The Patient - Patient-Centered Outcomes Research (2022) 15:473–483
https://doi.org/10.1007/s40271-021-00566-4

ORIGINAL RESEARCH ARTICLE

Will the Public Engage with New Pharmacy Roles? Assessing Future Uptake of a Community Pharmacy Health Check Using a Discrete Choice Experiment

Gin Nie Chua[1] · Christine Bond[2] · Terry Porteous[3] · Mandy Ryan[1]

Accepted: 7 December 2021 / Published online: 24 January 2022

Abstract

Background Pharmacists are increasingly providing more clinically orientated services that focus on enhancing patient care and health promotion. However, little is known about how acceptable this is to the public. This study explored public preferences for a community pharmacy-based health check for cardiovascular disease (CVD).

Methods A convenience sample of 423 individuals was recruited (from a community pharmacy, a dental practice, a shopping centre, a university campus and a sports centre) to complete a discrete choice experiment (DCE) survey administered face to face on a tablet. The DCE included six attributes: day of the week (weekday or weekends); way of accessing the service (walk-in and wait or by appointment); provider of health check (trainee pharmacist, pharmacist or nurse); duration of health check (30 or 45 min); follow-up phone call (no, yes and within 3 months); and cost (included to estimate the monetary value of health checks). Experimental design methods were used to create 12 choice tasks describing different health check services. Mixed logit (MXL) was used to analyse response data.

Results Respondents had a preference for a community pharmacy-based CVD health check over no health check. They preferred a service provided (i) at the weekend; (ii) by appointment; (iii) by a nurse; (iv) for 30 min and (v) with follow-up after 3 months. Respondents were willing to pay £50 for this health check.

Conclusion Findings affirm the public's acceptance and value of a pharmacy-led CVD health check. The findings can inform pharmacy-based screening services before they are introduced, guide new service design and support resource allocation decisions.

1 Introduction

Under the most recent community pharmacy contracts [1, 2], pharmacists in the UK, as in other countries internationally, are increasingly providing more clinically orientated services that focus on enhancing patient care. These extended roles include a wide range of services such as chronic disease and therapy management [3, 4], diagnosis and treatment for minor ailments [5–7], independent prescribing [8, 9], as well as health promotion activities such as smoking cessation [10, 11], sexual health [12, 13] and drug addiction services [14, 15], weight management and healthy lifestyle support [16–18], immunizations including for flu [19] and COVID 19 [20], and travel health [21].

One key public health service provided by community pharmacists where there is strong positive evidence of benefit is the prevention of cardiovascular disease (CVD). CVD comprises a range of conditions affecting the heart and/or blood vessels. It has high prevalence in the UK, particularly among disadvantaged groups, and is a significant economic burden [22, 23]. Published evidence indicates that community pharmacists offering services to modify unhealthy behaviour (e.g. smoking, poor diet, obesity) are able to reduce the risk factors for CVD [11, 24]. Furthermore, it has been demonstrated that screening for CVD risk factors is highly cost effective for the NHS (around £3000 per QALY) [25].

✉ Gin Nie Chua
ginniechua@gmail.com

1 Health Economics Research Unit, Institute of Applied Health Sciences, University of Aberdeen, Aberdeen, UK

2 Academic Primary Care, Institute of Applied Health Sciences, University of Aberdeen, Aberdeen, UK

3 Centre for Healthcare Education Research and Innovation, Institute of Education for Medical and Dental Sciences, and Health Economics Research Unit, Institute of Applied Health Sciences, University of Aberdeen, Aberdeen, UK

Key Points for Decision Makers

This study assessed public preferences and values for a community pharmacy-based cardiovascular disease (CVD) health check.

Using a discrete choice experiment, it was found that consumers valued a community pharmacy-based CVD health check that is provided at the weekend; by appointment; by a nurse; for 30 min; with a 3-month follow-up call; for £50.

The findings can inform pharmacy-based screening services before they are introduced, guide new service design and support resource allocation decisions.

It is important that individuals who are at risk of developing CVD are identified early to prevent the onset of disease or enable timely diagnosis so that treatment can be initiated to secure a better prognosis. One way to achieve this is by offering screening services either opportunistically or by targeting specific groups, and community pharmacy is one location where such services can be located. A 2013 systematic review of screening services for major diseases in community pharmacies by Ayorinde et al. [26] found that screening for risk factors associated with CVD was the most widely offered service. More recently in the UK, the NHS in England has started to offer free heart checks in pharmacies [1], informed by an evidence base of studies conducted in 17 countries that scrutinised community pharmacy services addressing a number of health conditions [27]. These comprise a 'vascular risk assessment' with the aim of identifying and modifying factors that can contribute to a number of conditions including coronary heart disease and stroke.

With its unique 'high street' location, community pharmacy offers a credible delivery site for CVD screening. There are over 14,000 community pharmacy premises across the UK that are highly accessible to the public in both urban and rural areas, with long operating hours and providing a no-appointment-based service [28]. Moreover, community pharmacy users are not only patients with known conditions, but a diverse group of healthcare consumers including seemingly healthy individuals who could be at risk of a disease. Given the extensive reach of the network, community pharmacies offer a convenient location and attract consumers who may not access other NHS services. This has the potential to reduce health inequalities associated with early detection and management of chronic diseases (e.g. diabetes, hypertension), modification of lifestyle risk factors (e.g. smoking, poor diet, physical inactivity and high alcohol consumption) as well as promoting access to health services amongst under-served populations (e.g. people from minority ethnic groups, or those who are housebound, homeless or misuse drugs or alcohol).

To date, studies have evaluated the public's acceptance of community pharmacy-based screening services using conventional satisfaction surveys [26, 29, 30]. Although it is clear from these studies that those who have undergone screening at community pharmacies are largely receptive and satisfied with the service, little is known about what characteristics of the service matter to them, the value they attach to the service, and how the service could be better configured taking into account their preferences. Against this background, the discrete choice experiment (DCE) methodology provides a useful way to quantify the subjective constructs of preference and value from the patient perspective into an objective measure that can be used to support decision making at the policy level. Typically, a DCE involves respondents making a series of repeated choices on hypothetical alternatives of a service or treatment, defined by a set of attributes. By systematically varying the combination of levels describing the attributes, a DCE allows the identification of the attributes that are important to (or preferred by) respondents, the strength of their preferences, the trade-offs that they are willing to make between different attributes and the probability of take-up of different configurations or ways of providing a service. This information can be used to guide service design and predict future demand and service utilization.

This study aimed to elicit public preferences and values for a community pharmacy-based CVD health check using a DCE. The specific objectives were to (i) establish the relative importance of different attributes of a community pharmacy-based CVD health check; (ii) quantify, in monetary terms, the trade-offs between attributes and the value that consumers attached to accessing a community pharmacy-based CVD health check; and (iii) predict the uptake probabilities of different community pharmacy-based CVD health checks.

2 Methods

2.1 Selecting Attributes and Levels

Previous DCEs on screening programmes in primary care and community pharmacy-based services were identified from major review articles identified through a targeted literature review on MEDLINE [31, 32]. The attributes and levels used in those DCEs generated a long list of possible attributes and levels that were considered to be important factors to the public when accessing community pharmacy-led health services. (See Online Resource 1 in electronic

supplementary material [ESM]). These were used to inform a series of discussions with a convenience sample of three local pharmacists to identify those most relevant and that could feasibly be implemented in the proposed health check. The pharmacists consulted were a proprietary pharmacy owner, a pharmacy manager, and an academic pharmacist with significant experience in pharmacy practice research. Based on those discussions, five attributes were selected: day of the week; way of accessing the service; provider; duration and follow-up care (Table 1). The levels for each attribute were assigned based on the long list of attributes and levels generated from the targeted literature review, the discussions with local pharmacists and based on what could be potentially implemented by pharmacies interested in offering a health check. In addition, a cost attribute was included, framed as an out-of-pocket payment for the health check. This allowed valuation of the pharmacy-led health check service in monetary terms. The levels for the cost attribute were based on the findings from previous pilot work assessing consumers' willingness-to-pay (WTP) for a lifestyle check at a community pharmacy [33].

2.2 Deriving Choice Sets

A D-efficient design was developed using Ngene software version 1.1.1 (ChoiceMetrics, Sydney, Australia) to construct a DCE experimental design with 12 choice sets, each comprising two alternative CVD health checks ('Health Check A' or 'Health Check B') (Fig. 1). An opt-out was added to each choice set, giving respondents the option of not having a health check at the pharmacy (as would be the case in real life). Given no prior information existed about consumers' preferences for a pharmacy-led CVD health check, an initial DCE design was created using null prior information (i.e. setting all preference parameters at zero).

Table 1 Attributes, levels and labels in the discrete choice experiment (DCE)

Attributes	Description (regression label)	Levels
Day of health check	The service will be made available on one particular day of the week which could be on a weekday or weekend (*DAY*)	Weekday Weekend
Way of accessing the service	Clients can walk-in and wait or schedule an appointment (*ACCESS*)	Walk-in and wait By appointment
Provider	The personnel providing the health check (*PROVIDER*)	Nurse Pharmacist Trainee pharmacist
Duration	This refers to the maximum consultation time for the health check. Respondents could use the extra time to ask any questions they have about the health check (*DURATION*)	Up to 30 min Up to 45 min
Follow-up call	After the health check, a follow-up call will be made to discuss progress and provide support to achieve health goals (*FOLLOWUP*)	No follow-up call Follow-up call at 3 months
Cost	The amount of money paid for the service (*COST*)	£15 £25 £35 £45

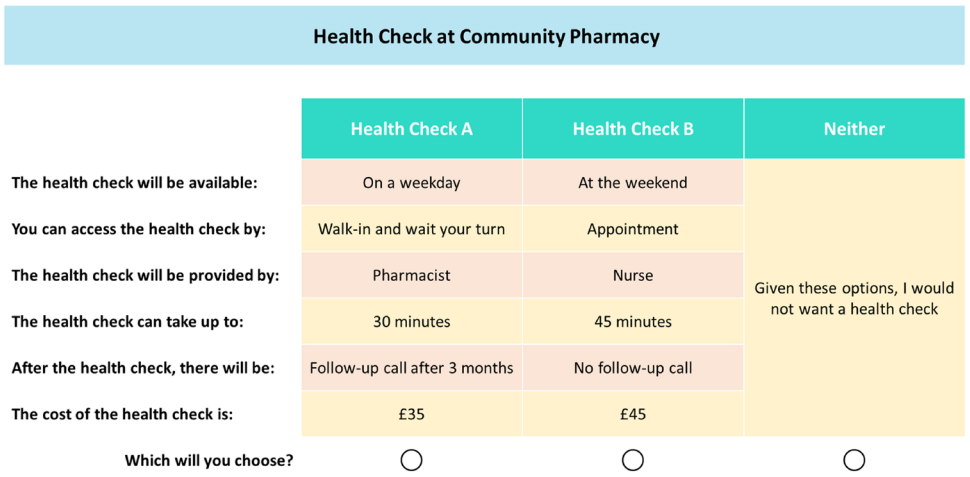

Fig. 1 Example of discrete choice experiment (DCE) choice set

2.3 Instrument Testing

Semi-structured pilot interviews were conducted with members of university staff ($n = 13$) to test respondents' understanding of the attributes, levels and choice sets, the time taken to complete the survey, to refine the DCE survey and identify other relevant attributes and levels. The respondents recruited for the pilot interviews included two laboratory technicians, a teaching assistant, two porters, and eight other academic staff members to represent consumers who are most likely to use a health check. Only minor adaptations were made after the pilot interviews. Subsequently, a quantitative pilot survey was conducted with the public, recruited in the same way as for the main study ($n = 49$, see Sect. 2.4 for recruitment strategy). Results from the quantitative pilot study were used as information priors to update the DCE design for the main study. The final survey instrument can be found in Online Resource 2 (see ESM).

2.4 Study Population

A convenience sample of individuals aged between 25–75 years was recruited between May and October 2015 from a high street independent community pharmacy located within Aberdeen City; a private dental practice located in the same building as the participating pharmacy; and public spaces such as shopping centres, a university campus, and a sport centre, all located within a 1-km radius from the participating pharmacy. These recruitment sites were chosen because the public typically travel an average distance of 1 km to the nearest pharmacy [34, 35]. Trained data collectors approached potentially eligible members of the general public to ask if they would like to be a part of a study exploring their interest in a community pharmacy-led health check service. Potential respondents were informed that the study would gather public opinion about a health check at the community pharmacy, and that their views would be important to develop and design the service. Recruitment was conducted from 9 am to 4 pm on Mondays to Fridays and from 9 am to 1 pm on Saturdays. Completion of the questionnaire was taken as implied consent. Individuals who were unable to speak, write or understand English were excluded from the study. Individuals who did not meet the age inclusion criteria were subsequently removed from the study sample. The survey was administered electronically on a tablet device. The target sample size for the survey was approximately 400 patients, which was determined based on an earlier study assessing consumer willingness-to-pay for a lifestyle check at the community pharmacy [33].

To ensure that respondents were well informed before undertaking the DCE, all respondents were asked to watch an instructional video explaining the purpose of the research; what a health check at the pharmacy would offer; what the attributes and attribute levels within the DCE meant; how to complete the DCE; and an example of a choice task. The video is available to view online at https://vimeo.com/119294273. Respondents then completed the 12 DCE choice sets plus one repeated choice set (included to test stability of preferences). The order of the choice sets was randomised between respondents to minimise ordering effect and a repeat of the seventh choice set was placed as the thirteenth choice set.

2.5 Statistical Analysis

Statistical analysis was conducted using Stata version 11 (StataCorp LLC, College Station, TX, USA). We first assessed the DCE data quality. Respondents were considered to have passed the stability test if they chose the same alternative in the repeated choice sets. In addition, respondents who always chose the same alternative (e.g. the opt-out or the first alternative in every choice set) were identified as serial responders. Respondents were judged as providing low quality data if they failed the stability test AND were serial responders.

Analysis of the DCE data was based on random utility theory [36]. Random utility theory states that while an individual knows the nature of the utility gained through the choices they make, it cannot be directly observed by researchers [36]. Utility is thus modelled using systematic (explainable) and random (unexplainable) components. The systematic components are used to quantify the importance of attributes and trade-offs. Following standard practice, the systematic utility (V) of alternative health checks (j) was a linear and additive function of the health check attribute levels, with the categorical variables effects coded.

$$\begin{aligned} V_j = {} & \beta_1\left(\text{Health Check}\right) + \beta_2\left(\text{DAY}_{\text{Weekend}}\right) \\ & + \beta_3\left(\text{ACCESS}_{\text{Appointment}}\right) + \beta_4\left(\text{PROVIDER}_{\text{Pharmacist}}\right) \\ & + \beta_5\left(\text{PROVIDER}_{\text{Trainee}}\right) + \beta_6\left(\text{DURATION}_{\text{45mins}}\right) \\ & + \beta_7\left(\text{FOLLOWUP}_{\text{After3months}}\right) + \beta_8(\text{COST}) \end{aligned} \quad (1)$$

Table 1 defines all variable labels; β_1 is the constant that indicates the general preference for having a health check and β_{2-8} are the preference parameters for each of the attribute levels. The statistical significance and sign of the βs show whether an attribute is a predictor of respondents'

choices and how a change in the attribute levels affect their preferences.

To allow for preference heterogeneity across respondents, Eq. (1) was estimated using a mixed logit (MXL) model. This model assumes that preferences are individual-specific and distributed along a probability distribution [37]. The mean and standard deviation (SD) of this distribution were estimated for each attribute. Preferences for all attributes, except cost, were assumed to be normally distributed. The cost attribute was fixed, avoiding the problem of not having a defined moment to compute WTP estimates [38]. The MXL model was estimated using 3000 Halton draws and model fit was assessed using log-likelihood and McFadden's pseudo-R^2. Based on estimated preference distributions from the MXL model and respondents' choices in the DCE, individual posterior conditional parameters for each attribute (i.e. preferences of each respondent) were obtained [39]. This permits the assessment of preference heterogeneity within the sample by calculating the proportion of the respondents for whom a given attribute has a positive or negative effect on their preferences. In addition, subgroup analyses were also conducted to explore the influence of respondents' sociodemographic characteristics on preference heterogeneity. The following subgroups were introduced as interaction terms with the attributes in the MXL model: age (25–44 years vs 45–64 years vs 65–75 years), gender (male vs female), employment status (not in employment vs in employment), income (< £32,000 vs £32,000–£51,999 vs ≥ £52,000), use of pharmacy in the past 6 months (never vs 1–3 times vs >3 times) and previous health screening (yes vs no). These interaction effects captured the observed preference heterogeneity around the mean of a random parameter in the MXL model and thus allowed for both observed and unobserved preference heterogeneity in the model. The selection of subgroup analyses was based on an a priori expectation of respondents' characteristics that were likely to impact on their preferences for a health check.

WTP for each attribute of the health check was estimated by taking the negative of the ratio of the mean estimates of the attribute coefficients to the cost coefficient, $-\beta_k/\beta_7$. Total WTP for a particular service configuration was calculated by taking the sum of the WTPs of each attribute. Predictions of the uptake probability (P) of two pre-defined, contrasting health checks (see Table 2) were calculated from

$$P = \frac{e^{V_j}}{\sum_{j=1}^{J} e^{V_j}} \quad (2)$$

The confidence intervals for the WTP and predicted uptake probabilities were calculated using Delta method.

2.6 Ethical Approval

This study was approved by the North of Scotland Research Ethics Committee and NHS Grampian Research and Development (REC NO: 15-NS- 0003).

3 Results

The DCE survey was completed by 423 respondents, of whom 16 were excluded as they did not meet the age inclusion criteria. Tables 3 and 4 summarise respondents' socio-economic and health characteristics. Respondents were predominantly male (56.7%), aged 25–44 years old (53.5%), educated up to degree level or higher (64.6%) and in some form of employment (71.5%). Of the 407 eligible respondents who completed the DCE, 56 (13.8%) were serial responders, of whom 55 (13.5%) always chose the opt-out option and one (0.2%) always chose the first alternative. Eighty respondents (19.7%) failed the stability test; however, only three (0.7%) were excluded from the main DCE analysis because they were serial responders and also failed the stability test. The final analysis sample consisted of 404 respondents.

Table 5 presents the MXL results. A positive and significant constant for a health check suggests respondents had a preference for having a health check (compared with no health check). All attributes were significant predictors of respondents' choices. Respondents preferred to have the health check at the weekend by appointment for 30 min with follow-up and provided by a nurse or pharmacist. In line

Table 2 Characteristics of health check service to estimate probability of take-up[a]

	Health check A	Health check B	No health check
Day of the week	Weekday	Weekend	N/A
Accessibility of service	By appointment	By appointment	
Provider	Pharmacist	Nurse	
Duration	30 min	45 min	
Follow-up	Follow-up call at 3 months	No follow-up call	
Cost	£15	£20	£0

[a]The characteristics of the two health checks were pre-defined based on how the community pharmacy could potentially offer the health check service

Table 3 Sample socioeconomic characteristics

Characteristics	Study sample ($n = 404$) n (%)	Scotland[b] (2011) %	p value[d]
Gender			
Female	175 (43.3)	51.5	$p < 0.001$
Male	229 (56.7)	48.5	
Age (years)			
25–44	216 (53.5)	41.5	$p < 0.001$
45–64	145 (35.9)	43.1	
65–75	43 (10.6)	15.4	
Education[a]			
No qualification	5 (1.3)	26.8	$p < 0.001$
Level 1	45 (11.5)	23.1	
Level 2	38 (9.7)	14.3	
Level 3	45 (11.5)	9.7	
Level 4	252 (64.6)	26.1	
Other	5 (1.3)		
Prefer not to say	11 (2.7)		
Missing data	3 (0.7)		
Employment status			
Self-employed	43 (10.6)	7.5	$p < 0.001$
Employed full time	192 (47.5)	39.6	
Employed part time	54 (13.4)	13.3	
Looking after home or family	9 (2.2)	3.6	
Permanently retired	39 (9.7)	14.9	
Unemployed and seeking work	7 (1.7)	4.8	
Full-time student	34 (8.4)	9.2	
Permanently sick or disabled	2 (0.5)	5.1	
Unable to work because of short-term illness	5 (1.2)		
Other	19 (4.7)	1.9	
Income level (£ per year)[c]			
< 5199	8 (2.0)	2.0	$p < 0.001$
5200–10,399	11 (2.7)	9.0	
10,400–15,599	21 (5.2)	15.0	
15,600–20,799	21 (5.2)	14.0	
20,800–25,999	21 (5.2)	11.0	
26,000–31,199	33 (8.2)	8.0	
31,200–36,399	24 (5.9)	8.0	
36,400–51,999	51 (12.6)	15.0	
≥ 52,000	98 (24.3)	18.0	
Prefer not to say	116 (28.7)	N/A	

N/A no national data available

[a]Level of education is defined as follows: Level 1: O Grade, Standard Grade, GCSE, GCE O level, CSE, NQ Access 3 Cluster, Intermediate 1, Intermediate 2, Senior Certificate or equivalent, GNVQ/GSVQ Foundation or Intermediate, SVQ Level 1, SVQ Level 2, SCOTVEC/National Certificate Module, City and Guilds Craft, RSA Diploma or equivalent, School Leaving Certificate, NQ Unit; Level 2: Higher Grade, Advanced Higher, CSYS, A Level, AS Level, Advanced Senior Certificate or equivalent, GNVQ/GSVQ Advanced, SVQ Level 3, ONC, OND, SCOTVEC National Diploma, City and Guilds Advanced Craft, RSA Advanced Diploma or equivalent; Level 3: HNC, HND, SVQ Level 4, RSA Higher Diploma or equivalent; Level 4: Degree, Higher degree/Postgraduate qualifications, SVQ Level 5 or equivalent: professional qualifications

[b]Data from census 2011

[c]Data from Family Resource Survey, Department for Work and Pension

[d]Chi square test was employed to test if the proportion of sample was comparable to that of the general population

Table 4 Sample health characteristics

Characteristics	Study sample ($n = 404$) n (%)
Visit to pharmacy in past 6 months	
Never	83 (20.5)
1–3 times	222 (55.0)
>3 times	99 (25.4)
Satisfaction with pharmacy service	
Very dissatisfied	5 (1.2)
Fairly dissatisfied	4 (1.0)
Neither satisfied nor dissatisfied	13 (3.2)
Fairly satisfied	102 (25.3)
Very satisfied	195 (48.3)
No opinion	2 (0.5)
Missing data	83 (20.5)
Perceived health status	
Very poor/poor	11 (2.7)
Fair	42 (10.4)
Good/very good	348 (86.1)
Don't know	3 (0.7)
Having any of the following conditions?	
Diabetes	11 (2.6)
Any heart/circulatory problem	16 (3.8)
High cholesterol	21 (5.0)
High blood pressure	33 (7.8)
Previous screening tests (e.g. cervical smear/prostate or bowel cancer screening)?	
Yes	356 (88.1)
No	48 (11.9)

with a priori expectation, the negative cost coefficient indicates increasing cost has a negative impact on preferences for the health check.

The standard deviation (SD) estimates for all attributes (except 'duration of health check') were statistically significant, suggesting preference heterogeneity. Based on the individual posterior conditional parameters for each attribute, the proportion of individuals with either a positive or

Table 5 Mixed logit regression result

Attributes[a]	β(SE)	SD (SE)	WTP (£) [95% CI]
Constant			
Opt-in for health check	3.126*** (0.267)	4.113*** (0.258)	36.22 [30.69 to 41.76]
Day of health check			
On a weekday	− 0.101** (0.044)	REF	− 1.17 [− 2.18 to − 0.16]
At the weekend	0.101** (0.044)	0.681*** (0.050)	1.17 [0.16 to 2.18]
Access to health check			
Walk in and wait	− 0.248*** (0.043)	REF	− 2.87 [− 3.78 to − 1.96]
By appointment	0.248*** (0.043)	0.424*** (0.051)	2.87 [1.96 to 3.78]
Provider of health check			
Nurse	0.539*** (0.071)	REF	6.24 [4.61 to 7.88]
Pharmacist	0.414*** (0.044)	0.287*** (0.071)	4.80 [3.90 to 5.69]
Trainee pharmacist	− 0.953*** (0.074)	0.942*** (0.072)	− 11.04 [− 12.60 to − 9.48]
Duration of health check			
30 min	0.153*** (0.025)	REF	1.77 [1.21 to 2.32]
45 min	− 0.153*** (0.025)	0.057 (0.125)	− 1.77 [− 2.32 to − 1.21]
Follow-up call			
No follow-up	− 0.308*** (0.040)	REF	− 3.57 [− 4.41 to − 2.72]
Follow-up call after 3 months	0.308*** (0.040)	0.509*** (0.045)	3.57 [2.72 to 4.41]
Cost of health check	− 0.086*** (0.004)		
Number of respondents	404		
Log-likelihood	− 3604		
BIC	7336		
McFadden Adjusted R^2	0.326		

BIC Bayesian information criterion, *CI* confidence interval, *SD* standard deviation, *SE* robust standard errors, *WTP* willingness-to-pay

***$p < 0.01$, **$p < 0.05$, *$p < 0.1$

[a]Categorical attribute levels were effects coded; the coefficient for the reference level (REF) was calculated by taking the negative sum of the estimated coefficients of all other levels

negative preference for each attribute were calculated [39]. For example, whilst most respondents preferred to make an appointment for the health check, 12.5% preferred to walk-in and wait; while on average follow-up care was preferred over no follow-up, 15.8% preferred not to have a follow-up; and 13.2% and 44.0% of consumers preferred having a trainee pharmacist or pharmacist over a nurse, respectively.

Results from the subgroup analysis showed that respondents who were older (aged ≥ 65 years) were less likely to choose to have a health check at the weekend compared with respondents who were younger (25–44 years old). Moreover, respondents who were in employment were more likely to choose a health check at the weekend compared with those who were not in employment. Female respondents were more likely to choose a health check with follow-up care after 3 months compared with male respondents. Respondents with a high annual income (£52,000 and above) preferred to access the health check by appointment compared with those with a lower annual income (< £32,000). Respondents' income did not significantly impact on their disutility to increasing cost of the health check. Lastly, respondents who had visited a pharmacy in the past 6 months preferred to have follow-up care 3 months after the health check and had less disutility to increasing cost of the health check compared with those who had never visited a pharmacy. More information about the subgroup analysis can be found in Online Resource 3 (see ESM).

Everything else being equal, respondents valued the health check at £36.22 (95% CI 30.69–41.76). The marginal (dis)value of the different configurations of how to provide the service could then be estimated. For example, respondents valued a community pharmacy-based CVD screening provided at the weekend (£1.17; 95% CI 0.16–2.18); by appointment (£2.87; 95% CI 1.96–3.78); by a nurse (£6.24; 95% CI 4.61–7.88), for 30 min (£1.77; 95% CI 1.21–2.32) with a follow-up call after 3 months (£3.57; 95% CI 2.72–4.41), totalling £51.84 (95% CI 45.85–57.84). If the service was provided by a pharmacist or trainee pharmacist, respondents valued the service at £50.40 (95% CI 44.56–56.24) and £34.56 (95% CI 28.56–40.56), respectively.

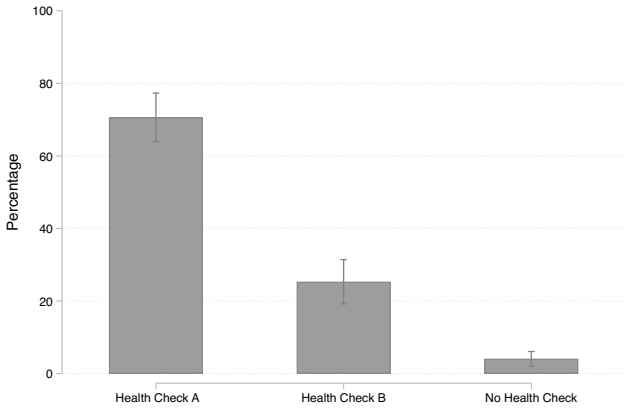

Fig. 2 Predicted uptake probabilities of health checks as described in Table 2

Figure 2 shows the probabilities of uptake for the two contrasting health checks (defined in Table 2). On average, 70.6% (95% CI 63.9–77.3) of respondents would take up a health check that was provided on a weekday by a pharmacist with a shorter duration and 3-month follow-up care at a cost of £15 (Health Check A). Contrastingly, only 25.3% (95% CI 19.2–31.4) of respondents would take up a health check at the weekend by a nurse with a longer duration and no follow-up care at a cost of £20 (Health Check B). A small proportion of respondents (4.1%; 95% CI 2.1–6.1) would not take up either health check.

4 Discussion

Our results indicate that the public have a positive preference for accessing a CVD health check in a community pharmacy, and that characteristics of the service have a significant influence on choice of health check. Most consumers preferred health checks that were delivered by an experienced healthcare professional (either nurse or pharmacist), had follow-up care 3 months after the health check, were available at the weekend on an appointment basis and lasted 30 min. This service was valued at approximately £50. Assuming a 30-min health check that is provided on a weekday by a pharmacist with a 3-month follow-up care at a cost of £15, the predicted uptake was 70.6%. We also found evidence of preference heterogeneity; one size does not fit all. Results from the subgroup analyses showed that preference for the characteristics of a community pharmacy-based health check is influenced by age, gender, employment status, income and previous use of a pharmacy.

The finding that individuals are willing to pay to attend a health check at the pharmacy are supported by recent experience of the influenza vaccination programme in England. Despite incurring a fee for service (£12.99 in 2012/13), 50% of consumers who were eligible for free vaccination at their GP surgeries chose instead to go to a community pharmacy due to its better accessibility, convenience and preference for the pharmacy environment [40]. The values generated from our model were higher than the real price of a health check from the pharmacy (https://lloydspharmacy.com/pages/total-health-check), suggesting the market may not be extracting maximum WTP.

Widening access to health care by offering services traditionally associated with hospitals or family doctors from community pharmacies may help contribute to reducing health inequalities. In today's society, where convenience is often paramount, the easily accessible nature of community pharmacies may attract some 'hard to reach' groups, for example people from disadvantaged areas [41, 42]. Previous studies have demonstrated that pharmacy-led screening for CVD risk factors is feasible and likely to be worthwhile [26, 43] but cautioned that a number of operational barriers may exist [44]. Our study built on previous research by taking a closer look at some of the factors thought to influence screening uptake [45] (appointment vs opportunistic test; provider; follow-up) as well as others thought likely to be relevant to screening provided in community pharmacies (day of test; duration; cost), and explored their relative importance. In doing so, our findings can inform where efforts and resources should be focussed when configuring such services.

In addition, accessing community pharmacies for a CVD screening such as the one offered in this study could provide opportunities to access other health promotion services that are already being provided at the pharmacies and, again, help to address health inequalities. Integration of these extended services makes the community pharmacy a convenient one-stop centre for consumers and promotes continuity and consistency in the care they receive [46]. It is notable that respondents valued receiving a follow-up call after the health check. One concern when deciding whether or not to commission community pharmacy screening services could be potential lack of follow-up after patients are referred for further management, such as in the event of a positive case-finding. In their guidance on criteria for national screening programmes, the UK National Screening Committee advises that screening tests should have "… an agreed policy on the further diagnostic investigation of individuals with a positive test result and on the choices available to those individuals" [47]. Many of the services already offered in the community pharmacies, such as smoking cessation [11, 48] and weight management programmes [16–18], frequently involve repeat visits or follow-up appointments (https://www.cps.scot/nhs-services/core/public-health-service/). This suggests that engaging with patients beyond the point of testing and, if needed, onward referral from the community pharmacy to appropriate follow-up services, is feasible.

The respondents in this study had a preference for a nurse over a pharmacist or a trainee pharmacist. This may imply that they valued having an experienced healthcare professional delivering the health check. However, in practice, it would not always be feasible to employ a nurse and expect the nurse to be solely responsible for the delivery of the health check at the community pharmacy. The expansion of primary care services within the NHS has impact on the healthcare workforce capacity and extending the role of community pharmacists beyond dispensing and medicine-related activities provides an integrated solution to the workforce issue [49]. In the NHS Health Check® programme launched by the Department of Health in England, the delivery of the health check at community pharmacies involved both pharmacists and pharmacy assistants [29, 30]. Where the latter are involved, they are responsible for performing the initial physical (e.g. weight and height), medical history and physiologic (e.g. blood pressure and blood test) assessment while the pharmacists carry out the risk assessment consultations and deliver the behavioural interventions. With appropriate training and competency development, the public can benefit from having community pharmacists deliver more public health and prevention services. The results from this study have also shown that respondents were willing to accept an alternative provider other than a nurse if they were compensated with a lower health check cost, on an appointment basis at the weekend with follow-up care.

There are a number of limitations to this study. While the selection of attributes and levels in the DCE was based on a targeted literature review and expert opinion, a full qualitative investigation was not conducted. The research team did not anticipate that the factors affecting the public's choice for a health check at the pharmacy would differ greatly from those found in the literature. This assumption was supported by findings from the pilot interviews where respondents did not identify other additional attributes when asked. In addition, the observed DCE data quality (i.e. failure rate of stability test and rate of serial responders) in this study are in line with other health DCEs in the literature [50].

The use of non-probability sampling may limit the generalisability of the study findings. Compared with the Scottish population, our sample was more likely to be male, younger, better educated, and employed with a higher income (Table 3). Convenience sampling carried out in one Scottish community pharmacy and surrounding areas was largely dictated by the resources of the research team; recruiting from multiple sites across the UK would have been too costly. To assess how the differences between the study sample and the Scottish population would impact on the preferences for a health check at the pharmacy, a weighted mixed logit model was estimated. Sampling weights for each respondent were generated to achieve known population margins for age and gender categories. This weighted MXL model adjusted for any bias introduced at the sampling stage. Results of the weighted MXL were similar to those of the unweighted model (see Online Resource 4 in the ESM).

It is also likely that the public's acceptance of community pharmacy services has evolved since the time the study was conducted. The new community pharmacy contractual framework has further underlined the role of community pharmacists in public health and prevention work with the introduction of services such as Hepatitis C, CVD and early cancer screening [1, 2, 53]. In addition, community pharmacists have undertaken a range of roles and activities in response to the COVID-19 pandemic, such as prevention and infection control (e.g. vaccination), ensuring adequate medical supplies as well as provision of patient care [20, 51]. As such, the public may have better awareness of the availability of services provided in a community pharmacy setting than before. Nevertheless, this study provides a valuable insight into the public's values and preferences for a pharmacy-led CVD screening that could be used to inform service design within other UK local authorities. Future studies targeting a wider group of consumers that are more representative of the UK population may further complement findings from this study.

5 Conclusion

This is one of the first studies to explore consumer preferences for characteristics of a community pharmacy-based CVD health check using DCE methodology. It provides information on the value that consumers place on the different attributes of the health check. Consumers preferred a 30-min health check service that was available at the weekend on an appointment basis and delivered by an experienced healthcare professional (either a nurse or a pharmacist) with follow-up care 3 months after the health check. The results obtained from the DCE can be used to inform the design of new services.

Supplementary Information The online version contains supplementary material available at https://doi.org/10.1007/s40271-021-00566-4.

Declarations

Funding Gin Nie Chua was funded by the Commonwealth Scholarship UK. No other specific funding was received for this work.

Conflicts of interest/competing interests The authors have no conflicts of interest to declare.

Availability of data and material The datasets generated during and/or analysed during the current study are not publicly available as no consent was sought from respondents to allow sharing of data with third parties.

Code availability Not applicable.

Authors' contributions All authors contributed to conception and design of the study. GNC developed the experimental design, constructed the survey, conducted the data collection and statistical analysis. All authors contributed to the interpretation of data for the work as well as drafting and revising the manuscript. All authors gave final approval and agreed to be accountable for all aspects of work ensuring integrity and accuracy.

Ethics approval The study was approved by the North of Scotland Research Ethics Committee.

Consent for participate Completion of the questionnaire was taken as implied consent to participate in the survey.

References

1. Department of Health and Social Care. The community pharmacy contractual framework for 2019/20 to 2023/24: supporting delivery for the NHS long term plan; 2019. https://www.gov.uk/government/publications/community-pharmacy-contractual-framework-2019-to-2024. Accessed 22 Nov 2021.
2. Pharmacy and Medicine Division, Scottish Government. NHS Pharmacy First Scotland; 2020. https://www.cps.scot/featured/nhs-pharmacy-first-scotland. Accessed 22 Nov 2021.
3. Newman TV, San-Juan-Rodriguez A, Parekh N, et al. Impact of community pharmacist-led interventions in chronic disease management on clinical, utilization, and economic outcomes: an umbrella review. Res Soc Adm Pharm. 2020;16(9):1155–65. https://doi.org/10.1016/j.sapharm.2019.12.016.
4. Buss VH, Shield A, Kosari S, Naunton M. The impact of clinical services provided by community pharmacies on the Australian healthcare system: a review of the literature. J Pharm Policy Pract. 2018;11(1):1–10. https://doi.org/10.1186/s40545-018-0149-7.
5. Porteous T, Ryan M, Bond C, Watson M, Watson V. Managing minor ailments; the public's preferences for attributes of community pharmacies. A discrete choice experiment. PLoS ONE. 2016;11(3):e0152257. https://doi.org/10.1371/journal.pone.0152257.
6. Smith S, Porteous T, Bond C, et al. The help for hay fever community pharmacy-based pilot randomised controlled trial for intermittent allergic rhinitis. Prim Care Respir Med. 2020. https://doi.org/10.1038/s41533-020-0180-4
7. Watson MC, Ferguson J, Barton GR, et al. A cohort study of influences, health outcomes and costs of patients' health-seeking behaviour for minor ailments from primary and emergency care settings. BMJ Open. 2015;5:e006261. https://doi.org/10.1136/bmjopen-2014-006261.
8. Law MR, Ma T, Fisher J, Sketris IS. Independent pharmacist prescribing in Canada. Can Pharm J. 2012;145(1):17–23. https://doi.org/10.3821/1913-701X-145.1.17.
9. Tonna AP, Stewart D, West B, McCaig D. Pharmacist prescribing in the UK—a literature review of current practice and research. J Clin Pharm Ther. 2007;32(6):545–56. https://doi.org/10.1111/j.1365-2710.2007.00867.x.
10. Cox S, Dawkins L, Doshi J, Cameron J. Effects of e-cigarettes versus nicotine replacement therapy on short-term smoking abstinence when delivered at a community pharmacy. Addict Behav Rep. 2019;10:100202. https://doi.org/10.1016/j.abrep.2019.100202.
11. Carson-Chahhoud KV, Livingstone-Banks J, Sharrad KJ, Kopsaftis Z, Brinn MP, To-A-Nan R, et al. Community pharmacy personnel interventions for smoking cessation. Cochrane Database Syst Rev. 2019;10:CD003698. https://doi.org/10.1002/14651858.CD003698.pub3.
12. Gauly J, Ross J, Hall I, Soda I, Atherton H. Pharmacy-based sexual health services: a systematic review of experiences and attitudes of pharmacy users and pharmacy staff. Sex Transm Infect. 2019;95(7):488–95. https://doi.org/10.1136/sextrans-2019-054096.
13. Gudka S, Afuwape FE, Wong B, Yow XL, Anderson C, Clifford RM. Chlamydia screening interventions from community pharmacies: a systematic review. Sex Health. 2013;10(3):229–39. https://doi.org/10.1071/SH12069.
14. Matheson C, Thiruvothiyur M, Robertson H, Bond C. Community pharmacy services for people with drug problems over two decades in Scotland: implications for future development. Int J Drug Policy. 2016;27:105–12. https://doi.org/10.1016/j.drugpo.2015.11.006.
15. Chaar BB, Hanrahan J, Day C. Provision of opioid substitution therapy services in Australian pharmacies. Australas Med J. 2011;4(4):210–6. https://doi.org/10.4066/AMJ.2011.706.
16. Inch J, Avenell A, Aucott L, Watson MC. A mixed-methods evaluation of a community pharmacy signposting service to a commercial weight-loss provider. Public Health Nutr. 2018;21(12):2311–9. https://doi.org/10.1017/S1368980018000733.
17. Morrison D, McLoone P, Brosnahan N, McCombie L, Smith A, Gordon J. A community pharmacy weight management programme: an evaluation of effectiveness. BMC Public Health. 2013;13:282–90. https://doi.org/10.1186/1471-2458-13-282.
18. Gordon J, Watson M, Avenell A. Lightening the load? A systematic review of community pharmacy-based weight management interventions. Obes Rev. 2011;12(11):897–911. https://doi.org/10.1111/j.1467-789X.2011.00913.x.
19. Pharmaceutical Services Negotiating Committee. Flu vaccination service. https://psnc.org.uk/services-commissioning/advanced-services/flu-vaccination-service/. Accessed 6 July 2021.
20. Pharmaceutical Services Negotiating Committee. COVID 19 vaccinations. https://psnc.org.uk/the-healthcare-landscape/covid19/covid-19-vaccinations/. Accessed 6 July 2021.
21. Jones JM, Kirkdale C, Thornley T. Travel health services provided through UK community pharmacies. Pharm J. 2017. https://pharmaceutical-journal.com/article/letters/travel-health-services-provided-through-uk-community-pharmacies. Accessed 6 July 2021.
22. Townsend N, Wilson L, Bhatnagar P, Wickramasinghe K, Rayner M, Nichols M. Cardiovascular disease in Europe: epidemiological update 2016. Eur Heart J. 2016;37(42):3232–45. https://doi.org/10.1093/eurheartj/ehw334.
23. Bhatnagar P, Wickramasinghe K, Williams J, Rayner M, Townsend N. The epidemiology of cardiovascular disease in the UK 2014. Heart. 2015;101(15):1182–9.
24. Alshehri AA, Jalal Z, Cheema E, Haque MS, Jenkins D, Yahyouche A. Impact of the pharmacist-led intervention on the control of medical cardiovascular risk factors for the primary prevention of cardiovascular disease in general practice: a systematic review and meta-analysis of randomised controlled trials. Br J Clin Pharmacol. 2020;86(1):29–38. https://doi.org/10.1111/bcp.14164.
25. Department of Health. Economic modelling for vascular checks. https://webarchive.nationalarchives.gov.uk/20130123194328/http://www.dh.gov.uk/en/Publicationsandstatistics/Publications/PublicationsPolicyAndGuidance/DH_085869. Accessed 6 July 2021.
26. Ayorinde AA, Porteous T, Sharma P. Screening for major diseases in community pharmacies: a systematic review. Int J Pharm Pract. 2013;21(6):349–61. https://doi.org/10.1111/ijpp.12041.
27. Stokes G, Rees R, Khatwa M, et al. Public health service provision by community pharmacies: A systematic map of evidence. London: EPPI-Centre, Social Science Research Unit, Institute of Education, University College London; 2019.

28. General pharmaceutical services in England—2008/09–2018/19. https://www.digital.nhs.uk/data-and-information/publications/statistical/general-pharmaceutical-services/in-2008-09---2018-19-ns. Accessed 22 Nov 2021.
29. Taylor J, Krska J, MacKridge A. A community pharmacy-based cardiovascular screening service: views of service users and the public. Int J Pharm Pract. 2012;20(5):277–84. https://doi.org/10.1111/j.2042-7174.2012.00190.x.
30. Krska J, Taylor J, du Plessie R. Views and experiences of the NHS health check provided in pharmacies and medical practices. Int J Pharm Pract. 2013;21(Suppl 1):1–26. https://doi.org/10.1111/ijpp.12028_3.
31. De Bekker-Grob E, Ryan M, Gerard K. Discrete choice experiments in health economics: a review of the literature. Health Econ. 2012;21:145–72. https://doi.org/10.1002/hec.1697.
32. Naik-Panvelkar P, Armour C, Saini B. Discrete choice experiments in pharmacy. Int J Pharm Pract. 2013;21(1):3–19. https://doi.org/10.1111/ijpp.12002.
33. Glynn D. An investigation into the external invalidity of contingent valuation responses. Master dissertation, University of Aberdeen. 2013.
34. Office of Fair Trading. Evaluating the impact of the 2003 OFT study on the control of entry regulations in the retail pharmacies market. https://www.dotecon.com/assets/images/oft1219.pdf. Accessed 22 Nov 2021.
35. UK Department for Transport. National travel survey: 2012. https://www.gov.uk/government/statistics/national-travel-survey-2012. Accessed 22 Nov 2021.
36. Manski CF. The structure of random utility models. Theor Decis. 1977;8(3):229–54. https://doi.org/10.1007/bf00133443.
37. Hensher DA, Greene WH. The mixed logit model: the state of practice. Transportation. 2003;30(2):133–76. https://doi.org/10.1023/A:1022558715350.
38. Daly AJ, Hess S, Train KE. Assuring finite moments for willingness to pay in random coefficients models. Transportation. 2012;39(1):19–31. https://doi.org/10.1007/s11116-011-9331-3.
39. Train K. Discrete choice methods with simulation. 2nd ed. Cambridge: Cambridge University Press; 2009.
40. Anderson C, Thornley T. "It's easier in pharmacy": why some patients prefer to pay for flu jabs rather than use the national health service. BMC Health Serv Res. 2014;14:35–41. https://doi.org/10.1186/1472-6963-14-35.
41. Donyai P, Van Den Berg M. Coronary heart disease risk screening: the community pharmacy healthy heart assessment service. Pharm World Sci. 2009;31(6):643–7. https://doi.org/10.1007/s11096-009-9338-4.
42. Horgan JMP, Blenkinsopp A, McManus RJ. Evaluation of a cardiovascular disease opportunistic risk assessment pilot ('heart MOT' service) in community pharmacies. J Public Health (United Kingdom). 2010;32(1):110–6. https://doi.org/10.1093/pubmed/fdp092.
43. Corlett SA, Krska J. Evaluation of NHS health checks provided by community pharmacies. J Public Health. 2016;38(4):e516–23. https://doi.org/10.1093/pubmed/fdv153.
44. McNaughton RJ, Oswald NTA, Shucksmith JS, Heywood PJ, Watson PS. Making a success of providing NHS health checks in community pharmacies across the tees valley: a qualitative study. BMC Health Serv Res. 2011;11:222–9. https://doi.org/10.1186/1472-6963-11-222.
45. Jepson R, Clegg A, Forbes C, Lewis R, Sowden A, Kleijnen J. The determinants of screening uptake and interventions for increasing uptake: a systematic review. Health Technol Assess. 2000;4(14):i–vii, 1–133.
46. Richards C. Vascular screening brings high hopes. Pharm J. 2009;282(7546):369–70.
47. Criteria for appraising the viability, effectiveness and appropriateness of a screening programme. https://www.gov.uk/government/publications/evidence-review-criteria-national-screening-programmes/criteria-for-appraising-the-viability-effectiveness-and-appropriateness-of-a-screening-programme. Accessed 22 Nov 2021.
48. Boyd KA, Briggs AH. Cost-effectiveness of pharmacy and group behavioural support smoking cessation services in Glasgow. Addiction. 2009;104(2):317–25. https://doi.org/10.1111/j.1360-0443.2008.02449.x.
49. Anderson C, Sharma R. Primary health care policy and vision for community pharmacy and pharmacists in England. Pharm Pract (Granada). 2020;18(1):1870. https://doi.org/10.18549/PharmPract.2020.1.1870.
50. Johnson FR, Yang JC, Reed SD. The internal validity of discrete choice experiment data: a testing tool for quantitative assessments. Value Health. 2019;22(2):157–60. https://doi.org/10.1016/j.jval.2018.07.876.
51. Paudyal V, Cadogan C, Fialová D, et al. Provision of clinical pharmacy services during the COVID-19 pandemic: experiences of pharmacists from 16 European countries. Res Social Adm Pharm. 2021;17(8):1507–17. https://doi.org/10.1016/j.sapharm.2020.11.017.