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Exploring the Preferences for Dental Care of Care- Dependent Elderly

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ABSTRACT

Objective

The aim of this study is to explore the preferences of older people for dental services when they have lost their independence. The observed preferences of care-dependent elderly people are compared to the preferences of elderly people who are still living independent.

Material and method

Discrete choice experiments (DCEs) were used to measure preferences for dental examination and treatment, regarding who provides oral health care and in which setting. All participants were 65 years or older and dependent on care. Data from a similar DCE carried by the University of Bern in 2018, with people over 65 years of age living independently, were analyzed and compared with the preferences of the group of care-dependent elderly people. To estimate the respondents' preferences, a conditional logit model is used. A Chi-square test is used to compare the results of the care-dependent and independent living elderly.

Results

51 care-dependent elderly people from the region of Bern (mean age 83.96 ± 7.25 years) were questioned. In the DCE with independent living elderly 50 participants from the region of Bern (mean age 73.97 ± 7.54 years) were included. Both groups of elderly express a preference for an examination undertaken by the family dentist. Elderly who live independent prefer the option for an examination done by an auxiliary healthcare person as much as an examination by their family dentist, the care-dependent elderly prefer this option significantly less ($p=0.003$). Both groups prefer least to have their oral health check performed by a family doctor. The family dental practice and at home are

favorite options for the examination. Both groups show a low preference for the specialist setting as the location for oral health screening.

For the dental treatment, the care-dependent and the independent living elderly people show no statistical differences in the preference for treatment provided by a family dentist or performed by a specialist-dentist ($p=0.317$). The elderly dependent on care prefer to be treated at home or at the family dental practice rather than in a specialist setting. The independent living elderly prefer to be treated in a specialist setting rather than at home.

Conclusions

The results of this DCE suggest that the continuation of dental services from the family dentist should be prioritized. Our research illustrates that the care-dependent elderly people prefer a familiar rather than a specialized form of dental care. The preferences of the care-dependent elderly turn out to be slightly different from the preferences of the elderly living independent.

INTRODUCTION

The proportion of older people in the population is increasing worldwide, and Switzerland is one of the fastest ageing societies. In the year 2018, in Switzerland 18.5% of the population was 65 years or older (BFS, 2019). Due to rising life expectancy and low birth rate, the proportion of older people in society will increase even further. The proportion of the population aged 65 or over is expected to almost 30% by the 2050s and the share of people over-80 is expected to double to 10% by 2045 (OECD, 2019).

In addition to the increase in the number and proportion of elderly people, the oral health of the Swiss population has also improved substantially in recent decades (Schneider et al. 2017). The number of missing teeth has been decreasing for adults in recent years, with more people maintaining a functional dentition and the number of edentate people is showing a marked decline (Schneider et al. 2017, Zitzmann et al. 2008). As a consequence of these oral hygiene improvements, dental healthcare provision has changed over the years (Brocklehurst et al. 2015). There has been a shift from complete dentures to various removable dentures or fixed dentures, including implant restorations (Zitzmann 2007). Thus, the older population today exhibits a complex mixture of fixed or removable prosthetic dental restorations requiring continuous maintenance, occasional replacement, and preventive measures (Schneider et al. 2017).

It is also known that high-age patients are often frail or dependent on care. Due to physical and/or cognitive limitations, frail older people have a higher risk of poor oral health. With increasing age, self-care decreases, dry mouth increases due to polypharmacy and diets become rich in sugars (MacEntee et al. 2011, Walls et al. 2004). All this leads to an increased risk of poor oral health, for example due to caries, periodontitis and loss of teeth (Gerritsen et al. 2010, Göstemeyer et al. 2019, Holtfreter et al. 2010, Niesten et al. 2019). Consumption of dental services also depends on age, and unfortunately many older people have not had dental check-ups for years (Nitschke

et al. 2002). Barriers to oral care seems to be partly patient-related and partly related to the organization of the dental health care system (Jerković et al. 2017, Niesten et al. 2019, Rabbo 2012). Restrictions in mobility and motor (manual) skills not only restrict the performance of adequate daily oral hygiene, but can also complicate dental visits (KNMT 2015, MacEntee 2011, MacEntee et al. 2016).

In addition, psychological and social impairments such as chronic pain, low morale, a lack of energy, and the decline in social contacts could also reduce motivation for dental care (Niesten et al. 2013). Apart from personal factors, the organization of the health system and the availability of suitable dental care also play a role as limiting factors (Jerkovic et al. 2017, Nitschke 2002). The oral health care for aged people is often unavailable or poor, the same is true for the level of knowledge of formal and informal health care providers (Everaars et al. 2015). Domiciliary services are difficult to access and hospitalization for dental problems is distressing and expensive (Listl 2011, Pretty 2014). Dentists for their part prefer to treat patients in their own practice (Hopcraft et al. 2008). The most common barriers experienced and identified by dentists in providing oral health care to older care home residents were lack of adequate dental equipment in a care home and unavailability of a treatment room (De Visschere et al. 2006, MacEntee et al. 1992, Nitschke et al. 2005, Schimmel et al. 2008). In addition, the lack of adequate reimbursement for delivering oral health care in a care home was a common experienced barrier (Antoun et al. 2008, Chowdhry et al. 2011, Nitschke et al. 2005). Concerns about the oral health knowledge, attitude of care home nurses towards oral hygiene care and the lack of assistance nurses in improving and maintaining daily oral hygiene care were reported as well as a barrier (Antoun et al. 2008, Bellomo et al. 2005, Bots-VantSpijker et al. 2014, Sweeney et al. 2007). Furthermore, Patients' refusal of dental care is also cited by healthcare professionals as one of the main barriers (Göstemeyer et al. 2019, Hoben et al. 2017).

Over the last decades, several studies have confirmed that poor oral health can have a major impact on general health. Excessive accumulation of microorganisms in the oral

cavity due to insufficient oral hygiene can lead to increased vulnerability to respiratory tract infections such as pneumonia and arteriosclerosis (El-Rabbany et al. 2015, Sjogren et al. 2014, Desvarieux et al. 2003). Reduced chewing performance due to an insufficient number of retained and/or insufficient teeth can lead to weight loss and ultimately to malnutrition (Saarela et al. 2014). Discomfort, pain and decreased dental aesthetics are also related with lower quality of life (Porter et al. 2015, Stenman et al. 2012).

The World Health Organization report on healthy aging calls for systems of care that are fit-for-purpose and evidence based (WHO 2012). Essential is to design oral care planning and strategies for people who are becoming more and more dependent and fragile. Creating oral care services for dependent elderly people who live at home or in an institution is a challenging task given the limitations in logistics and budgetary constraints. Traditionally, the design of suitable dental care for the elderly was mainly based on a 'top-down' medical model, where needs assessments are undertaken by someone external to a community and strategies are devised that encourage these communities to become passive recipients of services (Brocklehurst et al. 2018, Oliver et al. 2014). Therefore, techniques for systematically involving older people in determining their preferences for different quality characteristics of oral healthcare service are becoming more interesting and valuable.

Discrete Choice Experiments (DCEs) offer one such approach (Ratcliffe 2010) and have been found to be particularly useful for creating prioritization frameworks (Cheraghi-Sohi et al. 2008, Ryan 2001). DCE methods combine random utility theory, consumer theory, experimental design theory and econometric analysis (Louviere et al. 2010). Initially DCEs were introduced into health economics, recognizing that patients tend to deal with many aspects of health care that go beyond health outcomes, which applies in particular to the elderly people (Coast 2004). DCEs are often used in health economics to investigate a wide range of research and policy issues. Based on two assumptions, the technique is an attribute-based measure of benefit: The first is that health care interventions, services or policies can be reduced to a set of fundamental attributes. The

second is that these attributes can be valued by individuals. In DCEs, respondents are asked to choose their most preferred attribute so that information about the order of preference can be collected (Mangham et al. 2018, Ryan 2012).

The aim of this study was to explore the preferences of older people for dental services when they have lost their independence. This is, to identify the priorities that care-dependent elderly place on the different attributes of their oral health care service. Preferences regarding who provides oral health care and in which setting this care is provided were explored. The observed preferences of care-dependent elderly people are compared to the preferences of elderly people who are still living independent.

MATERIALS AND METHODS

The protocol of the current study was reviewed in the scope of a larger multi-center study by the ethics committees of the Canton of Geneva (lead) and Bern and received their authorization (CCER-GE 2017-00488, KEK-BE 31.08.2017).

Data collection and study population

In order to understand the differences in respect to the outcome parameters between independent living older people that begin to lose their independence and elderly individuals depended on care, two separate study groups were recruited.

Care-dependent elderly

Participants for this research were recruited from the database of residents of the Burgerspittel am Viererfeld in Bern, the Burgerspittel am Bahnhofplatz in Bern and the Siloah foundation in Gümliigen. All communicatively skilled residents have been informed orally and in writing about the study by the researcher or the nursing staff. Residents interested in participation and who gave informed consent have been included. All the participants were 65 years of age or older and were dependent on care.

As discrete choice questionnaires are more complex than conventional questionnaires, it was decided in to conduct oral interviews in this study. This would enable to include more care-dependent elderly people in the experiment, than if the questionnaire was done written. The interviews lasted between ten and fifteen minutes.

Independent living elderly

In order to identify the preferences for dental services of independent living older people, existing data from the initial study conducted by the Division of Gerodontology of the University of Bern in 2018 were used. In this study, participants were recruited through the University of Seniors of the University of Bern and from the patient pool of the Division of Gerodontology. The inclusion criteria consisted of participants aged 65

years and older, independently living at home. Participants were excluded if they were care-dependent, suffered from cognitive impairment, did not sufficiently comprehend the local language, or refused to give informed consent. Due to the complexity of the DCEs, the researchers guided the participants in groups of 10-15 participants through the experiment, which was supported by a projected visual presentation. The questions and choices were read out by the researcher and participants were asked to provide individual responses on a response sheet after each item. Questions by the participants were allowed and answered anytime. Response sheets were scanned and transferred into an electronic format and stored on an encrypted hard drive. Participant responses were anonymous.

Methodology: DCE setup

For this study, a questionnaire was derived from a study undertaken in 2018 by the Universities of Geneva and Bern to study the preferences for dental services of swiss older people as they begin to lose their independence. The research design was developed in collaboration with the Bangor university in the United Kingdom.

Based on the results of a Priority Setting Partnership (PSP), a set of attributes were developed for the DCE exercise (Brocklehurst et al. 2018). PSPs incorporate users' perspectives to help prioritize research agendas and ensure they are patient-centered (Abma et al. 2009). They are based on a consensus methodology and use a modified Nominal Group Technique to produce a series of sequential steps to build consensus. This structured approach ensures the narratives of users of services are heard and helps counter the 'top-down' medical model that can dominate healthcare services (Mitton et al. 2009).

Three levels of attributes were identified: the type of professional, the type of activity and the location of the activity (Brocklehurst et al. 2018). The attributes were adapted to ensure contextual relevance and applicability in the care-dependent elderly (Tables 1 and 2).

Table 1: DCE 1 on oral health screening	
Attributes	Levels
1. Who should be undertaking a screen to check your oral health?	<ul style="list-style-type: none"> A. Your family dentist B. Your family doctor C. Another auxiliary healthcare provider who has been trained to have the necessary skills
2. Where should that screen be taking place?	<ul style="list-style-type: none"> A. At home B. At your family dental practice C. At your family medical practice D. In a specialist setting (hospital/community clinic)

Table 2: DCE 2 on dental treatment	
Attributes	Levels
1. Who should be providing you with the necessary treatment to maintain your oral health?	<ul style="list-style-type: none"> A. Your family dentist B. A specialist dentist
2. Where should that treatment take place?	<ul style="list-style-type: none"> A. At home B. At your family dental practice C. In a specialist setting (hospital/community clinic)

In the first DCE, concerning the oral health checkup, the determined attributes and levels generated 12 combinations. In the DCE experiment, concerning dental treatment, the determined attributes and levels produced 6 combinations. The used DCE question sets can be found in the appendices 1 to 4. These two DCEs were embedded in a questionnaire that collected demographic characteristics such as age, sex, profession before retirement and willingness to pay. In order to get an indication of the oral

situation of the study population, the participants were also asked about their dental status. The participants had to choose the best description of their dental situation from five propositions. The degree of dental visits among the participants was also questioned. Again, the participants were asked which option best describes their dental visits. Furthermore, an inventory was made to indicate what the participants would be willing to pay for a dental check-up, a professional teeth cleaning and a dental treatment.

Statistical analysis: conditional logit

To estimate the preferences of the respondents, a conditional logit model is used. This type of statistical model is widely used in the field of DCE experiments (see i.e. Mangham et al. 2008, Ryan et al. 2012). As simple logit models, conditional logit models can be used to model binary outcomes. However, contrary to the simple logit model, conditional logit models can account for the fact that some of the observations are not completely independent from each other. In a DCE setup, every choice made leads to two observations, one with a positive and one with a negative outcome, both strictly related to each other. Using a simple logit model would lead to biased estimators and error terms, as it cannot account for this dependence. The conditional logit model can be formalized as follows (Greene, 2012):

$$Prob(Y_i = j | \mathbf{x}_{i1}, \mathbf{x}_{i2}, \dots, \mathbf{x}_{ij}) = Prob(Y_i = j | \mathbf{X}_i) = P_{ij} = \frac{\exp(\mathbf{x}'_{ij}\beta)}{\sum_{j=1}^J \exp(\mathbf{x}'_{ij}\beta)},$$

where $j=1, 2, \dots, J$ are the alternatives to be chosen among. In our case, the total number of alternatives J equals to 2 for every choice to be made.

Our dataset contains two sets of choices $c=1, 2, \dots, C$, differing in dental treatment. For each set we hence get a total number of $R*C*J$ observations, where R is the total number of respondents, C the number of choices and J the number of alternatives per choice. Hence, for each respondent r , we get a total of $C*J$ observations. This fact must be accounted for when calculating the error terms in the statistical model, as the answers

of one person are not completely independent from each other neither. We therefore use clustered standard errors with a total number of R clusters. Not accounting for this fact would lead us to too small standard errors and hence to too small confidence intervals. It would in this case be possible that we consider an effect to be statistically significant, even if it is not, only due to the high number of observations per respondent.

To compare the results of the dependently and independent living people, the difference of the coefficients is built. To test if this difference is statistically significantly different from zero, a Chi-square test is used. It must be noted also in this context, that it is necessary to use cluster-adjusted standard errors to calculate the test statistic. Not accounting for this would again lead to the risk of rating differences statistically significant at a given level, even if it is not.

In the tables for the separate estimation results Odd Ratios (OR) are reported in the place of the estimations coefficients, due to their better intuitive comprehensibility. An OR smaller than one means a lower preference for a certain item, whereas an OR larger than one means a higher preference for a certain item. However, to compare the results of the estimations, using the original coefficient is more straightforward, as the difference is directly interpretable. Therefore, in the table comparing the results for both groups, the original coefficients are reported, together with the test statistic of the Chi test and the corresponding confidence level (p-value).

RESULTS

Care-dependent elderly

A total of 51 residents were interviewed orally by the researcher between November 2018 and August 2019. The mean age of the participants was 83.96 years, with a standard deviation of ± 7.25 years. With 74.5%, women are three times more represented than men. As profession before retirement the participants indicated less often 'professional and managerial' in comparison to the other categories of professions. Table 3 shows the characteristics of the respondents.

Age	Mean (years)	Std. deviation
	83.96	7.25
Gender	n	%
Female	38	74.5
Male	13	25.5
Profession before retirement	n	%
Professional and managerial (e.g. teacher, doctor)	8	15.69
Clerical and sales (e.g. administration, salesperson)	17	33.33
Skilled blue-collar (e.g. electrician, craftsperson)	14	27.45
Semi-skilled and unskilled (e.g. factory worker)	12	23.53

For the description of their dental status, participants could choose 1 option out of 5 statements. Around 17% of the participants chose the option 'having own teeth'. The option 'having crowns and bridges' is chosen in 39% and the option 'having own teeth and a removable prosthesis' in 35% of the cases. Only 6% indicated to have a total prosthesis and only one person indicated to have an implant-supported total prosthesis.

One third of the participants stated to consider dental treatments unimportant and to visit a dentist only in case of pain or problems. The other participants reported that they regularly visit a dentist or an oral hygienist. 55% stated to visit the dentist at least once a year for a check-up and dental cleaning and 14% stated to visit the dental hygienist at least once a year and the dentist in case of problems. Not visiting the dentist because it is too expensive did not apply to any of the participants. The answers of the participants to the question about the willingness are very diverse, and no clear pattern can be observed. These characteristics are shown in table 4.

Table 4: Participants' dental characteristics and willingness to pay (n=51)		
	n	%
Dental status described by the respondent		
Having own teeth	9	17.65
Having crowns and bridges	20	39.22
Having own teeth and a removable prosthesis	18	35.29
Having a total prosthesis	3	5.88
Having an implant-supported total prosthesis	1	1.96
Frequency of visits to a dentist		
Regular dental check-ups and tooth cleaning once a year or more often	28	54.90
Regular tooth cleaning at a dental hygienist at least once a year or more often, visits to a dentist in case of dental problems	7	13.73
Visits at a dental laboratory in case of denture problems	0	0.00
No dental visits because they are too expensive	0	0.00
No dental treatment, because they are not important. Only in case of pain or problems a dentist will be visited	16	31.37
Willingness to pay for a dental check-up		
Up to 60 CHF	21	41.18
Up to 120 CHF	20	39.22
Over 120 CHF	10	19.61
Willingness to pay for a professional teeth cleaning		
Up to 80 CHF	22	43.14
Up to 120 CHF	12	23.53
Over 120 CHF	17	33.33
Willingness to pay for a dental treatment		
Up to 200 CHF	21	41.18
Up to 400 CHF	6	11.76
Over 400 CHF	24	47.06

When we observe the ranking of the chosen levels across all the options, the people interviewed chose most often to have the control examination carried out by their family dentist (option has been chosen in 66.2% of the options that contained this level). The option to have a check-up by their family doctor was chosen least often (31.1%). The preference for an auxiliary healthcare provider to be a supporter lies in between (52.7%).

Regarding the location, the check-up done at home is the option chosen most (65%), followed by the dental practice (50.3%). The questioned persons chose least often for the option to go to a specialized center (35.0%) or to have themselves examined in the family medical practice (46.7%).

These results are confirmed by the outcomes of the conditional logit model. The statistically lowest preference is observed for an examination by the family doctor, followed by a treatment by an auxiliary healthcare provider. An examination by the family dentist is the preferred option. These differences are highly statistically significant. When it comes to the location, a screening at home is the favorite option, followed by the family dental practice. The lowest preference is observed for the family medical practice and a specialist setting; these two options do not differ statistically significantly from each other.

Table 5: Attribute choices for oral health screening			
Attribute: Type of professional undertaking a screen to check the oral health	Number of levels		
	n chosen	n total	% chosen
Family dentist	270	408	66.2
Family doctor	127	408	31.1
Auxiliary healthcare provider who has been trained to have the necessary skills	215	408	52.7
Attribute: Location where the examination should take place			
Home	232	357	65.0
Family dental practice	154	306	50.3
Family medical practice	119	255	46.7
In a specialist setting (hospital/community clinic)	107	306	35.0

Table 6: Regression result for oral health screening DCE			
Attributes	Levels	Results	
		Odds ratio (Std. Err.)	P > z
Type of professional undertaking a screen to check the oral health Reference category = family dentist	Family doctor	0.235 (0.047)	0.000
	Auxiliary healthcare provider who has been trained to have the necessary skills	0.623 (0.097)	0.002
Location where the examination should take place Reference category = home	Family dental practice	0.711 (0.146)	0.096
	Family medical practice	0.289 (0.078)	0.000
	In a specialist setting (hospital/ community clinic)	0.284 (0.078)	0.000

For dental treatment, the options of the treatment carried out by the family dentist and by a specialist dentist are chosen in around 50% of the cases. As far as the location is concerned, a treatment at home is chosen most often (60.8%). A treatment at a family dental practice is chosen in 53.4% of the cases where it was possible to choose this option, and a treatment in a specialist setting, such as a hospital or a community clinic, is only chosen in 35.8% of the cases.

Again, the results of the conditional logit model confirm these first descriptions: the preference for a treatment by the family dentist and by a specialist dentist do not differ statistically significantly from each other ($p=0.403$). When it comes to the place of the treatment, the preference for a treatment at home or at the family dental practice do not differ statistically significantly from each other. However, they would like statistically significantly less to have it carried out in a specialist setting ($p=0.003$).

Table 7: Attribute choices for dental treatment			
Attribute: Type of professional providing dental treatment	Number of levels		
	n chosen	n total	% chosen
Family dentist	161	306	52.6
Specialist dentist	145	306	47.3
Attribute: Location where the dental treatment should take place			
Home	124	204	60.8
Family dental practice	109	204	53.4
In a specialist setting (hospital/community clinic)	73	204	35.8

Table 8: Regression result for treatment DCE			
Attributes	Levels	Results	
		Odds ratio (Std. Err.)	P > z
Type of professional providing dental treatment Reference category = family dentist	Specialist dentist	0.895 (0.119)	0.403
Location where the dental treatment should take place Reference category = home	Family dental practice	0.817 (0.194)	0.396
	In a specialist setting (hospital/ community clinic)	0.502 (0.118)	0.003

Independent living elderly

In 2018, the University of Bern explored the preferences of elderly people over 65 and living independent, with exactly the same DCE. In this study 50 people from Bern participated, the average age was 73.97 years, with a standard deviation of ± 7.54 years. Exactly 50% of the participants turned out to be men. In this group, the professional group 'professional and managerial' and 'clerical and sales' are very well represented with 40 and 34% respectively. The professions 'skilled blue-collar' (14%) and 'semi-skilled' (8%) that do not require a high level of education are clearly less represented compared to the group of care-dependent elderly people. The demographic characteristics are shown in table 9.

Age	Mean (years)	s.d.
	73.97	7.54
Gender	n	%
Female	25	50.00
Male	25	50.00
Profession before retirement	n	%
Professional and managerial (e.g. teacher, doctor)	20	40.00
Clerical and sales (e.g. administration, salesperson)	17	34.00
Skilled blue-collar (e.g. electrician, craftsperson)	7	14.00
Semi-skilled (e.g. factory worker)	4	8.00
Prefer not to say	2	4.00

Table 10 shows the characteristics of the group of independent living elderly people. The same options have been presented as for the group of care-dependent elderly. For the question about dental status and the visit to the dentist some of 50 participants of the independent living elderly have marked more than one answer. As a result, more than 50 outcomes are shown for these two items. When asked for the willingness to pay for the dental examination, two participants within the group of independent living elderly people did not give an answer. As a result, 48 answers were collected for this item. Within the group of independent living elderly people, several participants gave more than one answer to the questions about dental characteristics. In this group, the participants stated less often to have 'own teeth and a removable prosthesis' (9%). Clearly more total prostheses (10%) and implant-supported prostheses (10.) are observed.

The participants indicate to be highly motivated. 55% stated to visit the dentist at least once a year for a check-up and dental cleaning and 42% stated to visit the dental hygienist at least once a year and the dentist in case of problems. Only 6% stated that visits to the dentist are not important and that they only go to the dentist in case of problems. There is also no participant in this group who indicates to avoid the dentist because of too high prices. When it comes to the willingness to pay, the answers of the independent living elderly are also quite diverse, like the answers of the care-dependent participants. It should be noted that the participants of the care-dependent group clearly indicated less often 'over 120CHF' for a dental check-up or a professional teeth cleaning or 'over 400 CHF' for a dental treatment.

Table 10: Dental characteristics and willingness to pay of independent living elderly participants		
	n*	%
Dental status described by the respondent		
Having own teeth	16	27.58
Having crowns and bridges	25	43.10
Having own teeth and a removable prosthesis	5	8.62
Having a total prosthesis	6	10.43
Having an implant-supported total prosthesis	6	10.34
Frequency of visits to a dentist		
Regular dental check-ups and tooth cleaning once a year or more often	24	46.15
Regular tooth cleaning at a dental hygienist at least once a year or more often, visits to a dentist in case of dental problems	22	42.31
Visits at a dental laboratory in case of denture problems	3	5.77
No dental visits because they are too expensive	0	0
No dental treatment, because they are not important. Only in case of pain or problems a dentist will be visited	3	5.77
Willingness to pay for a dental check-up		
Up to 60 CHF	22	45.83
Up to 120 CHF	22	45.83
Over 120 CHF	4	8.33
Willingness to pay for a professional teeth cleaning		
Up to 80 CHF	17	34.00
Up to 120 CHF	26	52.00
Over 120 CHF	7	14.00
Willingness to pay for a dental treatment		
Up to 200 CHF	17	34.00
Up to 400 CHF	26	52.00
Over 400 CHF	7	14.00

*Choice of multiple options possible

In this younger group, the respondents most often chose for the check-up examination performed by an auxiliary healthcare provider (64.5% of positive choice when it was possible to choose this level) or by their family dentist (57.8%). The option of having a check-up done by their family doctor was chosen the least often (27.8%). In terms of the location for performing the check-up, the family medical practice is the most frequently chosen option (60.4%), followed by at home (50.9%) and the family dental practice (50.0%). The independent living elderly chose least often to perform the check-up in a specialist setting such as a hospital or a community clinic (40.3%). Attribute choices for oral health screening of independent living elderly are shown in table 11.

These results can also be confirmed by the results of the conditional logit model (table 12). An examination by an auxiliary healthcare provider followed by the family dentist are the preferred options, these two options do not differ statistically significant from each other. The statistically lowest preference is observed for an examination done by the family doctor. When it comes to the location, a screening at the family medical practice, the family dental practice and at home at are all preferred options for the younger group of elderly; these three options do not differ statistically significantly from each other. The lowest preference is observed for a specialist setting.

Table 11: Attribute choices for oral health screening of independent living elderly			
Attribute: Type of professional undertaking a screen to check the oral health	Number of levels		
	n chosen	n total	% chosen
Family dentist	231	400	57.8
Family doctor	111	400	27.8
Auxiliary healthcare provider who has been trained to have the necessary skills	258	400	64.5
Attribute: Location where the examination should take place			
Home	178	250	50.9
Family dental practice	150	300	50.0
Family medical practice	151	350	60.4
In a specialist setting (hospital/community clinic)	121	300	40.3

Table 12: Regression result for oral health screening DCE of independent living elderly			
Attributes	Levels	Results	
		Odds ratio (Std. Err.)	P > z
Type of professional undertaking a screen to check the oral health Reference category = family dentist	Family doctor	0.389 (0.064)	0,000
	Auxiliary healthcare provider who has been trained to have the necessary skills	1.142 (0.150)	0.316
Location where the examination should take place Reference category = home	Family dental practice	0.959 (0.223)	0.858
	Family medical practice	0.852 (0.129)	0.291
	In a specialist setting (hospital/community clinic)	0.613 (0.132)	0.023

For dental treatment, the independent living elderly chose the options of treatment by a specialist dentist in about 51.3% of the cases and by a family dentist in about 48.7% of the cases. As far as the location is concerned, a treatment at a family dental practice chosen most often (66%). A treatment in a specialist setting such as a hospital or a community clinic is chosen in around 50.5% of the cases and a treatment at home is only chosen in 33.5% of the cases. Attribute choices for dental treatment of independent living elderly are presented in table 13.

The results of the conditional logit model (see table 14) show that the preference for treatment by the family dentist or by a specialist dentist does not differ significantly statistically ($p=0.582$). When it comes to the place of the treatment, the preference is clearly for a treatment at the family dental practice or at a specialist setting. Elderly people living independent prefer statistically significantly less to have a dental treatment carried out at home compared to the other two choices.

Attribute: Type of professional providing dental treatment	Number of levels		
	n chosen	n total	% chosen
Family dentist	146	300	48.7
Specialist dentist	154	300	51.3
Attribute: Location where the dental treatment should take place			
Home	67	200	33.5
Family dental practice	132	200	66.0
In a specialist setting (hospital/community clinic)	101	200	50.5

Table 14: Regression result for dental treatment DCE of independent living elderly

Attributes	Levels	Results	
		Odds ratio (Std. Err.)	P > z
Type of professional providing dental treatment Reference category = family dentist	Specialist dentist	1.061 (0.113)	0.582
Location where the dental treatment should take place Reference category = home	Family dental practice	2.488 (0.649)	0.000
	In a specialist setting (hospital/ community clinic)	1.610 (0.360)	0.033

Comparison of care-dependent and independent living elderly

The measured preferences of the care-dependent elderly and the independent living partially correspond with each other (see table 15). Both groups express a preference for an examination undertaken by a family dentist. However, they differ when it comes to the preference for an examination by an auxiliary healthcare person. While the elderly who live independent prefer this option as much as an examination by their family dentist, the care-dependent elderly prefer this option significantly less ($p=0.003$). Both groups prefer least to have their oral health check performed by a family doctor. However, the refusal is significantly higher among care-dependent elderly ($p=0.050$).

		Coefficients (Std. Err.)		Difference (Chi ²)	P > Chi ²
Attribute	Levels	Care depen- dent elderly	Independent living elderly		
Type of professional undertaking a screen to check the oral health Reference category = family dentist	Family doctor	-1.447 (0.200)	-0.943 (0.162)	-0.504 (3.83)	0.050
	Auxiliary healthcare provider who has been trained to have the necessary skills	-0.473 (0.154)	0.133 (0.131)	-0.605 (8.92)	0.003
Location where the examination should take place Reference category = home	Family dental practice	-0.341 (0.204)	-0.041 (0.231)	-0.299 (0.94)	0.331
	Family medical practice	-1.241 (0.268)	-0.160 (0.151)	-1.080 (12.37)	0.000
	In a specialist setting (hospital/ community clinic)	-1.258 (0.272)	-0.488 (0.214)	-0.770 (4.95)	0.026

In terms of location for the oral examination, the family dental practice and at home are favorite options for care-dependent elderly and for those elderly who live independent. The relative preference for the family dental practice does not differ from each other ($p=0.331$). A large, highly significant difference can be seen in the preference for the option of performing the oral screening in the family medical practice. The independent living elderly persons prefer this option together with the check-up at home or at the family dentist. In contrast, the care-dependent elderly persons prefer this option significantly less ($p=0.000$). Both groups also have a low preference for the specialist setting as the location for oral screening, with a significantly lower preference for the care-dependent group of elderly ($p=0.026$).

Table 16: Difference between regression result for treatment DCE of the care-dependent and independent living elderly.

Attribute	Levels	Coefficients (Std. Err.)		Difference (Chi ²)	P > Chi ²
		Care dependent elderly	Independent living elderly		
Type of professional providing dental treatment Reference category = family dentist	Specialist dentist	-0.111 (0.132)	0.059 (0.106)	-0.170 (1.00)	0.317
Location where the dental treatment should take place Reference category = home	Family dental practice	-0.203 (0.238)	0.911 (0.260)	-1.114 (10.02)	0.002
	In a specialist setting (hospital/ community clinic)	-0.689 (0.234)	0.477 (0.223)	-1.166 (13.03)	0.000

For the dental treatment, the measured preferences of the care-dependent elderly and the independent living correspond for the type of professional providing it (see table 16). The two groups show no statistical differences in the preference for treatment

provided by a family dentist or performed by a specialist-dentist ($p=0.317$). In terms of location, the preferences for performing the dental treatment of the two groups differ statistically significantly from each other. While the care-dependent elderly people the preference for a treatment at home or at a family dental practice do not differ intra-group significantly, there is a difference between the two groups: the preference for a treatment at a family dental practice for the independent living elderly is significantly higher than for the care-dependent group ($p=0.002$). Finally, the care-dependent elderly people prefer not to be treated in a specialist setting while the independent respondents have expressed a significant positive preference for this option. Hence, the difference between the two groups in the preference for this option is therefore highly statistically significant ($p=0.000$).

DISCUSSION

The results of the undertaken DCEs show that both care-dependent and independent living elderly people prefer a familiar rather than a specialized form of dental care.

Like in any other study with a limited number of participants, it is important to consider if the measured preferences apply at a national level. The Swiss Federal Statistical Office reports that persons aged 80 and over (76% of them are women) represent three-quarters of the residents living in nursing homes in 2018 (BFS 2019). The care-dependent elderly of this study are very similar to the Swiss population living in nursing homes in terms of age (average age of 84 years) and gender distribution (75% are female), which makes this group representative in terms of two main demographic characteristics.

The demographic characteristics of the two groups of elderly people investigated with the DCEs show large differences in occupational status before retirement. In the group of independent living elderly, the profession for retirement 'Professional and managerial' (40%) was clearly better represented than in care-dependent group of elderly (16%). The group of care-dependent elderly contained proportionally much more 'skilled blue collar and semi-skilled workers' than the group of independent living elderly. These differences in occupational status could partially explain the differences in preferences between the two investigated groups of elderly. It is conceivable that people with a higher occupational status have a greater interest in more complex and specialized dental treatments. This could be a reason why the group of people living independent expresses a greater preference for a specialist dentist and a specialist setting than the group of care-dependent elderly people. It is known that occupational status is closely related to educational achievement and that these, together with income, are predictors for the consumption of dental care among older adults. Blue collar workers are reported to make significantly less use of dental facilities compared to other occupational groups (Kiyak et. al 2005, Roberts-Thomson et al. 1995).

As part of the demographic characteristics, the participants have been asked for their monthly income. Because the DCE undertaken in 2018 was part of a collaboration with other European universities, the answer options have been adjusted to a European price level. The highest option was 'a monthly income of 1600 CHF or more', which is still below the limit for supplementary benefits to the old-age and survivor's insurance in Switzerland (in German: Ergänzungsleistungen zur AHV). Therefore, the answers are not usable for the Swiss context. In addition, of the 50 participants in the study with the elderly living independent, 11 did not answer the question about their monthly income and 6 preferred not to say anything about their income. This large non-response also makes it impossible to make statements about the income of the participants.

A limiting factor to take into account is the use of self-reported information. The answers concerning the frequency of dental visits and particularly the answers concerning dental status involve a subjective assessment made by the participants themselves. Additionally, answer options for these subjects were limited and may not have been adequate and suitable for all participants. Another concern is that the questions about the willingness to pay are formulated unspecific and are consequently highly dependent on interpretations of the participants. These limiting factors should be taken into account when interpreting the answers given by the participants.

The method used to include the participants may be selective and therefore sub-optimal. All communicatively skilled residents have been informed orally and written by the researcher or the nursing staff. Residents interested in participating were included. It is conceivable that this group is more aware of and more interested in their oral health. The level of frailty and the level of care dependency (low, average, high) may also have an impact on the preferences of older people (Evenaars et al. 2015, Niesten et al. 2013). This explanation could explain the differences measured in the preferences between the questioned independent living and the care-dependent elderly.

It is known that conducting interviews with dependent older people is very challenging (Evenaars et al. 2015). The higher the dependency scale of older people, the more cognitive problems like dementia are present, which makes interviewing difficult or impossible. When interpreting the results of interviews with care-dependent elderly, it should be taken into account that those people often present cognitive problems and might be less capable to self-reflect on their oral health problems (Evenaars et al. 2015). Screening for cognitive function could be considered when conducting an interview on preferences of care-dependent elderly. For this purpose, the Mini Mental Status Examination (MMSE) could be useful. This is a widely used instrument to evaluate the mental status and to screen for dementia (Folstein et al. 1975). Administration of the MMSE takes between 5 and 10 minutes. To not burden the respondents with extra questions, it was decided in this study not to administrate this test.

It was decided to conduct an oral questionnaire with the participants. This form was chosen because it was estimated to be practically impossible for a significant proportion of care-dependent elderly people to complete the questionnaire in writing. Patients from this group of elderly people usually suffer from limited visual and motor skills, and written health questionnaires are mostly impossible. In order to be able to carry out this question-and-answer study, the choice was made to conduct the questionnaire orally, with the researcher filling in the answers. The disadvantage of this method is that the interviewees give socially desirable answers to the researcher. In the DCEs with the elderly living independent, the questionnaires were filled out by the participants themselves, making the risk of socially desirable answers much lower. The difference in interview method may also have contributed to the measured differences between the two DCE groups.

The respondents preferred their family dentist for the check-up. This outcome is well understandable and explainable. The factors patients consider important when choosing a dentist are the dentist's competence, the recommendation from someone known, and the overall quality of the service provided, but interpersonal factors such as

patience and respect are also essential (Ungureanu et al. 2015). Patients often have a long-term relationship of trust with their dentist. It is therefore understandable that care-dependent elderly people want to continue dental check-ups with their trusted dentist. This fits in with previous research suggesting that older people with unmet dental needs and those who expressed a lack of trust and confidence in their dentist were more likely to experience poor oral health quality of life. This reinforces the importance of the dental patient experience in healthy ageing and well-being (Muirhead et al. 2014). A 2017 meta-analysis by Birkenhauer also reported that across diverse clinical settings, patients reported to be more satisfied with treatment, to show more beneficial health behaviors, less symptoms and higher quality of life when they had higher trust in their health care professional (Birkenhauer et al. 2017).

The auxiliary healthcare provider was nearly as frequently chosen as the family dentist by the care-dependent and by the independent living elderly. The preference for this health care provider can possibly be explained by the fact that the respondents imagined the auxiliary healthcare provider could be a dental hygienist. Many patients are nowadays familiar with visiting an oral hygienist on a regular base. Analyzing the trends of the Swiss population in dental care by dentists and dental hygienists shows different trends. Visits to the dentist decreased slightly over the years, while the visits to the dental hygienist increased and the combination of both point to a small increase in oral health care utilization in Switzerland between 1992 and 2012 (Schneider et al. 2019). These observations indicate a trend towards a more specialized and tailored approach in oral health care provision, which was previously outlined by the increasing ratio of dentist to non-dentist oral health care workers in other European countries (Widstrom et al. 2010, Brocklehurst et al. 2015).

The respondents in the experiment with the care-dependent elderly prefer to have performed the dental check-up at home. For the dental treatment, both the home and the dental practice were the most desired options in terms of location. A specialist setting, such as a hospital or a community clinic, is the least popular for both the check-

up and the treatment among the respondents of the care-dependent group of elderly. Attendance at a dentist and accessing dental care is difficult for the majority of care-dependent elderly people and explains the preference for dental care at home. Getting frail elderly to the location of the dental surgery puts a burden on residents and homes. The majority of residents need an escort and a wheelchair and would have difficulties getting on a dental chair. It gets even more difficult and stressful specially for elderly with dementia (De Visschere et al. 2006). Research about preventive home visits at older people showed that these visits increase the patients' feeling of safety (Toien et al. 2018). Performing dental checks and treatments in their trusted home environment seems to reduce stress and discomfort.

The independent living elderly chose in 60.4% of the options to carry out the dental screening in a family medical practice. However, the combinations and unequal distribution of the attributes 'type of professional ' and 'location' offered in the questionnaire may explain the unexpected amount of choices for certain attributes. Therefore, regression with the conditional logit model must be used to determine preferences reliably. According to the regression results, the preference of independent living elderly people in terms of location for the oral examination does not differ statistically from the options of a family dental practice or at home. But this group of elderly in comparison with the care-dependent elderly still has a significantly greater preference for the check-up carried out in a family medical practice. The independent elderly also had a greater preference for the family doctor providing the oral check-up. An explanation for the preference of the family doctor could be better accessibility and potential cost efficiency. In earlier research by Evenaars et al. 2015, the family doctor option was also discussed. Oral health care could become an integral part of general health care, indicated that including basic oral health care screening performed by family doctors could improve affordability and accessibility to professional oral health care (Evenaars et al. 2015).

The preference to carry out a necessary dental treatment in the dental practice can be explained by the conviction that dentists can offer better quality when they have access to their equipment and operate in their normal working environment. It can also be explained by the idea that a visit to a dental practice is a nice change from the usual home setting for elderly people. In addition, the influence of years of visiting the same dental practice should not be underestimated. It is conceivable that elderly people want to continue having dental procedures at their trusted dental practice.

Several studies report very low motivation for care-dependent elderly people to visit a dentist at all. The main reason older people in western societies avoid visiting a dentist is the lack of desire to do so (Kiyak 1987, Lester et al. 1998, Listl et al. 2014, Niesten 2017). Niesten mentions in her research that 83% of the group of care-dependent elderly who did not, or only occasionally, visit a dentist reported not to feel the need to go more often (Niesten et al. 2017). The low motivation of care-dependent elderly people to visit a dentist could be explained by the adaptation process of „response shift“ (Evenaars et al. 2015). Due to this process, people create expectations about their lives, building on their experiences. Even in case of possible oral health discomfort, participants from the focus group and interviewees seem to be quite satisfied with their current oral health (care). Older people seem to have certain expectations about their oral health and cope with discomfort. By accepting the discomfort, they adapt to the situation not influencing their oral health related quality of life (Carr et al. 2001, Locker et al. 2005, Sprangers et al. 1999). When individuals have other health problems, this might influence the experience on their oral health. According to Sprangers et al. 1999 internal standards, values and conceptualizations of life quality can change over time in a disease trajectory (Sprangers et al. 1999). Niesten et al. support these theories for frail older people by mentioning the secondary control strategies. It was argued that with increased fragility, people compare themselves with others, their general health or their age. They adapt their judgment on what is „healthy“ by their age and oral health situation (Niesten et al. 2013). Frail older people would thereby adapt their judgment

on what is „healthy“ by their age and oral health situation. The phenomenon of decreasing motivation of the elderly to visit a dentist at all could explain why the care-dependent participants prefer the most basic choice in terms of setting, namely dental visits at home. The present study shows, that a check-up or dental treatment at home is clearly more preferred among the elderly dependent on our research than the more complex option for a specialist institution.

In the group of care-dependent elderly studied, clearly more people indicated that they did not visit a dentist on a regular basis, but only in case of pain or problems. Nearly one third of the elderly dependent on care said that they only visited a dentist in case of pain or problems, while the remaining two third of the respondents said that they visit a dentist or oral hygienist at least once a year. 88% of the group of elderly people living independent stated that they had their teeth checked and professionally cleaned at least once a year. These figures differ significantly from the results of the latest Swiss National Health Survey (BFS 2013). As part of this survey conducted in 2012, questions on dental visits from 17,784 people were analyzed. Two-thirds of all questioned adults claimed they visited a dentist or dental hygienist in the previous year. More than a third (36.4%) of the subjects in the Swiss National Health Survey stated that they had not visited a dentist in the past 12 months. The percentage of dental check-ups decreased with increasing age, to around 50% in the age group of 65 years and older (Schneider et al. 2019). These results from this Swiss National Health Survey are largely representative for the Swiss population and do not correspond with the high frequency of dental visits stated by the participants of the DCEs. A possible explanation could be the aforementioned limitation of this DCE; the way that the participants were selected. It is conceivable that both the care-dependent elderly, as well the independent elderly participated in the DCEs value their dental health more than average.

It is important to take the perspectives and expectations of elderly people into account in policy and planning of oral health care practice, because these can differ from the perspectives of dental professionals (Evenaars et al. 2015). The results of this DCE

suggest that the care-dependent elderly people prefer a familiar rather than a specialized form of dental care. To improve dental care for care-dependent elderly people, more dentists need to be motivated to continue dental care for the elderly. Consideration should be given to factors that can facilitate dentists' behavior towards providing oral care to the elderly. Systematic reviews have identified several factors from the perspective dental professionals that act as barriers or facilitators to the provision of dental care to dependent elderly people. The 'lack of adequate facilities in a care home' and the 'lack of transportation of patients' were most frequently stated barriers by dentists (Bots-VantSpijker et al. 2015, Göstemeyer et al. 2019). It seems highly important to support the provision of dental care for dentists by establishing suitable facilities, e.g., by providing mobile dental units, treatment rooms located at the nursing homes, or organization of transportation (Petersen et al. 2010). It is however to be noted that habitual behavior performed in a stable context is difficult to change (Godin et al. 2008). Availability of suitable facilities alone would therefore not be able to have a strong effect on the provision of dental care by dentists.

Moreover, 'lack of knowledge', 'patients refusing care', 'more time needed', 'lack of time and 'no/low financial incentives' were identified by dentists as barriers for providing dental care to dependent elderly people (Göstemeyer et al. 2019). Education in dentistry for the elderly should therefore be expanded, both at under- and post-graduate level. It seems necessary to train dentists in how to deal with elderly patients and to establish strategies for managing patients who refuse dental care. Adapting strategies from the pediatric and special needs dentistry seems to be a good approach. These strategies should be implemented appropriately, as guidelines and information on oral care have been identified as facilitators of dental treatment for dependent elderly people (Göstemeyer et al. 2019). Policymakers should develop systems that allow sufficient reimbursement for the treatment of dependent elderly people, with remuneration closely linked to the time spent on providing this type of care. A review by Holm-Pedersen et al. 2005 indicated that reimbursement for dental care for care-dependent

elderly people is an important factor related with the access to dental care for this group of elderly people in Europe (Holm-Pedersen et al. 2005).

This study wanted to explore the preferences of older people for dental services when they have lost their independence. With a larger amount of data, i.e. a larger number of resident groups and more interviews, a more complete analysis of the value and usefulness of DCEs in the elderly population group would be possible. In DCEs, people's preferences are elicited based on their intentions expressed in hypothetical situations (Louviere et al. 2000). Asking questions about hypothetical situations is complicated, especially for patients with cognitive impairments. Best-Worst Scaling (BWS) is a form of DCE that reduces the cognitive burden on participants and so is particularly suited for older people, where some degree of cognitive impairment may be present (Brocklehurst et al. 2018). In a BWS study, participants are asked to choose the best and worst (or most and least) level of a given attribute (Flynn et al. 2007). For future studies exploring the preferences of care-dependent elderly, the use of BWS seems to be a suitable method. An additional advantage of a BWS is that a 'zero option' could also be selected. In such an experiment, the option of 'no dental check-up' could be explored, something that does not benefit oral health but is probably a preferred option for many of the care-dependent elderly (Lester et al. 1998, Niesten et al. 2017). Future research concerning the preferences of the elderly should seriously consider the use of a BWS setup.

As a final consideration, it should be noted that people with cognitive problems and dementia also belong to the group of care-dependent elderly people. People suffering from an advanced stage of dementia and elderly with serious cognitive problems are legally incapacitated and cannot be asked about their preferences. It is known that individuals with dementia suffer from poor oral health and have more oral health problems than individuals without dementia (Rejnefelt et al. 2006, Zenthofer et al. 2014). The care provided to this group of elderly people mainly depends on the possibilities and limitations of the care providers (Delwel et al. 2017, Göstemeyer et al. 2019). When planning strategies for improving the dental care of care-dependent

elderly people based on their preferences, this group of people should not be overlooked. Then how do we deal with people with an early stage of dementia and mild cognitive problems? These people are not legally incapacitated, indicate certain preferences and have autonomy that must be respected. This is a very difficult and interesting ethical issue that needs to be taken into account when providing and developing dental care.

CONCLUSION

Demographic changes in the population affect the planning and implementation of dental care for care-dependent elderly people. It is important to take the perspectives and preferences of care-dependent elderly into account when setting the agenda for oral health care for care-dependent elderly people, because these seem to differ from the healthcare providers' perspectives. The results of this DCE suggest that the continuation of dental services from the family dentist should be prioritized. Our research illustrates that the care-dependent elderly people prefer a familiar rather than a specialized form of dental care. To improve the dental care of care-dependent elderly people, dentists should be motivated to provide dental check-ups at people's homes or in their nursing homes. Additional research needs to show what healthcare policymakers could do and what tools are required to achieve this goal.

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APPENDIX A: CHOICE SETS FOR THE DENTAL CHECK-UP DISCRETE CHOICE EXPERIMENT IN ENGLISH

Scenario	Choosing between
1	<p>A. Your check-up would be provided by your family dentist at home</p> <p>B. Your check-up would be provided by your family doctor at your family dental practice</p>
2	<p>A. Your check-up would be provided by another auxiliary healthcare provider who has been trained to have the necessary skills at home</p> <p>B. Your check-up would be provided by your family dentist at your family dental practice</p>
3	<p>A. Your check-up would be provided by your family doctor at home</p> <p>B. Your check-up would be provided by another auxiliary healthcare provider who has been trained to have the necessary skills in a specialist setting (hospital/community clinic)</p>
4	<p>A. Your check-up would be provided by your family dentist at your family medical practice</p> <p>B. Your check-up would be provided by your family doctor at home</p>
5	<p>A. Your check-up would be provided by another auxiliary healthcare provider who has been trained to have the necessary skills at your family medical practice</p> <p>B. Your check-up would be provided by your family doctor in a specialist setting (hospital/community clinic)</p>
6	<p>A. Your check-up would be provided by your family dentist in a specialist setting (hospital/community clinic)</p> <p>B. Your check-up would be provided by another auxiliary healthcare provider who has been trained to have the necessary skills at your family dental practice</p>
7	<p>A. Your check-up would be provided by another auxiliary healthcare provider who has been trained to have the necessary skills in a specialist setting (hospital/community clinic)</p> <p>B. Your check-up would be provided by your family doctor at home</p>

8	A. Your check-up would be provided by your family dentist at home
	B. Your check-up would be provided by another auxiliary healthcare provider who has been trained to have the necessary skills at your family medical practice
9	A. Your check-up would be provided by your family doctor at your family dental practice
	B. Your check-up would be provided by another auxiliary healthcare provider who has been trained to have the necessary skills at home
10	A. Your check-up would be provided by your family doctor in a specialist setting (hospital/community clinic)
	B. Your check-up would be provided by your family dentist at your family medical practice
11	A. Your check-up would be provided by your family dentist at your family dental practice
	B. Your check-up would be provided by your family doctor at your family medical practice
12	A. Your check-up would be provided by another auxiliary healthcare provider who has been trained to have the necessary skills at your family dental practice
	B. Your check-up would be provided by your family dentist in a specialist setting

APPENDIX B: CHOICE SETS FOR THE DENTAL TREATMENT DISCRETE CHOICE EXPERIMENT IN ENGLISH

Scenario	Choosing between
1	A. 1Your family dentist would provide you with the necessary treatment at home to maintain your oral health
	B. A specialist dentist would provide you with the necessary treatment at your family dental practice to maintain your oral health
2	A. A specialist dentist would provide you with the necessary treatment at home to maintain your oral health
	B. Your family dentist would provide you with the necessary treatment in a specialist setting (hospital/community clinic) to maintain your oral health
3	A. Your family dentist would provide you with the necessary treatment at your family dental practice to maintain your oral health
	B. A specialist dentist would provide you with the necessary treatment in a specialist setting (hospital/community clinic) to maintain your oral health
4	A. A specialist dentist would provide you with the necessary treatment in a specialist setting (hospital/community clinic) to maintain your oral health
	B. Your family dentist would provide you with the necessary treatment at home to maintain your oral health
5	A. Your family dentist would provide you with the necessary treatment in a specialist setting (hospital/community clinic) to maintain your oral health
	B. A specialist dentist would provide you with the necessary treatment at your family dental practice to maintain your oral health
6	A. Your family dentist would provide you with the necessary treatment at your family dental practice to maintain your oral health
	B. A specialist dentist would provide you with the necessary treatment at home to maintain your oral health

APPENDIX C: CHOICE SETS FOR THE DENTAL CHECK-UP DISCRETE CHOICE EXPERIMENT IN GERMAN

Scenario	Choosing between
1	A. Die zahnärztliche Kontrolluntersuchung wird von Ihrem Hauszahnarzt bei Ihnen zu Hause/ im Heim durchgeführt
	B. Die zahnärztliche Kontrolluntersuchung wird von Ihrem Hausarzt in der Hauszahnarztpraxis durchgeführt
2	A. Die zahnärztliche Kontrolluntersuchung wird von einer medizinischen Hilfsperson mit entsprechender Qualifikation bei Ihnen zu Hause/ im Heim durchgeführt
	B. Die zahnärztliche Kontrolluntersuchung wird von Ihrem Hauszahnarzt in der Hauszahnarztpraxis durchgeführt
3	A. Die zahnärztliche Kontrolluntersuchung wird von Ihrem Hausarzt bei Ihnen zu Hause/ im Heim durchgeführt
	B. Die zahnärztliche Kontrolluntersuchung wird von einer medizinischen Hilfsperson mit entsprechender Qualifikation in einem spezialisierten Zentrum (Spital, staatliches Krankenhaus) durchgeführt
4	A. Die zahnärztliche Kontrolluntersuchung wird von Ihrem Hauszahnarzt in Ihrer Hausarztpraxis durchgeführt
	B. Die zahnärztliche Kontrolluntersuchung wird von Ihrem Hausarzt bei Ihnen zu Hause/ im Heim durchgeführt
5	A. Die zahnärztliche Kontrolluntersuchung wird von einer medizinischen Hilfsperson mit entsprechender Qualifikation in ihrer Hausarztpraxis durchgeführt
	B. Die zahnärztliche Kontrolluntersuchung wird von Ihrem Hausarzt in einem spezialisierten Zentrum (Spital, staatliches Krankenhaus) durchgeführt
6	A. Die zahnärztliche Kontrolluntersuchung wird von Ihrem Hauszahnarzt in einem spezialisierten Zentrum (Spital, staatliches Krankenhaus) durchgeführt
	B. Die zahnärztliche Kontrolluntersuchung wird von einer medizinischen Hilfsperson mit entsprechender Qualifikation in ihrer Hauszahnarztpraxis durchgeführt

7	A. Die zahnärztliche Kontrolluntersuchung wird von einer medizinischen Hilfsperson mit entsprechender Qualifikation in einem spezialisierten Zentrum (Spital, staatliches Krankenhaus) durchgeführt
	B. Die zahnärztliche Kontrolluntersuchung wird von Ihrem Hausarzt bei Ihnen zu Hause/ im Heim durchgeführt
8	A. Die zahnärztliche Kontrolluntersuchung wird von Ihrem Hauszahnarzt bei Ihnen zu Hause/ im Heim durchgeführt
	B. Die zahnärztliche Kontrolluntersuchung wird von einer medizinischen Hilfsperson mit entsprechender Qualifikation in Ihrer Hausarztpraxis durchgeführt
9	A. Die zahnärztliche Kontrolluntersuchung wird von Ihrem Hausarzt in Ihrer Hauszahnarztpraxis durchgeführt
	B. Die zahnärztliche Kontrolluntersuchung wird von einer medizinischen Hilfsperson mit entsprechender Qualifikation bei Ihnen zu Hause/ im Heim durchgeführt
10	A. Die zahnärztliche Kontrolluntersuchung wird von Ihrem Hausarzt in einem spezialisierten Zentrum (Spital, staatliches Krankenhaus) durchgeführt
	B. Die zahnärztliche Kontrolluntersuchung wird von Ihrem Hauszahnarzt in Ihrer Hausarztpraxis durchgeführt
11	A. Die zahnärztliche Kontrolluntersuchung wird von Ihrem Hauszahnarzt in der Hauszahnarztpraxis durchgeführt
	B. Die zahnärztliche Kontrolluntersuchung wird von Ihrem Hausarzt in der Hausarztpraxis durchgeführt
12	A. Die zahnärztliche Kontrolluntersuchung wird von einer medizinischen Hilfsperson mit entsprechender Qualifikation in Ihrer Hauszahnarztpraxis durchgeführt
	B. Die zahnärztliche Kontrolluntersuchung wird von Ihrem Hauszahnarzt in einem spezialisierten Zentrum (Spital, staatliches Krankenhaus) durchgeführt

APPENDIX D: CHOICE SETS FOR THE DENTAL TREATMENT DISCRETE CHOICE EXPERIMENT IN GERMAN

Scenario	Choosing between
1	A. Ihr Hauszahnarzt führt die zur Erhaltung Ihrer Mundgesundheit notwendigen Behandlungsmassnahmen bei Ihnen zu Hause/im Heim durch
	B. Ein spezialisierter Zahnarzt führt die zur Erhaltung Ihrer Mundgesundheit notwendigen Behandlungsmassnahmen in Ihrer Hauszahnarztpraxis durch
2	A. Ein spezialisierter Zahnarzt führt die zur Erhaltung Ihrer Mundgesundheit notwendigen Behandlungsmassnahmen bei Ihnen zu Hause/im Heim durch
	B. Ihr Hauszahnarzt führt die zur Erhaltung Ihrer Mundgesundheit notwendigen Behandlungsmassnahmen in einem spezialisierten Zentrum (Spital, staatliches Krankenhaus) durch
3	A. Ihr Hauszahnarzt führt die zur Erhaltung Ihrer Mundgesundheit notwendigen Behandlungsmassnahmen in Ihrer Hauszahnarztpraxis durch
	B. Ein spezialisierter Zahnarzt führt die zur Erhaltung Ihrer Mundgesundheit notwendigen Behandlungsmassnahmen in einem spezialisierten Zentrum (Spital, staatliches Krankenhaus) durch
4	A. Ein spezialisierter Zahnarzt führt die zur Erhaltung Ihrer Mundgesundheit notwendigen Behandlungsmassnahmen in einem spezialisierten Zentrum (Spital, staatliches Krankenhaus) durch
	B. Ihr Hauszahnarzt führt die zur Erhaltung Ihrer Mundgesundheit notwendigen Behandlungsmassnahmen bei Ihnen zu Hause/ im Heim durch
5	A. Ihr Hauszahnarzt führt die zur Erhaltung Ihrer Mundgesundheit notwendigen Behandlungsmassnahmen in einem spezialisierten Zentrum (Spital, staatliches Krankenhaus) durch
	B. Ein spezialisierter Zahnarzt führt die zur Erhaltung Ihrer Mundgesundheit notwendigen Behandlungsmassnahmen in Ihrer Hauszahnarztpraxis durch

6	A. Ihr Hauszahnarzt führt die zur Erhaltung Ihrer Mundgesundheit notwendigen Behandlungsmassnahmen in der Hauszahnarztpraxis durch
	B. Ein spezialisierter Zahnarzt führt die zur Erhaltung Ihrer Mundgesundheit notwendigen Behandlungsmassnahmen bei Ihnen zu Hause / im Heim durch