

An economic evaluation of 'delivering assisted living lifestyles at scale' (dallas)

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Introduction: why 'mhealth'?

Development of a digital health strategy has been prioritised by the National Health Service (NHS)[1]. It is hoped that this will be a cost-effective mode of healthcare delivery as changing population demographics are becoming untenable for a growing elderly population [2]. Mobile health (mhealth) is the raising awareness of health information using mobile and wireless devices [3]. As the UK has increasingly become a 'smartphone society', the potential for successful well-being digital technologies has become widely recognised [4]. In particular, the flexibility these devices provide for users and service providers alike provides a means to engage with population groups that are harder to reach. However, complexity surrounding capturing mhealth value and impact on health and broader well-being outcomes is challenging [5].

Study aim

Launched in 2012, 'delivering assisted living lifestyles at scale' (dallas) was a large-scale intervention examining digital health for integrating preventative care for daily life. This study investigated general UK population value for mobile health (mHealth) lifestyle apps seeking to improve an individual's sense of the 6Cs (connectedness, control, choice, collaboration, community and contribution) for future inclusion in the NHS digital agenda.

Method: Contingent valuation (CV)

CV is a form of stated preference methodology used to estimate welfare gains [6]. Participants are presented with hypothetical scenarios relating to a change in the provision of a good or service with the aim of eliciting their direct preferences. Surveys are used to directly ask participants to report their WTP or willingness-to-accept (WTA) the gain or loss of a specified good/service. This is regarded as an indicator and measure of the demand for the good. This allows a direct valuation for the 6Cs which could be used within a cost benefit analysis (CBA) [5].

An open-ended WTP question confirmed the participants absolute WTP for access to the app and the marginal WTP question asked participants to consider the maximum they would be willing to pay for improved 6Cs through the use of 'healthy connections'. This allows for the identification of an individual's demand for the product (i.e. how much they are willing to pay for the change in their circumstances). Stata 12SE statistical software package was used to analyse the data [7]. In order to estimate a demand function for the 6Cs and the mean WTP, linear regression analyses was used.

Results

September – October 2015 a total of 2002 respondents were surveyed as two cohorts (UK general population and 'dallas-like' cohorts). The general UK representative cohort consisted of 1697 respondents. Based on the UK general population, 49% of the cohort were male, 51% were female. The average age of respondents was 47 years, ranging from 18 to 89 years. The majority of respondents (84%) were from the UK. 68% of the sample were in a relationship whilst 62% had children. The dallas-like cohort consisted of 305 respondents. 28% were male, 72% were female. The cohort had an average age of 48 years, with an age range of 16 to 86 years. Similarly to the UK general population cohort, 67% were in a relationship and 63% had children. Across cohorts absolute WTP exceeded marginal WTP (Table 2).

Table 2: Absolute and marginal WTP across cohorts

	General UK population (n=1697)		Dallas-like (n=305)	
	Absolute WTP (£/month)	Marginal WTP (£/month)	Absolute WTP (£/month)	Marginal WTP (£/month)
Mean	16.3	13.3	13.5	12.6
Median	5	5	5	5
Mode	0	0	0	0
Range	900	600	600	600

Table 3 illustrates that for the general UK population cohort, respondents who felt they 'disagree', were 'neutral' or 'agree' to the statement that they feel connected to healthcare providers were more likely to pay more (p<0.05) for the 'optimal' scenario presented to them compared to the reference level ('strongly disagree'). Feeling connected to social care services was a predictor of higher WTP. In the dallas-like cohort the only predictor was sense of 'control'. Higher levels of control over health management acted as an inverse indicator of WTP (relative to 'strongly disagree').

Socio-demographic analysis highlighted the following trends:

Both cohorts: respondents age had a significant (p<0.05) relationship with WTP and younger respondents will pay more for the health connections app. General health was a positive predictor of WTP, with those respondents who describe themselves in better health being more likely to spend more for the healthy connections app yet neither cohort illustrated that long-term illness was a factor influencing WTP;

General population cohort: income level was a significant, positive predictor of higher WTP up to £30,000. Dallas-like cohort: no relationship between income and WTP;

General population cohort: current monthly payments on phone, internet and additional features (i.e. app subscriptions), had an overall positive trend with WTP. Dallas-like cohort: owning a computer or smartphone, having regular access to the internet and the total monthly payment for phones, internet usage were not indicators for paying higher WTP. For both cohorts, previous amount spent on health apps acts as a significant positive predictor of WTP.

Conclusion

Mhealth apps such as 'healthy connections' may be an attractive 'preventative' healthcare intervention with healthier individuals seeking them out, some work may be needed to produce the same appeal for those suffering from a long-term illness. The success of this form of intervention and service will depend heavily on its integration with other aspects of a person's existing health plan to ensure that those already burdened with regular medication and illness do not feel further burdened in their daily lives. The results demonstrate that whilst uniform preferences and valuations for mhealth apps may not have been identified, there may be certain sub-groups of the population who see merit in this form of healthcare delivery and would benefit from future targeted efforts.

References

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The 6Cs

A self-completion questionnaire was used where participants were introduced to 'healthy connections' (Figure 1), a hypothetical app which aides users to improve their wellbeing through 6Cs features (Table 1). Data was collected through the use of online survey panels accessed through the survey host, ResearchNow.

Table 1: Innovate UK 6Cs

Concept	Definition
Connectedness	Connections and networking between individuals through real or virtual interaction
Control	Individuals ability to control their own health care and wellbeing
Choice	Choice in terms of products, services and systems available to suit needs
Collaboration	Organisations and communities collaborating together to develop and deliver products, systems and services
Community	Individuals part of a community rather than living in isolation, connected to others with shared needs, interests and aims
Contribution	Individuals ability to control their own health care and wellbeing

Figure 1: 'Healthy connections' app features

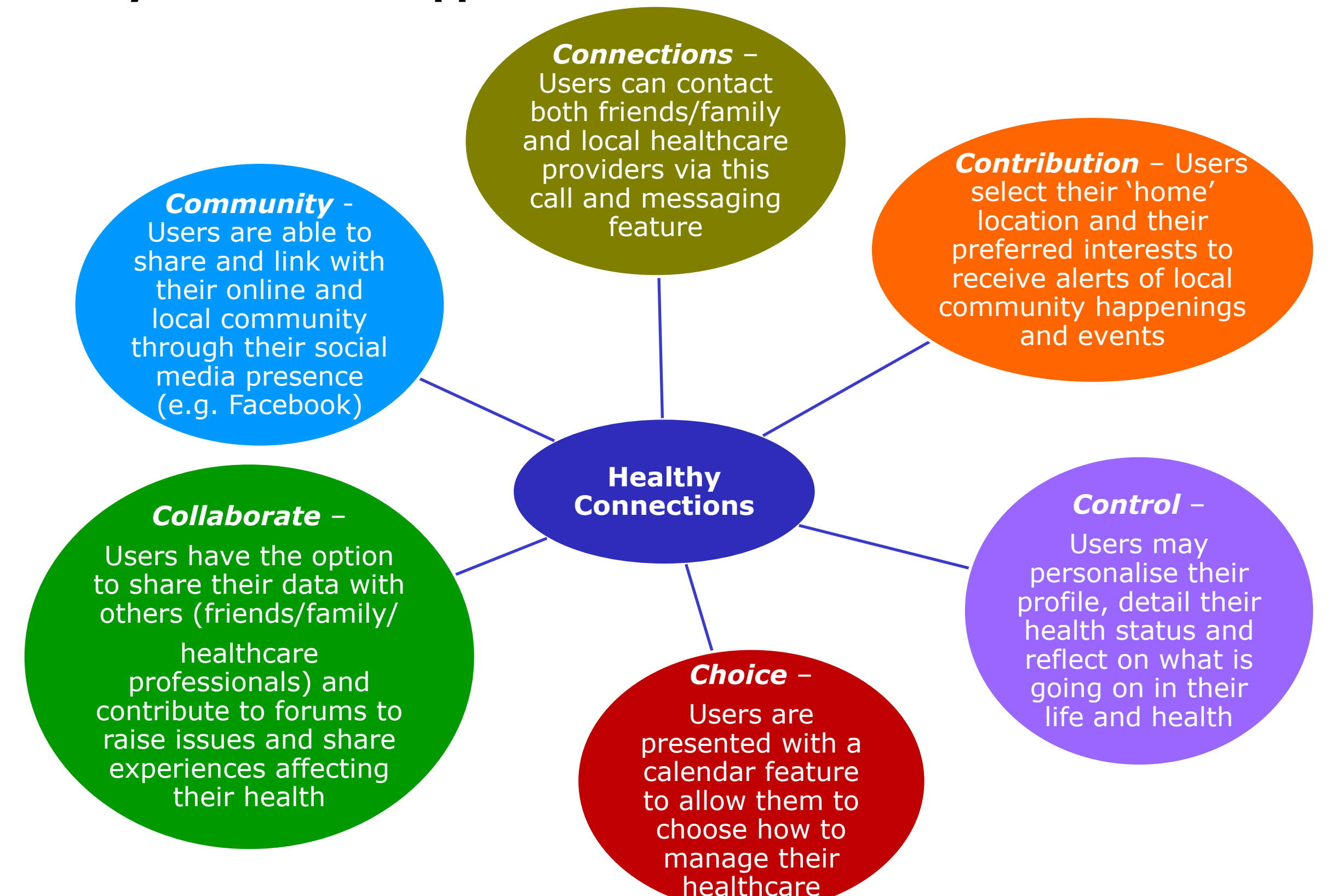


Table 3: Cohorts Marginal WTP and Current 6Cs levels linear regression (Adjusted for age, total household income and gender)

Variable	General UK population (n=1697)			Dallas-like (n=305)		
	Coef.	P-value	95% CI	Coef.	P-value	95% CI
Connections (I feel connected with/to...)						
....My friends and family						
Disagree	-0.2	0.59	-0.82 0.47	-0.16	0.85	-1.79 1.48
Neutral	-0.29	0.34	-0.89 0.30	-0.44	0.53	-1.79 0.92
Agree	-0.36	0.22	-0.94 0.21	-0.44	0.52	-1.79 0.91
Strongly Agree	-0.36	0.22	-0.94 0.22	-0.47	0.50	-1.83 0.89
....Healthcare services and/or providers						
Disagree	0.46	0.05	0.00 0.93	0.33	0.59	-0.88 1.54
Neutral	0.44	0.06	-0.01 0.88	0.19	0.75	-0.98 1.36
Agree	0.46	0.05	0.01 0.92	0.06	0.93	-1.14 1.26
Strongly Agree	0.42	0.10	-0.09 0.92	0.00	1.00	-1.40 1.41
...Social care services and/or providers						
Disagree	0.06	0.59	-0.17 0.30	-0.06	0.82	-0.60 0.48
Neutral	0.30	0.01	0.08 0.53	0.36	0.16	-0.15 0.87
Agree	0.89	0.00	0.61 1.17	0.50	0.14	-0.16 1.16
Strongly Agree	0.98	0.00	0.55 1.42	0.77	0.20	-0.42 1.95
I feel I make a contribution in my community						
Disagree	-0.08	0.68	-0.45 0.29	0.11	0.85	-1.00 1.22
Neutral	0.10	0.59	-0.27 0.47	0.22	0.69	-0.87 1.32
Agree	0.20	0.31	-0.19 0.58	0.45	0.44	-0.69 1.58
Strongly Agree	0.17	0.45	-0.27 0.61	-0.06	0.93	-1.35 1.23
I feel I have control in how I manage my health and wellbeing						
Disagree	-0.06	0.89	-0.83 0.72	-1.67	0.11	-3.70 0.36
Neutral	0.06	0.88	-0.70 0.81	-2.48	0.01	-4.31 -0.65
Agree	-0.19	0.62	-0.94 0.56	-2.62	0.01	-4.44 -0.79
Strongly Agree	-0.32	0.41	-1.10 0.45	-2.35	0.01	-4.22 -0.47
I feel I have a choice in how I manage my health and wellbeing						
Disagree	0.44	0.25	-0.32 1.19	0.86	0.44	-1.35 3.08
Neutral	0.42	0.27	-0.33 1.17	1.39	0.20	-0.73 3.51
Agree	0.61	0.11	-0.13 1.35	1.88	0.08	-0.24 4.00
Strongly Agree	0.65	0.09	-0.11 1.41	1.64	0.13	-0.47 3.74
I feel that I am part of my community						
Disagree	0.06	0.78	-0.34 0.46	0.24	0.70	-0.99 1.46
Neutral	0.04	0.86	-0.36 0.43	0.32	0.59	-0.85 1.49
Agree	0.24	0.25	-0.17 0.65	0.55	0.37	-0.65 1.76
Strongly Agree	0.24	0.31	-0.23 0.72	1.40	0.06	-0.03 2.82