any of the three included counties (N∼3.6 million, half of the adult Swedish population; descriptive statistics are available in Appendix 2 in Supplementary material). These counties were selected as individual level information on GP visits was available and linkable to registries of background data using personal identity numbers.

3.2.2. Socioeconomic indicator

We use equalized household disposable income per individual and year as our socioeconomic indicator, computed using Statistics Sweden's equivalence scale. Individuals with zero or negative equalized household income (∼1.5 and 0.5 percent of the population) are excluded. The use of income as socioeconomic indicator allows us to differentiate across a wide socioeconomic spectrum (contrary to for example educational levels), and is the standard socioeconomic proxy in health economic studies of health care equity [19,21,23].

3.2.3. GP visits

We have compiled a unique visit level database containing the respective health care utilisation registers from each of the three included counties, and linked this to the total population data. We focus only on on-clinic GP visits, as practices regarding registration of home and nurse visits differed between registries. For GP visits



	Total number of visits	Visit types contributing to total number of visits		
		First visit	Subsequent visits	
			Non-recurrent visits	Recurrent visits*
Individual A	0	0	0	0
Individual B	1	1	0	0
Individual C	4	1	1	2
Individual D	3	1	2	0
Individual E	4	1	2	1

Fig. 1. Definition of visit types; first visits, non-recurrent visits and recurrent visits.
Circles represent visits. Lines represent a (reform centred) year. * Visits occurring less than 14 days after a previous visit.

(hereafter referred to as visits), our database covers all visits to tax-funded, private and public, providers.

3.2.4. Morbidity

We control for socioeconomic differentials in morbidity using an individual level count variable for the 17 chronic diseases included in the UK Quality and Outcomes Framework (QOF; disease names and ICD10-codes in Appendix 3 in Supplementary material). This measure includes diagnoses that are specifically relevant to primary care, and outperforms more established measures in predicting primary health care costs [33]. We extract the diagnoses from all *hospital* in- and outpatient care registered in the National Patient Registry per reform centred year. The measurement of morbidity is hence less dependent of whether the individual had a *GP* visit or not.

3.3. Methods

3.3.1. The concentration index

We compute visit means and changes in visit means per age, sex and income group. To obtain summary measures of the full socioeconomic distribution of visits, we compute absolute and relative concentration indices per county and reform centred year. The absolute concentration index (ACI) is defined as twice the covariance between the number of visits v and the fractional equalized household disposable income rank R of each individual i:

$$ACI = 2cov(v_i, R_i)$$

The relative concentration index (RCI) equals ACI/μ, where μ denotes the mean of v. ACI and RCI range between μ and $-\mu$ and 1 and -1, respectively. Index values of zero indicate an equal distribution, positive numbers indicate that visits are concentrated among the relatively rich (pro-rich) and negative numbers indicate that visits are concentrated among the relatively poor (pro-poor).

The indices capture different aspects of changes in the distribution over time; the ACI is insensitive to *uniform* changes across the income distribution (for example one additional visit for all), whilst the RCI is insensitive to *equal percentage* changes. If poorer individuals on average made more visits than richer individuals in the beginning of the period (negative, or pro-poor, values of the indices), an equal absolute increase in visit means across the income distribution would result in ACIs remaining stable and RCIs moving towards less pro-poor.

We compute the concentration indices and their corresponding standard errors using the STATA® command *conindex* [34].

3.3.2. Decomposition by visit type

A challenge in studying changes in the distribution of visits is the risk that visits are not qualitatively comparable over time. For example, concerns have been raised that the activity-based reimbursement provides incentives for providers to prioritize less time consuming visits, or to subdivide visits, in order to maximise their revenues [11]. This is difficult to study, as there is no data on the visit length or content. In an effort to partially account for this problem, we decompose the overall ACIs and RCIs by the contribution of three visit types. *First visits* indicate whether an individual had any visit (0 | 1) a particular year, and subsequent visits are divided according to their proximity in time to the nearest preceding visit (Fig. 1). If there are at least 14 days since the nearest preceding visit, the visit is classified as *non-recurrent,* whilst if the distance is less than 14 days, it is classified as r*ecurrent*. The individual's total number of visits in a (reform centred) year hence constitutes the first visit, plus any non-recurrent visits, plus any recurrent visits. The idea is that recurrent visits capture tendencies of providers subdividing visits, which potentially are incentivised in the mixed reimbursement model.

We use a by component type decomposition [35]. For the ACI, this implies that the overall index equals the sum of the indices for its components k

$$ACI_{tot} = \sum_{k=1}^{K} 2cov(v_{ki},\ R_i) = \sum_{k=1}^{K} ACI_k$$

where k are first visits, non-recurrent visits and recurrent visits respectively. For the RCI, each component in addition is weighted by its mean divided by the overall mean

$$RCI_{tot} = \sum_{k=1}^{K} \left(\frac{2cov(v_{ki}, R_i)}{\mu_k}\right)\left(\frac{\mu_k}{\mu}\right) = \sum_{k=1}^{K} RCI_k \left(\frac{\mu_k}{\mu}\right)$$

3.3.3. Adjustment for age, sex and morbidity

We adjust all indices for demographic differences in age, sex and primary care relevant morbidity across the income distribution by replacing the visit variable in the above equations with an indirectly standardised number of visits, v^{IS} [36],

$$v_i^{IS} = v_i - v_i^x + \mu$$

for the total number of visits, and

$$v_{ki}^{IS} = v_{ki} - v_{ki}^x + \mu_k$$

for each of the k visit types. The predicted number of visits (v_i^x *and* v_{ki}^x) is computed using OLS regression with six age groups (25–44 years (reference), 45–54 years, 55–64 years, 65–74 years, 75–84 years and 85+ years)), sex, and seven diagnosis count groups (0 diagnoses (reference),1,2,3,4,5 or 6+). Non-linear models are used as sensitivity analysis.

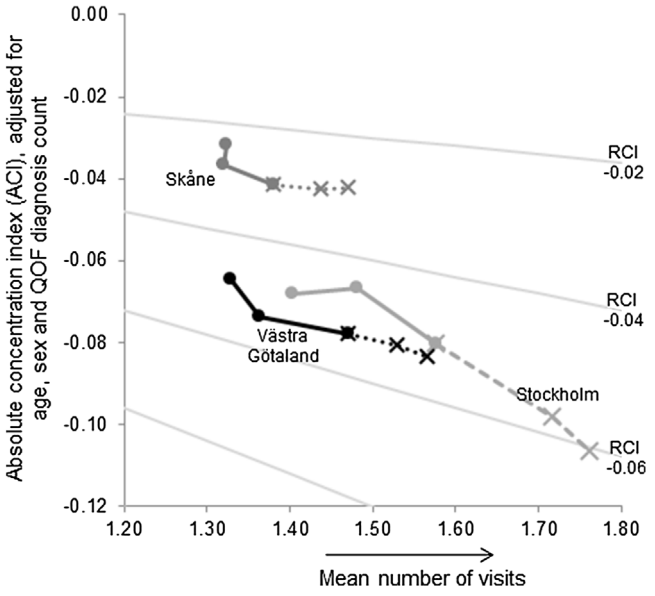


Fig. 2. Mean, ACI and RCI of total GP visits per county and year.
Circles represent yearly values pre reform, and crosses yearly values post reform. The circle furthest to the left represents the first year (year -2), and the cross furthest to the right represents the last year (year 2). The grey linear contours represent combinations of absolute concentration indices (ACIs) and means of the visit variable given different levels of the relative concentration index (RCI), where $ACI = \mu * RCI$.

4. Results

4.1. Total visit means and distributions

We use a graphical tool to depict visit mean changes in relation to changes in ACIs and RCIs [37]. In Fig. 2, a rightward movement on the x-axis represent visit increases, and a downward movement on the y-axis represent changes in ACIs towards more pro-poor. RCIs are depicted in relation to the diagonal lines. These lines are defined as $ACI = \mu * RCI$, and represent combinations of means and ACIs for which RCIs are the same. Thus, if the curve that illustrates the development of ACI follows one of the diagonal lines, the RCI is constant over time. Conversely, if the curve crosses or approaches a line, the RCI changes over time.

The mean number of visits increased in all three counties from the first year (year −2, the left circle) to the last (year 2, the right cross). Most of this increase took place from one year prior to reform (year −1), to one year post reform (year 1). The increases were largest in Stockholm. In all periods and for all counties, the values of the concentration indices were negative (pro-poor).

There were statistically significant pro-poor changes in the distribution of visits from year −2 to year 2. These were largest in Stockholm, where ACIs (RCIs) decreased from −0.068 to −0.107 (−0.049 to −0.061). In Stockholm, most of this change occurred from year −1 to year 1. In Skåne and Västra Götaland, the change contrarily occurred mostly prior to reform, from year −2 to −1. From year −1 onwards, there were slight pro-poor changes in ACIs, while RCIs were constant, as indicated by the curves following the diagonal lines. In other words, from year −1 onwards, visit increases were close to proportional to initial visit levels across the socioeconomic distribution in Västra Götaland and Skåne. In Stockholm, the number of visits increased more for lower income individuals even in proportional terms.

Despite the negative indices, the poorest fifth of the population consequently made less visits than the second poorest (Appendix 4 in Supplementary material). Increases in visits over time were however at least as large for the poorest as for the second poorest (Appendix 5 in Supplementary material).

4.2. Contribution of first, non-recurrent and recurrent visits

Table 1 presents the means and concentration indices of the three visit types. Visit means increased for all three types of visits and in all counties, for both sexes and in all age, income and morbidity groups (see Appendix 5 in Supplementary material). The increase in first visits was comparably small, and their share of total visits decreased over the study period. Instead, the overall increase was driven by increases in recurrent and, primarily, non-recurrent visits. Non-recurrent visits accounted for about half of the total number of visits in each period. The mean number of recurrent visits was much smaller, but increased in all counties.

Decomposition of the overall ACIs and RCIs by the contribution of visit types revealed that non-recurrent visits were most important in explaining both levels and changes of the indices. In Stockholm, the distribution of non-recurrent visits also became more pro-poor over time according to both indices, whilst in Skåne and Västra Götaland there were slight pro-poor changes according to ACIs, and no significant changes according to RCIs (from year −1 onwards). Changes over time in ACIs and RCIs for first visits were pro-rich in Västra Götaland from year −1 onwards, but not significant in Skåne and Stockholm. Recurrent visits explained a relatively large share of the index changes over time, particularly in absolute terms in Stockholm. In relative terms, there were significant pro-poor changes in recurrent visits in Stockholm, but not in Skåne, and in Västra Götaland only from year −2 to 2.

4.3. Sensitivity analysis

4.3.1. Effect of high users

The distinction between recurrent and non-recurrent visits makes less sense for frequent GP users, as those inevitably will have shorter time between visits. To better understand the impact of recurrent visits, we select an arbitrary cut-off at eight visits per year (between one and four percent of the population, depending on county and year, Appendix 7 in Supplementary material). Fig. 3 compares index values, and the respective contribution of each visit type, of the main analysis and a sensitivity analysis excluding individuals with eight visits or more.

Exclusion of high users removed the pro-poor patterns in adjusted ACIs for both non-recurrent and recurrent visits in Skåne, and even resulted in RCIs for non-recurrent visits moving towards being less pro-poor over time in Västra Götaland. Stockholm had a reduced but still clear pro-poor pattern over time in both recurrent and, especially, non-recurrent visits (index values, standard errors and significance tests in Appendix 8 in Supplementary material).

Alternative cut-offs for high users (six or ten visits) revealed overall similar results, but the lower the cut-off point for high users, the less pro-poor were both index levels and changes over time for non-high users.

4.3.2. Other sensitivity analyses

Three alternative time periods for recurrent visits (seven, ten and 21 days) all yielded similar temporal patterns to the chosen 14 day span. An alternative specification of morbidity (the Charlson comorbidity index [38]) also yielded qualitatively consistent patterns, as did computing expected utilisation with negative binomial, instead of linear, regression (adjustment for morbidity had overall limited effects on index levels – the upward shift of the curves was almost exclusively driven by age and sex, regardless of morbidity measure). Differences across counties remained when including only the individuals residing in the largest municipality – indicating that the results are not contingent on differences in

Table 1
Visit means and absolute and relative concentration index values per county, reform centred year and visit type.

	Visit means per year −2 to 2					Concentration indices per year −2 to 2[a]										Direction of changes between years[b]			
						Absolute (ACI)					Relative (RCI)[c]					ACI		RCI	
	Pre reform years			Post reform years		Pre reform years			Post reform years		Pre reform years			Post reform years		From −2 to 2	From −1 to 1	From −2 to 2	From −1 to 1
	−2	−1	0	1	2	−2	−1	0	1	2	−2	−1	0	1	2				
Skåne, total	**1.32**	**1.32**	**1.38**	**1.44**	**1.47**	**−0.032**	**−0.036**	**−0.042**	**−0.042**	**−0.042**	**−0.024**	**−0.028**	**−0.030**	**−0.030**	**−0.029**	**PP**	**PP**	**PP**	**NS**
First	0.55	0.55	0.57	0.58	0.59	−0.004	−0.004	−0.005	−0.004	−0.003	−0.006	−0.008	−0.009	−0.007	−0.006	NS	NS	NS	NS
Non-recurrent	0.63	0.63	0.66	0.69	0.70	−0.022	−0.026	−0.028	−0.030	−0.030	−0.035	−0.041	−0.043	−0.043	−0.042	PP	PP	PP	NS
Recurrent	0.14	0.14	0.15	0.17	0.17	−0.006	−0.006	−0.008	−0.009	−0.009	−0.042	−0.046	−0.054	−0.052	−0.053	PP	PP	NS	NS
Stockholm, total	**1.40**	**1.48**	**1.58**	**1.72**	**1.76**	**−0.068**	**−0.067**	**−0.080**	**−0.098**	**−0.107**	**−0.049**	**−0.045**	**−0.051**	**−0.057**	**−0.061**	**PP**	**PP**	**PP**	**PP**
First	0.49	0.50	0.52	0.54	0.54	−0.014	−0.013	−0.013	−0.014	−0.015	−0.029	−0.025	−0.026	−0.026	−0.027	NS	NS	NS	NS
Non-recurrent	0.68	0.72	0.77	0.85	0.87	−0.045	−0.044	−0.053	−0.063	−0.068	−0.066	−0.061	−0.068	−0.074	−0.078	PP	PP	PP	PP
Recurrent	0.24	0.26	0.29	0.33	0.35	−0.009	−0.010	−0.014	−0.021	−0.024	−0.040	−0.040	−0.049	−0.064	−0.068	PP	PP	PP	PP
Västra Götaland, total	**1.33**	**1.36**	**1.47**	**1.53**	**1.57**	**−0.065**	**−0.074**	**−0.078**	**−0.081**	**−0.084**	**−0.049**	**−0.054**	**−0.053**	**−0.053**	**−0.053**	**PP**	**PP**	**PP**	**NS**
First	0.54	0.55	0.57	0.58	0.59	−0.012	−0.013	−0.012	−0.011	−0.011	−0.022	−0.025	−0.021	−0.019	−0.019	NS	PR	PR	PR
Non-recurrent	0.64	0.66	0.71	0.74	0.76	−0.042	−0.048	−0.050	−0.052	−0.054	−0.066	−0.072	−0.070	−0.070	−0.070	PP	PP	NS	NS
Recurrent	0.15	0.16	0.19	0.21	0.21	−0.011	−0.013	−0.017	−0.018	−0.019	−0.071	−0.080	−0.086	−0.086	−0.087	PP	PP	PP	NS

[a] All indices are adjusted for age, sex and QOF diagnosis count. Standard errors of the indices are presented in Appendix 6 in Supplementary material.

[b] PP indicates a statistically significant change in the index towards more pro-poor, PR towards less pro-poor (direction pro-rich), and NS indicates no statistically significant change.

[c] The RCIs for the three visit types do not sum to the total index value, as the table presents actual (i.e. not mean-weighted) indices per visit type. For weighted contributions summing to the total value, we refer to Fig. 3.

urbanisation levels across counties. An alternative socioeconomic ranking variable (income from the previous year) had close to no impact on the indices.

5. Discussion

5.1. Result summary

Increasing access was a clear objective behind patient choice reform [1,4], and there were reform timed visit increases in all population groups in all three included counties. In comparison to other OECD countries, visit levels however remained low [19,39]. Visit increases were at least as large for lower, compared to higher, income individuals in both relative and absolute terms, after adjustment for differences in age, sex and morbidity. In the two capitation based reimbursement counties (Skåne and Västra Götaland), changes in the socioeconomic distribution of visits happened mostly prior to reform, i.e. - before the increase in visits. In these counties, proportional changes were also contingent on including the top two percent of users, suggesting that pro-poor changes were driven by a small, poor, high-user minority. The mixed reimbursement county (Stockholm) had the largest visit increases, and an increasingly pro-poor distribution of visits in both absolute and relative terms. In sum, a conservative interpretation of the findings is that, for the total population, patient choice reform did not impede, but if anything enhanced, the overall pro-poor distribution of visits.

5.2. Impact of patient choice reform

Introduction of patient choice broke the monopolies of local GP markets, and the number of providers increased. Free establishment and competition, combined with choice (and the possibility for patients to exit providers), put pressure on providers to increase visits, and providers were incentivized to increasingly care for patients who previously would have been triaged out to self-care or waits. The results show that the reform-induced incremental visits primarily came from an increase in subsequent visits, which were concentrated among the poor, but also from an inflow of new 'first visitors', which to a slightly larger extent were rich.

According to the literature, a wide range of barriers, including geographical, social or financial, refrain poorer individuals from accessing care, sometimes despite a perceived need [40–42]. These barriers may vary by visit type, and they may to differential extents have been altered following the reform.

The smaller increases in first visits for lower income individuals are in line with previous Swedish studies using other socioeconomic indicators [31,32], and may reflect the importance of financial barriers. These prevail also for subsequent visits, but their relative importance decreases when the number of visits increases, as there is a ceiling for patient co-payments. This potential role of financial barriers is supported in the findings, as pro-poor changes were not primarily driven by one or two additional visits for a larger poor group, but by many visits for high users.

Financial barriers themselves did not change following patient choice reform, but the reform likely altered other barriers which previously constrained access for poorer individuals. As overall access increased, the role of voice or bargaining power in accessing visits might for example have decreased, facilitating access for poorer individuals who potentially were less equipped to argue for visits in the more access constrained pre reform system.

5.3. Diverging changes across reimbursement models

Two findings point against interpreting the overall pro-poor distributional changes as being purely induced by patient choice reform. In the counties primarily relying on capitation (Skåne and

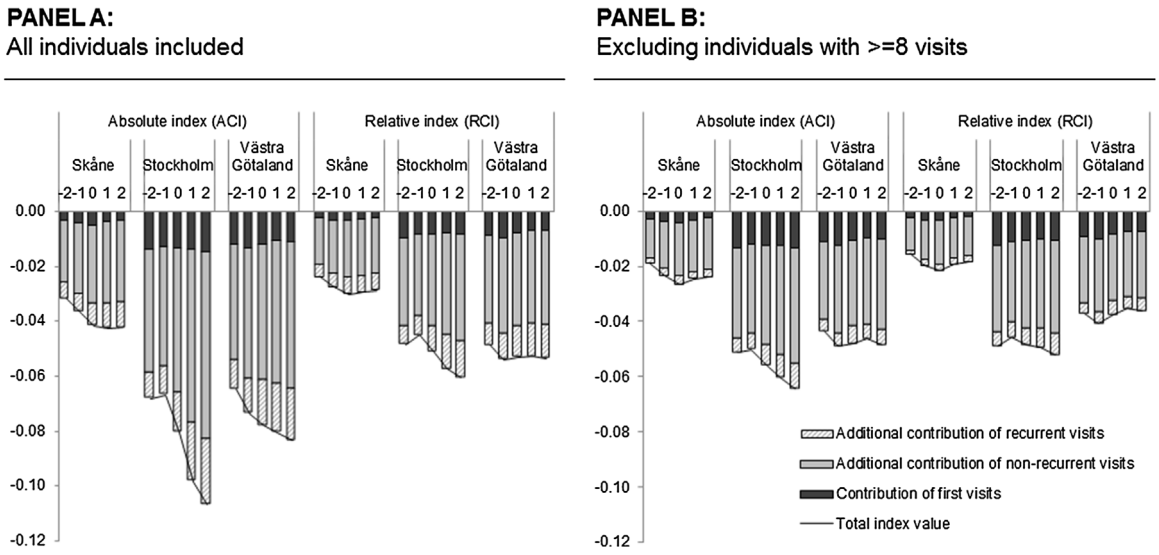


Fig. 3. Cumulative contribution of the concentration indices for each visit type to the total concentration index values, per county and reform centred year; Panel A: all individuals, Panel B: excluding high users.
Both panels present indices adjusted for age, sex and QOF diagnosis count.

Västra Götaland), pro-poor changes were, first, not completely timed to reform (but happened primarily between year −2 and −1), and second, contingent on including high users. This can be contrasted to the county which, simultaneously to implementation of patient choice reform, increased the share of activity-based reimbursement (Stockholm), where visit increases were both larger, and more pro-poor.

The enhanced visit increases in the mixed reimbursement county are clearly in line with what is expected based on the differences in reimbursement model incentives [13–15], but the literature is so far mute on their potential differential impact depending on socioeconomic status [16,43]. Our results indicate that mixed reimbursement amplified, whilst capitation dampened, the mechanisms leading to a more pro-poor distribution of visits. In the capitation settings, even post reform, there were some remaining incentives to keep visit levels low. Hence, for example, the role of voice or bargaining power in accessing visits, as discussed above, might not have been played down to the same extent. Another possibility is that increased pressure on providers to produce visits resulted in qualitatively different or shorter visits in the mixed reimbursement county.

5.4. Visit fragmentation

In general, the qualitative content, time allocated, and spectra of procedures performed within a visit may have shifted over time – dependently or independently of the introduction of the reform. The risk of visit fragmentation, or subdivision of visits, is likely largest where providers receive part of their reimbursement as per visit payments, i.e. in the capitation/activity-mixed reimbursement county.

Poorer individuals may have experienced subdivision of visits in response to providers' financial incentives to a larger extent than richer individuals - either because they were less equipped to identify, or oppose, such visits, or because they had higher rates of multi-morbidity, which potentially could be used as a motivation for subdividing visits. A study in Norway found that whilst poorer individuals make more visits, and consume a higher total amount of services in monetary terms, less time is spent and less services performed within each visit [44]. Our data unfortunately does not allow for such detailed investigation of visit length or content, but we did use the distinction between non-recurrent and recurrent visits to capture a potential, undesirable, supplier-induced division of visits.

Recurrent visits increased in all counties, but their increases were larger, and the change in the socioeconomic distribution more pro-poor, in the mixed reimbursement county. Only there did the pro-poor changes also remain when high users were excluded, i.e. the pro-poor change was not driven by (poor) high users inevitably having shorter time distances between visits. This supports the hypothesis that visits were more often subdivided for poorer individuals, in the mixed reimbursement setting. Still, the visit density-based definition of recurrent visits requires some caution as it can entail both undesired visits, implying unnecessary fragmentation and cost for the patient, and desired visits, such as repeated testing or monitoring, which are beneficial to the patient. Further studies are needed to draw clear conclusions about questions regarding visit length, content or quality.

5.5. Limitations

Effects of patient choice may be difficult to separate from those of other, conjointly implemented, changes [7,45,46]. This raises questions about the generalizability of the findings. In this study we move beyond a crude pre-to-post comparison, by using data from counties implementing the reform at slightly different points in time, but we cannot clearly separate the effects of choice from other underlying, or simultaneous, changes. It is for example possible that the 2008 financial crisis plays a role (although it did not affect Sweden as much as many other countries). Future studies could explore the possibility of studying not only counties but neighbourhoods within counties, as these might have had different de facto policy related changes in access and competition over time.

Given the limited information about health care need, we cannot draw conclusions about the level of equity as such. Adjustment for a more complex need measure would result in less pro-poor indices at each measured time point [21]. As our interest is changes over time, the limitation arises if the socioeconomic distribution of need changes over time – for example if richer and poorer individuals have differential changes in health or in use of (non GP) health care over time [47]. Given the relatively short time frame, we assume

that these changes are relatively limited, and that more extensive adjustment for need therefore would not change the patterns over time.

6. Conclusions

The results suggest that, compared to a system with limited choice, implementation of patient choice reform (including patient choice, free provider establishment and competition), increased overall access to GP visits, and implied small changes in their socioeconomic distribution. In combination with provider reimbursement models with incentives for higher visit volumes, changes were more pro-poor over time, but it is not clear whether this was at the expense of reduced visit length or content. Importantly, the results indicate that when designing reimbursement models, policy makers need to consider that any undesired incentives (such as over – or underproduction) risk to primarily hurt socioeconomically weaker individuals.

Declaration of interest

Sveréus is employed by a research and development unit at Stockholm County Council, and Rehnberg is partly contracted by the same organisation. Stockholm County is one of the included settings, but had no part in the design, results or conclusions of the study.

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The study is approved by the regional ethics committee in Stockholm (ref 2013/271-31/5).

Appendix A. Supplementary data

Supplementary material related to this article can be found, in the online version, at doi:https://doi.org/10.1016/j.healthpol.2018.07.017.

References

[1] Vrangbaek K, Robertson R, Winblad U, van de Bovenkamp H, Dixon A. Choice policies in Northern European health systems. Health Economics Policy and Law 2012;7(1):47–71.
[2] Thomson S, Dixon A. Choices in health care: the European experience. Journal of Health Services Research & Policy 2006;11(3):167.
[3] Bevan G, Helderman JK, Wilsford D. Changing choices in health care: implications for equity, efficiency and cost. Health Economics Policy and Law 2010;5(3):251–67.
[4] Fotaki M, Roland M, Boyd A, McDonald R, Scheaff R, Smith L. What benefits will choice bring to patients? Literature review and assessment of implications. Journal of Health Services Research & Policy 2008;13(3):178–84.
[5] Propper C. Competition, incentives and the English NHS. Health Economics 2012;21(1):33–40.
[6] Le Grand J. Choice and competition in publicly funded health care. Health Economics Policy and Law 2009;4(4):479–88.
[7] Barros PP, Brouwer WBF, Thomson S, Varkevisser M. Competition among health care providers: helpful or harmful? European Journal of Health Economics 2016;17(3):229–33.
[8] Marmot M. Social determinants of health inequalities. Lancet 2005;365(9464):1099–104.
[9] Hernandez-Quevedo C, Jones AM, Lopez-Nicolas A, Rice N. Socioeconomic inequalities in health: a comparative longitudinal analysis using the European Community Household Panel. Social Science & Medicine 2006;63(5):1246–61.
[10] Dixon A, Le Grand J. Is greater patient choice consistent with equity? The case of the English NHS. Journal of Health Services Research & Policy 2006;11(3):162–6.
[11] Burstrom B. Looking to Europe will Swedish healthcare reforms affect equity? British Medical Journal 2009;339.
[12] Anell A. Choice and privatisation in Swedish primary care. Health Economics Policy and Law 2011;6(4):549–69.
[13] Robinson JC. Theory and practice in the design of physician payment incentives. Milbank Quarterly 2001;79(2). p. 149-+.
[14] Iversen T, Luras H. The effect of capitation on GPs' referral decisions. Health Economics 2000;9(3):199–210.
[15] Krasnik A, Groenewegen PP, Pedersen PA, Vonscholten P, Mooney G, Gottschau A, et al. Changing remuneration systems – effects on activity in general practice. British Medical Journal 1990;300(6741):1698–701.
[16] Tao WJ, Agerholm J, Burstrom B. The impact of reimbursement systems on equity in access and quality of primary care: a systematic literature review. BMC Health Services Research 2016;16.
[17] Starfield B, Shi LY, Macinko J. Contribution of primary care to health systems and health. Milbank Quarterly 2005;83(3):457–502.
[18] Cookson R, Propper C, Asaria M, Raine R. Socio-economic inequalities in health care in England. Fiscal Studies 2016;37(3-4):371–403.
[19] Devaux M. Income-related inequalities and inequities in health care services utilisation in 18 selected OECD countries. European Journal of Health Economics 2015;16(1):21–33.
[20] Gerdtham UG, Sundberg G. Equity in the delivery of health care in Sweden. Scandinavian Journal of Social Medicine 1998;26(4):259–64.
[21] van Doorslaer E, Wagstaff A, van der Burg H, Christiansen T, De Graeve D, Duchesne I, et al. Equity in the delivery of health care in Europe and the US. Journal of Health Economics 2000;19(5):553–83.
[22] van Doorslaer E, Koolman X, Jones AM. Explaining income-related inequalities in doctor utilisation in Europe. Health Economics 2004;13(7):629–47.
[23] van Doorslaer E, Masseria C, Koolman X. Inequalities in access to medical care by income in developed countries. Canadian Medical Association Journal 2006;174(2):177–83.
[24] Vikum E, Krokstad S, Westin S. Socioeconomic inequalities in health care utilisation in Norway: the population-based HUNT3 survey. International Journal for Equity in Health 2012;11.
[25] Hanratty B, Zhang TH, Whitehead M. How close have universal health systems come to achieving equity in use of curative services? A systematic review. International Journal of Health Services 2007;37(1):89–109.
[26] Anell A. The public-private pendulum—patient choice and equity in Sweden. New England Journal of Medicine 2015;372(1):1–4.
[27] Fredriksson M, Blomqvist P, Winblad U. The trade-off between choice and equity: Swedish policymakers' arguments when introducing patient choice. Journal of European Social Policy 2013;23(2):192–209.
[28] SCS, Lag om valfrihetssystem [Law on choice systems], in 2008:962, S.C.o. Statutes, Editor (2008).
[29] Isaksson D, Blomqvist P, Winblad U. Free establishment of primary health care providers: effects on geographical equity. BMC Health Services Research 2016;16.
[30] Glenngard AH, Anell A, Beckman A. Choice of primary care provider: results from a population survey in three Swedish counties. Health Policy 2011;103(1):31–7.
[31] Agerholm J, Bruce D, de Leon AP, Burstrom B. Equity impact of a choice reform and change in reimbursement system in primary care in Stockholm County Council. BMC Health Services Research 2015;15:10.
[32] Beckman A, Anell A. Changes in health care utilisation following a reform involving choice and privatisation in Swedish primary care: a five-year follow-up of GP-visits. BMC Health Services Research 2013;13.
[33] Brilleman SL, Gravelle H, Hollinghurst S, Purdy S, Salisbury C, Windmeijer F. Keep it simple? Predicting primary health care costs with clinical morbidity measures. Journal of Health Economics 2014;35:109–22.
[34] O'Donnell O, O'Neill S, Van Ourti T, Walsh B. Conindex: estimation of concentration indices. The Stata Journal 2016;16:112–38.
[35] Clarke PM, Gerdtham UG, Connelly LB. A note on the decomposition of the health concentration index. Health Economics 2003;12(6):511–6.
[36] O'Donnell O, Van Doorslaer E, Wagstaff A, Lindelow M. Analyzing health equity using household survey data: a guide to techniques and their implementation. The World Bank; 2008.
[37] Kjellsson G, Petrie D. Graphical tools for monitoring inequality the beauty can lie (in the details). Epidemiology 2017;28(4):604–7.
[38] Charlson ME, Pompei P, Ales KL, MacKenzie CR. A new method of classifying prognostic comorbidity in longitudinal studies: development and validation. Journal of Chronic Diseases 1987;40(5):373–83.
[39] OECD. Health care utilisation. OECD Health Statistics Database; 2017.
[40] Burstrom B. Increasing inequalities in health care utilisation across income groups in Sweden during the 1990s? Health Policy 2002;62(2):117–29.
[41] Westin M, Ahs A, Persson KB, Westerling R. A large proportion of Swedish citizens refrain from seeking medical care – lack of confidence in the medical services a plausible explanation? Health Policy 2004;68(3):333–44.
[42] Molarius A, Simonsson B, Linden-Bostrom M, Kalander-Blomqvist M, Feldman I, Eriksson HG. Social inequalities in self-reported refraining from health care

due to financial reasons in Sweden: health care on equal terms? BMC Health Services Research 2014;14.
[43] Gosden T, Forland F, Kristiansen IS, Sutton M, Leese B, Giuffrida A, et al. Capitation, salary, fee-for-service and mixed systems of payment: effects on the behaviour of primary care physicians. Cochrane Database of Systematic Reviews 2000;(3):Cd002215.
[44] Brekke KR, Holmas TH, Monstad K, Straume OR. Socio-economic status and physicians' treatment decisions. Health Economics 2018;27:e77–89.
[45] Cookson R, Laudicella M, Donni PL. Does hospital competition harm equity? Evidence from the English National Health Service. Journal of Health Economics 2013;32(2):410–22.
[46] Asaria M, Ali S, Doran T, Ferguson B, Fleetcroft R, Goddard M, et al. How a universal health system reduces inequalities: lessons from England. Journal of Epidemiology and Community Health 2016;70(7):637–43.
[47] Cookson R, Laudicella M, Donni PL. Measuring change in health care equity using small-area administrative data – evidence from the English NHS 2001–2008. Social Science & Medicine 2012;75(8):1514–22.