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Improving quality care for diabetes in the community: what do Cypriot patients want?

Article (Accepted version)
(Refereed)

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Title Page

Title: Improving quality care for diabetes in the community: what do Cypriot patients want?

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Running title: Patient preferences for their care

Word count for the abstract (max 250): 250

Word count for the text of the manuscript (2500 max, excluding references and tables): 2500

Abstract

Objective: to measure patient preferences for their diabetic care in community setting

Design: Discrete-choice survey

Setting: community setting (primary physician and hospital sites) in Cyprus

Participants: diabetic patients attending community sites

Main Outcome Measure(s): patient preferences, to estimate which components of quality healthcare service people value, their relative importance, but also the potential shift to shared-decision-making (SDM).

Results: Older respondents with experience of the private sector already received SDM (managing their care and choosing their treatments; detailed and accurate information, continuity of care; compassion for their personal situation) from their primary care physician with waiting time shorter than one hour. They valued their 'current' option and they did not want to change it with other services. Younger people from the public sector valued a change in policy and wanted to move from their 'current' to alternative diabetic care services where the waiting times were shorter, they could not only manage their care but also choose their treatments (together with receiving information, continuity of care and compassionate care). Individuals agreed with receiving multidisciplinary care from a team of healthcare providers but they mostly preferred being supported by their primary care physician. The pooled sample valued their 'current' option but they also supported policy changes that would implement SDM service for everybody.

Conclusions: Diabetic patients value SDM and are willing to support a shift of practice to receive it not only in the private but also in the public sector. The forthcoming National-Health-Insurance-Service would aim to address such developments as anticipated both in the European Troika's recommendations and the relevant laws

Keywords: Community Health Care, Patient Preference, Patient satisfaction, Diabetes, Cyprus.

Introduction

Patient preferences for community care services has become an increasingly important aspect of healthcare policy in Europe; unfortunately much of the evidence collected in the literature is related to Northern European countries and limited data are available on the Mediterranean area.[1] Cyprus, an eastern Mediterranean country that lacks of an universal coverage health system, is a quite unique case in Europe.[2-3] A National Health Insurance System (NHIS), as put forward and approved by law, which hasn't yet been implemented, provides for inclusion and coverage of all citizens, equity in contribution and in treatment provision, bolstering of patients' rights, introduction of cost-containment policies towards the sustainability of the system, which will be applicable across the system, monitoring and medical audit control. Of particular interest is that none of these applies today in the private sector, while public sector travails to implement some of them.[4-5] Pertinent to the patient's empowerment, the competent authority for the introduction of the NHIS, the Health Insurance Organization, has appointed a member of the patient's association in its board of directors, thus streamlining its operational framework with the need to engage patients and also solidifying its support regarding the active role of patients in the decision making process.

Current health care sector features two fragmented systems, public and private sectors, which run in an uncoordinated and parallel way, with minimum cooperation, duplication of infrastructures and failure to achieve economies of scale, a significant aspect in Cyprus small health care market. We should underline that the two sectors are subject to different legislations, which further broadens the gap and perpetuates to inequity among patients. For instance, patient's right officers are employed only in public hospitals. Moreover, private hospitals cannot operate pharmacies, while public do.

The public sector provides free health care to a series of highly prevalent chronic conditions including diabetes[1,6] affecting about 9.2 per cent of the Cypriot population, well above the average of 6.1 per cent in the European Union.[7] An estimated 4 million euros (corresponding to the 5% of total pharmaceutical expenditure of public sector) is allocated for antidiabetic agents in the public health care sector. In the private sector, the corresponding amount is 3.4 million euros, nevertheless volume-wise public sector consumes significantly more quantities more since it procures medicines through tendering which plummets prices as low as 62% in the generics and 25% for branded products. This underlines another difference between the two sectors, diverging pricing approaches, which further compound the affordability issues of private sector patients, who pay all costs out-of-pocket. The overall impact of endocrine-related diseases and conditions including diabetes translates in about 10% of the total annual health care expenditure (1.2 billion euro)for the country [8]

Overall 85% of total population who fulfil certain socioeconomic and employment status criteria are eligible for free public health care funded by the Ministry of Health, on a highly centralised context. The array of eligibility criteria is rather biased, which violates equity in access and favours some cohorts of the population. This leads to a grossly uneven access to public health care.[9] The Public sector reimburses pharmaceuticals (including consumables and diagnostics) from a tender-based closed formulary, while the Private sector applies external price referencing. Failure of patients to tolerate or respond to the formulary products force them to the Private sector, whose affordability for patients has proven to be highly problematic.[10] Although there is freedom of choice and the majority of the population are eligible for free public health care, out-of-pocket payment remains the primary source of health care funding indicating that people may disparage public health care, because of perceived issues of quality and long waiting times.[11] Cost of private sector are borne out-of-pocket unless patient is covered by an optional private health insurance.

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[1] Patients in the public sector are subject to co-payment which come in the form of a fixed fee for physicians (3 Euro for GP, 6 Euro for specialists) and 0.5 Euro for each medicine and laboratory test (both capped at 10 per prescription/ laboratory order form).

These attributes of Cyprus health system led to an oversupply of private sector, as illustrated by the second highest number per capita in Europe of high-cost technologies (e.g. computerized tomography scanners). This leads to high running cost that, in the context of the private sector, are shifted to private patients.[12] The inertias of the system are further aggravated by minimum adoption of information technology, which leads to lack of coordination, and interruption of continuity of care both between public and private, but also between public primary and secondary care sectors, resulting in duplication of diagnostic activities. The lack of clinical guidelines has impeded the introduction of benchmarking and the consequent definition of performance targets, which unavoidably results into major variability of health outcomes among health centres.[13-14] These features also limited monitoring and medical auditing.

Although a number of the issues delineated above are experienced also in other Northern European countries featuring uncoordinated private and public systems (see for example the Republic of Ireland), Cyprus constitutes a quite unique case study to assess the provision of quality of healthcare in a challenging environment, that is still burdened by the ramifications of the fiscal crisis, that has further impeded the affordability of patients, which intertwined with access, especially in the private health care sector. This is further substantiated by the existence of only scarce data. So far, four patient satisfaction surveys were conducted.[14-18] Unfortunately they were too broad and did not considered specific needs and opinions for diabetic patients looking for community care services and did not include any notion of strength of preference and relative importance between attributes of care.

Current paper offers a unique perspective on decision-making criteria among Cyprus, using for the first time the discrete choice experiment (DCE) approach[19-24] to capture Cypriot preferences for community care services across private and public sectors. DCE is an economic tool that can be used to study preferences for variety of healthcare services[20], including diabetes care[24]. Its application to community care can demonstrate the value a particular healthcare service has when making

decisions about quality care interventions to be implemented.[25-27] This particular application investigated Cypriot patients' preferences when choosing community care services for their diabetes care, and how they value shared decision making (SDM)[26-29], as a process in which healthcare professionals and patients work together to select tests, treatments, management, or support packages, based on clinical evidence and patients' informed preferences. In the field of SDM no studies have been performed in Cyprus, although some authors highlighted this lack and urged for its implementation.[2]

Results from the DCE allowed to estimate the components of SDM that people value, their relative importance; and the potential willingness to shift to alternative healthcare services (compared with their 'current' option). Differences in preferences are presented across sectors.

Methods

The DCE questionnaire

A description of the DCE questions is presented in here (see example in figure 1); however more details are provided in Appendix 1 on: the DCE choice set creation; questionnaire design and development; feasibility and piloting; theoretical validity; preparation for data collection and analysis; and ethical approval. First, respondents were asked to describe their 'current' option in terms of six characteristics:

1. Information - whether they (rarely/never; sometimes; most of the times; always) receive detailed and accurate information about their care;

2. Compassion - whether they (rarely/never; sometimes; most of the times; always) receive care and compassion for their personal situation;

3. Care management- whether they can choose treatment options and manage care (I can choose my treatment options and manage my care; I can only choose my treatment options; I can only manage my care; None of them);

4. Waiting time- their waiting time at the site (less than one hour; one hour; two hours; three hours or more);

5. Continuity of care-- whether they receive community care from the same healthcare professional (primary care physician/nurse/specialist doctor);

6. Who is providing care- the healthcare provider(s) delivering their care (primary care physician only; primary care physician and nurse; hospital physician/specialist only; hospital physician/specialist and nurse; primary care physician, hospital physician/specialist, and nurse).

Following that, patients were then asked to complete a set of four DCE choices about their most preferred health care service. Each choice compared three separate alternatives ('hypothetical Alternative A', 'hypothetical Alternative B' and their 'current' option described by combinations of the same attributes and levels used above; see appendix 1). The set of choices was created according to best practice in the design of DCE (details are in Appendix 1).

An additional set of questions addressed patients' socio-demographic characteristics, and health status.

Data collection, sample and sample size

Seven separate community sites were involved in the study (four public and three private sites; see Appendix 2). They were chosen as a convenience sample of data collection sites distributed between urban and rural locations. A target recruitment of about 100 patients from public and private sites was estimated to be sufficient for comparing preferences across settings.[30] The questionnaire was administered to diabetic patients aged 18 years or older whilst attending the community clinics. Subjects that were too ill to listen to the researcher were excluded from the study. A researcher was available during data collection in the community site to provide clarification and assistance in completing the questionnaire. After giving their signed consent, respondents were invited to

complete a questionnaire either whilst waiting (with the option of completing it after the consultation) or later at home (to be returned to the site at their convenience).

Analysis of data

Only questionnaires with a completed DCE choice set and section on their 'current' option were considered for analysis. Results from the raw statistics and regression model are presented for the pooled data ('all Cyprus') and for the two specific subgroups ('Cyprus public' vs. 'Cyprus private'). Site characteristics, patient responses, aspects of their 'current' option, and demographic characteristics were analysed using raw statistics. Categorical data were described using frequencies and percentages, whilst continuous data were described with a mean and standard deviation. Differences between groups ('Cyprus all' vs. 'Cyprus public'/'Cyprus private'; 'Cyprus public' vs. 'Cyprus private') were tested using Chi squared and t independent group statistics for categorical and continuous variables respectively.

The utility or satisfaction function, which specifies the relationship between the attributes and preferences, was derived from the DCE choice set and estimated using an appropriate regression model (see appendix 3).[31]

Comparing policy changes across groups

Two examples of change in healthcare practice were proposed (change in healthcare practice 1, from 'current' option to hypothetical 'Alternative diabetic service 1', and change in healthcare practice 2, from 'current' option to hypothetical 'Alternative diabetic service 2'). Details on the actual characteristics attached to the alternative healthcare practices are presented in the results below. 'Alternative diabetic services 1 and 2' were chosen to reflect the preferred attribute levels' combinations from the patient preferences. Measure of patient satisfaction for the two proposed policy changes (compared with 'current' option) is provided by probability of uptake for changes; details are presented in appendix 4.

Results

Community sites, patient responses, and their socio-demographic characteristics

Between July and September 2014, 192 eligible patients were identified across 7 community sites (see appendix 1). In the public and private subgroups, 92 and 72 eligible patients who received the survey completed it (90.2% and 80.0% respectively; see table 1). Overall, 162 (84.3%) questionnaires were used for analysis, 90 (88.2%) in public and 72 (80%) in private settings. Individuals attending the private setting were older with more comorbidities but reported a better health status than those in the public setting (p<0.01; more in table 2).

Patient 'current' option

Current experience of diabetic care was positive across settings, and characterised by (appendix 5, 'Cyprus all'): (i) receiving detailed and accurate information about their care, most of the times/Always, 96%; (ii) receiving care and compassion for their personal situation, most of the times/Always 95%; (iii) choosing treatment options and manage my care 43%; (iv) 1 hour or less waiting time at the site 77%; (v) receiving community care from the same healthcare provider 88%; (vi) receiving care from the primary care physician/primary care physician and nurse 64%. When looking at the setting-specific data, attributes' levels combination for the 'current' option varied across groups (see appendix 5). 'Cyprus private' presented the best attribute combinations in terms of information (100% most of the times/always), compassion (100% most of the times/always), care management (100% managing their care, either alone or together with choosing treatment option), waiting time (100% one hour or less), and continuity of care (80%). The healthcare provider mostly approached in the private setting was the primary care physician (alone or with the primary care nurse, 96%). Difference across the three groups are presented in appendix 5.

Patient preferences

Results confirmed the theoretical validity of responses (see appendix 6). Respondents from 'Cyprus private' presented constant preference for their 'current' option and were not willing to trade for any alternative hypothetical service. DCE output are presented for the pooled sample 'Cyprus all' and subgroup 'Cyprus public' (see appendix 6). Overall respondents from 'Cyprus all' valued: receiving detailed and accurate information about their care (always/most of the times); receiving compassionate care (always/most of the times); choosing treatment options and managing their care; continuity of care; and receiving community from their primary care physician. The three most preferred service characteristics were: receiving community from their primary care physician (compared with hospital sites); receiving 'always' care and compassion for their personal situation; and receiving 'always' detailed and accurate information about their care. Waiting time was the least valued characteristic. More details are in appendix 6.

Policy changes

When comparing patient preferences across settings, the probability of uptake for alternative diabetes care services are easily interpretable measure of the relative importance placed on specific policy changes (listed in table 3), and figure 2 reports the results of this exercise. Both 'Cyprus all' and 'Cyprus public' wanted to change from their 'current' option to 'alternative diabetic services'. For both groups the preferred policy change was represented by the shift to the 'alternative diabetic services 2' (probability of uptake was 90% for 'Cyprus all' compared with 96% for 'Cyprus public') offering: 'always' detailed and accurate information about their care'; 'always' care and compassion for their personal situation'; the opportunity to both 'choose their treatment options, and manage their care'; 50% decrease in their 'waiting time'; 'care delivered by the physician, the hospital specialist and nurse'.

Discussion

This paper shows that Cypriot value SDM processes regarding their care for diabetes regardless of whether they seek private or public treatments. Private patients (who were already involved in SDM

and supported by their primary care physician) presented constant preference for their 'current' option and were not willing to trade for alternative hypothetical services (*status quo* bias, where people are more likely to adopt a conservative response to health services innovations; see Tinelli et al[26]).

Respondents from the public setting were younger people and had already some experience of what is regarded as SDM; however they could not 'choose their treatment options and manage their care', and their average 'waiting time' at the clinics was longer than one hour (both aspects highly valued by the respondents). Overall they valued a shift in policy and wanted to move from their current 'option' to 'alternative diabetic care services' where the waiting times were shorter, they could not only manage their care but also choose their treatments, whist receiving 'always detailed and accurate information about their care', 'care and compassion for their personal situation', and 'continuity of care'. Individuals did value a team of multidisciplinary healthcare providers (change to service 1) but they preferred to receive support from their primary care physician (change to service 2).

The 'all Cyprus' sample valued their 'current' option but they were willing to change to 'alternative diabetic care services' where they could experience shorter waiting times, and be involved more in SDM. Again, support from their primary care physician was preferred to coordinated care from a multidisciplinary team of healthcare professionals. It may be argued that, although over the past two decades[32], most health systems have reoriented diabetes care from acute services to regular integrated management in the community setting, Cypriots are still very new to the concept of coordination between primary–secondary settings and they have still limited opportunities to experience it across private and public sectors. Diabetes is particularly challenging to coordinate given the multiple healthcare providers and settings involved. International emphasis is now on integrated care which focuses on the organisation of management within settings and the coordination of care between settings.[33-34] The overall findings from this Cypriot case study

emphasize the need to implement anticipated more person centred healthcare system that would seek to unify public and private resources in a way that would allow patients to decide, on their own, the service provider who will fit their needs.[12,35] The documented patient value of shorter waiting times, more personalised care, more information can be satisfied only within the context of a person centred healthcare system which will redistribute existing resources in more efficient allocation, allow people to choose their provider and support a quality performance scheme. The latter has proven to be very useful when promoting interaction between clinicians and their patients. Unfortunately we can anticipate that the public health care sector in Cyprus is highly unlikely to adopt to the findings of this study since currently there is recruitment freeze, an austerity measure, and many physicians leave public sector for the more profitable private sector, a trend which is aggravated by constant reduction in their remuneration –again an austerity measure.[2] Consequently, public sector cannot cope effectively with patient's demands and adjust to its new (expected) mode of action since demand has exceeded its functional capacity. The same applies for the private sector, which is totally financed by out-of-pocket payment, an attribute that leaves patients exposed to large health expenditure and violates the principles of health care provision, namely equity and solidarity, by not cross-subsidizing both from rich to poor and from people at low risk of illness to people with higher risks. When comparing Cyprus to an alternative European setting such as England where person centred practices are already in place we found that Cypriots valued choosing alternative SDM services compared to their 'current' option, whereas the English preferred their status quo to other services.[36] Several of these issues can be imputed to the lack of a universal coverage system. Indicatively, patient campaigns, medical audit and other efficiency enhancement activities such as electronic prescribing, performance management have been programmed once the NHIS is on, therefore is anticipated that this will address, at least to a certain degree some of our findings. This was also one of the European Troika's recommendations as well, prior to the implementation of the bail-out agreement.

Future work should allow to expand the limited sample size of this application (representing only 0.2% of the 89,700 overall diabetes population in Cyprus) and allow to capture the levels of interest for the introduction of SDM not just within the diabetes but also within the overall patient community in Cyprus compared with other healthcare systems with similar issues.

Tables: 2

Figures: 2

Authorship:

MT contributed to the conception and design of the study, to the establishment of the team, to study management, to planning on the analysis, ethics application in England, data entering and cleaning, data analysis, interpretation of the results, and drafting and revision of the paper.

PP led the ethics application in Cyprus, contributed to the recruitment of the local sites, translation of the questionnaire, data collection, interpretation of the results, and drafting and revision of the paper.

GS contributed to development of the questionnaire, recruitment of the local sites, data collection, and revision of the paper.

GO contributed to the development of the questionnaire, data collection, revision of the paper; AMG contributed to the conception and design of the study, interpretation of the results, and drafting and revision of the paper.

Conflict of interest: there is no conflict of interest that could be perceived as prejudicing the impartiality of the research reported.

Overlapping publications:

A conference paper: Tinelli M, McGuire A, Petrou P, Samoutis G. Implementing shared-decision-making for diabetes care across country settings: what really matters to people? European Young Endocrine Scientists 2014.

A peer reviewed publication: Tinelli M, Petrou P, Samoutis G, Traynor V, Olympios G, McGuire A. Implementing shared-decision-making for diabetes care across country settings: What really matters to people? Health Policy. 2017 Jul;121(7):786-792. doi: 10.1016/j.healthpol.2017.05.001. Epub 2017 May 10.

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Table 1: Responses and versions of the questionnaire

	Cyprus total		Cyprus public		Cyprus private	
	no.	%	no.	%	no.	%
Questionnaires distributed a	192	100	102	100	90	100
Questionnaires returned b	164	85.4	92	90.2	72	80.0
Questionnaires used for analysis c	162	84.3	90	88.2	72	80.0
Versions of the questionnaire						
1	53	32.7	28	31.1	25	34.7
2	50	30.9	28	31.1	22	30.6
3	59	36.4	34	37.8	25	34.7

A: Questionnaires were distributed to the patients attending the community site by a member of the local research team; B: Questionnaires returned to the research team with attached consent form either at the community site or by post. C: Only questionnaires with completed DCE choice set and 'current' option levels were considered for analysis.

Note: differences between groups (Cyprus total vs. public/private; Cyprus public vs. private) were not significant at 0.05 level.

Table 2: Patients' socio-demographic characteristics

		Cyprus total		Cyprus public		P val	Cyprus private		P val	P val
		no.	%	no.	%	CT vs. CPu	no.	%	CT vs. CPr	CPu vs. CPr
Age	Mean (sd)	62.7	14	59.32	16.3	0.08	66.75	9.2	0.01	0.01
Gender	Male	62	48.1	37	48.1	0.99	25	48.1	0.99	0.99
	Female	67	51.9	40	51.9		27	51.9		
Health status	Very poor	1	0.6	0	0.0	0.16	1	1.4	0.11	0.01
	Poor	1	0.6	1	1.2		0	0.0		
	Average	22	14.2	17	19.8		5	7.2		
	Good	87	56.1	55	64.0		32	46.4		
	Very good	44	28.4	13	15.1		31	44.9		
Comorbidities	Other	29	17.6	5	5.5	0.09	24	32.4	0.13	0.01
	Cancer	6	3.6	4	4.4		2	2.7		
	Heart disease	21	12.7	14	15.4		7	9.5		
	Asthma	7	4.2	3	3.3		4	5.4		
	missing data/no co-morbidities	102	61.8	65	71.4		37	50.0		
Income	In paid work	31	19.5	24	27.3	0.36	7	9.9	0.14	0.01
	Unemployed	7	4.4	4	4.5		3	4.2		
	Retired from paid work	102	64.2	45	51.1		57	80.3		
	Looking after family, home, or dependents	11	6.9	8	9.1		3	4.2		
	Others	8	5.1	7	8.0		1	1.4		

Table 3: Alternative diabetes care services to be compared

	'Current' option for Cyprus all (comparator)	'Current' option for Cyprus public (comparator)	Alternative diabetic service 1	Alternative diabetic service 2
Detailed and accurate information about your care	84% always; 12% most of the times; 4% sometimes	74% always; 19% most of the times; 7% sometimes	100% 'always'	100% 'always'
Care and compassion for your personal situation	85% always; 10% most of the times; 5% sometimes	78% always; 13% most of the times; 9% sometimes	100% 'always'	100% 'always'
Choosing your treatment options, and manage your care	43% 'choosing their treatment options, and manage their care'; 47% 'managing their care only';1% I can only choose my treatment options; 9% none of them	6% 'choosing their treatment options, and manage their care'; 76% 'managing their care only'; 2% I can only choose my treatment options; 16% none of them	100% 'choosing their treatment options, and manage their care'	100% 'choosing their treatment options, and manage their care'
Waiting time at the clinic	40 min	1 hour	50% decrease in their 'waiting time'	50% decrease in their 'waiting time'
Care from the same GP, nurse, specialist doctor, or team of professionals	88% Yes	93% Yes	100% Yes	100% Yes
Who is providing your care	33% Primary care physician only; 32% Primary care physician and nurse; 3% Hospital physician/ specialist only; 2% Hospital physician/ specialist and nurse; 30% Primary care physician, hospital physician/specialist, and nurse	40% Primary care physician and nurse; 2% Hospital physician/ specialist only; 3% Hospital physician/ specialist and nurse; 55% Primary care physician, hospital physician/ specialist, and nurse	100% 'receiving care from primary care physician, hospital physician/specialist, and nurse'	100% 'receiving care from primary care physician only'

Supplementary material

Appendix 1

The discrete choice experiment (DCE) choice, and identification of attributes and their levels

The DCE choice, the attributes and their levels were informed through appropriate review of the DCE literature, clinician interviews and field testing with patients and their representatives. The vignette presented the respondents with a hypothetical situation where they had to imagine that they need primary care for their diabetes. They were offered a choice of multiple diabetic services described in terms of: (i) Information, receiving detailed and accurate information about their care; (ii) Compassion, whether they could receive care and compassion for their personal situation; (iii) Care management, whether they could choose treatment options, and manage their care themselves; (iv) waiting time at the site; (v) Continuity of care, whether they could receive community care from the same healthcare professional; (vi) their care provider. For more details see table A1.

Table A1: DCE attributes, their levels and coding

ATTRIBUTES	LEVELS [REGRESSION CODING]
1) Information [receiving detailed and accurate information about their care]	- Always [INFO3] - Most of the times [INFO2] - Sometime [INFO1] - Rarely/never a
2) Compassion [receiving care and compassion for their personal situation]	- Always [COMPASSION3] - Most of the times [COMPASSION2] - Sometime [COMPASSION1] - Rarely/never a
3) Care management [choosing treatment options, and managing care]	- I can choose my treatment options and manage my care [MANAGEMENT3] - I can only choose my treatment options [MANAGEMENT2] - I can only manage my care [MANAGEMENT1] - None of them a
4) Waiting time [waiting time at the site]	- Less than 1 hour a - 1 hour [TIME1] - 2 hours [TIME2] - 3 hours or more [TIME3]
5) Continuity of care [receiving community care from the same primary care physician /nurse/specialist doctor]	- Always [CONTINUITY3] - Most of the times [CONTINUITY2] - Sometime [CONTINUITY1] - Rarely/never a
6) Who is providing care	- Primary care physician only a - Primary care physician and nurse [PROVIDER1] - Hospital physician/specialist only [PROVIDER2] - Hospital physician/specialist and nurse [PROVIDER3] - Primary care physician, hospital physician/specialist, and nurse [PROVIDER4]
Alternatives	- Alternative community care service [ALTERNATIVE_SERVICE] - 'Current' situation a

a Reference level.

Choice set creation, questionnaire design, and development

Two generic hypothetical alternatives and their 'current practice' were then compared within a series of 12 choice tasks generated using a D-optimal approach designed to elicit the maximum information from respondents (http://www.choice-metrics.com/). Since a 12 choice set could be excessively burdensome for respondents to complete in the limited time available at the community clinic, the 12 choice sets were divided into four separate versions of the questionnaire, each of them accommodating for the design D-optimal properties (http://www.choice-metrics.com/). Before completing the DCE exercise respondents were asked to describe the service received at their 'current practice' to be kept as constant comparator for the entire choice set. An example of choice is presented in figure 1.

Robustness checks

The theoretical validity of responses was explored by examining the sign and significance of parameter estimates. A priori, we expected respondents to prefer: Information [receiving detailed and accurate information about their care] (positive sign); Compassion [receiving care and compassion for their personal situation] (positive sign); Care management [choosing treatment options, and managing care] (positive sign); shorter waiting time [waiting time at the site] (negative sign); Continuity of care [receiving community care from the primary care physician/nurse/specialist doctor (positive sign); Who is providing care, multidisciplinary team (positive sign); and staying with their 'current practice' (negative sign).

Testing the feasibility and piloting the questionnaire, and preparing for data collection and analysis

Testing with patients was conducted in order to ensure that the most important attributes for the decision-making process of diabetic patients were included in the DCE and proper levels were used to each of the attributes as well as its length, its ability to be completed, and need for additional questions or possible rewording. No changes in the attributes and/or levels were deemed necessary based on the feedback received from discussion with 8 patients. A core group of researchers from the team had an active role in the adaptation and translation of the DCE questionnaire into Greek, supervised the implementation of the survey in preparation for data collection.

Ethics approval

Ethical approval was granted by the London School of Economics Research Ethics Committee, the Health Research Authority in England (13/NW/0893), the Ministry of Health in Cyprus, the Cyprus Bioethics Committee and the Cyprus Office of Commission for the Protection of Personal Data.

Appendix 2: Community care sites

	All Cyprus	**Public sites n (%)**	**Private sites n (%)**
Primary care practices	5 (71)	3 (75)	2 (67)
Hospital clinics	2 (29)	1 (25)	1 (33)
Rural location (vs urban)	2 (29)	2 (50)	0
Multidisciplinary team at the clinics (primary care physician/hospital specialist and nurse)	1 (14)	1 (25)	0
Total	7 (100)	4 (100)	3 (100)

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Appendix 3: Regression model: Multinomial conditional logit model

The multinomial conditional logit model was used to analyse the response data, with the following utility function being estimated:

$Uji = Vji + eji$ Eq 1

Where

Vji = **constant** $_{\text{alternative service}}$ + β_1 INFO1 + β_2 INFO2 + β_3 INFO3 + β_4 COMPASSION1 + β_5 COMPASSION2 + β_6 COMPASSION3 + β_7 MANAGMENT1 + β_8 MANAGMENT2 + β_9 MANAGMENT3 + β_{10}TIME1 + β_{11}CONTINUITY1 + β_{12}PROVIDER1 + β_{13}PROVIDER2 + β_{14}PROVIDER3 + β_{15}PROVIDER4 Eq 2

  Uij = the utility of the jth choice to the ith individual, Vij is the systematic part of the utility function observable by the researcher and eji is the error term. Dummy variable were used to analyse categorical attributes, with reference levels identified in Appendix 1 (Table A1). The alternative practice constant is describing the general preference for alternative practice A or B over the 'current practice', with the defined dummy variable omitted attributes' level captured in these constants. $\beta1$- $\beta15$ are the coefficients to be estimated for the attributes.

Appendix 4: Policy analysis and probability choices for changes in diabetic care

Results from the utility models can be used to estimate the probability of uptake for changes in policy to new diabetic services. This kind of information may be a useful contribution to policy analysis. We use results from the preferred model to estimate the impact of redesigning diabetes care in the community. In doing so, attribute levels are predefined and resultant utility scores converted to probabilities (see figure 2)[13].

Probabilities were calculated by using the following formula: Pc (alternative diabetic service 1) = exp ($V1n$)/Σj exp Vjn, where individual n will choose alternative diabetic service 1 within a choice set C of J ($j = 1, ... , J$) options.

Vi **= constant** $_\text{alternative service}$ **+ β $_1$** INFO1 **+ β $_2$** INFO2 **+ β $_3$** INFO3 **+ β $_4$** COMPASSION1 **+ β $_5$** COMPASSION2 **+ β $_6$** COMPASSION3 **+ β $_7$** MANAGMENT1 **+ β$_8$** MANAGMENT2 **+ β $_9$** MANAGMENT3 **+ β $_{10}$**TIME1 **+ β $_{11}$**CONTINUITY1 **+ β $_{12}$**PROVIDER1 **+ β $_{13}$**PROVIDER2 **+ β $_{14}$**PROVIDER3 **+ β $_{15}$**PROVIDER4 Eq 2

β coefficients 1-15 and constant values are reported in appendix 6.

Appendix 5: 'Current' option

		Cyprus all (CA)		Cyprus public (CPu)		P value (CA vs. CPu)	Cypr priva (CPr)
		no.	%	no.	%		no.
		162		90			72
Do you receive detailed and accurate information about your care?	Rarely/never	0	0.0	0	0.0	n/a	0
	Sometimes	6	3.7	6	6.7		0
	Most of the time	20	12.3	17	18.9		3
	Always	136	84.0	67	74.4		69
Do you receive care and compassion for your personal situation?	Rarely/never	0	0	0	0	n/a	0
	Sometimes	8	4.9	8	8.9		0
	Most of the time	16	9.9	12	13.3		4
	Always	138	85.2	70	77.8		68
Can you choose your treatment options, and manage your care?	None of them	14	8.6	14	15.6	0.01	0
	I can only manage my care	76	46.9	68	75.6		8
	I can only choose my treatment options	2	1.2	2	2.2		0
	I can choose my treatment options and manage my care	70	43.2	6	6.7		64
What is your waiting time at the clinic?	Less than 1 hour	87	53.7	16	17.8	0.01	71
	1 hour	39	24.1	38	42.2		1
	2 hours	29	17.9	29	32.2		0
	3 hours or more	7	4.3	7	7.8		0
Do you receive care from the same GP/nurse/specialist doctor at the hospital?	No	20	12.3	6	6.7	0.15	14
	Yes	142	87.7	84	93.3		58
Who is providing your care?	Primary care physician only	54	33.3	**0**	**0.0**	0.01	54
	Primary care physician and nurse	51	31.5	36	40.0		15
	Hospital physician/ specialist only	5	3.1	2	2.2		3
	Hospital physician/ specialist and nurse	3	1.9	3	3.3		0
	Primary care physician, hospital physician/ specialist, and nurse	49	30.2	49	54.5		0

Appendix 6: DCE results

	Cyprus all			Cyprus public		
	Coeff.	SE	P-val	Coeff.	SE	P-val
HEALTHCARE SERVICE CHARACTERISTICS						
Information [receiving detailed and accurate information about their care]						
(Compared to Rarely/never)						
Sometimes	2.05	1.06	0.05	1.61	1.04	0.12
Most of the times	2.01	0.81	<0.01	2.13	0.83	<0.01
Always	2.20	0.65	<0.01	1.73	0.64	<0.01
Compassion [receiving care and compassion for their personal situation]						
(Compared to Rarely/never)						
Sometimes	-0.38	0.92	0.67	-0.63	0.91	0.48
Most of the times	2.11	.86	<0.01	1.41	0.92	0.12
Always	2.69	.80	<0.01	2.35	0.84	<0.01
Care management [choosing treatment options, and managing care]						
(compared to none of them)						
I can choose my treatment options and manage my care	1.29	0.60	0.03	1.08	0.58	0.06
I can only choose my treatment options	-0.02	0.97	0.97	0.21	0.96	0.82
I can only manage my care	1.37	0.62	0.02	0.93	0.64	0.14
Waiting time [waiting time at the site]						
	-0.59	0.22	<0.01	-0.29	0.25	0.05
Continuity of care [receiving community care from the same primary care physician/nurse/specialist doctor]						
(Compared to Rarely/never)						
yes	1.69	0.55	<0.01	1.42	0.58	<0.01
Who is providing care						
(Compared to GP only in England; *Primary care physician only, in Cyprus*)						
GP and nurse in England (*Primary care physician and nurse, in Cyprus***)**	-0.24	0.73	0.73	0.55	0.85	0.51
Hospital specialist only in England (*Hospital physician/specialist only, in Cyprus***)**	-3.09	1.19	<0.01	-1.98	1.43	0.16
Hospital specialist and nurse in England (*Hospital physician/specialist and nurse, in Cyprus***)**	-3.74	1.19	<0.01	-2.43	1.25	0.05
GP, hospital specialist and nurse in England (*Primary care physician, hospital physician/specialist, and nurse, in Cyprus***)**	-2.41	0.75	<0.01	-1.21	0.90	0.17
ALTERNATIVES						
(compared to current)						
Alternative community care service	0.61	0.36	0.09	0.64	0.36	0.07
No of observations	637			351		

| No of individuals | 162 | 90 |