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ORIGINAL RESEARCH ARTICLE

Preferences for Enhanced Primary Care Services Among Older Individuals and Primary Care Physicians

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Abstract

Objective We aimed to identify the factors that are most important for community-dwelling older individuals (i.e., users) and primary care (PC) providers to enhance PC services.

Methods Discrete choice experiment surveys were administered to 747 individuals aged ≥ 60 years and 242 PC physicians in Singapore between December 2020 and August 2021. Participants were asked to choose between two hypothetical PC clinics and their current clinic. Latent class models were used to estimate the relative attribute importance (RAI) and to calculate the predicted uptake for enhanced PC services.

Results Based on the attributes and levels used in this study, the out-of-pocket cost (RAI: 47%) and types of services offered (RAI: 25%) were the most important attributes for users while working hours (RAI: 28%) and patient load (RAI: 25%) were the most important for providers. For out-of-pocket visit costs ranging from Singapore dollars (S)$100 to S$5, users' predicted uptake for enhanced PC services ranged from 46 to 84%. For daily patient loads ranging from 60 to 20 patients, providers' predicted uptake ranged from 64 to 91%, assuming their income remains unchanged.

Conclusions Our study provides timely insights for the development of strategies to support the government's new health care initiative (HealthierSG), which places PC at the center of Singapore's healthcare system. The ability to choose their preferred clinic, low out-of-pocket costs and types of services offered (for users), and reasonable working conditions (for providers) were the key factors for users and providers to participate in enhanced PC services.

Key Points for Decision Makers

Our findings showed that 48% of users and 65% of providers preferred their current clinic over other clinics, while 27% of users preferred clinics other than their current clinics when they offer the same services.

Factors such as the ability to choose their preferred clinic, low out-of-pocket costs and services offered in a clinic (for users), and reasonable working conditions (for providers) were key for users and providers to enhance PC services.

1 Introduction

The number of people living with chronic conditions in Singapore is expected to grow alongside the nation's increasingly aging population [1]. When left unmanaged, chronic conditions lead to complexities that can substantially strain healthcare systems. Singapore's healthcare system has already shown signs of systemic stress [2], including high acute hospital bed occupancy rates [3], increased emergency department use, long waiting times for receiving health services, and overburdened specialist outpatient clinics [4]. To better align the healthcare system with the needs of an aging population, the Singaporean government recently announced the HealthierSG initiative that places primary care (PC) at the center of its healthcare system [5].

One of the goals of HealthierSG is to enhance PC services by integrating PC providers, thus enabling data sharing across all healthcare institutions and building team-based care. Patients could then be assigned to a PC provider whom they can visit regularly for all their healthcare needs, ensuring continuity of care. The government is currently

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evaluating different policies and strategies to implement this multi-year healthcare reform as well as to encourage participation and adherence. However, it is unclear whether patients and PC providers would be interested in this new initiative and what factors would encourage them to consider enhanced PC services. In this study, we developed and conducted two discrete choice experiments (DCEs) to identify what factors are the most important for older Singaporeans and PC providers to enhance PC services, and their willingness to participate in these services. Our findings will inform policymakers about developing specific strategies that support the HealthierSG initiative.

1.1 Primary Care Setting in Singapore

There are currently two PC settings in the city-state: public polyclinics and private general practice (GP) clinics. While polyclinics offer comprehensive, subsidized healthcare services, patients are likely to see different physicians at each visit depending on availability. Conversely, although patients are more likely to see the same physician in GP clinics, most clinics are relatively small with one or two physicians providing consultation and having limited diagnostic services. With patients free to choose between GP clinics and polyclinics for their PC needs, most of them choose GP clinics (81%). However, for chronic care management, the percentage of patients choosing polyclinics increases (45%), likely due to the availability of a wide range of services and lower out-of-pocket costs at polyclinics [6].

2 Methods

2.1 Study Setting

Users were sampled from participants of a prior cohort study [7]; a nationally-representative sample of community-dwelling Singaporeans aged ≥ 60 years. Respondents were citizens or permanent residents who were cognitively fit (scoring 6 or more on the Abbreviated Mental Test) [8]. Trained interviewers administered the survey using tablets between December 2020 and April 2021.

Providers were recruited through email invitations sent by the senior leaders of major public and private PC systems. Providers could register to the study through the email invitations. General practitioners/family medicine physicians who have been actively seeing patients in a public or private clinic in the past year were eligible. The web-enabled survey was administered between June and August 2021.

All participants provided informed consent before completing the survey. The study was approved by the Institutional Review Board of the National University of Singapore (NUS-IRB Reference Code: LS-19-104).

2.2 Discrete Choice Experiment

DCE is a survey research method commonly used to assess preferences for healthcare products and services. DCEs are based on random utility theory where individuals are assumed to choose between several options in a choice task that maximizes their utility [9]. Each option is defined by a set of attributes, which differ from that of other options. The respondents are administered a series of these choice tasks to enable researchers to quantify how individuals trade changes in one attribute with changes in other attributes and predict uptake for specified healthcare services [10, 11].

2.3 Development of the Survey

The attributes were identified based on a literature review, and one-on-one interviews with a convenience sample of 35 users, as well as a short web-enabled survey with 15 providers. After developing draft DCE questionnaires, we conducted pre-test interviews using the "think aloud" protocol [12] with 13 users and 8 providers. Based on the feedback from the pre-tests, we identified the final list of attributes presented in electronic supplementary material [ESM] Table S1. We then pilot tested the web-enabled survey with 30 users and 18 providers (see the Methods section in the ESM, for details on survey development).

Each DCE choice task consisted of two hypothetical clinics. After respondents chose one of the clinics, they were asked whether they would choose the selected clinic or their current clinic (Fig. 1a, b).

We created a fractional-factorial experimental design based on optimal D-efficiency, using SAS 9.4 software (SAS Institute, Cary, NC, USA) [13]. The saturated design required 10 choice tasks for the user survey and 15 for the provider survey. To collect more data from each respondent than the saturated design required, we generated 18 and 24 choice tasks for the user and provider surveys, respectively. In addition, we limited the number of choice tasks per respondent to a manageable level to reduce cognitive burden. The choice tasks were divided into three blocks of six and eight questions for the user and provider surveys, respectively using the SAS software. Each respondent was randomly assigned to one of the blocks.

As part of the choice tasks, we also manually created two choice tasks (attention task and hold-out task) for each respondent. An attention task was used to check respondents' attentiveness [14] by presenting them with two clinics to choose from, of which one had strictly better attributes than the other. A utility-maximizing respondent is expected to choose the dominant/better clinic. A hold-out

(a) **If you need to go to a primary care doctor, which clinic will you choose?**

	Clinic A	Clinic B
Approach to care	Usual care	New approach to care
Seen by same or different doctor	Same doctor	Different doctor
Doctor's ability to manage	Common as well as uncommon or unstable conditions	Common or stable medical conditions
Services in clinic	Doctor, medication and common diagnostic services	Doctor, medication and full range of diagnostics and specialist services
Access to medical records	From clinic	From clinic and other health facilities
Out-of-pocket cost	$100	$5
	Clinic A	Clinic B

Would you prefer the clinic you chose above or your current clinic mentioned in Section 2?

	Code	
The clinic I chose above	1	
My current clinic	2	

(b) **If you will need to choose between one of these clinics as your practice site, which clinic will you choose?**

	Clinic A	Clinic B
Operating hours of clinic	Working hours, evenings and weekends	24/7 including home visits
Services available	Doctor, medication and common diagnostic services	Doctor, medication and wide range of diagnostics and specialist services
Continuity with patients	Mostly different patients	Mostly same patients
Typical patient load per day	20	60
Hours of administrative work per day	3 hours	1 hour
Professional development and training	No protected time	1 day per month
Income per month	25% increase in income	Current income
	Clinic A	Clinic B

Assume that the clinics are different ***only*** in terms of the levels of the features shown.

Would you prefer the clinic you chose above or your current clinic?

	Code	
The clinic I chose above	1	
My current clinic	2	

Fig. 1 Sample DCE choice task in the user survey (**a**) and provider survey (**b**). *DCE* discrete choice experiments

task was used to test the predictive validity of model estimates [15]. In the holdout task, one clinic (Clinic A) represented the most common PC clinic setting currently while the other clinic (Clinic B) represented an enhanced PC clinic setting that is most likely to be offered in the country. The percentage of respondents choosing Clinics A, B or their 'Current Clinic' in the holdout task was compared with the probability of choosing those alternatives using estimates based on responses to the rest of the choice tasks.

The questionnaires also included demographic and health status questions and questions regarding participants' use of PC and providers' practice.

2.4 Statistical Analysis

Based on Orme's formula [16], the recommended sample size for a DCE was 166 for users and 125 for providers. We targeted to recruit more respondents to enhance the precision of the results and investigate whether user and provider characteristics affect preferences.

The final outcome in a DCE task was indicated as a single choice among the three options (Clinic A/B, or current clinic). The attribute levels for their current clinic were assigned based on participants' answers to the current clinic questions. All attributes were dummy-coded, with the worst level being assigned as the reference level. The model also had an alternative specific constant (ASC) for the current clinic, reflecting the utility gain associated with the current clinic that was not captured via the attributes used in the study.

To analyze the data, we used a latent class logistic (LCL) model that allow taste heterogeneity (see the Statistical Analysis section in the ESM, for details on model selection.) The predictors of class memberships were investigated by entering variables related to user and provider characteristics.

Using the coefficients from the model, we first calculated the relative attribute importance (RAI) for each attribute by dividing the difference between the largest and smallest preference weight of an attribute by the sum of all weights and then multiplying by 100 [17]. We did this for each class, and then weighted by their class proportion in the sample. We reported the weighted RAI for the overall sample. The greater this difference, the more important that attribute is compared with the other attributes.

We calculated the predicted uptake for PC services, assuming three available options: (1) users'/providers' current clinics (i.e., baseline); (2) users'/providers' current clinics offering enhanced PC services; and (3) new (i.e.,

different than the current clinic) clinics offering enhanced PC services. The current clinic for each participant was defined based on the participant's responses to the questions that describe their current clinic consistent with the attributes and levels used in the DCE. Enhanced PC service was defined based on the government's description of new services under the new system. For users, enhanced PC services were defined as new approach to care; seen by the same physician; physician has the ability to treat common as well as uncommon or unstable conditions; consultation, medication and a full set of diagnostic and specialist services are offered; and medical records can be accessed from all healthcare facilities. For providers, enhanced PC services were defined as: operating hours are weekdays and working hours; provider mostly sees the same patients; consultation, medication and a full set of diagnostic and specialist services are offered; 0.5 h of administrative duties per week; 1 day per month allocated for professional development and training; no change in income. We varied the out-of-pocket cost of enhanced PC services to show the effect of cost on predicted uptake for users. For providers, we varied the patient load of the enhanced PC clinics (see the Predicted Uptake Calculations section, in the ESM for details.) NLOGIT 6.0 software (Econometric Software, Inc., Plainview, NY, USA) was used to analyze the choice data and Stata 15.1 was used for other analyses (StataCorp LLC, College Station, TX, USA).

3 Results

3.1 Sample Characteristics

Of the 1285 users approached, 383 declined to participate, 12 were deceased, and 113 were ineligible. The first 30 users participated in pilot testing. 441 physicians registered their interest in the study; 30 of which were duplicates. 329 physicians were invited to the final survey (the remainder were invited during the survey development or pilot-testing stages), of which, 242 completed the survey, 84 declined to participate, and 3 were ineligible. The analytical sample consisted of 747 users and 242 providers.

The average age of the users was 72 ± 6 years; 53% ($n = 398$) were female (Table 1); and the majority were Chinese ($n = 599$, 80%) and reported having medical conditions that required regular PC visits ($n = 566$, 76%). The average number of PC visits per person was 4 ± 4 within the last year. About 36% ($n = 269$) reported utilizing GPs while the remainder (64%, $n = 478$) reported utilizing polyclinics. The median out-of-pocket cost of the most recent visit was < S$5 (~ US$3.7) for polyclinics and between S$15 and S$30 (~ US$11.1 and US$22.2) for GPs. About 25% ($n = 185$) reported that they were able to cover out-of-pocket medical costs very well.

The average age of providers was 37 ± 9; about half were female (51%) and reported working at GP clinics (50%). About one-quarter (26%) reported owning their clinic. 25% and 28 % reported practicing for < 3 years and for > 10 years, respectively (see the Information on Current Clinics section, in the ESM for information on the current clinics.)

3.2 Data Quality and Model Selection

In the user survey, 12 (1.6%) respondents chose the dominated clinic while only one (0.4%) respondent chose the dominated clinic in the provider survey. These rates are within the range of the findings from other DCE studies [18].

We choose the latent class model based on Akaike information criterion (AIC), significance of the estimates and how well the model predicted the hold-out task. A 3-class latent class model was chosen for both data sets after investigating the 2-, 3- and 4-class models. The 3-class model performed better than the 2-class model in terms of AIC and performed better than the 4-class model in terms of significance of the estimates and in predicting the hold-out task for both sets (see the Model Selection section, in the ESM for more details on the model selection.)

3.3 Users' Preferences for Primary Care Services

We predicted that almost half (48%) of the users belong to Class 1, followed by Class 3 (27%) and Class 2 (24%) (Table 2). All the classes preferred being seen by physicians with greater ability to manage symptoms and going to clinics where more services are offered at a lower cost. The approach to care was not significant for all three classes. Classes 2 and 3 preferred being seen by the same physician and their clinic to have access to medical records from all healthcare facilities. Class 1 had a positive preference for their current clinic, Class 2 was indifferent to their current clinic (i.e., not significant) and Class 3 had a negative preference for their current clinic over other clinics, assuming everything else was the same.

Based on the attributes and levels used in the user survey, the out-of-pocket cost was the most important attribute (42%), followed by the range of services available (25%) (Fig. 2). Access to medical records (6%) and approach to care (2%) were the least important attributes. Patients who reported being able to cover their out-of-pocket costs very well (versus 'poorly') were significantly more likely to be in Class 1 ($\beta = 1.25$, $p = 0.01$) or Class 2 ($\beta = 1.46$, $p = 0.01$) than Class 3.

Table 1 User and provider characteristics

Characteristics	Mean ± SD/*N* (%)	
	Users	Providers
Age, years	71.6 ± 5.5	36.7 ± 9.0
Ethnicity		
Chinese	599 (80.2)	
Malay	79 (10.6)	
Indian/others	69 (9.2)	
Sex		
Female	398 (53.3)	123 (50.8)
Number of times visited a clinic in the last year	3.90 ± 3.7	
Primary care satisfaction		
Very satisfied	172 (23.0)	
Satisfied	547 (73.2)	
Dissatisfied	24 (3.2)	
Very dissatisfied	0 (0.00)	
Do not know	4 (0.5)	
Has medical condition that requires regular follow-ups	566 (75.8)	
Current primary care clinic		
General practitioner	269 (36.0)	120 (49.6)
Polyclinic	478 (64.0)	114 (47.1)
Out-of-pocket cost for the last medical visit, median		
Overall	$5–14	
GP visits	$15–30	
Polyclinic visits	< $5	
Ability to cover the out-of-pocket costs of medical visits		
Very well	185 (24.8)	
Fairly well	445 (59.6)	
Poorly	58 (7.7)	
Do not pay out-of-pocket for consultations/treatments	59 (7.9)	
Years practicing in a primary care setting		
< 3		61 (25.2)
3–5		62 (25.6)
6–10		52 (21.5)
11–15		30 (12.4)
16–20		7 (2.9)
> 20		30 (12.4)
Own the clinic they work on		
Yes		30 (26.3)
No		80 (70.2)
Others		4 (3.5)
Usually seen by the same or different doctor/Usually see the same or different patients?		
Same doctor/patients	315 (42.2)	100 (41.3)
Different doctor/patients	432 (57.8)	142 (58.7)
Doctor's ability to manage		
Common as well as uncommon or unstable medical conditions	343 (45.9)	
Common or stable medical conditions	404 (54.1)	
Services available in the clinic		
Doctor consultation and medication	147 (19.7)	38 (15.7)
Doctor, medication and common diagnostic services	427 (57.2)	178 (73.6)
Doctor, medication and full range of diagnostics and specialist services	167 (22.4)	26 (10.7)

Table 1 (continued)

Characteristics	Mean ± SD/*N* (%)	
	Users	Providers
Access to medical records		
The doctor uses medical records from his or her clinic only	242 (32.4)	
The doctor uses medical records from his or her clinic and has access to medical records from all health facilities	505 (67.6)	
Out-of-pocket cost (consultation and medication)		
< $5	307 (41.1)	
$5–$14	117 (15.7)	
$15–$30	140 (18.7)	
$31–$50	96 (12.9)	
$51–$75	27 (3.6)	
$76–$100	20 (2.7)	
$101–$150	22 (3.0)	
> $150	18 (2.4)	
Operating hours		
Weekdays and working hours		222 (91.7)
Weekdays and weekends, working hours and evenings		13 (5.4)
24/7 including home visits		7 (2.9)
Patient load per day		
20		27 (11.2)
40		154 (63.6)
60		61 (25.2)
Administrative duties per week, hours		
0.5		79 (32.6)
1		95 (39.3)
3		68 (28.1)
Professional development and training		
1 day per month		100 (41.3)
1 day per 3 months		25 (10.3)
No protected time		117 (48.3)

SD standard deviation, *GP* general practice

3.4 Providers' Preferences for Primary Care Services

Class 2 was the largest (38%), followed by Class 3 (35%) and Class 1 (26%) (Table 3). All three classes preferred shorter operating hours and lower patient load. Classes 1 and 3 preferred seeing the same patients and shorter administrative hours per week, while Classes 2 and 3 preferred higher income. Only Class 1 preferred more dedicated time for professional development. Classes 1 and 2 had positive preferences for their current clinic over other clinics, while Class 3 was indifferent to their current clinic.

Based on the attributes and levels used in the provider survey, operating hours was the most important attribute (28%), followed by patient load (25%) and change in income (20%) (Fig. 2). Time dedicated to professional development (6%) and the range of services offered (5%) were the least important attributes. Physicians who reported higher yearly income were significantly more likely to be in Class 1 ($\beta = 1.13$, $p = 0.01$) or Class 2 ($\beta = 0.69$, $p = 0.10$) than Class 3.

3.5 Predicted Uptake for Enhanced Primary Care Services

As the out-of-pocket cost for enhanced services decreased from $100 to $5, the users' predicted uptake for enhanced PC services increased from 46 to 84% (Fig. 3). Most of these individuals (18–48% of the total sample) preferred staying with their current clinics to receive the enhanced services while 28–36% of the sample preferred new clinics, depending on out-of-pocket costs. The predicted uptake for the current clinics was the highest among Class 1 users while the predicted uptake for new clinics offering enhances services was highest among Class 3 users (Fig. 4a).

Table 2 Three-Class latent class estimates for the user survey

	Class 1				Class 2				Class 3			
	Coefficient		SE	*p* value	Coefficient		SE	*p* value	Coefficient		SE	*p* value
Approach to care (reference: standard care)												
New approach to care	− 0.072		0.317	0.821	0.177		0.134	0.184	0.089		0.077	0.251
Seen by (reference: seen by different doctor)												
Seen by the same doctor	− 0.394		− 1.59	0.112	0.730	***	0.120	0.000	0.516	***	0.074	0.000
Doctor's ability to manage (reference: common conditions)												
All conditions	0.695	***	0.255	0.006	0.460	***	0.126	0.000	0.473	***	0.078	0.000
Services available (reference: only medication)												
Full services	1.404	***	0.357	0.000	1.297	***	0.185	0.000	1.250	***	0.109	0.000
Diagnostics services	1.095	***	0.299	0.000	0.928	***	0.173	0.000	0.616	***	0.110	0.000
Access to medical records (reference: only records in the clinic)												
All records	0.038		0.233	0.870	0.798	***	0.137	0.000	0.465	***	0.079	0.000
Cost												
Linear cost	− 0.067	***	0.002	0.000	− 0.085	***	0.008	0.000	− 0.028	***	0.006	0.000
Squared cost	0.000	***	0.000	0.000	0.000	***	0.000	0.000	0.000	***	0.000	0.011
ASC												
ASC for current clinic	4.925	***	0.345	0.000	0.143		0.176	0.417	− 2.645	***	0.183	0.000
Class membership predictors (reference: Class 3)												
Constant	0.510	***	0.123	0.000	− 0.364		0.167	0.029	0.000			
Ability to cover cost: very well	1.255	**	0.505	0.013	1.464	**	0.589	0.013	0.000			
Ability to cover cost: fairly well	− 0.066		0.224	0.768	0.462	*	0.274	0.092	0.000			
Did not pay out-of-pocket	− 0.004		0.370	0.991	0.254		0.516	0.623	0.000			
Ability to cover cost poorly (ref)	0.000				0.000				0.000			
Percentage of participants belonging to each class	48.4				24.2				27.4			

SE standard error, *ASC* alternative specific constant

*Significance at the 10% level

**Significance at 5%

***Significance at 1%

Among providers, as patient load decreased from 60 patients to 20 patients, the providers' predicted uptake for enhances services increased from 64 to 91% (Fig. 3). Similar to the users, physicians preferred providing standard or enhanced services at their current clinics, which were mostly due to Classes 1 and 2 who preferred their current clinics over other clinics (Fig. 4b). Predicted uptake for a new enhanced clinic was 15% at a patient load of 60 and 21% at a patient load of 20, and was highest among Class 3 providers.

4 Discussion

We administered two choice experiments to identify the key factors for older community-dwelling individuals and PC physicians to enhance PC services in Singapore. Latent-class analyses indicated three classes of participants with different preferences. The main difference between the classes was their preference for current clinics. Users who reported being able to cover their out-of-pocket medical costs well were more likely to be in classes with a positive or neutral preference for the current clinic. Similarly, physicians who reported higher yearly income were more likely to be in classes with a positive preference for their current clinic. These findings suggest that affordability and income for users and providers, respectively, were key predictors affecting their preference for PC services.

Based on the attributes and levels used in this study, the out-of-pocket cost was the most important attribute (47%), similar to previous DCE studies [19, 20]. It is understandable that out-of-pocket cost was a major concern for older individuals who are not likely to expect substantial gains in their income. Although Singapore provides basic universal healthcare coverage for all citizens, and subsidies based on means testing, out-of-pocket payments constitute a significant percentage of total health spending [21]. Furthermore, the coronavirus disease 2019 (COVID-19)

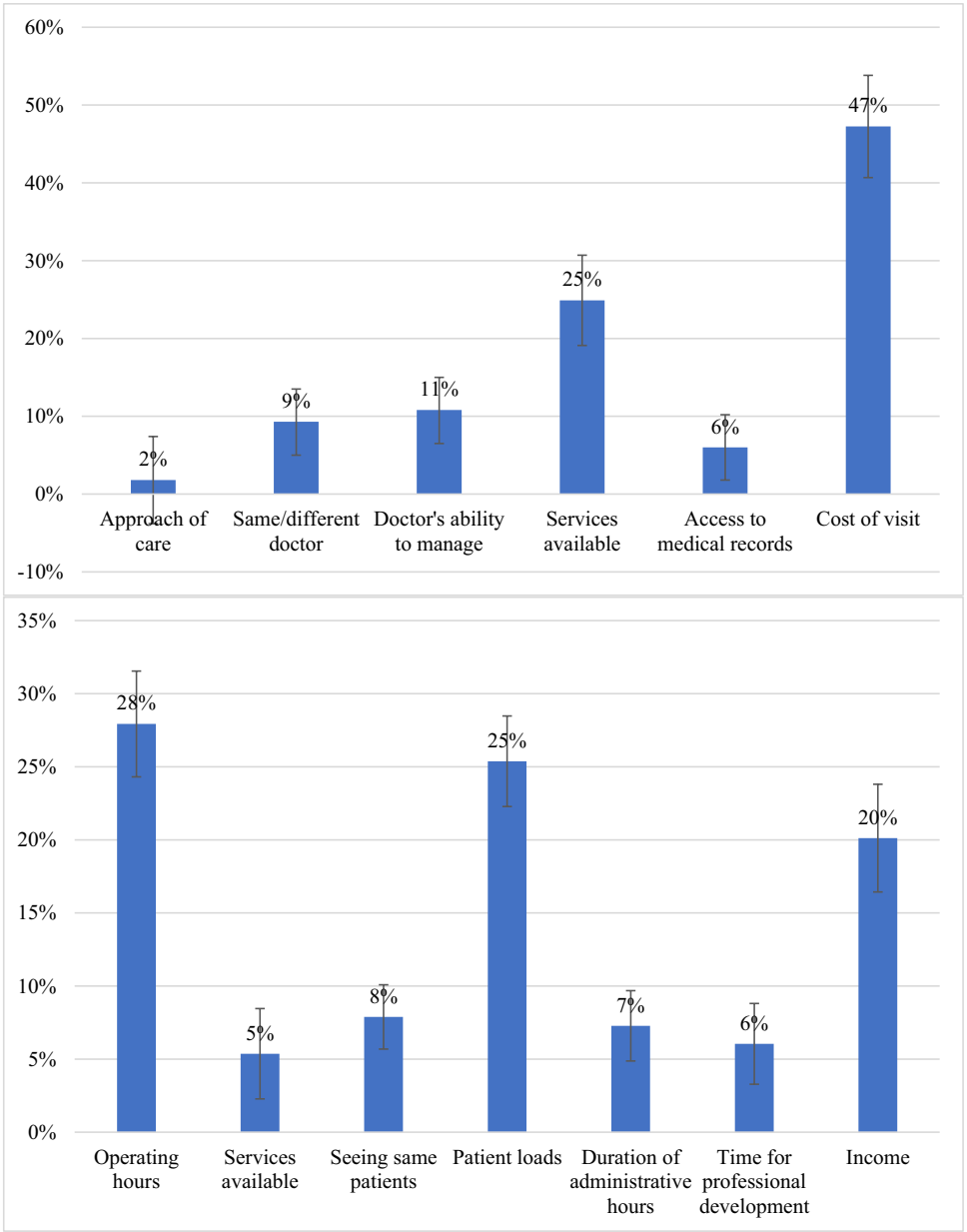

Fig. 2 Relative attribute importance for users (top) and providers (bottom)

pandemic and associated policies may have had a detrimental effect on household income, leading to users' greater preference for affordable PC services.

The approach of care was the least important attribute for users. During the interviews conducted to identify the most important attributes, the concept for this attribute was captured by an attribute labeled continuity of care and it was highly rated in these interviews. However, the label also created confusion and required extra explanation; hence, we revised the labeling of this concept. Further work may be needed to communicate the concept of an accountable clinic as articulated under HealthierSG, in order to improve understanding of the new initiative.

In contrast to the findings of prior research with patients [22], having access to a wide range of diagnostic services was one of the most important attributes for users, but not for providers, in our study. This may be because most GP clinics in Singapore are small and provide limited services, meaning that even simple tests have to be conducted in larger clinics or hospitals. Thus, users may appreciate having a full range of services available in their PC clinics. Conversely, this may not be feasible for most GP clinics in their current settings. In addition, both users and providers (8–9%) felt that establishing a relationship between patients and providers (i.e., seeing the same doctor/patients) is equally important. These findings are also

Table 3 Three-Class latent class estimates for the provider survey

	Class 1				Class 2				Class 3			
	Coefficient		SE	*p* value	Coefficient		SE	*p* value	Coefficient		SE	*p* value
Operating hours (reference: 24/7 with home visits)												
Weekdays and working hours	2.414	***	0.473	0.000	4.120	***	0.536	0.000	1.194	***	0.166	0.000
Workdays and weekends, working hours and evenings	1.822	***	0.463	0.000	1.973	***	0.524	0.000	0.530	***	0.159	0.001
Services offered in the clinic (reference: Only medication)												
Full services	1.044	**	0.194	0.015	− 0.017		0.248	0.946	0.027		0.146	0.855
Diagnostics services	− 1.690	***	0.195	0.000	− 0.146		0.218	0.504	− 0.006		0.132	0.966
Patient type (reference: different patients)												
Same patient	2.424	***	0.399	0.000	0.196		0.175	0.263	0.420	***	0.119	0.000
Patient load per day (reference: 60 patients)												
20 patients	3.830	***	0.671	0.000	2.449	***	0.361	0.000	1.353	***	0.165	0.000
40 patients	2.031	***	0.446	0.000	1.082	***	0.242	0.000	0.820	***	0.154	0.000
Administrative hours per week, hours (reference: 3 h)												
0.5	1.423	***	0.431	0.001	0.047		0.209	0.824	0.458	***	0.140	0.001
1	− 0.449		0.356	0.207	− 0.159		0.233	0.496	0.137		0.141	0.330
Professional development (reference: none)												
1 day per month	0.980	***	0.366	0.007	0.178		0.190	0.348	0.152		0.124	0.219
1 day per 3 months	− 0.125		0.365	0.733	− 0.533	**	0.265	0.045	− 0.063		0.146	0.669
Change in income (reference: no change in income)												
25% increase	0.447		0.549	0.416	2.622	***	0.481	0.000	1.126	***	0.194	0.000
10% increase	− 0.771		0.579	0.183	1.824	***	0.471	0.000	0.649	***	0.172	0.000
5% increase	− 0.875		0.757	0.248	1.180	***	0.445	0.008	0.238		0.183	0.192
ASC												
ASC for current clinic	5.374	***	0.749	0.000	2.369	***	0.466	0.000	− 0.271		0.194	0.162
Class membership predictors (reference: Class 2)												
Constant	− 1.850	***	0.588	0.002	− 0.828		0.552	0.134				
Income	1.133	***	0.414	0.006	0.694	*	0.417	0.096				
Percentage of participants belonging to each class	26.4				38.2				35.4			

SE standard error, *ASC* alternative specific constant

*Significance at thr 10% level

**Significance at 5%

***Significance at 1%

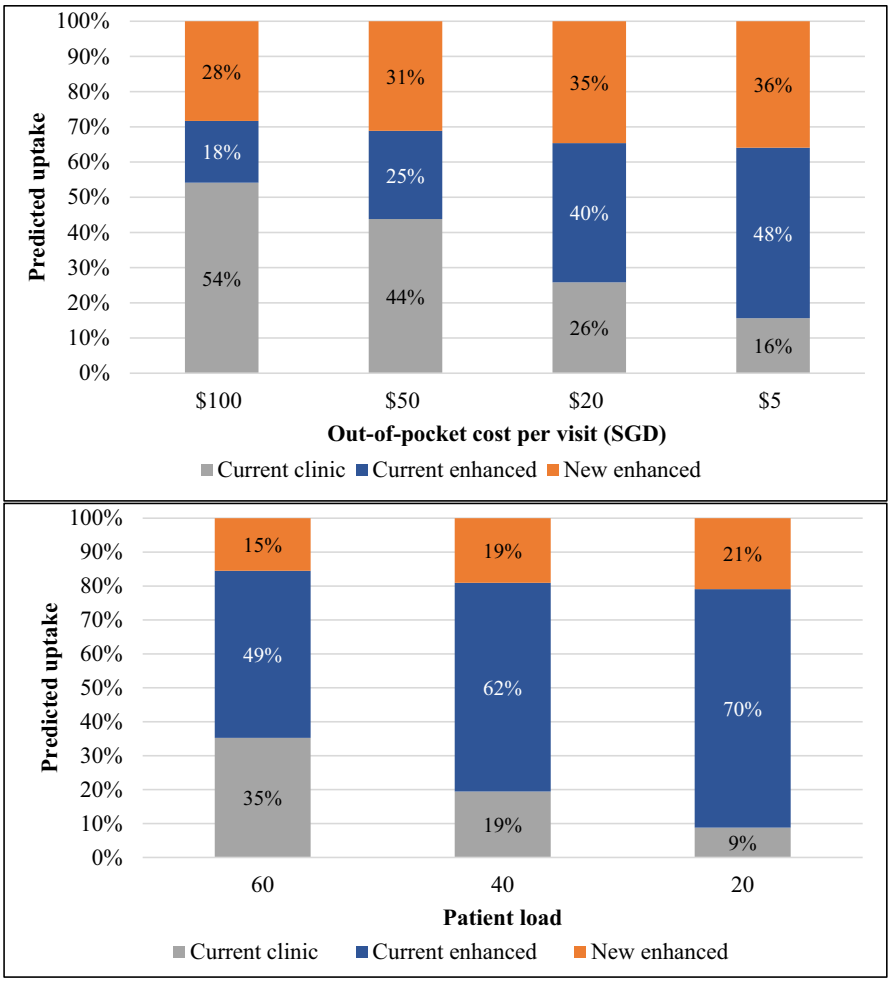

Fig. 3 Predicted uptake of primary care clinics at different out-of-pocket cost levels for the enhanced primary care services for users (top) and at different patient load levels for providing enhanced primary care services for providers (bottom). *SGD* Singapore dollars

'Current clinic' refers to users' and providers' current clinics offering standard care. 'Current enhanced' refers to current clinics offering enhanced services. 'New enhanced' refers to different (from current) clinics offering enhanced services.
Enhanced primary care services for users: Approach to care: new, seen by: same physician, physician ability to treat: common and uncommon conditions, types of services: full set of services, medical records: from all clinics, out of pocket cost: varied.
Enhanced primary care services for providers: Operating hours: weekdays and during working hours; Services available: Consultation, medication and full diagnostics services; Continuity with patients: mostly same patients; Administrative duties per week: 0.5 hour; Professional development and training: 1 day per month; Income level: no change; Patient load: varied.

consistent with the aims of the HealthierSG initiative, where PC services are expected to support individuals across their life course for different health needs.

Physicians, on the other hand, found several attributes equally important: operating hours (28%), patient load (25%), and income (20%). These findings show that working conditions and income are top concerns for physicians, even more than their professional development and the type of services they provide. We anticipate that the additional strain on healthcare providers during the COVID-19 pandemic [23] might have strengthened physicians preference for reasonable working conditions.

Our findings show that when out-of-pocket cost ranged from $20 to $5, users' predicted uptake for the enhanced PC services ranged from 75 to 84%. However, most (40–48% of the total sample) users preferred to receive these services at their current clinics, while about one-third of the users preferred different clinics. Similarly, most physicians (64–91%) were found to be willing to work at clinics offering enhanced PC services even when there was no change in their income.

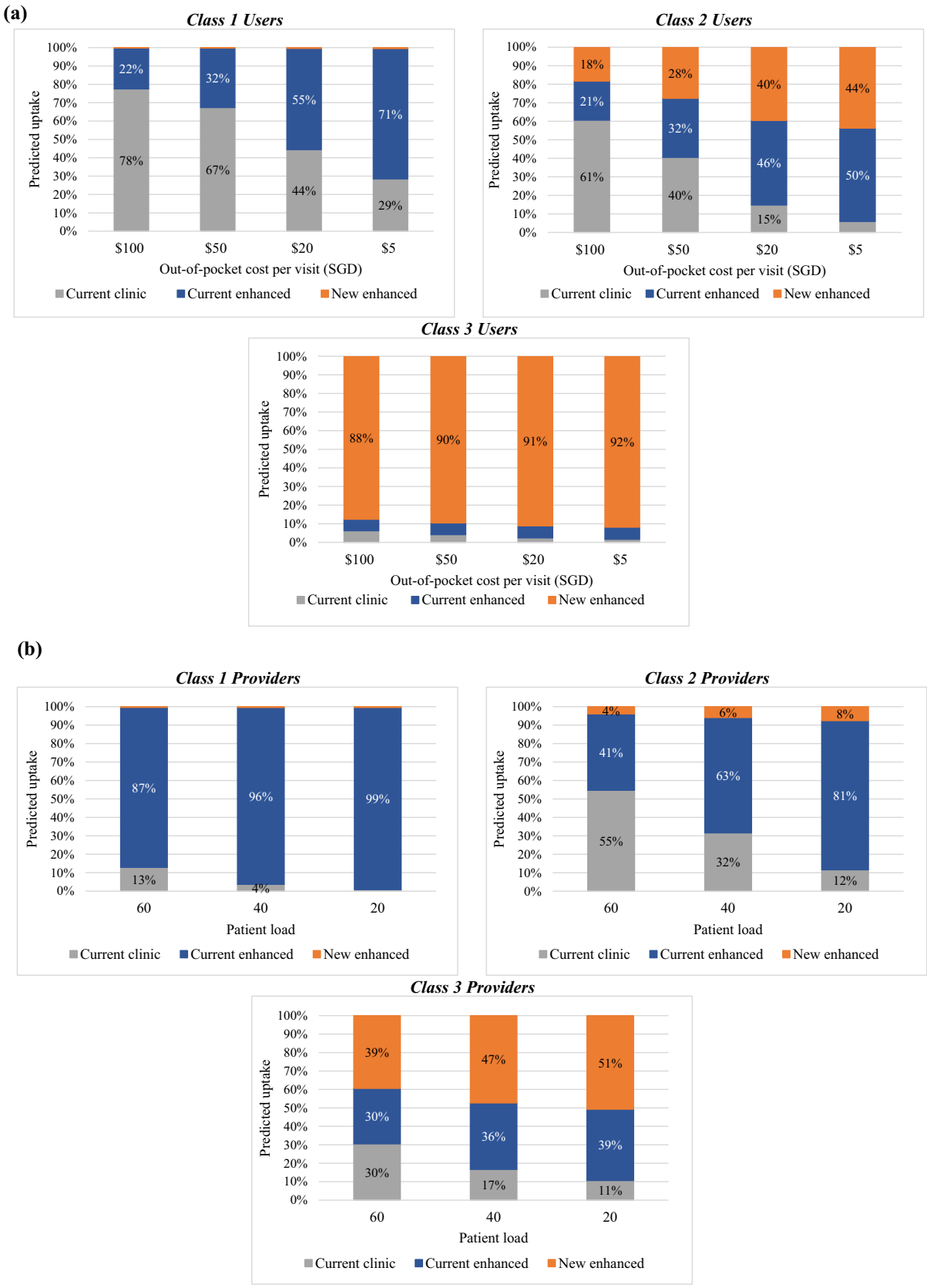

Fig. 4 Predicted uptake for each class: **a** users, and **b** providers. *SGD* Singapore dollars

When the patient load was 40 or lower per day, 62–70% of physicians preferred to work in their own clinics while about 20% preferred working at different clinics. These results suggest that while some users/providers would always want to switch to a different clinic, a larger proportion of them would prefer their current clinics to be providing these enhanced services.

In order to increase demand for enhanced PC services, we suggest policy makers to give users and providers the option of choosing the clinic they want to visit or work at, respectively. This may result in most users and providers choosing to stay with their own clinic, creating feasibility problems for small GPs to deliver the required services as part of the initiative. Similar to the team-based approach recommended by the HealhierSG initiative to support patients throughout their health journey, GP clinics would need to work closely with hospitals, especially for the management of patients with complex needs.

The findings of the study should be interpreted in the context of some limitations. First, our sample was diverse, derived from a statistically-representative sample of the older population and a random pool of PC physicians in Singapore; however, the group who participated were not statistically representative, and thus, the findings may not be generalizable. Second, since we limited the number of attributes to reduce cognitive burden, several other attributes that were otherwise important to users could not be included in this study. However, the final attribute selection was based on findings from the iterative process we implemented with users or providers of the PC services. Third, the study findings on RAI and predicted uptake are based on the attributes and levels used in the study. This problem is inherent to all studies that utilize a DCE method to estimate preferences.

5 Conclusions and Implications

The HealthierSG initiative announced by the Singapore government places PC at the center of the healthcare system to better cater to an aging population burdened with increasing chronic diseases. Our study provides timely insights into the preferences of community-dwelling older individuals and PC physicians for different features of PC services, which can inform the development of strategies to support this initiative. Based on the findings on the 'approach of care', there appears to be significant room to better communicate the value of a clinic that is accountable for care and health outcomes before the concept of enhanced PC, as articulated by HealthierSG can achieve the highest possible levels of participation. Our study shows that by choosing their preferred clinic for PC services, users and providers would be more willing to be part of this initiative. Low out-of-pocket costs and offering a wide range of services for users and low patient load for providers are other key factors that this initiative should target to encourage participation.

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Declarations

Conflict of interest Semra Ozdemir, John Ansah, and David Matchar declare that they have no conflicts of interest.

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Authorship contributions Study concept and design: SO, JA, DA. Acquisition of data: DA. Analysis and interpretation: SO, JA, DA. Manuscript drafting: SO. Critical revision of the manuscript: JA, DA.

Informed consent All participants provided informed consent before completing the survey.

Ethics approval This study was performed in line with the principles of the Declaration of Helsinki. The study was approved by the Institutional Review Board of the National University of Singapore (NUS-IRB Reference Code: LS-19-104).

Data availability The datasets generated and/or analyzed during the current study are available from the corresponding author on reasonable request.

Consent for publication (from patients/participants) Not applicable.

Code availability Codes used in the analysis will be made available upon reasonable request from the authors.

References

1. Malhotra C, Chan A, Malhotra R, et al. Prevalence, correlates and perceived causes of limitations in activities of daily living among older Singaporeans. Aging Clin Exp Res. 2012;24:56–61.
2. Low D, Elias M. Population ageing requires adaptive responses, not just technical ones. Singapore: Healthcare Leadership College, Ministry of Health Holdings; 2012.
3. Khalik S. Ministry of Health spells out efforts to tackle bed crunch. The Straits Times. 2014. Accessed on January 2023 at https://www.straitstimes.com/singapore/ministry-of-health-spells-out-efforts-to-tackle-bed-crunch.
4. Khong P,Ghista D. Increasing ED use, long waiting times for hospital admissions from ED, as well as workforce shortages. Int J Healthc Technol Manag 2006;7:429–39.
5. Ministry of Health. Promoting overall healthier living while targeting specific sub-populations. (2022). https://www.moh.gov.sg/news-highlights/details/promoting-overall-healthier-living-while-targeting-specific-sub-populations.

6. Sng QS. Primary care survey 2010 profile of primary care patients. Singapore: Ministry of Health Singapore; 2010.
7. Chan A, Malhotra R, Manap NB, et al. Transitions in health, employment, social engagement and intergenerational transfers in Singapore study (THE SIGNS study)—I: descriptive statistics and analysis of key aspects of successful ageing. National University of Singapore; 2018.
8. Sahadevan S, Lim PP, Tan NJ, et al. Diagnostic performance of two mental status tests in the older Chinese: influence of education and age on cut-off values. Int J Geriatr Psychiatry. 2000;15:234–41. https://doi.org/10.1002/(sici)1099-1166(200003)15:3%3c234::aid-gps99%3e3.0.co;2-g.
9. Lancsar E, Savage E. Deriving welfare measures from discrete choice experiments: inconsistency between current methods and random utility and welfare theory. Health Econ. 2004;13:901–7.
10. Finkelstein EA, Ozdemir S, Malhotra C, et al. Understanding factors that influence the demand for dialysis among elderly in a multi-ethnic Asian society. Health Policy. 2018;122:915–21.
11. Ozdemir S, Wong TT, Allingham RR, et al. Predicted patient demand for a new delivery system for glaucoma medicine. Medicine 2017;96(15):e6626.
12. Whitty JA, Walker R, Golenko X, et al. A think aloud study comparing the validity and acceptability of discrete choice and best worst scaling methods. PLoS ONE. 2014;9: e90635.
13. Johnson FR, Kanninen B, Bingham M, et al. Experimental design for stated-choice studies. In: Valuing environmental amenities using stated choice studies. Springer; 2006. p. 159–202.
14. Özdemir S, Mohamed AF, Johnson FR, et al. Who pays attention in stated-choice surveys? Health Econ. 2010;19:111–8.
15. Ozdemir S, Baid D, Verghese NR, et al. Patient preferences for medications in managing type 2 diabetes mellitus: a discrete choice experiment. Value Health. 2020;23:842–50.
16. Orme B. Sample size issues for conjoint analysis studies. Sequim: Sawtooth Software technical paper. 1998.
17. Gonzalez JM. A guide to measuring and interpreting attribute importance. Patient-Patient-Cent Outcomes Res. 2019;12:287–95.
18. Johnson FR, Yang J-C, Reed SD. The internal validity of discrete choice experiment data: a testing tool for quantitative assessments. Value Health. 2019;22:157–60. https://doi.org/10.1016/j.jval.2018.07.876.
19. van den Broek-Altenburg EM, Atherly AJ. Patient preferences for provider choice: a discrete choice experiment. AMJC. 2020;26:219–24.
20. Liu Y, Kong Q, de Bekker-Grob EW. Public preferences for health care facilities in rural China: a discrete choice experiment. Soc Sci Med. 2019;237: 112396.
21. Lim J. Sustainable health care financing: the Singapore experience. Glob Policy. 2017;8:103–9.
22. Krinke K-S, Tangermann U, Amelung VE, et al. Public preferences for primary care provision in Germany—a discrete choice experiment. BMC Fam Pract. 2019;20:1–9.
23. Tan BYQ, Kanneganti A, Lim LJH, et al. Burnout and associated factors among health care workers in singapore during the COVID-19 pandemic. J Am Med Dir Assoc. 2020;21:1751-1758.e1755. https://doi.org/10.1016/j.jamda.2020.09.035.