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## Exploring Older Swiss People's Preferred Dental Services for When They Become Dependent

#### KEYWORDS

Older people  
 Homebound  
 Dental care  
 Discrete choice experiments  
 Willingness to pay  
 Willingness to travel  
 Uptake of dental services

#### SUMMARY

The objective of this study was to explore the preferred dental services of older people for when they become dependent. It aimed to assess their preferred type of health care professional and location of dental service, and relate their preferences to their willingness to pay (WTP) and willingness to travel (WTT).

Older people aged 65 years or older were invited to participate in a questionnaire-based discrete choice experiment (DCE), to measure preferences for dental examinations and treatment, defined by two attributes: type of professional and location of the activity. Hypothetical scenarios based on selected attributes were displayed in a projected visual presentation and participants noted their personal preference using a response sheet. Data was analyzed using a random-effects logit model.

Eighty-nine participants (mean age 73.7 ± 6.6 years) attended focus group sessions. Respondents preferred that the family dentist (β: 0.2596) or an auxiliary (β: 0.2098) undertake the examination and wanted to avoid a medical doctor (β: -0.469).

The preferred location for dental examination was at a dental practice (β: 0.2204). Respondents preferred to avoid treatments at home (β: -0.3875); they had a significant preference for treatment at the dental office (β: 0.2255) or in a specialist setting (β: 0.1620, ns). However, the type of professional did not have a significant influence on overall preference. Participants with a low WTP preferred examination at home (β: 0.2151) and wanted to avoid the dental practice (β: -0.0235), whereas those with a high WTP preferred the dental office (β: 0.4535) rather than home (β: -0.3029). WTT did not have a significant influence on preference.

The study showed that older people generally preferred receiving dental services in a dental practice or specialist setting, and would prefer not to be treated at home. Continuity of dental services provided by the family dentist should therefore be prioritized where possible and further studies should examine the role of domiciliary care at home.

## Introduction

The proportion of older people in the population of industrialized countries is rapidly increasing (defined as over 65 years of age). In Switzerland, the number of older people constitutes 18.3% of the population, reaching a total of 1.6 million in 2017, while 5% of the population is aged 85 years or older, commonly described as the “oldest old”. Among those over 80 years of age, the rate of recourse to domiciliary health services is 28.9%, whereas 15.3% are cared for in nursing homes ([www.bfs.admin.ch/bfs/en/home/statistics/health.html](http://www.bfs.admin.ch/bfs/en/home/statistics/health.html)). High life expectancy is often linked to poor health and the related expenditures in Switzerland are estimated at 12.2% of the gross domestic product (HEALTH 2017). The uptake for dental services is age-dependent and many older people have not had a dental check-up for several years (NITSCHKE ET AL. 2001). Yet regular screening of the oral cavity, professional oral hygiene and, if necessary, dental treatments are essential to maintain/restore oral health. Hence, it remains critical to establish a policy for oral health care for dependent and immobile older people, which not only considers the cost involved but also takes into consideration the perspective of the patients themselves.

For treatment in a dental practice, dependent older people would require special transportation and/or an assistant to accompany them, especially in case of cognitive impairment. The willingness to travel (WTT) can be a factor in the uptake of the dental service. Alternatively, the dentist could travel to the patient's home to provide domiciliary dental care using mobile equipment. The barriers experienced by dentists are often related to the lack of equipment, poor working conditions or the time away from private practice. The additional time and logistics often lack appropriate financial reimbursement (BOTS-VANTSPIJKER ET AL. 2014). Consequently, dentists prefer to treat patients in their own practice (HOPCRAFT ET AL. 2008). Other concepts of oral health care for homebound older people, including a bus with a dental unit, a mobile clinic installed in the nursing facility, or teledentistry are provided in some locations, but these all present advantages and disadvantages according to the particular context.

To date, public health has mostly adopted a top-down approach to deliver dental services for the homebound. However, incorporating older peoples perspective is important for the delivery of patient-centered care with respect to both routine check-ups and the need for further dental treatment.

Stated preference discrete choice experiments (DCEs) have been particularly useful for creating prioritization frameworks (RYAN ET AL. 2001; REED JOHNSON ET AL. 2013; DE BEKKER-GROB ET AL. 2019; SOEKHAI ET AL. 2019). DCEs are a survey-based method that involves presenting individuals with a series of choices defined by attributes with varying levels. Respondents are required to make a hypothetical choice, enabling information to be gleaned about their stated preference, in the absence of revealed preference data. The actual match between the stated choices and the actual health care utilization represent the external prediction validity of the DCEs, the proportion of individual choices that can be correctly predicted at an individual level can reach up to 91% (DE BEKKER-GROB ET AL. 2020).

The willingness to pay (WTP) measures the highest monetary amount an individual will agree to spend on a service. When an individual is seeking a dental service, they consider two things, the attributes of the service and the price (TAN ET AL. 2017). The optimal combination of the two can ensure the maximum uptake for that service.

Swiss older people may have preferences and expectations that may differ from other countries where similar studies have been undertaken (BROCKLEHURST ET AL. 2018), and may also vary between the German and French-speaking cantons. Consequently, greater knowledge is needed around what priority older persons place on the different attributes of their oral health services. No previous studies have reported user experience and opinions on how oral care services for homebound, dependent older people should be organized.

The aim of this study was to identify the preferences and priorities of older persons with respect to check-ups and the need for dental treatment for when they become dependent, namely, who provides oral health care and in which setting. The secondary objective was to relate their preference choices to their willingness to pay, their willingness to travel and their probability of uptake of a given dental service.

## Materials and methods

Approval from the local ethical committees in Bern and Geneva (CCER) for research on humans was obtained for this study (2017-00488).

### Identifying attributes and levels

Three attributes were identified based on a pilot study undertaken in the United Kingdom: the type of health-care professional, the type of activity and the location of the activity (BROCKLEHURST ET AL. 2018). These attributes were further discussed among experts in geriatric oral care and validated by all the researchers involved in the study. The attributes and their levels were further adapted to ensure contextual relevance and applicability in all the countries where the DCE was going to be conducted. The attributes and their levels for the DCE are summarized in Table I.

### Experimental design

The attributes and levels set in this study produced 12 combinations for examinations and 6 for dental treatments. Two DCEs

**Tab. I** The attribute and their levels in the discrete choice experiment

Attributes	Examination Levels	Treatment Levels
<b>Type of health care professional:</b>	A: Your family dentist [base] B: Your family doctor C: Another auxiliary health care provider who has been trained to have the necessary skills	A: Your family dentist [base] B: Specialist
<b>The place where the activity is undertaken:</b>	A: At home [base] B: At your family dental practice C: At your family medical practice D: In a specialist setting (hospital/ community clinic)	A: At home [base] B: At your family dental practice C: In a specialist setting (hospital/ community clinic)

were embedded in a questionnaire that collected additional questions about age, sex and willingness to pay and to travel. The questions used for the current analysis are listed in appendix I.

The questionnaire and associated data collection form (response sheet) were originated in English, translated to French and German, and translated back to English again to ensure consistency in all the languages. The experiments were tested in Geneva, where a focus group of French-speaking collaborators from the University Clinics of Dental Medicine participated in a pilot experiment. Based on their remarks and comments, minor changes were made to the presentation. In Geneva, participants were recruited from the patient pool of the University Clinics of Dental Medicine of the University of Geneva as well as at the University for Seniors of the University of Geneva. In Bern, participants were also recruited via the University for Seniors of the University of Bern, and from the patient pool of the School of Dental Medicine, University of Bern.

The inclusion criteria consisted of participants aged 65 years and older, independently living at home, and speaking the local language fluently, namely French or German, for the Geneva and Bern group, respectively. Participants were excluded if they were dependent, suffered from cognitive impairment, did not sufficiently comprehend the local language, or if they declined to provide informed consent.

### Protocol

In Geneva and Bern, four group meetings were each organized at different times, and participants were invited to attend the meeting of their choice.

Three researchers guided the groups of 10–15 participants through the experiment, which was supported by a projected visual presentation. Firstly, participants were asked to imagine that they had lost their independence. Then, the researcher read out the questions/choices and participants were asked to provide individual responses on a response sheet after each item. Questions from the participants to the researchers were allowed and answered at any time during the process. The total session lasted no more than one hour.

Response sheets were scanned and transferred into an electronic format and stored on an encrypted hard drive. Participant responses were anonymous.

### Statistical analysis

Categorical attributes were effects coded, in order to generate preference weights for every possible level, rather than describing the data relative to the base case e.g. dental practice compared to “home”. Responses to the DCE were analyzed in STATA, version 13 (StataCorp LP, College Station, TX) using a random-effects logit model that allowed for multiple observations from the same respondent. The regression model estimated preference weights ( $\beta$  coefficient) for each attribute that indicate the importance of attributes, the direction of the effect, and the magnitude of preference. The level of significance was set at 0.05. Log likelihood ratio tests of the base case regression models of two subgroups were performed at a 1% level of significance. Subgroups included region, age, sex, WTT and WTP. Expected utility associated with the hypothetical scenarios was derived to estimate the probability of uptake for the most and least preferred scenarios.

### Results

Ninety-one participants (51 in Bern, 40 in Geneva) attended the group sessions and filled in the response sheet. In Geneva,

two patients were excluded *post hoc* as they did not understand the instructions for the experiment and therefore did not meet the inclusion criteria in terms of cognitive function. The respondents' demographic characteristics are reported in Table II.

Respondents preferred the family dentist to the auxiliary to undertake the examination and wanted to avoid the medical doctor; they preferred to have the examination done in the dental practice (Tab. III). As for the dental treatment, they had no significant preference between the specialist and the dentist, they preferred to have the dental treatment conducted in the dental office or would accept a specialist center, but they wanted to avoid home (Tab. IV). A summary of statistically significant preference weight for examination and for treatment is presented in rank order in Table V. When comparing subgroups (Bern and Geneva), there was a significant difference in preference choices for examination and for treatment by region and WTP; examination preferences also differed by age, while treatment preferences differed by sex (Tab. VI). The WTT for examination and for treatment was not significantly different for all participants (Tab. VI). Participants willing to pay up to 60 CHF preferred to have the examination conducted by the dentist or an auxiliary and had a significant preference for the examination at home, whereas participants willing to pay 60 CHF or more for the examination had a higher preference for the dentist and the dental office and wanted to avoid home (Tab. VII). Participants with a lower willingness to pay for treatment (<200 CHF) preferred the specialist in a specialist center and

Tab. II Participants' demographic characteristics

	Geneva n = 38	Bern n = 51	P-value
<b>Age</b>	n = 38	n = 49	
Mean (SD)	73.3 (5.17)	74.0 (7.55)	0.66
Median	73	73	
Range	64–88	65–91	
<b>Sex</b>	n = 38	n = 51	
Male (%)	44.7%	49.0%	0.69
<b>Profession in working life</b>	n = 38	n = 51	
Professional and managerial	44.4%	39.2%	0.78
Clerical and sales	27.8%	33.3%	0.48
Skilled blue collar	16.7%	15.7%	0.99
Semi-skilled and unskilled	11.1%	9.8%	0.91
Prefer not to say	0.0%	2.0%	0.39
<b>Co-habiting</b>	n = 35	n = 50	
Mean (SD) number of persons	0.86 (0.14)	1.8 (0.43)	<0.01
Median	1	2	
Range	0–4	1–2	
Live alone (%)	36.1%	0.0%	<0.01

those with a higher WTP  $\geq 400$  CHF had a significant preference for the dental office. The participants' greatest preference was to avoid dental treatments at home (Tab. VIII). The probability of uptake of the most preferred and least preferred scenarios for an examination and treatments are summarized in Table IX. Log

likelihood-ratio test of restricted model (WTP-t) versus unrestricted model (WTP-t per region) showed no statistical difference. The probability of uptake highlighting the difference in choice preferences for the dental examination between Bern and Geneva are presented in Table X.

Attributes	$\beta$ Coefficient	P Value	95% CI <sup>^</sup>
who_dentist#	0.2596*		0.1707 to 0.4008
who_doctor	-0.4694*	<0.001	-0.6501 to -0.3986
who_aux	0.2098*	<0.001	0.1142 to 0.3399
where_home#	-0.0467		-0.1954 to 0.0803
where_dental	0.2204*	0.002	0.0967 to 0.3949
where_medical	-0.1094	0.128	-0.2695 to 0.0345
where_special	-0.0643	0.360	-0.2248 to 0.0796
_cons	-0.0613	0.365	-0.2048 to 0.0707
Number of observations	1068		
Number of groups	89		
Wald X <sup>2</sup> (5 degrees of freedom)	73.28		
Log likelihood	-700.35		

CI, confidence interval; <sup>^</sup>CI<sup>s</sup> generated by 1,000 bootstrap replications; #omitted level calculated as -1\*(sum  $\beta$  of other levels); \*P<0.05

Attributes	$\beta$ Coefficient	P Value	95% CI <sup>^</sup>
who_dentist#	-0.0259		-0.1337 to 0.0704
who_specialist	0.0259	0.586	-0.0717 to 0.1330
where_home#	-0.3875*		-0.6259 to -0.2822
where_dental	0.2255*	0.002	0.0975 to 0.4222
where_special	0.1620*	0.025	0.0348 to 0.3468
_cons	-0.1488	0.118	-0.3875 to 0.0331
Number of observations	534		
Number of groups	89		
Wald X <sup>2</sup> (3 degrees of freedom)	28		
Log likelihood	-353.89		

CI, confidence interval; <sup>^</sup>CI<sup>s</sup> generated by 1,000 bootstrap replications; #omitted level calculated as -1\*(sum  $\beta$  of other levels); \*P<0.05

Examination	Treatment
Rank 1 Avoid the doctor ( $\beta = -0.47$ )	Rank 1 Avoid home ( $\beta = -0.39$ )
Rank 2 Prefer the dentist ( $\beta = 0.26$ )	Rank 2 Go to dentist ( $\beta = 0.23$ )
Rank 3 Go to the dental practice ( $\beta = 0.22$ )	Rank 3 Go to specialist setting ( $\beta = 0.16$ )
Rank 4 Prefer an auxiliary professional ( $\beta = 0.21$ )	

Tab. VI Subgroup analysis for treatment and for examination

Subgroup	Experiment	Restricted Model		Unrestricted Model		Likelihood-ratio test
		N	Group 1 n	Group 2 n	P-Value	
Region	Treatment (exp=0)	89	38 Geneva	51 Bern	<b>0.007*</b>	
Region	Examination (exp=1)	89	38 Geneva	51 Bern	<b>&lt;0.001*</b>	
Age	Treatment (exp=0)	89	44 Younger	45 Older	0.511	
Age	Examination (exp=1)	89	44 Younger	45 Older	<b>0.002*</b>	
Sex	Treatment (exp=0)	89	42 Male	47 Female	<b>0.009*</b>	
Sex	Examination (exp=1)	89	42 Male	47 Female	0.011	
WTT	Treatment (exp=0)	86	32 Less than 5 km	54 More than 5 km	0.128	
WTT	Examination (exp=1)	86	32 Less than 5 km	54 More than 5 km	0.152	
WTP	Treatment (exp=0)	88	35 Up to 200 CHF	53 More than 400 CHF	<b>&lt;0.001*</b>	
WTP	Examination (exp=1)	86	40 Up to 60 CHF	46 More than 60 CHF	<b>&lt;0.001*</b>	

\* Bonferroni correction for multiple comparisons (5 per experiment), P < 0.01

Tab. VII The preferences of participants with a willingness to pay up to 60 CHF and more than 60 CHF for the examination

Attribute	$\beta$ Coeff. WTP $\leq 60$	P-Value WTP $\leq 60$	95% CI <sup>^</sup>	$\beta$ Coeff. WTP > 60	P-Value WTP > 60	95% CI <sup>^</sup>
who_dentist#	0.2385*		0.0918 to 0.4480	0.2932*		0.1637 to 0.4796
who_doctor	-0.4706*	<0.001	-0.7139 to -0.3329	-0.4854*	<0.001	-0.6994 to -0.3747
who_aux	0.2321*	0.0030	0.0831 to 0.4346	0.1922*	0.0090	0.0529 to 0.3811
where_home#	0.2151*		0.0046 to 0.4617	-0.3029*		-0.5606 to -0.1268
where_dental	-0.0235	0.8240	-0.2663 to 0.2138	0.4535*	<0.001	0.3200 to 0.6966
where_medical	-0.1714	0.1060	-0.4299 to 0.0282	-0.0690	0.5010	-0.2739 to 0.1359
where_special	-0.0202	0.8450	-0.2527 to 0.2161	-0.0816	0.4120	-0.3171 to 0.1453
_cons	-0.0182	0.8530	-0.2355 to 0.1856	-0.0370	0.6900	-0.2340 to 0.1540
Number of observations	480			522		
Number of groups	40			46		
Wald X <sup>2</sup> (5 degrees of freedom)	35.70			56.17		
Log likelihood	-312.66			-351.08		

CI, confidence interval; <sup>^</sup> CIs generated by 1,000 bootstrap replications; #omitted level calculated as -1\*(sum  $\beta$  of other levels); \*P < 0.05

**Tab. VIII** The preferences of participants with a willingness to pay up to 200 CHF and up to and more than 400 CHF for the treatment

Attributes	$\beta$ Coeff. WTP <200	P-Value	95% CI <sup>^</sup>	$\beta$ Coeff. WTP >400	P-Value	95% CI <sup>^</sup>
who_dentist#	-0.1728*		-0.4317 to -0.0164	0.0525		-0.0721 to 0.1927
who_specialist	0.1728*	0.039	0.0119 to 0.4303	-0.0524	0.386	-0.1937 to 0.0714
where_home#	-0.6555*		-1.2332 to -0.5103	-0.2444*		-0.5059 to -0.0774
where_dental	0.1704	0.155	-0.0669 to 0.5025	0.2688*	0.004	0.1107 to 0.5271
where_special	0.48507*	<0.001	0.3132 to 0.9443	-0.0243	0.793	-0.2308 to 0.1814
_cons	-0.0339	0.839	-0.4156 to 0.3687	-0.1641	0.175	-0.4299 to 0.0886
Number of observations	210					
Number of groups	35					
Wald X <sup>2</sup> (3 degrees of freedom)	29.41					
Log likelihood	-127.32					

CI, confidence interval; <sup>^</sup> CIs generated by 1,000 bootstrap replications; #omitted level calculated as -1\*(sum  $\beta$  of other levels); \*P < 0.05

**Tab. IX** The probability of uptake of the most and least preferred scenarios for a dental examination and treatment in relation to WTP high and low

Treatment	Most preferred	Least preferred
Low WTP (<200 CHF)	<i>Specialist dentist specialist setting</i> 58%	<i>Family dentist at home</i> 31%
High WTP ( $\geq$ 400 CHF)	<i>Family dentist at dental practice</i> 65%	<i>Specialist dentist at home</i> 35%
<b>Examination</b>	<b>Most preferred</b>	<b>Least preferred</b>
Low WTP ( $\leq$ 60 CHF)	<i>Family dentist at home</i> 75%	<i>Doctor at medical center</i> 25%
High WTP (>60 CHF)	<i>Family dentist at dental practice</i> 82%	<i>Doctor at home</i> 18%

**Tab. X** The probability of uptake of the most and least preferred scenarios for a dental examination by WTP for examination and region (Bern and Geneva)

Examination <sup>a</sup>	Most preferred Geneva	Least preferred Geneva	Most preferred Bern	Least preferred Bern
Low WTP ( $\leq$ 60 CHF)	<i>Auxiliary at dental practice</i> 82%	<i>Doctor at medical center</i> 18%	<i>Family dentist at home</i> 89%	<i>Doctor at dental practice</i> 11%
High WTP (>60 CHF)	<i>Family dentist at dental practice</i> 87%	<i>Auxiliary at home</i> 13%	<i>Auxiliary at a dental practice</i> 92%	<i>Doctor at specialist setting</i> 8%

<sup>a</sup> Log Likelihood-ratio test of restricted model (willingness to pay for examination) versus unrestricted model (willingness to pay for examination by region) reached statistical significance for willingness to pay for examination (P = 0.004).

## Discussion

Policymakers and health care professionals are addressing the needs of older persons, and in order to appropriately plan services, these expressed needs have to be correctly identified. In this study, the preferences of independent older people for oral care services were explored by means of a DCE. The participants were asked to envision the loss of their independence and imagine that they were dependent on caregivers whilst living at home. DCEs can be conceptually challenging compared to a standard questionnaire. As a result, the researchers guided the participants as they answered the questions related to oral examination and to dental treatment.

The strength of this study is that it explored the expressed needs of older people, i.e. those who will be increasingly affected by oral care policies as longevity further increases. Although the cohorts of respondents were all aged over 65 years, they may not have perfectly represented the dependent older people population. Nevertheless, asking dependent older people would be logistically and ethically complex as access to this population is very challenging. As a result, it was felt that it would be more judicious to elucidate the views of independent older people, who are easier to access and whose cognitive abilities remain functional, which might be more difficult to find in the case of dependent older people.

The results of this study have shown that for independent older people, the family dentist was the preferred professional to conduct an examination; the participants' second option was a trained dental auxiliary. This result reflects the common practice in Switzerland, in which patients are followed-up by a dental hygienist who may refer the patient to the dentist if a treatment need is detected. They clearly stated that they preferred not to have dental examinations conducted by the family doctor.

This result is not surprising, as dentists usually create a strong relationship with their patients and have a long-term rapport built on trust. Having a perceived unmet need for dental treatment and expressing a lack of trust and confidence in one's dentist were significant predictors of poor oral health quality of life among older people (MUIRHEAD ET AL. 2014). The interpersonal relationship between the medical professional and the patient may alleviate stress and increase compliance with instructions (TRACHTENBERG ET AL. 2005). When patients start to lose their independence and have been lifelong routine users of dental care, their desire is to continue to be seen by their regular dentist. This was reinforced by their higher WTP for the examination in the dental office and significant preference for the family dentist over the auxiliary. The preferred professional to conduct a treatment was the specialist dentist in the dental office or in the specialist center and participants in this study clearly stated that they wanted to avoid home as a location for dental treatment. This result confirms that patients are looking for continuity in their oral care and appear to perceive the dentist's visit into their own homes as an intrusion. This finding is in contradiction with previous research, which showed that these visits added to the patients' feeling of safety and supported their ability to live at home (TOIEN ET AL. 2018). The results may reflect a particular willingness to protect the private sphere, well anchored in Swiss society. Nevertheless, these results suggest that the perception of a dentist may be different to that of other caregivers like doctors or nurses who more regularly attend the patients' home. These choices may be explained by a belief that dentists can provide better quality care when they have access to their equip-

ment and are in their habitual working environment. It may also be motivated by the idea that an "outing" to the dental practice would be a nice change of scenery from the usual homebound situation. Equally, this finding may have been influenced by the fact that independent older people had been questioned about their future expressed needs, rather than asking dependent older people about their current priorities.

These results may indicate that, in Switzerland, policies should focus on the development of special transportation services able to give access to the dentist and to specialty clinics. Developing transportation for dependent older people with reduced mobility or an accompaniment service for those in need seem to be the options that would best address the respondents' desires. Participants in this experiment have clearly stated that travel and the distance travelled was not of significant importance. The development of mobile and portable dentistry has been suggested as an option to provide care for dependent older people who would otherwise not receive treatment (LEE ET AL. 2001). Nevertheless, it may not be the direction that is deemed most adequate by the respondents in this study. Furthermore, these types of solutions require important initial investments, have high operational expenses and high depreciation, and may require government subsidies or donations in order to ensure long-term sustainability (AREVALO ET AL. 2010).

Each visit outside the home provides visibility to a group of persons, who may otherwise be housebound. This could raise awareness of the existence of these persons in our society. This inclusion policy is also relevant for other sub-populations, such as persons with special needs.

The results of this study should be interpreted with caution as only independent older people living in urban areas took part; hence the indicated choices may not represent the preferences of dependent older people or those living in remote rural areas of Switzerland. Oral care services are unevenly distributed in rural or remote areas and underserved populations are more likely to seek oral care from non-dental providers. Logically, there is growing interest in telemedicine. In cases where the transportation of a patient to a clinic is too difficult or presents a health risk, it would be interesting to provide caregivers with intraoral cameras for additional diagnostics and/or second opinions. The cost of a face-to-face examination by a dentist is higher than the cost of real-time remote oral examination using teledentistry (MARINO ET AL. 2016). Moreover, this approach allows effective triaging of patients, reduces waiting lists and in-appropriate referrals (ESTAI ET AL. 2016). Telecommunication raises the quality of a preliminary diagnosis, normally limited to a telephone medical and dental history and some information from the family or medical and caring staff. It can help in optimizing the preparation of the adequate equipment and tools for an intervention, and hence decrease the number of sessions needed to finalize the treatment and the cost related to transport (TORRES-PEREIRA ET AL. 2013; INQUIMBERT ET AL. 2018).

At the time of this study, most participants had to pay for their dental treatment as an out-of-pocket expense. Interestingly, if their preference choice was presented as a service, their probability of uptake increased along with their willingness to pay. The barriers and facilitators for providing dental services relate to three domains: the capability, the opportunity and the motivation (GOSTEMEYER ET AL. 2019). Strategies to improve uptake of dental services starting with examination and then for dental treatments should cover those three domains. Capability includes the knowledge and the skill set to provide care for de-

pendent older persons. Health policy should request that dental providers complete an education module in geriatric dentistry to acquire the adequate skill sets. The opportunity relates to the social context, the resources available and the organization of access to care, public transport should be physically accessible to all, including persons of reduced mobility. Private transportation companies should complement the transportation offer, at a reasonable, or even a subsidized fee. The third domain relates to the motivation, presenting older people with their preference choice increases dental uptake of services. In addition to the three domains mentioned above, it should be born in mind that providing preventive oral care to this vulnerable population can be cost-effective for both older people and for society, as it can prevent more costly systemic infections (SCHWENDICKE ET AL. 2017).

## Conclusions

The results from this DCE suggest that the continuity of dental services from the family dentist should be prioritized, preferably at the dental practice or a dental specialist setting for dependent older patients. Health policy should identify and reduce barriers for access to care in the patient's preferred setting.

## Conflicts of interest, acknowledgments and funding

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The authors declare no conflict of interest and confirm that the study was financed by institutional funds.

## Zusammenfassung

### Ziel

Das Ziel dieser Studie ist, die Präferenzen von älteren, pflegebedürftigen Menschen hinsichtlich zahnärztlicher Leistungen in Bezug auf die medizinische Fachkraft und den Ort der Behandlung zu untersuchen und sie mit ihrer Zahlungsbereitschaft (WTP), der Reisebereitschaft (WTT) und der Wahrscheinlichkeit der Inanspruchnahme zahnärztlicher Leistungen in Bezug zu setzen.

### Material und Methode

Es wurden Discrete-Choice-Experimente (DCE) durchgeführt, um die Präferenzen für zahnärztliche Leistungen (Untersuchungen oder Behandlungen) anhand von zwei definierten Attributen zu messen: von wem und wo eine zahnärztliche Leistung erbracht wird. Unabhängig lebende Senioren wurden eingeladen, an Fokusgruppen teilzunehmen, um unter der Annahme, dass sie in Zukunft unterstützungsabhängig würden, ihre Präferenzen anzugeben. Mittels einer visuellen Präsentation wurden hypothetische Szenarien zu den o.g. Attributen dargestellt, zu denen die Teilnehmer ihre persönlichen Präferenzen auf einem Bogen mit vorgegebenen Antwortmöglichkeiten notierten. Die Daten wurden mithilfe eines Random-Effekt-Logit-Modells analysiert. Das Signifikanzniveau wurde auf 0,01 festgelegt.

### Ergebnisse

91 Teilnehmer (51 in Bern, 40 in Genf) nahmen an den Gruppendiskussionen teil, und 89 Teilnehmer mit einem Durchschnittsalter von  $73,7 \pm 6,6$  Jahren beendeten das Experiment. Für Untersuchungen bevorzugten die Befragten den Familien-

zahnarzt ( $\beta$ : 0,2596) gegenüber dem Zahnarthelfer, und sie möchten zahnärztliche Untersuchungen durch den Allgemein- arzt vermeiden ( $\beta$ : -0,469;  $P < 0,001$ ). Sie bevorzugten, die Untersuchung in der Zahnarztpraxis durchführen zu lassen ( $\beta$ : 0,2204;  $P = 0,002$ ). Was die zahnärztliche Behandlung betrifft, so haben sie keine signifikante Präferenz zwischen einem spezialisierten und einem Allgemein-Zahnarzt. Sie bevorzugten die zahnärztliche Behandlung in der Zahnarztpraxis ( $\beta$ : 0,2255) oder würden ein Fachzentrum akzeptieren ( $\beta$ : 0,1620; ns), wollen jedoch eine Behandlung zu Hause vermeiden ( $\beta$ : -0,3875). Beim Vergleich der Untergruppen (Bern und Genf) gab es einen signifikanten Unterschied in der Präferenzauswahl für die Untersuchung ( $P < 0,001$ ). Die Präferenzen waren in anderen Untergruppen relativ konsistent. Teilnehmer, die bereit sind, bis zu 60 CHF zu zahlen, präferieren, die Untersuchung vom Zahnarzt in ihrem Zuhause durchführen zu lassen, wohingegen Teilnehmer, die bereit sind, 60 CHF oder mehr für die Untersuchung zu zahlen, eine höhere Präferenz für den Zahnarzt und die Zahnarztpraxis haben und eine Untersuchung zu Hause vermeiden möchten ( $\beta$ : -0,3029;  $P < 0,001$ ). Teilnehmer mit einer geringeren Zahlungsbereitschaft für die Behandlung ( $< 200$  CHF) bevorzugten den Spezialisten in einem Fachzentrum ( $\beta$ : 0,4851;  $P < 0,001$ ), und Teilnehmer mit einem höheren WTP  $\geq 400$  CHF bevorzugten die Zahnarztpraxis ( $\beta$ : 0,2688;  $P = 0,004$ ). Die Teilnehmer wollen Zahnbehandlungen zu Hause vermeiden ( $\beta < 0$ ). Die Bereitschaft, zur Untersuchung und zur Behandlung zu reisen, war nicht für alle Teilnehmer signifikant.

## Diskussion

Das Erbringen zahnärztlicher Leistungen durch den Familienzahnarzt sollte priorisiert werden. Massnahmen, die den Zugang zu Zahnärzten verbessern, können eine bessere Inanspruchnahme der zahnärztlichen Leistungen gewährleisten.

## Résumé

### Objectif

Cette étude vise à explorer les préférences des services dentaires pour les personnes âgées dépendantes par rapport au type de professionnel de santé préféré et l'emplacement de l'activité, et à relier leurs choix à leur consentement à payer (CAP), à leur disposition à voyager (DAV) et à leur probabilité de recourir aux services dentaires.

### Matériels et méthodes

Des expériences de choix discrets (ECD) ont été menées pour mesurer les préférences en matière d'examen et de traitement dentaires, définies par deux attributs : le type de professionnel et le lieu de l'activité. Les aînés vivant de façon indépendante étaient invités à participer à des groupes de discussion pour exprimer leurs préférences s'ils devenaient un jour dépendants. Des choix hypothétiques concernant les attributs sélectionnés ont été affichés dans une présentation visuelle projetée et les participants ont noté leur préférence personnelle à l'aide d'une feuille de réponses. Les données ont été analysées à l'aide d'un modèle logit à effets aléatoires. Le niveau de signification a été fixé à 0,01.

### Résultats

91 participants (51 à Berne, 40 à Genève) ont assisté aux séances de groupe et 89 participants, avec un âge moyen de  $73,7 \pm 6,6$  ans, ont terminé l'expérience. Les répondants préfèrent le dentiste de famille ( $\beta$ : 0,2596) à l'auxiliaire dentaire

pour entreprendre l'examen et veulent éviter le médecin ( $\beta$ : -0,469;  $P < 0,001$ ); ils préfèrent que l'examen soit effectué dans le cabinet dentaire ( $\beta$ : 0,2204;  $P = 0,002$ ). Quant aux soins dentaires, ils n'ont pas de préférence significative entre le spécialiste et le dentiste, ils préfèrent que le traitement dentaire soit effectué dans le cabinet dentaire ( $\beta$ : 0,2255) ou accepteraient un centre spécialisé ( $\beta$ : 0,1620; ns), mais ils veulent éviter les traitements dentaires à domicile ( $\beta$ : -0,3875). Lors de la comparaison des sous-groupes (Berne et Genève), il y avait une différence significative dans les choix de préférence pour l'examen ( $P < 0,001$ ). Les préférences étaient relativement cohérentes entre les autres sous-groupes. Les participants ayant un CAP jusqu'à CHF 60.- préfèrent que l'examen soit effectué par le dentiste, tandis que les participants ayant un CAP de CHF 60.- ou plus pour l'examen ont une préférence plus élevée pour le dentiste et le cabinet dentaire et veulent éviter le domicile ( $\beta$ : -0,3029;  $P < 0,001$ ). Les participants avec un CAP pour le traite-

ment plus faible (<CHF 200.-) ont préféré le spécialiste dans un centre spécialisé ( $\beta$ : 0,4885;  $P < 0,001$ ) et ceux avec un CAP plus élevé  $\geq$  CHF 400.- avaient une préférence significative pour le cabinet dentaire ( $\beta$ : 0,2668;  $P = 0,004$ ). Les participants voulaient éviter les traitements dentaires à domicile ( $\beta < 0$ ). La DAV pour l'examen et le traitement n'était pas significative pour tous les participants.

## Discussion

L'étude a montré que les personnes âgées préféraient généralement recevoir des services dentaires dans un cabinet dentaire ou un environnement spécialisé, et préféraient ne pas être traitées à domicile. La continuité des services dentaires du dentiste de famille devrait être favorisée, des mesures qui pourraient améliorer l'accès aux professionnels dentaires assureront un meilleur recours aux services dentaires.

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## Appendix I



# Exploring Older Swiss People's Preferred Dental Services for When They Become Dependent

## Part 1: Personal information

Q1. What is your age?

Q2. What is your gender?

- Male  
 Female

Q3. In your working life, which of the following occupations best described what you used to do?

- Professional and managerial (e.g. teacher, doctor, manager, solicitor)  
 Clerical and sales (e.g. administration, salesperson)  
 Skilled blue-collar (e.g. electrician, plumber, craftsman/woman)  
 Semi-skilled and unskilled (e.g. factory worker, laborer)  
 Prefer not to say

Q4. How many people live with you?

Q5. Do you have your own means of transport or do you use public transport? (Please describe)

- Yes (please describe) \_\_\_\_\_  
 No

Q6. What is your monthly income?

- Over CHF 1,600.–  
 Between CHF 1,300.– and CHF 1,600.–  
 Between CHF 1,000.– and CHF 1,300.–  
 Less than CHF 1,000.–  
 Prefer not to say

## Part 2: Making choices (examination)

We are interested in what type of dental care you think should be ensured in the future as you begin to lose your independence. In other words, when the journey to visit your family dentist becomes more and more difficult.

In this section we would like you to think about a way for you to ensure your examination takes place as you begin to lose your independence. We will present you with two options and would like you to record the one you prefer. Please check whether you prefer option A or option B on your answer sheet.

1. Part 2: Option 1

Option A: Your examination would be performed by your family dentist at home

Option B: Your examination would be performed by your family doctor at a family dental practice

2. Part 2: Option 2

Option A: Your examination would be performed by an auxiliary healthcare provider with the required qualifications at home

Option B: Your examination would be performed by the family dentist at the family dental practice

3. Part 2: Option 3

Option A: Your examination would be performed by your family doctor at a family medical practice

Option B: Your examination would be performed by an auxiliary healthcare provider with the required qualifications in a specialist setting (hospital, community clinic)



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4. Part 2: Option 4  
Option A: Your examination would be performed by the family dentist in the family medical practice  
Option B: Your examination would be performed by your family doctor at home
  5. Part 2: Option 5  
Option A: Your examination would be performed by an auxiliary healthcare provider with the required qualifications, at the family medical practice  
Option B: Your examination would be performed by your family doctor in a specialist setting (hospital, community clinic)
  6. Part 2: Option 6  
Option A: Your examination would be performed by your family dentist in a specialist setting (hospital, community clinic)  
Option B: Your examination would be performed by an auxiliary healthcare provider with the required qualifications at the family dental practice
  7. Part 2: Option 7  
Option A: Your examination would be performed by an auxiliary healthcare provider with the required qualifications in a specialist setting (hospital, community clinic)  
Option B: Your examination would be performed by your family doctor at home
  8. Part 2: Option 8  
Option A: Your examination would be performed by your family dentist at home  
Option B: Your examination would be performed by an auxiliary healthcare provider with the required qualifications at the family medical practice
  9. Part 2: Option 9  
Option A: Your examination would be performed by your family doctor at the family dental practice  
Option B: Your examination would be performed by an auxiliary healthcare provider with the required qualifications at home
  10. Part 2: Option 10  
Option A: Your examination would be performed by your family doctor in a specialist setting (hospital, community clinic)  
Option B: Your examination would be performed by your family dentist at the family medical practice
  11. Part 2: Option 11  
Option A: Your examination would be performed by your family dentist at the family dental practice  
Option B: Your examination would be performed by your family doctor at the family medical practice
  12. Part 2: Option 12  
Option A: Your examination visit would be performed by an auxiliary healthcare provider with the required qualifications at the family dental practice  
Option B: Your examination visit would be performed by your family doctor in a specialist setting (hospital, community clinic)
- Q7. What journey are you willing to undertake in order to have an oral-health check-up?
- I am willing to undertake a journey of up to 5 km
  - I am willing to undertake a journey of up to 10 km
  - I am willing to undertake a journey of more than 10 km
- Q8. How much would you be willing to pay for the dental examination?
- I am willing to pay up to CHF 60.–
  - I am willing to pay up to CHF 120.–
  - I am willing to pay more than CHF 120.–



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### Part 3: Making choices (dental treatment)

In this section we would like you to think about a way for you to ensure your dental care visit should you lose your independence. We will present you with two options and would like you to record the one you prefer. Please check whether you prefer option A or option B on your answer sheet.

1. Part 3: Option 1  
Option A: Your family dentist will ensure the necessary treatments at home in order to maintain your oral health  
Option B: A specialist dentist will ensure the necessary treatments in the family dental practice in order to maintain your oral health
  2. Part 3: Option 2  
Option A: A specialist dentist will ensure the necessary treatments at home in order to maintain your oral health  
Option B: Your family dentist will ensure the necessary treatments in a specialist setting (hospital, community clinic) in order to maintain your oral health
  3. Part 3: Option 3  
Option A: Your family dentist will ensure the necessary treatments in the family medical practice in order to maintain your oral health  
Option B: A specialist dentist will ensure the necessary treatments in a specialist setting (hospital, community clinic) in order to maintain your oral health
  4. Part 3: Option 4  
Option A: A specialist dentist will ensure the necessary treatments in a specialist setting (hospital, community clinic) in order to maintain your oral health  
Option B: Your family dentist will ensure the necessary treatments at home in order to maintain your oral health
  5. Part 3: Option 5  
Option A: Your family dentist will ensure the necessary treatments in a specialist setting (hospital, community clinic) in order to maintain your oral health  
Option B: A specialist dentist will ensure the necessary treatments in the family dental practice in order to maintain your oral health
  6. Part 3: Option 6  
Option A: Your family dentist will ensure the necessary treatments in the family dental practice in order to maintain your oral health  
Option B: A specialist dentist will ensure the necessary treatments at home in order to maintain your oral health
- Q9. What journey are you willing to undertake in order to have dental treatment?
- I am willing to undertake a journey of up to 5 km
  - I am willing to undertake a journey of up to 10 km
  - I am willing to undertake a journey of more than 10 km
- Q10. How much would you be willing to pay for dental treatment?
- I am willing to pay up to CHF 200.–
  - I am willing to pay up to CHF 400.–
  - I am willing to pay more than CHF 400.–

**Thank you for answering this questionnaire.**