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The link between out-of-pocket costs and inequality in specialist care in Australia

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ABSTRACT

Objective. Out-of-pocket (OOP) costs could act as a potential barrier to accessing specialist services, particularly among low-income patients. The aim of this study is to examine the link between OOP costs and socioeconomic inequality in specialist services in Australia. **Methods.** This study is based on population-level data from the Medicare Benefits Schedule of Australia in 2014–15. Three outcomes of specialist care were used: all visits, visits without OOP costs (bulk-billed services), and visits with OOP costs. Logistic and zero-inflated negative binomial regression models were used to examine the association between outcome variables and area-level socioeconomic status after controlling for age, sex, state of residence, and geographic remoteness. The concentration index was used to quantify the extent of inequality. **Results.** Our results indicate that the distribution of specialist visits favoured the people living in wealthier areas of Australia. There was a pro-rich inequality in specialist visits associated with OOP costs. However, the distribution of the visits incurring zero OOP cost was slightly favourable to the people living in lower socioeconomic areas. The pro-poor distribution of visits with zero OOP cost was insufficient to offset the pro-rich distribution among the visits with OOP costs. **Conclusions.** OOP costs for specialist care might partly undermine the equity principle of Medicare in Australia. This presents a challenge to the government on how best to influence the rate and distribution of specialists' services.

Keywords: Australia, bulk-billing, concentration index, inequality, out-of-pocket cost, policy, socioeconomic status, specialist visit.

Introduction

Universal health systems aim to deliver healthcare services according to health needs rather than the ability to pay.[1] The need for healthcare services is typically higher among people with poorer socioeconomic backgrounds and they require more services compared to richer people.[2,3] However, socioeconomic inequality and inequity (after adjustment for healthcare needs) in healthcare utilisation persists in many health systems of Organisation for Economic Co-operation and Development (OECD) countries.[4] More specifically, inequality in specialist care favouring socioeconomically better-off people is well-documented in the literature.[4–8] In general, people from poorer socioeconomic backgrounds use fewer specialist services compared to their richer counterparts, and this inequality is larger in countries with higher out-of-pocket (OOP) costs.[4,9] The current evidence from Australia is consistent with the results of many other OECD countries, where socioeconomic inequality in specialist care is pro-rich.[10,11] However, the link between OOP costs and inequality in specialist care is largely unknown, and studies using population-based administrative data in this area of research are still scant.

The Australian case is interesting because OOP costs are determined through market mechanisms rather than regulation. Under Australia's Medicare system, a patient is reimbursed a fixed, government-determined amount from Medicare.[12] However, fees are unregulated, and physicians are free to charge any fee to any patient at any time.

For out-of-hospital services, patients must pay the gap between the physician fee and the Medicare rebate. Here, the Medicare rebate refers to the amount the patient receives from the government through their Medicare claim. In most instances, for specialist consultations, the MBS rebate is equal to 85% of the MBS Schedule Fee. The Schedule Fee is the government-determined fee for any medical service listed on the MBS. This implies that the size of the OOP is largely determined by the physician's fee and OOP depends on the percentage of the Schedule Fee subsidised by Medicare. In many instances, particularly among general practitioners, the physician fee is equal to the Medicare rebate, which means that there is no gap and therefore no co-payment (popularly known as bulk-billing in Australia). Among specialist physicians, however, patients often face a substantial gap in payment. In 2018, for example, among the 60% of specialist visits where there was a gap between the fee and the Medicare rebate, the average co-payment was A$80.[13] About 72% of the patients who visited a specialist incurred some OOP costs in 2016–17.[14]

Higher OOP costs could act as a potential barrier to accessing specialist services, particularly among low-income patients.[9] According to Johar *et al.*,[12] only 8% of specialists charge a fee to all their patients that is commensurate to a zero OOP cost. Around 12% of specialists charge the same fee to all their patients, but their patients do face a co-payment; however, 80% of specialists engage in price discrimination and charge low-income patients lower fees compared to their high-income counterparts. On average, the difference in fees between high- and low-income patients is A$26; a discount of 19%. Specialists may offer such discounts in response to the higher price sensitivity among lower income groups. An important, but still unanswered question, is whether such discounts are sufficient to remove the barriers for low-income patients to use specialist services.

Few recent studies from Australia have used administrative data to understand inequality in healthcare use.[15–17] However, these studies are limited by sub-population analysis or aggregate measures of healthcare. There is currently no study from Australia that has used national administrative data to study inequality in specialist care. This study contributes to the current literature by examining the role of OOP costs in socioeconomic inequality of Medicare-funded specialist care using individual-level data for the entire Australian population. Importantly, we analyse how the prices charged by specialists influence the degree to which specialists care is distributed. Our results present new and policy-relevant information on the distribution of specialists' use according to the socioeconomic area of living. The policy relevance is that current discounts offered to patients living in low-income areas are insufficient to remove overall inequalities; however, policies targeted at increasing the bulk-billing rate in low-income areas may remove such inequality.

Methods

Study data and sample

This study uses population-level data from the Medicare Benefits Schedule (MBS) of Medicare Australia. The MBS keeps the record of services rendered by medical professionals under the fee-for-service arrangement. In Australia, patients must have a referral from a general practitioner (GP) before seeking services from a specialist in the out-of-hospital setting. Otherwise, they cannot claim reimbursements from Medicare. So, every patient with at least one GP visit in the fiscal year 2014–15 is included for analysis in this study. Data on age, gender, enrolment postcode, and the number of visits to specialists are extracted from the MBS using the last date of service provision. We exclude the individuals with a post-box address from the analysis. This process yields us a database of 19.81 million individuals (about 85% of the Australian population in 2014–15). We exclude inpatient specialist services from the analysis as these services are funded by a combination of the Medicare rebate and private health insurance. This exclusion criterion results in about 6.8 million individuals with at least one specialist visit.

Outcome measures

The dependent variable of this study is the number of specialist services provided to the patients on a fee-for-service basis and covered by Medicare. This study follows the definition of the Commonwealth Department of Health, Australia, which has categorised Medicare items into the broad type of services (BTOS). BTOS is developed to publicly release various Medicare statistics at the aggregate level.[18] The specialist service is the combination of various items of professional attendances provided by private specialists. Specialist attendance is labelled as 'Item-0200' in the BTOS. The list of items is available in the Supplementary File. Specialist service is further categorised into bulk-billed and non-billed services using the bulk-billing identifier in the Medicare data. The bulk-billing services are the visits that do not incur any OOP cost to the patients. The MBS bulk-billing rate for specialist services was about 30% in 2014–15.[18] We analyse three types of specialist visits: the probability of visits (0 = No and 1 = Yes), the total number of visits (includes zero), and positive visits (conditional number of visits). The first one is used to examine inequality in the likelihood of using any specialist, the second one is for measuring the extent or intensity of inequality, and the third one is used to assess the extent of inequality among the patients who are already accessing specialist services.

Independent variables

The MBS does not have information about the individual-level socioeconomic status (SES) such as income, education, occupation, etc. Therefore, the index of relative socioeconomic advantage and disadvantage (IRSAD) is used as the area-level SES indicator in this study. The Australian Bureau of Statistics (ABS) constructed the IRSAD through principal components analysis using the information on several socioeconomic indicators from the Australian Census-2011.[19] Individuals were assigned to the IRSAD deciles of the ABS by using respective enrolment postcodes available in the MBS. The proportion of individuals in each IRSAD decile is provided in Supplementary Table S1. We also use the Accessibility Remoteness Index of Australia (ARIA) as the remoteness indicator, as ARIA is strongly related to healthcare service utilisation in Australia.[20] The ABS has classified all Australian geographic regions into one of five categories: major cities, inner regional, outer regional, remote, and very remote. We use the postal area concordance file from the ABS to assign individuals to their respective IRSAD deciles, ARIA category, and state/territory.

Statistical analysis

Zero-inflated negative binomial models (ZINB) are applied to model the relationship between specialist visits and explanatory variables.[21] The inflation part is estimated using a logit model and the count part is modelled using a negative binomial model. We also estimated the concentration index (CI) to quantify the extent of socioeconomic inequality in specialist visits. The following 'convenient regression' approach is used to estimate the CI using the individual level data:

$$2\sigma_r^2\left(\frac{y_i}{\mu}\right) = \alpha + \delta r_i + \varepsilon_i \qquad (1)$$

Here, y_i is the outcome variable, r_i is the fractional ranking of individuals by the IRSAD, μ is the mean of the outcome variable,ε_i is the error term, and σ_r^2 is the variance of fractional rank. The ordinary least square (OLS) estimate of δ gives the value of the CI. The CI considers information from the entire socioeconomic distribution rather than the two extremes and the index ranges between -1 and $+1$.[22] A positive (negative) and significant CI suggests pro-rich (pro-poor) inequality in specialist visits. In other words, the distribution of specialist visits favours those individuals living in higher (lower) socioeconomic areas. We have not used other independent variables in estimating the CI to provide an unadjusted extent of inequality in different types of specialist care.

Ethics statement

As part of a PhD thesis, this study has received ethics exemption from the University of Technology Sydney Human Research Ethics Committee (UTS HREC). The ethics application number is UTS HREC ETH17.1317. Data were anonymised but not publicly available. The data custodian of the Australian Institute of Health and Welfare (AIHW) has approved the use of data for the purpose of this study.

Results

About 34% of the individuals had at least one specialist visit (Table 1). Both the proportion of people visiting a specialist and the number of visits increase with age. The mean of the conditional number of specialist visits was 3.12 among people living in major cities, whereas it was only 1.91 in very remote areas. On average, the proportion of people visiting a specialist and the number of specialist visits were higher among people living in better SES (higher IRSAD deciles) areas.

Regression results in Table 2 indicate that the probability of specialist visits was less among males (column 1), but males were more likely to incur zero OOP costs for their specialist visits (column 4). Area of residence was a significant determinant of all types of specialist visits. For example, the odds of using a specialist service were about 27% lower in very remote areas compared to major cities. The total number of specialist visits was 45% lower in very remote areas. Moreover, the number of visits with OOP costs and without OOP costs were about 28 and 22% less among people from very remote areas compared to people from major cities respectively.

The probability of visiting a specialist was 1.52-fold higher among individuals from the highest SES areas compared to people living in the lowest SES areas (column 1 in Table 2). The area-level SES gradient in specialist visits was more pronounced for visits with OOP costs compared to those where there is a zero OOP cost. For example, people from the highest IRSAD decile had 22% more OOP cost visits compared to the people from the lowest decile. In contrast, visits without a co-payment were about 13% lower among the people belonging to decile 10. In other words, the relationship between visits with OOP costs and IRSAD was positive, whereas this relationship for zero OOP cost visits was negative. Both the OOP costs and without OOP cost models show statistical significance of the SES gradient – the difference is that the former is a positive gradient, and the latter is a negative gradient. Despite these countervailing results between the OOP costs and without OOP cost models, there remains a pro-rich distribution for overall Medicare-funded specialist visits.

Statistically significant and positive estimates of the CI for all types of visits, except for visits without OOP costs, suggest that the distribution of these visits favoured patients living in wealthier areas (Table 3). In other words, inequality was pro-rich for all visits, and this result was driven by the larger pro-rich inequality in visits with OOP costs. In contrast, inequality in specialist visits without OOP costs was slightly pro-poor because the CI was statistically significant and negative, but the absolute value of the index was small. The results also indicate that extent of inequality among the patients who were already using specialist services was smaller than the inequality in the probability of using specialist services.

Table 1. Mean number of specialist visits by independent variables.

	Probability of visit (1 = yes, 0 = no)	Total number of visits (zero and positive visits)	Conditional number of visits (positive visits only)
	(1)	(2)	(3)
Overall	0.34	1.02	3.01
Age groups (years)			
0–4	0.22	0.48	2.18
5–14	0.18	0.37	2.07
15–24	0.19	0.45	2.33
25–34	0.23	0.57	2.46
35–44	0.28	0.75	2.64
45–54	0.34	0.96	2.80
55–64	0.45	1.41	3.12
65–74	0.59	2.15	3.64
75+	0.64	2.62	4.10
Gender			
Female	0.35	1.08	3.05
Male	0.31	0.94	2.97
Remoteness			
Major city	0.34	1.06	3.12
Inner region	0.34	0.98	2.86
Outer region	0.30	0.79	2.60
Remote	0.23	0.51	2.22
Very remote	0.19	0.39	1.98
State/Territory			
ACT	0.30	0.81	2.63
NSW	0.37	1.18	3.17
NT	0.17	0.35	2.07
Qld	0.29	0.83	2.85
SA	0.36	1.08	2.99
Tas.	0.33	0.92	2.77
Vic.	0.35	1.08	3.10
WA	0.27	0.71	2.56
IRSAD			
Decile 1	0.30	0.92	2.98
Decile 2	0.33	0.96	2.86
Decile 3	0.32	0.92	2.97
Decile 4	0.33	0.98	2.87
Decile 5	0.31	0.91	3.02
Decile 6	0.33	0.99	2.98
Decile 7	0.32	0.96	3.02
Decile 8	0.33	1.00	3.09
Decile 9	0.35	1.08	3.11
Decile 10	0.38	1.23	3.20

(*Continued on next column*)

Table 1. (*Continued*)

ACT, Australian Capital Territory; NSW, New South Wales; NT, Northern Territory; Qld, Queensland; SA, South Australia; Tas., Tasmania; Vic., Victoria; WA, Western Australia; IRSAD, index of relative socioeconomic advantage and disadvantage.

Discussion

The main strength of our study is the use of population-wide, individual-level data on specialist visits to mitigate subjective measurement and potential sample bias. Our findings reveal a pro-rich inequality in specialist visits by area-level SES. This implies that people living in wealthier areas used more specialist services compared to their poorer counterparts. The most important result appears when we differentiate the analysis between visits with OOP costs and without OOP costs (bulk-billed services). We find a pro-rich socioeconomic inequality for specialist visits associated with OOP costs, whereas the distribution of the visits incurring zero OOP cost was slightly favourable to the people living in lower SES areas. Importantly, the pro-poor distribution among zero OOP cost visits was insufficient to completely offset the pro-rich distribution among the OOP cost-incurred visits. This implies that overall, the distribution of specialist visits was pro-rich.

In general, pro-rich inequality in specialist care by neighbourhood-level SES found in this study is consistent with the Australian and international evidence. For example, there was substantial income-related inequality in bariatric surgery, and the level of inequality was even greater when measured by area-level SES in Australia.[23] Area-level SES inequality was also pro-wealthy for Medicare-subsidised consultant psychiatry services.[17] Our finding also follows the conclusion from other high-income countries, such as France and Canada, where the distribution of specialist visits was found to be favourable to the individuals from higher income areas and areas with higher levels of education.[24–26]

The findings from this study suggest almost no area-level SES inequality in specialist visits if doctors opted to offer bulk-billing to the patients. However, the distribution of specialist services incurring OOP cost favours patients from socioeconomically advantaged areas. Our result is consistent with the finding of higher socioeconomic inequality in specialist services with OOP costs.[26] Therefore, financial barriers may, at least, be partly responsible for inequality in specialist care, as argued by other Australian studies.[12,27]

Table 2. Regression results for four types of specialist visits.

Type of visit	Probability of visit	Total number of visits			Number of visits with OOP costs		Number of visits without OOP cost	
	Logistic model		ZINB		NB		NB	
	1		2		3		4	
	OR	s.e.	IRR	s.e.	IRR	s.e.	IRR	s.e.
Age (years) (Ref: 0–4 year)								
5–14	**0.78**	(−0.002)	**0.90**	(0.004)	**0.91**	(0.004)	**1.08**	(0.005)
15–24	**0.85**	(0.002)	**1.16**	(0.005)	**1.04**	(0.005)	**1.11**	(0.006)
25–34	**1.06**	(0.003)	**1.28**	(0.005)	**1.08**	(0.005)	**1.12**	(0.006)
35–44	**1.39**	(0.003)	**1.44**	(0.006)	**1.13**	(0.006)	**1.22**	(0.007)
45–54	**1.84**	(0.004)	**1.60**	(0.006)	**1.16**	(0.005)	**1.31**	(0.007)
55–64	**2.93**	(0.007)	**1.89**	(0.007)	**1.28**	(0.006)	**1.38**	(0.008)
65–74	**5.22**	(0.013)	**2.40**	(0.008)	**1.45**	(0.007)	**1.46**	(0.009)
75+	**6.43**	(0.017)	**2.90**	(0.010)	**1.59**	(0.009)	**1.54**	(0.011)
Gender (Ref: Female)	**0.84**	(0.001)	**0.98**	(0.001)	**0.96**	(0.001)	**1.02**	(0.002)
Remoteness (Ref: Major city)								
Inner region	**0.99**	(0.001)	**0.87**	(0.001)	**0.93**	(0.005)	**0.89**	(0.007)
Outer region	**0.93**	(0.002)	**0.78**	(0.002)	**0.86**	(0.006)	**0.86**	(0.009)
Remote	**0.77**	(0.004)	**0.63**	(0.005)	**0.79**	(0.009)	**0.79**	(0.010)
Very remote	**0.73**	(0.006)	**0.55**	(0.006)	**0.78**	(0.015)	**0.72**	(0.019)
State/Territory (Ref: ACT)								
NSW	**1.58**	(0.007)	**1.49**	(0.008)	**1.19**	(0.009)	**1.18**	(0.011)
NT	**0.71**	(0.007)	**0.97**	(0.013)	**1.05**	(0.016)	1.03	(0.024)
Qld	**1.11**	(0.005)	**1.25**	(0.007)	**1.23**	(0.010)	**1.06**	(0.011)
SA	**1.50**	(0.007)	**1.38**	(0.008)	**1.17**	(0.010)	**1.07**	(0.011)
Tas.	**1.34**	(0.007)	**1.36**	(0.009)	**1.25**	(0.025)	**1.08**	(0.013)
Vic.	**1.41**	(0.006)	**1.42**	(0.008)	**1.24**	(0.010)	**1.12**	(0.010)
WA	**0.98**	(0.004)	1.00	(0.006)	**1.10**	(0.009)	**0.88**	(0.010)
IRSAD (Ref: Decile 1)								
Decile 2	**1.08**	(0.003)	1.00	(0.003)	**1.03**	(0.008)	**0.96**	(0.013)
Decile 3	**1.05**	(0.003)	**0.96**	(0.003)	**1.04**	(0.009)	**0.94**	(0.014)
Decile 4	**1.10**	(0.003)	**1.01**	(0.003)	**1.07**	(0.011)	**0.96**	(0.013)
Decile 5	**1.12**	(0.003)	**1.02**	(0.003)	**1.06**	(0.008)	**0.94**	(0.012)
Decile 6	**1.16**	(0.003)	**1.03**	(0.003)	**1.09**	(0.010)	**0.94**	(0.013)
Decile 7	**1.21**	(0.003)	**1.05**	(0.003)	**1.13**	(0.010)	**0.94**	(0.012)
Decile 8	**1.24**	(0.003)	**1.06**	(0.003)	**1.15**	(0.010)	**0.91**	(0.010)
Decile 9	**1.34**	(0.003)	**1.10**	(0.003)	**1.19**	(0.011)	**0.91**	(0.010)
Decile 10	**1.52**	(0.004)	**1.16**	(0.003)	**1.22**	(0.013)	**0.87**	(0.010)

IRR, incidence rate ratio; OR, odds ratio; s.e., standard error; ZINB, zero-inflated negative binomial model; NB, negative binomial model; ACT, Australian Capital Territory; NSW, New South Wales; NT, Northern Territory; Qld, Queensland; SA, South Australia; Tas., Tasmania; Vic., Victoria; WA, Western Australia; IRSAD, index of relative socioeconomic advantage and disadvantage.
Bold denotes significant at $P < 0.05$.

Table 3. Estimates of inequality in specialist visits.

Type of visit	Concentration Index	95% confidence interval
Probability of visit	**0.030**	(0.030, 0.031)
Number of visits (zero and positive visits)	**0.047**	(0.046, 0.047)
Number of visits (positive visits only)	**0.016**	(0.016, 0.017)
Number of visits with OOP costs	**0.038**	(0.038, 0.039)
Number of visits without OOP cost	**−0.009**	(−0.010, −0.009)

Bold denotes significant at $P < 0.05$.

The argument is that patients facing OOP cost either delay or skip specialist appointments and this financial barrier hits the people from socioeconomically disadvantaged areas harder.[28] Inequality in specialist care due to remoteness is similar to the findings of primary care services, as reported by current Australian studies.[29,30] Specifically, Australians living in remote and very remote areas have less utilisation of both bulk-billed and non-bulk-billed specialist care. This indicates that both physician availability and financial barriers drive inequalities in specialist care.

This study has some important policy implications. Previous research revealed that specialists price-discriminate by offering reduced fees to lower-income households.[12] This study has shown that these discounts and resulting lower OOP costs are insufficient to remove the financial barriers for patients living in low socioeconomic areas. Well-designed incentive mechanisms to encourage specialists to offer more low-fee services, particularly for low-income patients, might be effective in reducing the degree of inequality in specialist services utilisation in Australia. Such incentives may need to be higher in rural and remote areas where patients are more likely to incur OOP costs compared to patients living in metropolitan areas. This kind of incentive was implemented in 2005 for general practice consultations, with a noticeable impact on the OOP costs.[31] Similar financial incentives could be designed for specialist consultations, although more research is required on the level of the incentives that would maximise behaviour change among specialists and minimise unintended consequences on Government expenditure and other (eg higher income) patients.

Our findings are subject to a few limitations. The empirical evidence presented in this study is for all specialist services, regardless of specialist type. It is worth noting that there is considerable variation in the quantum of co-payment and the degree to which services attract a co-payment between different specialist types. In our analysis, we were unable to disaggregate by specialist type, but further research should focus on whether the overall conclusions reached here hold true for different types of specialists. The current analysis does not include data on outpatient specialist services provided in public hospitals that are not funded by the MBS. The impact that such services may have on the inequality of specialist service utilisation is not clear and requires further research. Another limitation is that individuals were ranked from the lowest to the highest based on the SES of the areas where they lived. This could lead to the common problem of 'ecological fallacy', which was found in other studies.[32] That said, our findings are broadly consistent with earlier – individual-level – results showing a pro-rich distribution in specialist use. Finally, we could not adjust for the need for specialist services, which restricts us from drawing any conclusions about inequity. However, earlier studies reported that inequality favouring the better-off socioeconomic groups becomes even higher after need adjustment.[8] Hence, our results may be an underestimation of the pro-rich distribution of specialist visits.

We emphasise that Medicare data would be a richer source of information if it could be linked to data on personal characteristics. For example, ecological fallacy problems would be solved by linking individual-level Medicare data to tax file data. One area for future research is to investigate how Medicare data could be used to measure healthcare needs. It could be plausible to derive estimates of healthcare needs based on particular types of claims. For example, the use of specific patterns of chemotherapy or radiation oncology claims may identify patients with cancer. The identification of health needs to be based on claims data would require careful clinical expertise and validity checking. Routine linkage of public hospital outpatient data would be also useful to undertake a robust analysis of equity in the Australian healthcare system. Linking MBS data to hospital records would be another avenue to measure the need for healthcare services based on the Charlson index or diagnoses-based morbidity indices. This would allow future research to go beyond inequality analysis to study inequity in healthcare use. Finally, studies using linked hospital records and Medicare data would be an opportunity to analyse the substitution of services due to inequality in one area of the healthcare sector.

Conclusion

This study shows that the performance of Australian Medicare to deliver equitable healthcare services is linked to the use of services with zero OOP costs. As OOP costs are determined through a mix of government policy and market interactions, this presents a challenge to the government on how best to influence the rate and distribution of bulk-billed specialist services. High and rising OOP costs to use specific services could undermine the equity principle of Medicare in Australia.

Supplementary material

Supplementary material is available online.

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