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The public's preferences for emergency care alternatives and the influence of the presenting context

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STROBE Statement—checklist of items that should be included in reports of observational studies

	Item No	Recommendation
Title and abstract	1	(a) Indicate the study's design with a commonly used term in the title or the abstract
<i>(In Abstract)</i>		(b) Provide in the abstract an informative and balanced summary of what was done and what was found
Introduction		
Background/rationale (pp.4-5 of 33)	2	Explain the scientific background and rationale for the investigation being reported
Objectives (p.5)	3	State specific objectives, including any prespecified hypotheses
Methods		
Study design (pp. 5-8)	4	Present key elements of study design early in the paper
Setting (pp.8-10)	5	Describe the setting, locations, and relevant dates, including periods of recruitment, exposure, follow-up, and data collection
Participants (p. 9)	6	(a) <i>Cohort study</i> —Give the eligibility criteria, and the sources and methods of selection of participants. Describe methods of follow-up <i>Case-control study</i> —Give the eligibility criteria, and the sources and methods of case ascertainment and control selection. Give the rationale for the choice of cases and controls <i>Cross-sectional study</i> —Give the eligibility criteria, and the sources and methods of selection of participants
		(b) <i>Cohort study</i> —For matched studies, give matching criteria and number of exposed and unexposed <i>Case-control study</i> —For matched studies, give matching criteria and the number of controls per case
Variables (pp. 5-7)	7	Clearly define all outcomes, exposures, predictors, potential confounders, and effect modifiers. Give diagnostic criteria, if applicable
Data sources/ measurement (pp. 6-10; Table 2)	8	For each variable of interest, give sources of data and details of methods of assessment (measurement). Describe comparability of assessment methods if there is more than one group
Bias (p. 9; p. 17; Table 2)	9	Describe any efforts to address potential sources of bias
Study size (based on sample size calculations e.g. Dillman, 2007)	10	Explain how the study size was arrived at
Quantitative variables (p. 10)	11	Explain how quantitative variables were handled in the analyses. If applicable, describe which groupings were chosen and why
Statistical methods	12	(a) Describe all statistical methods, including those used to

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(pp. 10)

- Missing data coded with -999 with high data quality evident based on inspection of missing values

- Confidence level of 95% used for sample size calculations and significance level for preference weights set at $p=0.05$

- Consistency check responses included (e.g Richardson et al., 2009)

Continued on next page

control for confounding

(b) Describe any methods used to examine subgroups and interactions

(c) Explain how missing data were addressed

(d) *Cohort study*—If applicable, explain how loss to follow-up was addressed

Case-control study—If applicable, explain how matching of cases and controls was addressed

Cross-sectional study—If applicable, describe analytical methods taking account of sampling strategy

(e) Describe any sensitivity analyses

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Results		
Participants (p. 10 ; Table 2)	13*	(a) Report numbers of individuals at each stage of study—eg numbers potentially eligible, examined for eligibility, confirmed eligible, included in the study, completing follow-up, and analysed (b) Give reasons for non-participation at each stage (c) Consider use of a flow diagram
Descriptive data (pp. 10 – 12; Table 2)	14*	(a) Give characteristics of study participants (eg demographic, clinical, social) and information on exposures and potential confounders (b) Indicate number of participants with missing data for each variable of interest (c) <i>Cohort study</i> —Summarise follow-up time (eg, average and total amount)
Outcome data (Tables 3-6)	15*	<i>Cohort study</i> —Report numbers of outcome events or summary measures over time <i>Case-control study</i> —Report numbers in each exposure category, or summary measures of exposure <i>Cross-sectional study</i> —Report numbers of outcome events or summary measures
Main results (Tables 5-6)	16	(a) Give unadjusted estimates and, if applicable, confounder-adjusted estimates and their precision (eg, 95% confidence interval). Make clear which confounders were adjusted for and why they were included (b) Report category boundaries when continuous variables were categorized (c) If relevant, consider translating estimates of relative risk into absolute risk for a meaningful time period
Other analyses (further research to explore preference heterogeneity to be reported in subsequent publications)	17	Report other analyses done—eg analyses of subgroups and interactions, and sensitivity analyses
Discussion		
Key results (pp. 15-17)	18	Summarise key results with reference to study objectives
Limitations (pp. 17-18)	19	Discuss limitations of the study, taking into account sources of potential bias or imprecision. Discuss both direction and magnitude of any potential bias
Interpretation (p. 18)	20	Give a cautious overall interpretation of results considering objectives, limitations, multiplicity of analyses, results from similar studies, and other relevant evidence
Generalisability (p. 18)	21	Discuss the generalisability (external validity) of the study results
Other information		
Funding (p. 23 of 33)	22	Give the source of funding and the role of the funders for the present study and, if applicable, for the original study on which the present article is based

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5 **The public's preferences for emergency care alternatives and the influence of the**
6 **presenting context**
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10 **Manuscript Type: Original research**
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Running title: The public's preferences for emergency care

ABSTRACT

Background: Internationally, increasing presentations to Emergency Departments have led to overcrowding, long waiting times and suboptimal health system performance. Accordingly, a range of new models of care involving the provision of care in alternative settings and delivered by other practitioners continue to be developed. The current study seeks to understand the Australian public's preferences for emergency care alternatives and to determine if these differ depending on presenting circumstances.

Methods: The cross-sectional study used a discrete choice experiment to elicit the Australian public's (n=1838 adults) preferences for accessing emergency care and the characteristics of this care. Preferences were elicited in the context of four scenarios; a possible concussion, a rash/asthma-related problem involving oneself or one's child and an anxiety-related presentation. Mixed logit regression analyses were undertaken to identify the relative importance of care attributes and the propensity to access or delay care in each context.

Results: Results indicated a preference for treatment by specialist emergency physician in hospital for possible concussion and for treatment by a doctor in ambulatory settings for rash/asthma-related and anxiety-related problems. Participants were prepared to wait twice as long for their preferred alternative in the rash/asthma scenario compared to the same concerns for their child. Results suggest a clear preference for lower costs, shorter wait times and a strong emphasis on service quality; however there was significant heterogeneity across all characteristics and contexts.

Conclusion: This study has increased awareness that the public's emergency care choices will differ depending on the presenting context. It has further demonstrated the importance of service quality as a determinant of health care choices. The findings have also provided insights into the Australian public's reactions to emergency care reforms.

STRENGTHS AND LIMITATIONS OF THIS STUDY

- This study represents the first investigation of the Australian public's preferences for emergency care and, internationally, the first examination of preferences for both the characteristics of emergency care and service uptake decisions, irrespective of the care options available.
- The demonstration of the importance of contextual factors represents a novel contribution to the literature.
- The results offer some explanations to the apparent inconsistencies in the literature indicating 'inappropriate' presentations to emergency departments even when there are ambulatory alternatives available.
- Although the sample was stratified by age and sex, participants were less diverse and reported higher levels of morbidity compared to the general population.

INTRODUCTION

Emergency Departments (EDs) primarily exist to treat people experiencing medical emergencies, but often provide services to patients with a range of presenting problems of less urgency.^[1-4] Both within Australia and internationally, demand for emergency care has been increasing each year leading to substantial ED pressures.^[2, 3, 5-7] Although the causes of ED overcrowding are complex, socio-demographic changes, including population growth and ageing, and clinical considerations such as increasing co-morbidities are key contributors to excessive demand.^[3] Other contributing factors relate to system issues such as decisions about resourcing and the increasing cost of health care,^[8, 9] the availability and type of bed stock and lack of service alternatives for lower acuity patients.^[2, 3, 5] An additional factor, however, is the public's understanding of ED and when it should be accessed,^[10] with 'inappropriate' patient attendance considered to adversely impact the performance of ED.^[11] Despite some conjecture in the literature about the degree to which less urgent presentations, often described as 'GP type patients', contribute to overcrowding and the utility of alternative service models^[3, 12, 13], some Australian health authorities have launched social marketing campaigns to redirect less urgent ED patients to alternative care.^[14] Further reforms including the introduction of user co-payments for accessing care have also been proposed.^[e.g. 14, 15]

EDs have been described as being "amongst the biggest 'hotspots' in Australia's healthcare system".^[16, p. 6] Increasing demand has led to considerable pressures on emergency care resources and staff, overcrowding and "access block"; with ambulances having to queue to deliver patients and hospitals having to be bypassed due to excessive waiting times.^[16-18] This situation contributes to sub-optimal management of critically ill patients and inefficiencies in the health system,^[3, 17] and has been identified as the most important barrier

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3 to the provision of quality care in ED. ^[16] Indeed, estimates of the increased mortality rate
4 that can be directly associated with access block and overcrowding in ED range between 10%
5 and 30%, as a results of the mix of contributing factors identified, in particular, the lack of
6 inpatient beds for people who require hospital admission.^[3, 16]
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12 In an attempt to address this burden, health decision-makers both internationally and
13 in Australia, have sought to understand the way in which the public access ED and under
14 what circumstances. Alternative models of care have been recommended as part of global
15 efforts to deflect demand on EDs, reduce wait times and drive innovation.^[19] Despite
16 recognition of the need to consider contextual issues,^[20] there has been limited research on
17 how different presenting problems and contexts may be associated with different patterns of
18 preferences or access to care. Indeed, the public's preferences for emergency care
19 alternatives remain largely unknown.^[21] The results of a recent Hong Kong study suggest
20 that how patients perceive their presentation is key to their care choices.^[11] There are also
21 indications that members of the public understand health emergencies differently to that
22 espoused in clinical guidelines.^[22] This suggests that understanding how patient perceptions
23 influence care choices in different scenarios may provide important insights to drive demand
24 management solutions. However, investigations regarding how different presenting contexts
25 impact preferences for emergency care are limited.^[11]
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45 Researchers have begun responding to calls for knowledge about public preferences
46 for emergency care ^[23-25] and the impact of different care alternatives on ED presentations.^{[11,}
47 ^{26]} However, no previous study has to date explored the impact of different presentations on
48 preferences for the characteristics of care and service uptake decisions. Thus, the current
49 study compared preference patterns of the general public for the delivery of emergency care
50 in the context of different hypothetical scenarios.
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METHODS

A Discrete Choice Experiment (DCE) was developed to elicit the preferences of a representative Australian population sample about the characteristics of an emergency care service and the use of ED in different circumstances. A DCE involves presenting a series of hypothetical scenarios to participants who are asked to indicate their preferred option from a set of mutually exclusive alternatives.^[27] The value of DCE methods in eliciting preferences for emergency care^[11, 21, 23-25] and primary health care or alternative settings^[25, 28-31] has previously been established.

To explore the impact of the presenting context, respondents were asked to make their choices in the context of one of four presenting scenarios. The scenarios reflected a mix of potentially life-threatening and less-urgent presentations (i.e. within the range of emergency care alternatives for which different models of care might potentially exist), and were developed in consultation with health service partners. The primary scenario was designed to represent a typical ED presentation involving injuries from an accident or fall. The alternative scenarios were designed to represent potential ‘GP type presentations’, varying both the type of concern and person presenting. For example, in Scenario 1 (S1) respondents were told to imagine; *“you have fallen from the top of a ladder and landed heavily. Although you may not have lost consciousness, you hit your head hard and are feeling dazed and nauseous. You are also experiencing pain in your right arm and shoulder and have some cuts and abrasions”*. In Scenario 2 (S2), respondents were told *“you have been diagnosed with asthma. Over the last couple of days you have developed a heavy cough. After showering this morning you noticed you are developing a rash on your upper body which has made you worry about what is going on?”* Scenario 3 (S3) involved the same presentation as Scenario 2 but respondents were asked to imagine the symptoms concerned their 12 year old

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3 daughter. In the fourth scenario (S4), respondents were asked to imagine being “*in distress*
4 *because your heart won't stop racing. After trying to calm yourself you are still feeling*
5 *extremely anxious and decide to seek help having previously been diagnosed and treated for*
6 *anxiety*”.

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13 A DCE was developed for each scenario in accordance with best practice
14 guidelines.^[27, 32, 33] The DCE presented a series of hypothetical choices between two service
15 models defined by different levels of five key attributes. Attributes of ED care were initially
16 identified through focus group discussions as by described by Scuffham *et al.*^[21] Relevant
17 literature was used to refine attribute descriptions and derive attribute-levels.^{[e.g. 24, 25, 28, 29, 31,}
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^{34]} Five attributes comprising key features of ED service models were included in the choice
scenarios; namely, treating healthcare professional, treatment location, waiting time, out of
pocket cost and service quality.

Levels for treating professional included being treated by an ED physician, general
practitioner (GP) or an emergency care professional other than a doctor, whilst levels for
treatment location were at home, in a local clinic or at hospital. Currently the vast majority of
Australians choose to access an ED at a public hospital with no ‘out-of-pocket’ expenses as
opposed to paying for treatment privately.^[16] Cost levels therefore varied from no cost up to
a maximum of \$200 based on the range of out-of-pocket expenses that may be incurred if
emergency care were accessed privately. Cost levels of \$50 and \$100 constituted the mid
ranges. National and international benchmarks designed to reduce overcrowding and
excessive wait times were used to set waiting times of half an hour, 1 hour, 2 hours and
maximum of 4 hours.^[5, 19] Levels for service quality were based on a combination of
attribute-levels used in related studies,^[24, 28, 29] and ranged from comprehensive care to basic

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3 treatment from a clinician who was not easy to understand with some interruptions. The
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5 attributes and levels are summarised in Table 1.
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8 *Table 1 goes here*
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11 To select pairs of service profiles to be presented to respondents, a fractional factorial
12 main effects D_p -efficient design was generated using *NGENE software (Version 1.1.1, 2012)*.
13 The combination of attribute levels whereby an emergency care physician treats people in
14 their own homes was considered to be implausible, and was therefore prohibited in the
15 design.^[27] The resulting design generated 24 choice of sets, each consisting of a choice
16 between two alternative services (A and B). A blocked design was used to divide the 24
17 choice sets into a manageable number of 12 choice sets per participant,^[35] with participants
18 randomly allocated to each block. An *opt out* option was included for each choice set,
19 whereby respondents could choose to delay accessing care for 24 hours to see if their
20 condition improved. This question increased the realism of the scenarios, as it is known that a
21 percentage of the public choose not to wait to be seen in ED or choose not to seek ED
22 treatment in the first instance.^[6, 36] For each block, one choice set was repeated as a
23 consistency check, to provide an indication of data quality; individual responses to the repeat
24 choice set were excluded from the preference models.^[37] A sample choice profile is presented
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46 Following ethical approval^[21] the DCE was pilot tested on a convenience sample of
47 21 adults. The pilot results were used to make minor changes such as re-wording of some
48 attribute-levels, and the coefficients generated from the analysis of the pilot data were used as
49 prior parameters to improve the efficiency of the experimental design. The survey was then
50 administered via the internet to a sample of adults (n = 1838) residing in two states in
51 Australia (Queensland and South Australia). Participants were recruited from a survey panel
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3 by a third party provider (PureProfile) between September and December 2012. Quotas were
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5 set to ensure the sample reflected the age and gender distribution of the corresponding state
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7 populations. All participants were provided with an information sheet to explain the study
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9 and informed consent was assumed upon completion and submission of the survey responses.
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12 The survey was administered online and consisted of three main components; the
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14 DCE choice sets , socio-demographic characteristics and attitudinal measures of
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16 responsibilities for one's own health. Members of the general public (n= 909); 453
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18 participants from Queensland (QLD) and 456 from South Australia (SA) were randomly
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20 assigned to complete the main survey version involving a possible concussion or one of three
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22 additional versions which varied the presenting context. Smaller samples of respondents from
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24 Queensland were assigned to consider the alternative scenarios (rash/asthma – self; n=311,
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26 rash/asthma – child; n=309, and the anxiety related issue; n=309). After being introduced to
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28 their respective scenarios, respondents were asked to rate the urgency of the situation based
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30 on a brief description of triage categories. This rating provided an indicator of their perceived
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32 urgency of the situation prior to the consideration of choice sets.
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38 Preferences for emergency care were analysed in *NLOGIT (Version 5)* ^[38] using
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40 mixed logit (MXL) models. MXL models were generated using 1000 Halton draws, an
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42 intelligent simulation method that requires a tenth of the number of draws used with other
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44 random approaches.^[27] All parameters were specified as random for analysis purposes,
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46 assuming a normal distribution. Treating health professional, location and service quality
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48 were specified using effects coding and cost and waiting time were coded continuously after
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50 confirming their level effects were linear in preliminary analyses. While coefficients cannot
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52 be directly compared across models, the resulting patterns of preferences can be descriptively
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54 compared to identify any variations in intentions to access healthcare or the public's
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56 preferences for how this care is delivered and marginal rates of substitution (MRS) used to
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3 identify trade-offs between preferred alternatives.^[27] In recognition of current public
4 reactions to the proposed introduction of co-payments in Australia, willingness to wait was
5 identified as the preferred metric to quantify trade-offs and used to compare the public's
6 preferences for service delivery across different scenarios.^[e.g. 39] Marginal willingness to wait
7 represents the additional time an individual would be willing to wait in order gain an
8 improvement in a characteristic of service delivery, and is estimated as the ratio between the
9 relevant attribute coefficients in the model.^[39, 40]

19 RESULTS

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21 From the 4,354 members of the general public who accepted the survey invitation, a
22 total of 2045 people (46.97%) met screening criteria and commenced the survey. Of these,
23 89.88% (n=1838) completed the survey to achieve the required sample quotas. The average
24 completion time was 14.37 minutes, with 99.4% of respondents taking five seconds or longer
25 to choose their preferred option. Consistent patterns were observed across all scenarios with a
26 total of 1672 respondents (90.96%) passing the consistency check. In recognition of some
27 concerns about excluding those who fail consistency checks, for example evidence of
28 lexicographic healthcare preferences, all responses were analysed as a kind of sensitivity
29 analysis employed by Richardson *et al.*^[37]

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31 Although the stratified sample was selected according to quotas to ensure
32 demographic representativeness, comparisons were made with population norms including
33 socioeconomic and health status measures. Table 2 summarises the characteristics of the
34 sample on a range of socio-demographic, health status and health service usage indicators.
35 Overall the sample appeared to represent the respective state and national population
36 distributions. Notable exceptions included comparatively higher morbidity levels (e.g.
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3 asthma rates and poorer quality of life) and less cultural diversity in the study sample
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5 compared to the general population.
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14 15 16 17 ***Perceived urgency of presenting problem***

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19 Table 3 presents the triage ratings assigned by respondents for each of the
20 presenting scenarios based on a brief description on the categories used in the Australasian
21 Triage Scale where higher scores represent lower levels of urgency. In relation to the
22 possible concussion (S1), relatively equal numbers of participants rated this scenario as a
23 Triage Category 1, 2 or 3. The median score was 2, with an interquartile range (IQR) of 1 to
24 3, and a mode of 3. For the rash/asthma- related presentation (S2), the median was 3, IQR 2
25 to 4, and mode 4. When the scenario involved the respondents' daughter (S3), the median and
26 mode were 3 with the same IQR, providing some indication that more respondents considered
27 this a more urgent presentation compared to Scenario 2. Notably, the highest level of urgency
28 was assigned to the anxiety-related presentation (S4) with a median score of 2, IQR 1 to 3.5,
29 and a mode of 1.
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49 50 ***Does presenting context influence uptake of ED services?***

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52 In accordance with respondents' differing levels of perceived urgency across the four
53 scenarios, the "opt out" data (i.e., the decision to delay care and monitor the situation)
54 suggested that the degree to which people would take up any service also differed depending
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3 on the presenting problem. As indicated in Table 4, respondents most often elected to access
4 services when considering the rash/asthma-related presentation involving their child (S3) and
5 least frequently for the rash/asthma-related problem involving themselves (S2). Interestingly,
6 the pattern of responses for S3 was similar to S1 (a possible concussion). Kruskal-Wallis
7 results indicated significant differences between presenting contexts ($H_{(3)} = 83.65$,
8 $p < 0.001$). Using Mann-Whitney tests (with Bonferroni corrections where $p = 0.008$),
9 significant differences were found between all scenarios except for S1 and S3 ($z = -1.39$,
10 $p = 0.164$) and S2 and S4, ($z = -1.92$, $p = 0.054$).
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23 *Table 4 goes here*
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26 27 ***Preferences for emergency care: Results of Mixed Logit (MXL) analyses*** 28

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30 MXL models for all four scenarios revealed a good model fit for a choice model with
31 all resulting in a McFadden Pseudo R^2 of greater than 0.3.^[27] (S1: McFadden Pseudo R^2
32 = 0.371, AIC/N = 1.386; S2: Pseudo $R^2 = 0.367$, AIC/N = 1.401; S3: Pseudo $R^2 = 0.395$,
33 AIC/N = 1.338; S4: Pseudo $R^2 = 0.367$, AIC/N = 1.400). The results are presented for each
34 scenario in Table 5. As indicated in Table 5, the constants in each of the models were large,
35 negative and significant suggesting a strong propensity to access any type of emergency care
36 rather than delay care in all scenarios. However, there was marked heterogeneity indicated
37 by the significance of standard deviations, and the size and statistical significance of the
38 constant terms suggests the impact of factors beyond the service attributes on healthcare
39 choices.
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3 For S1, the results indicate an overall preference to be treated by an ED physician ($\beta =$
4 0.261) compared to a GP ($\beta = -0.073$, $p = < 0.001$) or any emergency health professional
5 other than a doctor ($\beta = -0.188$, $p = < 0.001$). Respondents also preferred treatment at hospital
6 ($\beta = 0.119$, $p = < 0.001$) over treatment at a local clinic ($\beta = -0.091$, $p = 0.002$) or treatment at
7 home ($\beta = -0.028$). As expected, lower personal costs ($\beta = -0.019$, $p < 0.001$) and shorter wait
8 times were clearly valued ($\beta = -0.012$, $p < 0.001$), as was comprehensive treatment ($\beta =$
9 0.557) compared to basic treatment for a clinician who was easy to understand ($\beta = 0.156$, p
10 < 0.001) and not easy to understand ($\beta = -0.713$, $p < 0.001$). Indeed, the preference weights
11 for service quality suggest that an improvement in this service characteristic was relatively
12 more important when compared to marginal improvements in the other attributes in the DCE.
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26 Although treatment by an emergency health professional other than a doctor was the
27 least preferred in all contexts, a different pattern of preferences were observed for S1
28 compared to the other scenarios. Whereas treatment at hospital was clearly preferred in S1,
29 for each of the remaining scenarios, preferences were strongest for treatment in ambulatory
30 settings such as a local clinic (S3 and S4) or at home (S2), as depicted in Figure 1. In all four
31 scenarios, there were clear preferences for lower costs (for every dollar of out-of-pocket
32 expense), shorter wait times (for every minute waited) and higher levels of service quality.
33 However, in S4 there was no significant difference between preferences for comprehensive
34 treatment and basic treatment if the clinician was able to be understood ($\beta = 0.005$, $p =$
35 0.977). Although there was marked heterogeneity across all contexts, the variations observed
36 in both patterns of service uptake and preferences for the different characteristics of care
37 suggest different presenting problems are associated with differences in healthcare choices.
38 Choices differed even when the same problem affected different people (e.g. S2 and S3).
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55 *Figure 1 goes here*

Willingness to wait

In order to directly compare between models, MRS were estimated to analyse the public's willingness to wait for their preferred alternative in each scenario. As indicated in Table 6, the public's clear preference was to be treated by an ED clinician rather than an emergency health care professional in all contexts. The public were willing to wait between an additional 22.556 minutes in S2 (rash/asthma scenario) and 57.727 minutes in S3 (rash/asthma in participant's child) in order to be treated by an ED clinician rather than another emergency health care professional. Indeed, people were willing to wait twice as long for every one dollar saved in out-of-pocket expenses for their preferred option when the presenting problems concerned themselves as opposed to their child. On average, participants were willing to wait an additional 30.333 minutes to be treated at home rather than in hospital in the context of S2 (rash/asthma), but the opposite effect was observed in relation to willingness to wait estimates for S1, confirming a complex interaction between willingness to wait, preferences for treatment location and the presenting problem.

Table 6 goes here

The marginal willingness to wait estimates for trade-offs in service quality ranged from a minimum of an additional 105.833 minutes in S1, to a maximum of 164.727 minutes (in the context of S3). Specifically, participants were willing to wait longer to receive comprehensive care, even in circumstances where one would expect to see a desire for more immediate care. Of note, however, this effect was not as evident in the context of the anxiety scenario (S4) for which there was no significant difference between preferences for comprehensive and basic treatment, providing there were minimal interruptions and the

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3 clinician could be understood. Overall, however, these results suggest that the public clearly
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5 place significant value on high quality care.
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8 **DISCUSSION**

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10 The preferences for emergency care elicited in this study suggest that regardless of
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12 cost and waiting time, the Australian public have a clear preference for treatment by a doctor
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14 across all presenting contexts. Although researchers and policy makers have identified a role
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16 for models led by nurses and ambulance officers to reduce ED workloads,^[41] the results
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18 suggest there is currently little public support for such innovations in Australia when this is
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20 described as care led by ‘emergency care practitioners (other than a doctor)’. Consistent with
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22 previous results from other countries^[11,24] there were clear preferences for shorter wait
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24 times, higher service quality and support for treatment in proximal service locations including
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26 a local GP clinic for “GP type” presentations. Indeed, the extraordinary amount of time
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28 people were prepared to wait before trading for lower levels of service quality provide further
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30 support that this is a primary determinant of health care choices. [e.g. ^{34]} However, it was
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32 also noted that this effect was less apparent in the circumstances involving the anxiety
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34 scenario. The findings suggest that the public are clearly adverse to contributing out-of-
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36 pocket expenses or receiving treatment from health professionals other than a doctor,
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38 suggesting they may be unwilling to support such changes should they be introduced in the
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40 future.^[15,42] Nonetheless, these findings provide guidance about how to improve current
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42 efforts aimed at reducing wait times and support further investments in ambulatory care
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44 alternatives, in particular, for problems involving chronic issues.
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51 Specifically, our analyses have suggested that the presenting context influences
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53 preferences for emergency care, both in terms of propensity to access emergency care and
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55 preferences for the different characteristics of service options. Differences were observed not
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3 only for different conditions, but also according to who was being treated (i.e. when the
4 problem affected their daughter rather than themselves). These findings are to be expected
5 given the literature on social constructions of childhood and heightened notions of
6 vulnerability,^[43, 44] which in part have led to the establishment of dedicated paediatric ED
7 and/or treatment areas within ED.^[e.g. 6, 7] Indeed, triage categories reflect an urgency rather
8 than a complexity scale and clinicians may also assign different urgency ratings to similar
9 presenting problems in different patients.^[12] Further, presentations involving skin rashes are
10 also recognised as being particularly challenging to assess.^[45] However, the urgency ratings
11 assigned by respondents, including for the anxiety-related scenario, also support the assertion
12 that the public understand health emergencies differently to that outlined in triage guidelines,
13 ^[e.g. 4] and may give more weight to psychosocial considerations rather than just physiological
14 metrics or threats to life.^[22] The implication of these findings for health policy and decision-
15 makers is that although the public may have differing views about how quickly non-life
16 threatening problems need to be treated, they also recognise that different problems may be
17 treated in different settings; even if they still want to be treated urgently, as evidenced in the
18 anxiety-related scenario.

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40 Our results are similar to findings from a recent Hong Kong study^[11], demonstrating
41 the need to further examine how patient perceptions of presenting problems drive healthcare
42 decision-making. Although recent international studies have suggested that more than half of
43 all visits to ED are classified as non-emergencies, the availability of alternative ambulatory
44 care services has done little to reduce demand.^[26, 46] Our study sheds light on this persistent
45 problem, demonstrating clear preferences for higher levels of service quality delivered by
46 doctors (and emergency specialists in the case of suspected concussion). The preferences
47 elicited for the 'GP type scenarios' suggest the Australian public generally prefer to be
48 treated at their local GP clinic in these circumstances. However, other doctor-led models that
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3 may reduce ED workload, including integration of GP clinics within ED, extended hours GP
4 co-operatives and in-home care [e.g. 11, 41] and re-designing patient flow processes (e.g. fast-
5 track streams for chronic-disease related issues)^[3, 5, 6, 12, 13, 47] could gain public acceptance in
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10 future.

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13 The levels of preference heterogeneity observed across all DCE scenarios raises the
14 need for further analyses and exploration of the public's preferences. Although there was a
15 different pattern of preferences evident for accessing care when presentations involved new
16 concerns and chronic problems compared to an acute injury, the heterogeneity observed may
17 also help explain why a substantial proportion of ED presentations continue to be considered
18 'inappropriate' [11, 22, 46, 48] even when ambulatory alternatives are available.^[26] It is likely that
19 a range of situational or socio-demographic factors may impact preferences,^[e.g. 1] and will be
20 explored in future analyses.
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32 The moderate response rate, although comparable to other internet and paper based
33 choice studies,^[e.g. 30, 49, 50] and the under-representation of culturally diverse participants in
34 our sample is noteworthy. Sample bias may have originated from the use of a panel
35 recruitment company and internet-administered surveys.^[e.g. 51] Another limitation of our
36 study was that the description of each of the hypothetical scenarios was brief, using simple
37 everyday language which may have left too much opportunity for participants to infer
38 missing information. Although this was a deliberate strategy, it is acknowledged that our
39 brief description of presenting context may not have been as useful as anticipated.
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49 Nevertheless, the research was exploratory and many of the challenges are overshadowed by
50 our large relatively representative sample and the use of multiple scenarios and systematic
51 comparison of different attributes. Although caution should be applied in generalising the
52 results of this study, findings suggest future research should examine other variations of the
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3 patient, nature and time of presenting problems as well as models of care led by other health
4 professionals. The public's apparent aversion to non-doctor led care may have been
5 influenced by our framing of this choice as 'other than a doctor'. This change was made to
6 improve clarity in response to feedback from the pilot study, however, may have resulted in
7 this being perceived as a loss or 'substandard' choice^[e.g. 52] The findings also suggest the
8 need to investigate the influence of other individual factors on healthcare decision-making.
9 Researchers and decision-makers may then be able to isolate the preferences of specific
10 groups, such as high services users or people found to be less likely to delay care to inform
11 demand management strategies.
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24 CONCLUSION

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27 Overall, the findings from this study suggest that the Australian public do not support
28 being treated by an emergency health practitioner other than a doctor, irrespective of the
29 presenting problem, or reductions in cost or wait times. This conclusion appears to be
30 supported by the high value the public have placed on service quality. Results do, however,
31 provide support for reforms focussing on providing greater access to GP-based ambulatory
32 care in cases involving chronic conditions as well as efforts to reduce wait times without
33 increasing cost. Although the literature is mixed about the degree to which ambulatory care
34 alternatives reduce pressures on ED, our findings provide evidence that citizens do make
35 different decisions about when to access emergency care according to their presenting
36 situation, as reflected in the different pattern of choices evident. They also suggest different
37 presenting contexts including when the same problem affects different people influence these
38 choices. However, future investigations are needed to clarify how these contextual issues and
39 other differentiating factors influence these decision-making processes. This type of
40 knowledge will assist us to not only better understand the public's preferences for accessing
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3 services but, more broadly, develop and target specific demand management strategies for
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5 emergency care services and related primary health care initiatives
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8 **FOOTNOTES**

9 *Authors' Contributions*

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12 All authors contributed to the research design. The DCE was developed by JW, PH, JR, EK
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14 and PS. PH and JW led data analysis. All authors contributed to, reviewed and approved the
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16 final manuscript led by PH.
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37 *Competing Interests*

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39 All authors declare they have no competing interests.
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43 *Ethics Approval*

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47 Ethics approval was obtained from the Griffith University Human Research Ethics
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49 Committee (Reference Number: MED/10/12/HREC).
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52 *Data Sharing Statement*

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55 Requests for results of preliminary analyses, coding and other information can be directed to
56
57 the corresponding author.
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Table 1. Sample profile based on DCE design

<i>Imagine you have been diagnosed with asthma. Over the last couple of days you have developed a heavy cough. After showering this morning you noticed you are developing a rash on your upper body which has made you worry about what is going on?</i>		
	Option A	Option B
Treating healthcare professional	General Practitioner (may not be your usual GP)	Emergency healthcare professional (other than a doctor)
Location	Local clinic	Home
Potential cost to you	\$0	\$200
Maximum waiting time	4 hours	30 mins
Quality of service	Healthcare professional is <u>easy</u> to understand, <u>comprehensive</u> treatment provided with <u>no</u> interruptions	Healthcare professional is <u>not easy</u> to understand, <u>basic</u> treatment provided with <u>some</u> interruptions
Which would you prefer?	Option A <input type="checkbox"/>	Option B <input type="checkbox"/>
If this option was available, would you take it, or would you delay for 24 hours to see if your condition improves before accessing care?	I would take my preferred option..... <input type="checkbox"/>	I would delay for 24 hours to see if my condition improves before accessing care <input type="checkbox"/>
<i>Note:</i>		
<ul style="list-style-type: none"> • Health professionals options; were ED clinician; GP (may not be your usual GP) or an Emergency health professional (other than a doctor) • Treatment locations were; home, local clinical, or hospital, • Potential out of pocket expenses were; \$0, \$50, \$100 or \$200 • Maximum wait times were; 30 mins, 1 hour, 2 hours or up to 4 hours • Levels of service quality were; healthcare professional is easy to understand, comprehensive treatment provided with no interruptions; healthcare professional is easy to understand, basic treatment provided with some interruptions, or healthcare professional is not easy to understand, basic treatment provided with some interruptions 		

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Table 2. Breakdown of sample by selected individual characteristics and available norms

Individual characteristics	Categories	Scenario 1 (n= 909)	Scenario 2 (n=311)	Scenario 3 (n=309)	Scenario 4 (n=309)	Population norms ^[53]	
Demographics:	Gender	<i>Male</i>	439 (48.3%)	150 (48.2%)	150 (48.5%)	148 (47.9%)	49.4%
		<i>Female</i>	470 (51.7%)	161 (51.8%)	159 (51.5%)	161 (52.1%)	50.6%
	Age cohorts	<i>18- 24 years</i>	109 (12.0%)	36 (11.6%)	36 (11.7%)	38 (12.3%)	13.3%*
		<i>25-34 years</i>	157 (17.3%)	58 (18.6%)	57 (18.4%)	56 (18.1%)	13.8%
		<i>35-44 years</i>	165 (18.2%)	58 (18.6%)	57 (18.4%)	59 (19.1%)	14.3%
		<i>45-54 years</i>	165 (18.2%)	55 (17.7%)	55 (17.8%)	55 (17.8%)	13.7%
		<i>55-64 years</i>	141 (15.5%)	51 (16.4%)	49 (15.9%)	49 (15.9%)	11.6%
		<i>65 years and over</i>	172 (18.9%)	53 (17.0%)	55 (17.8%)	52 (16.8%)	14.0%
	Relationship status	<i>Married/partner</i>	572 (62.9%)	214 (68.8%)	209 (67.6%)	212 (68.6%)	58.7%
		<i>Separated/divorced</i>	86 (9.5%)	32 (10.3%)	36 (11.7%)	25 (8.1%)	11.4%
		<i>Widowed</i>	26 (2.9%)	7 (2.3%)	4 (1.3%)	12 (3.9%)	5.5 %
		<i>Single</i>	220 (24.2%)	55 (17.7%)	57(18.4%)	58 (18.8%)	34.3% ^
	English as main spoken language	<i>Yes</i>	848 (93.3%)	293 (94.2%)	287 (92.9%)	288 (93.2%)	70.6% +
<i>No</i>		48 (5.4%)	11 (3.6%)	12 (3.9%)	15 (5.2%)	-	
Aboriginal and/or Torres Strait Islander	<i>Yes</i>	13 (1.4%)	5 (1.6%)	1 (0.3%)	5 (1.6%)	2.5%	
	<i>No</i>	887 (98.6%)	301 (96.8%)	299 (96.8%)	300 (97.1%)	-	

Individual characteristics		Categories	Scenario 1 (n= 909)	Scenario 2 (n=311)	Scenario 3 (n=309)	Scenario 4 (n=309)	Population norms
Socioeconomic factors:	Have a professional qualification/degree	<i>Yes</i>	369 (40.6%)	131 (42.1%)	146 (47.2%)	142 (46.0%)	32.4%
		<i>No</i>	526 (57.9%)	175 (56.3%)	158 (51.1%)	164 (53.1%)	
	Main activity (employment)	<i>Employed/self-employed</i>	452 (49.7%)	170 (54.7%)	163 (52.8%)	181 (58.6%)	59.7% [#]
		<i>Retired</i>	212 (23.3%)	67 (21.5%)	69 (22.3%)	60 (19.4%)	-
		<i>Homemaker</i>	100 (11.0%)	28 (9.0%)	36 (11.7%)	26 (8.4%)	-
		<i>Student</i>	63 (6.9%)	19 (6.1%)	22 (7.1%)	24 (7.8%)	-
		<i>Seeking work</i>	48 (5.3%)	17 (5.5%)	13 (4.2%)	14 (4.5%)	5.6%
		<i>Other</i>	28 (2.9%)	6 (1.9%)	3 (0.9%)	3 (1.0%)	-
	Annual household income	<i>Up to \$40,000</i>	265 (29.2%)	84 (27.0%)	75 (24.3%)	69 (22.3%)	<i>Md = \$68,800</i>
		<i>\$40,001 - \$70,000</i>	203 (22.3%)	73 (23.5%)	57 (18.4%)	71 (23.0%)	
		<i>\$70,001- \$100,000</i>	159 (17.5%)	48 (15.4%)	50 (16.2%)	53 (17.2%)	
		<i>\$100,001 - \$130,000</i>	92 (10.1%)	27 (8.7%)	35 (11.3%)	34 (11.0%)	
<i>Over \$130,000</i>		67 (7.4%)	30 (9.6%)	35 (11.3%)	28 (12.3%)		

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Individual characteristics		Categories	Scenario 1 (n= 909)	Scenario 2 (n=311)	Scenario 3 (n=309)	Scenario 4 (n=309)	Population norms
Health status and experiences:	Quality of life	(AQoL4D)	$\chi = 0.67$ (± 0.26)	$\chi = 0.68$ (± 0.26)	$\chi = 0.70$ (± 0.24)	$\chi = 0.72$ (± 0.23)	$\mu = 0.81$ (± 0.22) ^[54]
	Asthma	(self)	175 (19.3%)	65 (20.9%)	64 (20.7%)	52 (16.8%)	11.8% ^[55]
		(close family)	239 (26.3%)	93 (29.9%)	80 (26.1%)	90 (29.1%)	-
	Use of ED in past 12 months	None	671 (73.8%)	241 (77.5%)	225 (72.8%)	236 (76.4%)	13% at least once ^[56]
		1-3 times	210 (23.1%)	61 (19.6%)	72 (23.3%)	65 (21.0%)	
		4 or more	20 (2.2%)	5 (1.6%)	4 (1.3%)	5 (1.6%)	
	Use of GP services in past 12 months	None	114 (12.5%)	40 (12.9%)	33 (10.7%)	35 (11.3%)	81% at least once ^[56]
		1-3 times	467 (51.4%)	144 (46.3%)	162 (52.4%)	151 (48.9%)	
		4 or more	321 (35.3%)	124 (39.9%)	11 (35.9%)	120 (38.8%)	
	Previously employed in health industry	Yes	75 (8.3%)	15 (4.8%)	34 (11.0%)	31 (10.0%)	6% ^[57]
No		827 (91.0%)	292 (93.9%)	272 (88.0%)	277 (89.6%)	-	

*Note young people defined as 15-24 and Australian Census data includes children and young people aged 0-15 collectively comprising 19.3% of the population as

^ Defined as never married in 2011 Australian Census data

+ Defined as English only spoken at home in 2011 Australian Census data

Defined as worked full-time in 2011 Australian Census data

Residual percentages represent the small number of missing values observed

Only

Table 3. Frequency of triage ratings assigned for presenting scenarios

Scenario	Sample	Australasian Triage Scale ^[4]	Frequency
(S1) Presentation involving possible concussion (self)	(n=909) (n= 453 QLD) (n= 456 SA)	1 (immediately life-threatening)	233 (25.6%)
		2 (imminently life-threatening)	230 (25.3%)
		3 (potentially life-threatening)	255 (28.1%)
		4 (potentially serious)	153 (16.8%)
		5 (less urgent)	38 (4.2%)
(S2) Rash/asthma-related presentation (self)	(n=311) (QLD)	1 (immediately life-threatening)	51 (16.4%)
		2 (imminently life-threatening)	46 (14.8%)
		3 (potentially life-threatening)	61 (19.6%)
		4 (potentially serious)	80 (25.7%)
		5 (less urgent)	73 (23.5%)
(S3) Rash/asthma-related presentation (daughter)	(n=309) (QLD)	1 (immediately life-threatening)	55 (17.8%)
		2 (imminently life-threatening)	52 (16.8%)
		3 (potentially life-threatening)	85 (27.5%)
		4 (potentially serious)	82 (26.5%)
		5 (less urgent)	35 (11.4%)
(S4) Anxiety related presentation (self)	(n=309) (QLD)	1 (immediately life-threatening)	81 (26.2%)
		2 (imminently life-threatening)	76 (24.6%)
		3 (potentially life-threatening)	75 (24.3%)
		4 (potentially serious)	51 (16.5%)
		5 (less urgent)	26 (8.4%)

Table 4. Service uptake by presenting context

Scenario	n =	Minimum (frequency)	Maximum (frequency)	Median	Inter-quartiles		Mean (\pm s.d.)
					25%	75%	
(S1) Possible concussion (self)	909	0 (28, 3.1%)	12 (600, 66.0%)	12	10	12	10.46 \pm 2.98
(S2) Rash/asthma-related presentation (self)	311	0 (24, 7.7%)	12 (139, 44.7%)	11	6	12	8.78 \pm 3.98
(S3) Rash/asthma-related presentation (daughter)	309	0 (10, 3.2%)	12 (215, 69.6%)	12	11	12	10.73 \pm 2.77
(S4) Anxiety related presentation (self)	309	0 (16, 5.2%)	12 (161, 52.1%)	12	7	12	9.28 \pm 3.92

Table 5. Results of MXL analyses on opt out data by presenting scenario

		Part-worth utilities											
		S1 (possible concussion - self)				S2 (rash/asthma related - self)				S3 (rash/asthma related - daughter)			
Attribute	Levels	Mean parameter	P	Standard deviation	P	Mean parameter	P	Standard deviation	P	mean parameter	P	Standard deviation	P
Principal healthcare professional	• ED clinician	<i>0.261</i>		<i>-0.527</i>		<i>0.054</i>		<i>-0.454</i>		<i>0.293</i>		<i>-0.031</i>	
	• GP (may not be your usual GP)	** <i>-0.073</i>	.001	0.161	.233	0.095	.062	** <i>0.302</i>	.001	0.049	.239	0.004	.974
	• Emergency health professional (other than a doctor)	** <i>-0.188</i>	<.001	** <i>0.366</i>	<.001	** <i>-0.149</i>	.003	0.152	.196	** <i>-0.342</i>	<.001	0.027	.772
Location	• Home	<i>-0.028</i>		<i>-0.934</i>		<i>0.100</i>		<i>-0.600</i>		<i>-0.027</i>		<i>-0.785</i>	
	• local clinic	** <i>-0.091</i>	.002	** <i>0.357</i>	<.001	0.073	.200	** <i>0.369</i>	<.001	0.063	.206	** <i>0.358</i>	<.001
	• hospital	** <i>0.119</i>	<.001	** <i>0.577</i>	<.001	** <i>-0.173</i>	.004	** <i>0.594</i>	<.001	-0.036	.451	** <i>0.427</i>	<.001
Potential cost to you	Per \$1 of out of pocket expense (continuously coded based on levels of \$0, \$50, \$100, \$200)	** <i>-0.019</i>	<.001	** <i>0.019</i>	<.001	** <i>-0.027</i>	<.001	** <i>0.023</i>	<.001	** <i>-0.016</i>	<.001	** <i>0.018</i>	<.001
Maximum waiting time	Per 1 minute of waiting time (based on attribute-levels of 30mins, 1 hour, 2 hours and 4 hours)	** <i>-0.012</i>	<.001	** <i>0.008</i>	<.001	** <i>-0.009</i>	<.001	** <i>0.007</i>	<.001	** <i>-0.011</i>	<.001	** <i>0.005</i>	<.001
Quality	• Healthcare professional is <i>easy to understand, comprehensive treatment; no interruptions</i>	<i>0.557</i>		<i>-0.918</i>		<i>0.552</i>		<i>-0.981</i>		<i>0.806</i>		<i>-1.017</i>	
	• Healthcare professional is <i>easy to understand, basic treatment; some interruptions</i>	** <i>0.156</i>	<.001	0.092	.149	** <i>0.279</i>	<.001	* <i>0.227</i>	.042	** <i>0.200</i>	<.001	0.161	.143
	• Healthcare professional is <i>not easy to understand, basic treatment; some interruptions</i>	** <i>-0.713</i>	<.001	** <i>0.826</i>	<.001	** <i>-0.831</i>	<.001	** <i>0.754</i>	<.001	** <i>-1.006</i>	<.001	** <i>0.856</i>	<.001
Constant	(associated with delaying care)	** <i>-6.502</i>	<.001	** <i>3.722</i>	<.001	** <i>-4.736</i>	<.001	** <i>3.474</i>	<.001	** <i>-6.715</i>	<.001	** <i>3.601</i>	<.001

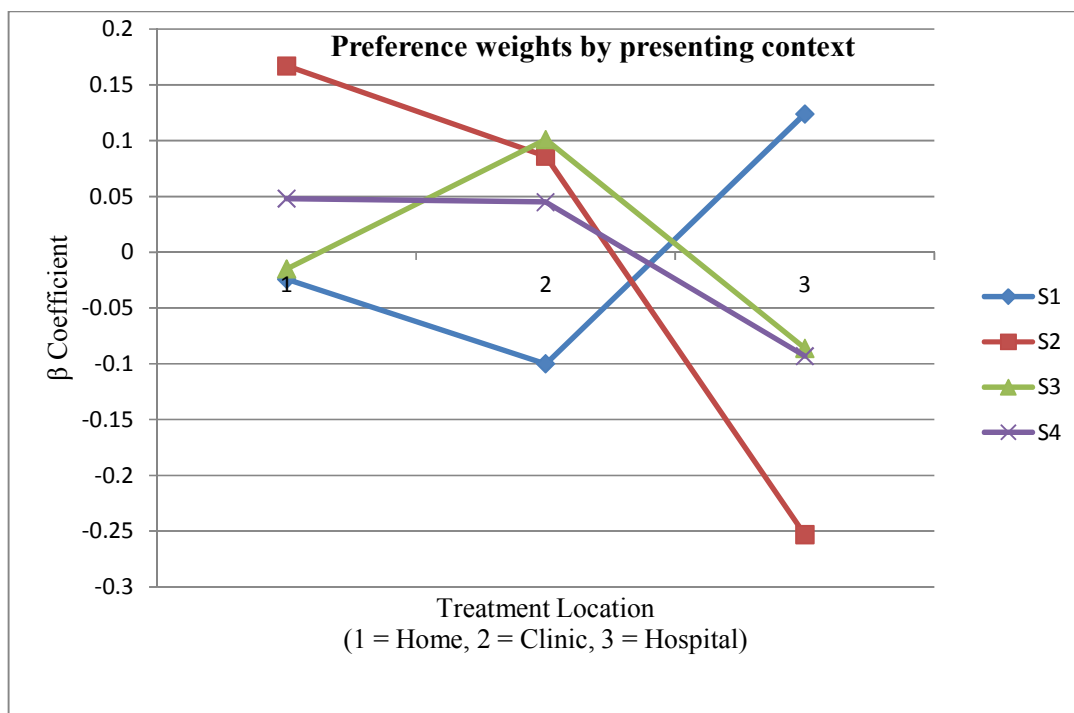
p= probability level where **<.01; *<.05 Note: referent levels in italics

		Part-worth utilities			
		S4 (anxiety related - self)			
Attribute	Levels	Mean parameter	P	Standard deviation	P
Principal healthcare professional	• ED clinician	0.163		-0.720	
	• GP (may not be your usual GP)	0.005	.927	**0.430	<.001
	• Emergency health professional (other than a doctor)	**-.0158	.002	**0.290	.001
Location	• Home	0.038		-1.132	
	• local clinic	0.067	.263	**0.538	<.001
	• hospital	-0.105	.083	**0.594	<.001
Potential cost to you	Per \$1 of out of pocket expense (continuously coded based on levels of \$0, \$50, \$100, \$200)	**-.022	<.001	**0.022	<.001
Maximum waiting time	Per 1 minute of waiting time (based on levels of 30mins, 1 hour, 2 hours and 4 hours)	**-.013	<.001	**0.008	<.001
Quality	• Healthcare professional is easy to understand, comprehensive treatment; no interruptions	0.599		-0.759	
	• Healthcare professional is easy to understand, basic treatment; some interruptions	**0.199	<.001	0.005	.977
	• Healthcare professional is not easy to understand, basic treatment; some interruptions	**-.0.798	<.001	**0.754	<.001
Constant	(associated with delaying care)	**-.5.477	<.001	**3.726	<.001

p = probability level where **<.01, *<.05 Note: referent levels in italics

view only

Figure 1. Pattern of preferences for treatment location by presenting scenario



Note: S1 (possible concussion); S2 (rash/asthma related – self); S3 (rash/asthma related – daughter); S4 (anxiety related presentation)

Table 6 Willingness to wait trade-offs between service characteristics.

Perceived improvement in service characteristics	Marginal willingness to wait (in minutes) to gain improvement			
	S1	S2	S3	S4
ED Clinician instead of an emergency health professional	37.417	22.556	57.727	24.692
GP instead of an emergency health professional	9.583			
Treatment at home instead of hospital	-12.250	30.333		
Treatment at a local clinic instead of hospital	-17.500			
For every AU\$1 reduction in cost	1.583	3.000	1.455	1.692
Comprehensive care compared to basic treatment from a clinician you can understand with no interruptions	105.833	153.667	164.727	
Basic treatment from a clinician you understand compared to basic treatment from a clinician you can't understand and some interruptions	72.417	30.333	109.636	76.692

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The public's preferences for emergency care alternatives and the influence of the presenting context: A Discrete Choice Experiment

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6 **presenting context: A Discrete Choice Experiment**
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ABSTRACT

Objectives: The current study seeks to quantify the Australian public's preferences for emergency care alternatives and determine if preferences differ depending on presenting circumstances.

Setting: Increasing presentations to Emergency Departments have led to overcrowding, long waiting times and suboptimal health system performance. Accordingly, new service models involving the provision of care in alternative settings and delivered by other practitioners continue to be developed.

Participants: A stratified sample of Australian adults (n=1838), 1382 from Queensland and 456 from South Australia, completed the survey. This included 951 females and 887 males from the 2045 people who met screening criteria out of the 4,354 people who accepted the survey invitation.

Interventions: A discrete choice experiment was used to elicit preferences in the context of one of four hypothetical scenarios; a possible concussion, a rash/asthma-related problem involving oneself or one's child and an anxiety-related presentation. Mixed logit regression was used to analyse the dependent variable choice and identify the relative importance of care attributes and the propensity to access care in each context.

Results: Results indicated a preference for treatment by an emergency physician in hospital for possible concussion and treatment by a doctor in ambulatory settings for rash/asthma-related and anxiety-related problems. Participants were consistently willing to wait longer before making trade-offs in the context of the rash/asthma-related scenario compared to when the same problem affected their child. Results suggest a clear preference for lower costs,

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3 shorter wait times and strong emphasis on quality care; however, significant preference
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5 heterogeneity was observed.
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8 **Conclusion:** This study has increased awareness that the public's emergency care choices
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10 will differ depending on the presenting context. It has further demonstrated the importance of
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12 service quality as a determinant of health care choices. The findings have also provided
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14 insights into the Australian public's reactions to emergency care reforms.
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17 18 19 20 **STRENGTHS AND LIMITATIONS OF THIS STUDY**

- 21 • This study represents the first investigation of the Australian public's preferences for
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23 emergency care and, internationally, the first examination of preferences for both the
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25 characteristics of emergency care and service uptake decisions, irrespective of the
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27 care options available.
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- 29 • The demonstration of the importance of contextual factors represents a novel
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31 contribution to the literature.
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- 33 • The results offer some explanations to the apparent inconsistencies in the literature
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35 indicating 'inappropriate' presentations to emergency departments even when there
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37 are ambulatory alternatives available.
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- 39 • Although the sample was stratified by age and sex, participants were less diverse and
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41 reported higher levels of morbidity compared to the general population.
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INTRODUCTION

Emergency Departments (EDs) primarily exist to treat people experiencing medical emergencies, but often provide services to patients with a range of presenting problems of less urgency.^[1-4] Both within Australia and internationally, demand for emergency care has been increasing each year leading to substantial ED pressures.^[2, 3, 5-7] Although the causes of ED overcrowding are complex, socio-demographic changes, including population growth and ageing, and clinical considerations such as increasing co-morbidities are key contributors to excessive demand.^[3] Other contributing factors relate to system issues such as decisions about resourcing and the increasing cost of health care,^[8, 9] the availability and type of bed stock and lack of service alternatives.^[2, 3, 5] An additional factor, however, is the public's understanding of ED and when it should be accessed;^[10] with 'inappropriate' patient attendance considered to adversely impact the performance of ED.^[11] Despite some conjecture in the literature about the degree to which presentations deemed lower acuity, often referred to as 'GP type patients', contribute to overcrowding and the utility of alternative service models^[3, 12, 13], some Australian health authorities have launched social marketing campaigns to redirect the public to alternative care.^[14] Further reforms including the introduction of user co-payments for accessing care have also been proposed.^[e.g. 14, 15]

EDs have been described as being "amongst the biggest 'hotspots' in Australia's healthcare system".^[16, p. 6] Increasing demand has led to considerable pressures on emergency care resources and staff, overcrowding and "access block"; with ambulances having to queue to deliver patients and hospitals having to be bypassed due to excessive waiting times.^[16-18] This situation contributes to sub-optimal management of critically ill patients and inefficiencies in the health system,^[3, 17] and has been identified as the most important barrier to the provision of quality care in ED.^[16] Indeed, estimates of the increased mortality rate

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3 that can be directly associated with access block and overcrowding in ED range between 10%
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5 and 30%, as a results of the mix of contributing factors identified, in particular, the lack of
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7 inpatient beds for people who require hospital admission.^[3, 16]
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11 In an attempt to address this burden, health decision-makers both internationally and
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13 in Australia, have sought to understand the way in which the public access ED and under
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15 what circumstances. Alternative models of care have been recommended as part of global
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17 efforts to manage ED demand, reduce wait times and drive innovation.^[19] Despite
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19 recognition of the need to consider contextual issues,^[20] there has been limited research on
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21 how different presenting problems and contexts may be associated with different patterns of
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23 preferences or access to care. Indeed, the public's preferences for emergency care
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25 alternatives remain largely unknown.^[21] The results of a recent Hong Kong study suggest
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27 that how patients perceive their presentation is key to their care choices.^[11] There are also
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29 indications that members of the public understand health emergencies differently to that
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31 espoused in clinical guidelines.^[22] This suggests that understanding how patient perceptions
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33 influence care choices in different scenarios may provide important insights to drive demand
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35 management solutions. However, investigations regarding how different presenting contexts
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37 impact preferences for emergency care are limited.^[11]
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43 Researchers have begun responding to calls for knowledge about public preferences
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45 for emergency care ^[23-25] and the impact of different care alternatives on ED presentations.^{[11,}
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47 ^{26]} However, no previous study has to date explored the impact of different presentations on
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49 preferences for the characteristics of care and service uptake decisions. Thus, the current
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51 study compared preference patterns of the general public for the delivery of emergency care
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53 in the context of different hypothetical scenarios.
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METHODS

A Discrete Choice Experiment (DCE) was developed to elicit the preferences of a representative Australian population sample about the characteristics of an emergency care service and the use of ED in different circumstances. A DCE involves presenting a series of hypothetical scenarios to participants who are asked to indicate their preferred option from a set of mutually exclusive alternatives.^[27] The value of DCE methods in eliciting preferences for emergency care^[11, 21, 23-25] and primary health care or alternative settings^[25, 28-31] has previously been established.

To explore the impact of the presenting context, participants were asked to make their choices in the context of one of four presenting scenarios. The hypothetical scenarios reflected a mix of potentially life-threatening and less-urgent presentations (i.e. within the range of emergency care alternatives for which different models of care might potentially exist), and were developed in consultation with health service partners. The primary scenario was designed to represent a typical ED presentation involving injuries from an accident or fall - in this case a possible concussion. In Scenario 1 (S1) participants were told to imagine; *“you have fallen from the top of a ladder and landed heavily. Although you may not have lost consciousness, you hit your head hard and are feeling dazed and nauseous. You are also experiencing pain in your right arm and shoulder and have some cuts and abrasions”*. The alternative scenarios were designed to represent potential ‘GP type presentations’, varying both the type of concern and person presenting. In Scenario 2 (S2), participants were told *“you have been diagnosed with asthma. Over the last couple of days you have developed a heavy cough. After showering this morning you noticed you are developing a rash on your upper body which has made you worry about what is going on?”* Scenario 3 (S3) involved the same presentation involving a rash, and possibly an asthma-related problem, but

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3 participants were asked to imagine the symptoms concerned their 12 year old daughter.
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5 These scenarios are hereafter referred to as a rash/asthma-related self (S2) and child (S3).
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7 The fourth scenario involved an anxiety related presentation (S4). Participants were asked to
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9 imagine being “*in distress because your heart won’t stop racing. After trying to calm*
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11 *yourself you are still feeling extremely anxious and decide to seek help having previously*
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13 *been diagnosed and treated for anxiety*”.

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17 A DCE was developed for each scenario in accordance with best practice
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19 guidelines.^[27, 32, 33] The DCE presented a series of hypothetical choices between two service
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21 models defined by different levels of five key attributes. Attributes of ED care were initially
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23 identified through focus group discussions.^[21] Relevant literature was used to refine attribute
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25 descriptions and derive attribute-levels.^[e.g. 24, 25, 28, 29, 31, 34] Five attributes comprising key
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27 features of ED service models were included in the choice scenarios; namely, treating
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29 healthcare professional, treatment location, waiting time, out of pocket cost and service
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31 quality.
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36 Levels for treating professional included being treated by an ED physician, general
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38 practitioner (GP) or an emergency care professional other than a doctor, whilst levels for
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40 treatment location were at home, in a local clinic or at hospital. Currently the vast majority of
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42 Australians choose to access an ED at a public hospital with no ‘out-of-pocket’ expenses as
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44 opposed to paying for treatment privately.^[16] Cost levels therefore varied from no cost up to
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46 a maximum of \$200 based on the range of out-of-pocket expenses that may be incurred if
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48 emergency care were accessed privately. National and international benchmarks designed to
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50 reduce overcrowding and excessive wait times were used to set waiting times of half an hour,
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52 1 hour, 2 hours and maximum of 4 hours.^[5, 19] Levels for service quality were based on a
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54 combination of attribute-levels used in related studies,^[24, 28, 29] and ranged from
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3 comprehensive care to basic treatment from a clinician who was not easy to understand with
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5 some interruptions.
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8 *Table 1 goes here*
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12 To select pairs of service profiles to be presented to participants, a fractional factorial
13 main effects D_p -efficient design was generated using *NGENE software (Version 1.1.1, 2012)*.
14 The combination of attribute levels whereby an emergency care physician treats people in
15 their own homes was considered to be implausible, and was therefore prohibited in the
16 design.^[27] The resulting design generated 24 choice sets, each consisting of a choice
17 between two alternative services (A and B). A blocked design was used to divide the 24
18 choice sets into a manageable number of 12 choice sets per participant,^[35] with participants
19 randomly allocated to each block. To increase the realism of scenarios, an *opt out* option was
20 included for each choice set, whereby participants could choose to delay accessing care for
21 24 hours to see if their condition improved.^[6, 36] For each block, one choice set was repeated
22 as a consistency check, to provide an indication of data quality; however, responses to the
23 repeat choice set were excluded from the preference models.^[37] A sample choice profile is
24 presented in Table 1.
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42 Following ethical approval^[21] the DCE was pilot tested on a convenience sample of
43 21 adults. The pilot results were used to make minor amendments, and the coefficients
44 generated from analysis of the pilot data were used as prior parameters to improve the
45 efficiency of the experimental design. The survey was then administered via the internet to a
46 sample of adults (n = 1838) residing in two Australian States (Queensland and South
47 Australia). Participants were recruited from a survey panel by a third party provider
48 (PureProfile) between September and December 2012. Quotas were set to ensure the sample
49 reflected the age and gender distribution of the corresponding state populations. All
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3 participants were provided with an information sheet to explain the study and informed
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5 consent was assumed upon completion and submission of the survey responses. A copy of
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7 the information sheet and survey based on the possible concussion scenario is provided as an
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9 online Appendix.
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12 The survey was administered online and consisted of three main components; the
13
14 DCE choice sets , socio-demographic characteristics and attitudinal measures of
15
16 responsibilities for one's own health. Members of the general public (n= 909); 453
17
18 participants from Queensland (QLD) and 456 from South Australia (SA) were randomly
19
20 assigned to complete the main survey version involving a possible concussion. Smaller
21
22 samples from QLD were assigned to consider the alternative scenarios (rash/asthma – self;
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24 n=311, rash/asthma – child; n=309, and the anxiety related issue; n=309).
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30 After being introduced to their respective scenarios, participants were asked to rate
31
32 the urgency of the situation based on a brief description of triage categories. This rating
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34 provided an indicator of their perceived urgency of the situation prior to the consideration of
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36 choice sets. Non-parametric tests (Kruskal-Wallis test and Mann-Whitney U tests with
37
38 Bonferroni corrections for post-hoc comparisons of categorical variables) were used to
39
40 examine if there were significant differences in in the public's perceptions of urgency across
41
42 presenting contexts as well as their intentions to access emergency care alternatives [e.g. 38, 39].
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46 Preferences for emergency care were analysed in *NLOGIT (Version 5)* [40] using
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48 mixed logit (MXL) regression models. MXL models estimate the effect of the different
49
50 service attribute levels (independent variables) on choice of service (dependent variable),
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52 whilst allowing service preferences to vary (i.e. to be heterogeneous) across the sample. MXL
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54 models were generated using 1000 Halton draws, an intelligent simulation method that
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56 requires a tenth of the number of draws used with other random approaches.^[27] Treating
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3 health professional, location and service quality were specified using effects coding and cost
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5 and waiting time were coded continuously after confirming their level effects were linear in
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7 preliminary analyses. The resulting patterns of preferences were descriptively compared to
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9 identify any variations in intentions to access healthcare or the public's preferences for how
10
11 this care is delivered. Further, marginal willingness to wait was estimated to quantify trade-
12
13 offs and used to compare the public's preferences for service delivery across different
14
15 scenarios.^[27, 41] Marginal willingness to wait represents the additional time an individual
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17 would be willing to wait in order gain an improvement in a characteristic of service delivery,
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19 and is estimated as the ratio between the relevant attribute coefficients in the model.^[41, 42]
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21 Parameters were specified as random and following a normal distribution with confidence
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23 intervals calculated using the delta method, as described by Daly *et al.*^[43] and software
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25 developed by Hess.^[44]
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30 RESULTS

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33 From the 4,354 members of the general public who accepted the survey invitation, a
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35 total of 2045 people (46.97%) met screening criteria and commenced the survey. Of these,
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37 89.88% (n=1838) completed the survey to achieve the required sample quotas. The average
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39 completion time was 14.37 minutes, with 99.4% of participants taking five seconds or longer
40
41 to choose their preferred option. A total of 1672 participants (90.96%) passed the consistency
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43 check. In recognition of some concerns about excluding those who fail consistency checks,
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45 for example evidence of lexicographic healthcare preferences, all responses were included in
46
47 the analysis as a kind of sensitivity analysis employed by Richardson *et al.*^[37]
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51 Although the stratified sample was selected according to quotas to ensure
52
53 demographic representativeness, comparisons of socioeconomic and health status measures
54
55 were made with population norms (Table 2). Overall the sample appeared to represent the
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respective state and national population distributions. Notable exceptions included comparatively higher morbidity levels (e.g. asthma rates and poorer quality of life) and less culturally diverse and Aboriginal and Torres Strait peoples in the study sample compared to the general population.

Table 2 goes here

Perceived urgency of presenting problem

Table 3 presents the triage ratings assigned by participants for each of the presenting scenarios based on a brief description on the categories used in the Australasian Triage Scale where higher scores represent lower levels of urgency. Relatively equal numbers of participants rated the possible concussion scenario (S1) as a Triage Category 1, 2 or 3. The median score was 2, with an interquartile range (IQR) of 1 to 3, and a mode of 3. For the rash/asthma- related (self) presentation (S2), the median was 3, IQR 2 to 4, and mode 4. When the scenario involved the participants' daughter (S3), the median and mode were 3 with the same IQR, providing some indication that more participants considered this a more urgent presentation compared to Scenario 2. Notably, the highest level of urgency was assigned to the anxiety-related presentation (S4) with a median score of 2, IQR 1 to 3.5, and a mode of 1.

Table 3 goes here

Does presenting context influence uptake of ED services?

In accordance with participants' differing levels of perceived urgency across the four scenarios, the "opt out" data (i.e., the decision to delay care and monitor the situation)

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2
3 suggested that the degree to which people would take up any service also differed depending
4 on the presenting problem. Table 4 indicates the number of times participants chose to access,
5 rather than delay accessing care. It suggests participants most often elected to access services
6 when considering the rash/asthma-related presentation involving their child (S3) and least
7 frequently for the same problem involving themselves (S2). Interestingly, the pattern of
8 responses for S3 was similar to S1 (a possible concussion). Kruskal-Wallis results indicated
9 significant differences between presenting contexts ($H_{(3)} = 83.65$, $p = <0.001$). Using Mann-
10 Whitney tests (with Bonferroni corrections where $p = 0.008$), significant differences were
11 found between all scenarios except for S1 and S3 ($z = -1.39$, $p = 0.164$) and S2 and S4, ($z =$
12 -1.92 , $p = 0.054$). Thus, while the anxiety scenario was most frequently perceived to be more
13 urgent, participants were most likely to delay accessing care in the context of a possible
14 concussion or rash/asthma related presentation involving their daughter.
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32 *Table 4 goes here*

33 ***Preferences for emergency care: Results of Mixed Logit (MXL) analyses***

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MXL models for all four scenarios revealed a good model fit for a choice model ^[27]
(S1: McFadden Pseudo $R^2 = 0.371$, AIC/N = 1.386; S2: Pseudo $R^2 = 0.367$, AIC/N = 1.401;
S3: Pseudo $R^2 = 0.395$, AIC/N = 1.338; S4: Pseudo $R^2 = 0.367$, AIC/N = 1.400). The results
are presented for each scenario in Table 5. The mean parameters represent the preference
weight associated with each attribute-level. Positive weights indicate the part-worth utility
associated with each characteristic and a negative weight the associated disutility. The
standard deviation parameters and significance levels indicate the extent of preference
heterogeneity around mean parameters across participants.

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3 As indicated in Table 5, the constants in each of the models were large, negative and
4 significant suggesting a strong propensity to access any type of emergency care rather than
5 delay care in all scenarios. However, there was marked heterogeneity indicated by the
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7 significance of standard deviations. This heterogeneity and the size and statistical
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9 significance of the constant terms suggest the impact of factors beyond the observed service
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11 attributes on healthcare choices.
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21 For S1, the results indicate an overall preference to be treated by an ED clinician ($\beta =$
22 0.261) compared to a GP ($\beta = -0.073$, $p < 0.001$) or any emergency health professional
23 other than a doctor ($\beta = -0.188$, $p < 0.001$). Participants also preferred treatment at hospital
24 ($\beta = 0.119$, $p < 0.001$) over treatment at a local clinic ($\beta = -0.091$, $p = 0.002$) or treatment at
25 home ($\beta = -0.028$). As expected, lower personal costs ($\beta = -0.019$, $p < 0.001$) and shorter wait
26 times were clearly valued ($\beta = -0.012$, $p < 0.001$), as was comprehensive treatment ($\beta =$
27 0.557) compared to basic treatment for a clinician who was easy to understand ($\beta = 0.156$, p
28 < 0.001) and not easy to understand ($\beta = -0.713$, $p < 0.001$). Indeed, the preference weights
29 for service quality suggest that an improvement in this service characteristic was relatively
30 more important when compared to marginal improvements in the other attributes in the DCE.
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44 Although treatment by an emergency health professional other than a doctor was the
45 least preferred in all contexts, a different pattern of preferences were observed for S1
46 compared to the other scenarios. Whereas treatment at hospital was clearly preferred in S1,
47 for each of the remaining scenarios, preferences were strongest for treatment in ambulatory
48 settings such as a local clinic (S3 and S4) or at home (S2). The different patterns of
49 preferences for treatment location, by presenting context are depicted in Figure 1. In all four
50 scenarios, there were clear preferences for lower costs (for every dollar of out-of-pocket
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3 expense), shorter wait times (for every minute waited) and higher levels of service quality.
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5 The marked heterogeneity observed across all contexts and variations observed in both
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7 patterns of service uptake and preferences for the different characteristics of care suggest
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9 different presenting problems are associated with differences in healthcare choices. Choices
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11 differed even when the same problem affected different people (e.g. S2 and S3).
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15 *Figure 1 goes here*
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18 Willingness to wait

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21 In order to directly compare between models, the public's marginal willingness to
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23 wait for improvements in service characteristics were estimated. As indicated in Table 6,
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25 there was a clear preference to be treated by an ED clinician rather than an emergency health
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27 care professional in all contexts. The public were willing to wait between an additional 22.0
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29 minutes (95%CI 9.6 to 34.4; S2) and 60.2 minutes (95%CI 46.3 to 74.1; S3) in order to be
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31 treated by an ED clinician rather than another emergency health care professional. In the
32
33 context of a possible concussion the public were also prepared to wait an additional 27.5
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35 minutes (95%CI 22.3 – 32.7) to be treated by an ED Clinician instead of a GP. Participants
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37 were willing to wait an additional 29.4 (95%CI 16.3 to 42.5) minutes to be treated at home
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39 rather than in hospital in the context of S2 (rash/asthma), but the opposite effect was observed
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41 in relation to willingness to wait estimates for S1, confirming a complex interaction between
42
43 willingness to wait, preferences for treatment location and the presenting problem. On
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45 average, people were willing to wait almost twice as long for every one dollar saved in out-
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47 of-pocket expenses for their preferred option when the presenting problems concerned
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49 themselves as opposed to their child.
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57 *Table 6 goes here*
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5 The marginal willingness to wait estimates for trade-offs in quality varied by level of
6 quality and scenario, ranging from a minimum of an additional 29.5 (95%CI 17.1 to 41.8)
7 minutes for a moderate improvement in quality in S1, to a maximum of 171.8 (95%CI 136.3
8 to 207.4) minutes for a large improvement in quality in S3. Participants were willing to wait
9 substantially longer to receive comprehensive care, even in circumstances where one would
10 expect to see a desire for more immediate care. Overall, these results suggest that the public
11 clearly place significant value on high quality care.
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20 21 **DISCUSSION**

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23 The preferences for emergency care elicited in this study suggest that regardless of
24 cost and waiting time, the Australian public have a clear preference for treatment by a doctor
25 across all presenting contexts. Although researchers and policy makers have identified a role
26 for models led by nurses and ambulance officers to reduce ED workloads,^[45] the results
27 suggest there is currently little public support for such innovations in Australia when this is
28 described as care led by ‘emergency care practitioners (other than a doctor)’. Consistent with
29 previous results from other countries^[11,24] there were clear preferences for shorter wait
30 times, higher service quality and support for treatment in proximal service locations including
31 a local GP clinic for ‘GP type’ presentations. Indeed, the extraordinary amount of time
32 people were prepared to wait before trading for lower levels of service quality provide further
33 support that this is a primary determinant of health care choices.^[e.g. 34] The findings suggest
34 that the public are clearly adverse to contributing out-of-pocket expenses or receiving
35 treatment from health professionals other than a doctor, suggesting they may be unwilling to
36 support such changes should they be introduced in the future.^[15,46] Nonetheless, these
37 findings provide guidance about how to improve current efforts aimed at reducing wait times
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3 and support further investments in ambulatory care alternatives, in particular, for problems
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5 involving chronic issues.
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9 Specifically, our analyses have suggested that the presenting context influences
10 preferences for emergency care, both in terms of propensity to access emergency care and
11 preferences for the different characteristics of service options. Differences were observed not
12 only for different conditions, but also according to who was being treated (i.e. when the
13 problem affected their daughter rather than themselves). These findings are to be expected
14 given the literature on social constructions of childhood and heightened notions of
15 vulnerability,^[47, 48] which in part have led to the establishment of dedicated paediatric ED
16 and/or treatment areas within ED.^[e.g. 6, 7] Indeed, triage categories reflect an urgency rather
17 than a complexity scale and clinicians may also assign different urgency ratings to similar
18 presenting problems in different patients.^[12] Further, presentations involving skin rashes are
19 also recognised as being particularly challenging to assess.^[49] However, the urgency ratings
20 assigned by participants, including for the anxiety-related scenario, also support the assertion
21 that the public understand health emergencies differently to that outlined in triage guidelines,
22 ^[e.g. 4] and may give more weight to psychosocial considerations rather than just physiological
23 metrics or threats to life.^[22] The implication of these findings for health policy and decision-
24 makers is that although the public may have differing views about how quickly non-life
25 threatening problems need to be treated, they also recognise that different problems may be
26 treated in different settings; even if they still want to be treated urgently, as evidenced in the
27 anxiety-related scenario.
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52 Our results are similar to findings from a recent Hong Kong study^[11], demonstrating
53 the need to further examine how patient perceptions of presenting problems drive healthcare
54 decision-making. Although recent international studies have suggested that more than half of
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3 all visits to ED are classified as non-emergencies, the availability of alternative ambulatory
4 care services has done little to reduce demand.^[26, 50] Our study sheds light on this persistent
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7 problem, demonstrating clear preferences for higher levels of service quality delivered by
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10 doctors (and emergency specialists in the case of suspected concussion). The preferences
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12 elicited for the ‘GP type scenarios’ suggest the Australian public generally prefer to be
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14 treated at their local GP clinic in these circumstances. However, other doctor-led models that
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16 may reduce ED workload, including integration of GP clinics within ED, extended hours GP
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18 co-operatives and in-home care^[e.g. 11, 45] and re-designing patient flow processes (e.g. fast-
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20 track streams for chronic-disease related issues)^[3, 5, 6, 12, 13, 51] could gain public acceptance in
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22 future.

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26 The levels of preference heterogeneity observed across all DCE scenarios raise the
27
28 need for further analyses and exploration of the public’s preferences. Although there was a
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30 different pattern of preferences evident for accessing care when presentations involved new
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32 concerns and possible chronic problems compared to an acute injury, the heterogeneity
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34 observed may also help explain why a substantial proportion of ED presentations continue to
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36 be considered ‘inappropriate’^[11, 22, 50, 52] even when ambulatory alternatives are available.^[26]
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38 It is likely that a range of situational or socio-demographic factors may impact preferences,
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[e.g. 1] and these will be explored in future analyses.

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The moderate response rate, although comparable to other internet and paper based
choice studies,^[e.g. 30, 53, 54] and the under-representation of culturally diverse participants in
our sample is noteworthy. Sample bias may have originated from the use of a panel
recruitment company and internet-administered surveys.^[e.g. 55] Whereas future researchers
would benefit from undertaking their formative qualitative research with consumer
representatives, the initial focus groups used to design the DCE survey largely comprised

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3 health professionals. Another limitation of our study was that the description of each of the
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5 hypothetical scenarios was brief, using simple everyday language which may have left too
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7 much opportunity for participants to infer missing information. Although this was a
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9 deliberate strategy, it is acknowledged that our brief description of presenting context may
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11 not have been as useful as anticipated. Nevertheless, the research was exploratory and many
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13 of the challenges are overshadowed by our large relatively representative sample and the use
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15 of multiple scenarios and systematic comparison of different attributes. Although caution
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17 should be applied in generalising the results of this study, findings suggest future research
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19 should examine other variations of the patient, nature and time of presenting problems as well
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21 as models of care led by other health professionals. The public's apparent aversion to non-
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23 doctor led care may have been influenced by our framing of this choice as 'other than a
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25 doctor'. This change was made to improve clarity in response to feedback from the pilot
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27 study, however, may have resulted in this being perceived as a loss or 'substandard' choice'
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29 [e.g. 56] The findings also suggest the need to investigate the influence of other individual
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31 factors on healthcare decision-making. Researchers and decision-makers may then be able to
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33 isolate the preferences of specific groups, such as high services users or people found to be
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35 less likely to delay care to inform demand management strategies.
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41 CONCLUSION

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45 Overall, the findings from this study suggest that the Australian public do not support
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47 being treated by an emergency health practitioner other than a doctor, irrespective of the
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49 presenting problem, or reductions in cost or wait times. This conclusion appears to be
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51 supported by the high value the public have placed on service quality. Results do, however,
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53 provide support for reforms focussing on providing greater access to GP-based ambulatory
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55 care as well as efforts to reduce wait times without increasing cost. Although the literature is
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3 mixed about the degree to which ambulatory care alternatives reduce pressures on ED, our
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5 findings provide evidence that citizens do make different decisions about when to access
6
7 emergency care according to their presenting situation, as reflected in the different pattern of
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9 choices evident. They also suggest different presenting contexts including when the same
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11 problem affects different people influence these choices. Indeed, when the presenting
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13 problems affected a child they were perceived as more urgent, led to higher rates of service
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15 uptake and also marked differences in the public's willingness to wait before making trade-
16
17 offs in care. Future investigations are needed to clarify how these contextual issues and other
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19 differentiating factors influence these decision-making processes. This type of knowledge
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21 will assist us to not only better understand the public's preferences for accessing services but,
22
23 more broadly, develop and target specific demand management strategies for emergency care
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25 services and related primary health care initiatives
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30 FOOTNOTES

32 *Authors' Contributions*

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36 All authors contributed to the research design. The DCE was developed by JW, PH, JR, EK
37
38 and PS. PH and JW led data analysis. All authors contributed to, reviewed and approved the
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40 final manuscript led by PH.
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56 Institute for Health and Care Excellence (NICE).
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3 ***Competing Interests***
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6 All authors declare they have no competing interests.
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9 ***Ethics Approval***
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11 Ethics approval was obtained from the Griffith University Human Research Ethics
12

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14 Committee (Reference Number: MED/10/12/HREC).
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17 ***Data Sharing Statement***
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20 Requests for results of preliminary analyses, coding and other information can be directed to
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22 the corresponding author.
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Table 1. Sample profile based on DCE design

<i>Imagine you have been diagnosed with asthma. Over the last couple of days you have developed a heavy cough. After showering this morning you noticed you are developing a rash on your upper body which has made you worry about what is going on?</i>		
	Option A	Option B
Treating healthcare professional	General Practitioner (may not be your usual GP)	Emergency healthcare professional (other than a doctor)
Location	Local clinic	Home
Potential cost to you	\$0	\$200
Maximum waiting time	4 hours	30 mins
Quality of service	Healthcare professional is <u>easy</u> to understand, <u>comprehensive</u> treatment provided with <u>no</u> interruptions	Healthcare professional is <u>not easy</u> to understand, <u>basic</u> treatment provided with <u>some</u> interruptions
Which would you prefer?	Option A <input type="checkbox"/>	Option B <input type="checkbox"/>
If this option was available, would you take it, or would you delay for 24 hours to see if your condition improves before accessing care?	I would take my preferred option..... <input type="checkbox"/>	I would delay for 24 hours to see if my condition improves before accessing care <input type="checkbox"/>
<i>Note:</i>		
<ul style="list-style-type: none"> • Health professionals options; were ED clinician; GP (may not be your usual GP) or an Emergency health professional (other than a doctor) • Treatment locations were; home, local clinical, or hospital, • Potential out of pocket expenses were; \$0, \$50, \$100 or \$200 • Maximum wait times were; 30 mins, 1 hour, 2 hours or up to 4 hours • Levels of service quality were; healthcare professional is easy to understand, comprehensive treatment provided with no interruptions; healthcare professional is easy to understand, basic treatment provided with some interruptions, or healthcare professional is not easy to understand, basic treatment provided with some interruptions 		

Table 2. Breakdown of sample by selected individual characteristics and available norms

Individual characteristics	Categories	Scenario 1 (n= 909)	Scenario 2 (n=311)	Scenario 3 (n=309)	Scenario 4 (n=309)	Population norms ^[57]	
Demographics:	Gender	<i>Male</i>	439 (48.3%)	150 (48.2%)	150 (48.5%)	148 (47.9%)	49.4%
		<i>Female</i>	470 (51.7%)	161 (51.8%)	159 (51.5%)	161 (52.1%)	50.6%
	Age cohorts	<i>18- 24 years</i>	109 (12.0%)	36 (11.6%)	36 (11.7%)	38 (12.3%)	13.3%*
		<i>25-34 years</i>	157 (17.3%)	58 (18.6%)	57 (18.4%)	56 (18.1%)	13.8%
		<i>35-44 years</i>	165 (18.2%)	58 (18.6%)	57 (18.4%)	59 (19.1%)	14.3%
		<i>45-54 years</i>	165 (18.2%)	55 (17.7%)	55 (17.8%)	55 (17.8%)	13.7%
		<i>55-64 years</i>	141 (15.5%)	51 (16.4%)	49 (15.9%)	49 (15.9%)	11.6%
		<i>65 years and over</i>	172 (18.9%)	53 (17.0%)	55 (17.8%)	52 (16.8%)	14.0%
	Relationship status	<i>Married/partner</i>	572 (62.9%)	214 (68.8%)	209 (67.6%)	212 (68.6%)	58.7%
		<i>Separated/divorced</i>	86 (9.5%)	32 (10.3%)	36 (11.7%)	25 (8.1%)	11.4%
		<i>Widowed</i>	26 (2.9%)	7 (2.3%)	4 (1.3%)	12 (3.9%)	5.5 %
		<i>Single</i>	220 (24.2%)	55 (17.7%)	57(18.4%)	58 (18.8%)	34.3% ^
	English as main spoken language	<i>Yes</i>	848 (93.3%)	293 (94.2%)	287 (92.9%)	288 (93.2%)	70.6% +
<i>No</i>		48 (5.4%)	11 (3.6%)	12 (3.9%)	15 (5.2%)	-	
Aboriginal and/or Torres Strait Islander	<i>Yes</i>	13 (1.4%)	5 (1.6%)	1 (0.3%)	5 (1.6%)	2.5%	
	<i>No</i>	887 (98.6%)	301 (96.8%)	299 (96.8%)	300 (97.1%)	-	

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Individual characteristics		Categories	Scenario 1 (n= 909)	Scenario 2 (n=311)	Scenario 3 (n=309)	Scenario 4 (n=309)	Population norms
Socioeconomic factors:	Have a professional qualification/degree	<i>Yes</i>	369 (40.6%)	131 (42.1%)	146 (47.2%)	142 (46.0%)	32.4%
		<i>No</i>	526 (57.9%)	175 (56.3%)	158 (51.1%)	164 (53.1%)	
	Main activity (employment)	<i>Employed/self-employed</i>	452 (49.7%)	170 (54.7%)	163 (52.8%)	181 (58.6%)	59.7% [#]
		<i>Retired</i>	212 (23.3%)	67 (21.5%)	69 (22.3%)	60 (19.4%)	-
		<i>Homemaker</i>	100 (11.0%)	28 (9.0%)	36 (11.7%)	26 (8.4%)	-
		<i>Student</i>	63 (6.9%)	19 (6.1%)	22 (7.1%)	24 (7.8%)	-
		<i>Seeking work</i>	48 (5.3%)	17 (5.5%)	13 (4.2%)	14 (4.5%)	5.6%
		<i>Other</i>	28 (2.9%)	6 (1.9%)	3 (0.9%)	3 (1.0%)	-
	Annual household income	<i>Up to \$40,000</i>	265 (29.2%)	84 (27.0%)	75 (24.3%)	69 (22.3%)	<i>Md</i> = \$68,800
		<i>\$40,001 - \$70,000</i>	203 (22.3%)	73 (23.5%)	57 (18.4%)	71 (23.0%)	
		<i>\$70,001- \$100,000</i>	159 (17.5%)	48 (15.4%)	50 (16.2%)	53 (17.2%)	
		<i>\$100,001 - \$130,000</i>	92 (10.1%)	27 (8.7%)	35 (11.3%)	34 (11.0%)	
<i>Over \$130,000</i>		67 (7.4%)	30 (9.6%)	35 (11.3%)	28 (12.3%)		

Individual characteristics		Categories	Scenario 1 (n= 909)	Scenario 2 (n=311)	Scenario 3 (n=309)	Scenario 4 (n=309)	Population norms
Health status and experiences:	Quality of life	(AQoLAD)	$\chi = 0.67$ (± 0.26)	$\chi = 0.68$ (± 0.26)	$\chi = 0.70$ (± 0.24)	$\chi = 0.72$ (± 0.23)	$\mu = 0.81$ (± 0.22) ^[58]
	Asthma	(self)	175 (19.3%)	65 (20.9%)	64 (20.7%)	52 (16.8%)	11.8% ^[59]
		(close family)	239 (26.3%)	93 (29.9%)	80 (26.1%)	90 (29.1%)	-
	Use of ED in past 12 months	None	671 (73.8%)	241 (77.5%)	225 (72.8%)	236 (76.4%)	13% at least once ^[60]
		1-3 times	210 (23.1%)	61 (19.6%)	72 (23.3%)	65 (21.0%)	
		4 or more	20 (2.2%)	5 (1.6%)	4 (1.3%)	5 (1.6%)	
	Use of GP services in past 12 months	None	114 (12.5%)	40 (12.9%)	33 (10.7%)	35 (11.3%)	81% at least once ^[60]
		1-3 times	467 (51.4%)	144 (46.3%)	162 (52.4%)	151 (48.9%)	
		4 or more	321 (35.3%)	124 (39.9%)	11 (35.9%)	120 (38.8%)	
	Previously employed in health industry	Yes	75 (8.3%)	15 (4.8%)	34 (11.0%)	31 (10.0%)	6% ^[61]
No		827 (91.0%)	292 (93.9%)	272 (88.0%)	277 (89.6%)	-	

*Note young people defined as 15-24 and Australian Census data includes children and young people aged 0-15 collectively comprising 19.3% of the population as

^ Defined as never married in 2011 Australian Census data

+ Defined as English only spoken at home in 2011 Australian Census data

Defined as worked full-time in 2011 Australian Census data

Residual percentages represent the small number of missing values observed

Table 3. Frequency of triage ratings assigned for presenting scenarios

Scenario	Sample	Australasian Triage Scale ^[4]	Frequency
(S1) Presentation involving possible concussion (self)	(n=909) (n= 453 QLD) (n= 456 SA)	1 (immediately life-threatening)	233 (25.6%)
		2 (imminently life-threatening)	230 (25.3%)
		3 (potentially life-threatening)	255 (28.1%)
		4 (potentially serious)	153 (16.8%)
		5 (less urgent)	38 (4.2%)
(S2) Rash/asthma-related presentation (self)	(n=311) (QLD)	1 (immediately life-threatening)	51 (16.4%)
		2 (imminently life-threatening)	46 (14.8%)
		3 (potentially life-threatening)	61 (19.6%)
		4 (potentially serious)	80 (25.7%)
		5 (less urgent)	73 (23.5%)
(S3) Rash/asthma-related presentation (daughter)	(n=309) (QLD)	1 (immediately life-threatening)	55 (17.8%)
		2 (imminently life-threatening)	52 (16.8%)
		3 (potentially life-threatening)	85 (27.5%)
		4 (potentially serious)	82 (26.5%)
		5 (less urgent)	35 (11.4%)
(S4) Anxiety related presentation (self)	(n=309) (QLD)	1 (immediately life-threatening)	81 (26.2%)
		2 (imminently life-threatening)	76 (24.6%)
		3 (potentially life-threatening)	75 (24.3%)
		4 (potentially serious)	51 (16.5%)
		5 (less urgent)	26 (8.4%)

Table 4. Number of times participants chose to access care by presenting context

Scenario	n =	Minimum (frequency)	Maximum (frequency)	Median	Inter-quartiles		Mean (\pm s.d.)
					25%	75%	
(S1) Possible concussion (self)	909	0 (28, 3.1%)	12 (600, 66.0%)	12	10	12	10.46 \pm 2.98
(S2) Rash/asthma-related presentation (self)	311	0 (24, 7.7%)	12 (139, 44.7%)	11	6	12	8.78 \pm 3.98
(S3) Rash/asthma-related presentation (daughter)	309	0 (10, 3.2%)	12 (215, 69.6%)	12	11	12	10.73 \pm 2.77
(S4) Anxiety related presentation (self)	309	0 (16, 5.2%)	12 (161, 52.1%)	12	7	12	9.28 \pm 3.92

Table 5. Results of MXL analyses on opt out data by presenting scenario

		Part-worth utilities											
		S1 (possible concussion - self)				S2 (rash/asthma related - self)				S3 (rash/asthma related - daughter)			
Attribute	Levels	Mean parameter	P	Standard deviation	P	Mean parameter	P	Standard deviation	P	mean parameter	P	Standard deviation	P
Principal healthcare professional	• ED clinician	<i>0.261</i>		<i>-0.527</i>		<i>0.054</i>		<i>-0.454</i>		<i>0.293</i>		<i>-0.031</i>	
	• GP (may not be your usual GP)	** <i>-0.073</i>	.001	0.161	.233	0.095	.062	** <i>0.302</i>	.001	0.049	.239	0.004	.974
	• Emergency health professional (other than a doctor)	** <i>-0.188</i>	<.001	** <i>0.366</i>	<.001	** <i>-0.149</i>	.003	0.152	.196	** <i>-0.342</i>	<.001	0.027	.772
Location	• Home	<i>-0.028</i>		<i>-0.934</i>		<i>0.100</i>		<i>-0.600</i>		<i>-0.027</i>		<i>-0.785</i>	
	• local clinic	** <i>-0.091</i>	.002	** <i>0.357</i>	<.001	0.073	.200	** <i>0.369</i>	<.001	0.063	.206	** <i>0.358</i>	<.001
	• hospital	** <i>0.119</i>	<.001	** <i>0.577</i>	<.001	** <i>-0.173</i>	.004	** <i>0.594</i>	<.001	-0.036	.451	** <i>0.427</i>	<.001
Potential cost to you	Per \$1 of out of pocket expense (continuously coded based on levels of \$0, \$50, \$100, \$200)	** <i>-0.019</i>	<.001	** <i>0.019</i>	<.001	** <i>-0.027</i>	<.001	** <i>0.023</i>	<.001	** <i>-0.016</i>	<.001	** <i>0.018</i>	<.001
Maximum waiting time	Per 1 minute of waiting time (based on attribute-levels of 30mins, 1 hour, 2 hours and 4 hours)	** <i>-0.012</i>	<.001	** <i>0.008</i>	<.001	** <i>-0.009</i>	<.001	** <i>0.007</i>	<.001	** <i>-0.011</i>	<.001	** <i>0.005</i>	<.001
	• Healthcare professional is <i>easy to understand, comprehensive treatment; no interruptions</i>	<i>0.557</i>		<i>-0.918</i>		<i>0.552</i>		<i>-0.981</i>		<i>0.806</i>		<i>-1.017</i>	
Quality	• Healthcare professional is <i>easy to understand, basic treatment; some interruptions</i>	** <i>0.156</i>	<.001	0.092	.149	** <i>0.279</i>	<.001	* <i>0.227</i>	.042	** <i>0.200</i>	<.001	0.161	.143
	• Healthcare professional is <i>not easy to understand, basic treatment; some interruptions</i>	** <i>-0.713</i>	<.001	** <i>0.826</i>	<.001	** <i>-0.831</i>	<.001	** <i>0.754</i>	<.001	** <i>-1.006</i>	<.001	** <i>0.856</i>	<.001
Constant	(associated with delaying care)	** <i>-6.502</i>	<.001	** <i>3.722</i>	<.001	** <i>-4.736</i>	<.001	** <i>3.474</i>	<.001	** <i>-6.715</i>	<.001	** <i>3.601</i>	<.001

p= probability level where **<.01; *<.05 Note: referent levels in italics

		Part-worth utilities			
		S4 (anxiety related - self)			
Attribute	Levels	Mean parameter	P	Standard deviation	P
Principal healthcare professional	• <i>ED clinician</i>	0.163		-0.720	
	• GP (may not be your usual GP)	0.005	.927	**0.430	<.001
	• Emergency health professional (other than a doctor)	**-.0158	.002	**0.290	.001
Location	• <i>Home</i>	0.038		-1.132	
	• local clinic	0.067	.263	**0.538	<.001
	• hospital	-0.105	.083	**0.594	<.001
Potential cost to you	Per \$1 of out of pocket expense (continuously coded based on levels of \$0, \$50, \$100, \$200)	**-.022	<.001	**0.022	<.001
Maximum waiting time	Per 1 minute of waiting time (based on levels of 30mins, 1 hour, 2 hours and 4 hours)	**-.013	<.001	**0.008	<.001
Quality	• <i>Healthcare professional is easy to understand, comprehensive treatment; no interruptions</i>	0.599		-0.759	
	• Healthcare professional is <u>easy to understand, basic treatment; some interruptions</u>	**0.199	<.001	0.005	.977
	• Healthcare professional is <u>not easy to understand, basic treatment; some interruptions</u>	**-.0.798	<.001	**0.754	<.001
Constant	(associated with delaying care)	**-.5.477	<.001	**3.726	<.001

p = probability level where **<.01, *<.05 Note: referent levels in italics

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Table 6 Willingness to wait trade-offs between service characteristics.

Perceived improvement in service characteristics	Marginal willingness to wait in minutes to gain improvement (with 95% confidence intervals)			
	S1	S2	S3	S4
ED Clinician instead of an emergency health professional	37.0 (30.7–43.4)	22.0 (9.6–34.4)	60.2 (46.3–76.1)	24.0 (15.0–33.1)
ED Clinician instead of GP	27.5 (23.3–32.7)			
Treatment at hospital instead of home	12.1 (7.0–17.2)	29.4 (16.3–42.5)		
Treatment at home instead of hospital		29.4 (16.3–42.5)		
Treatment at home instead of a local clinic	5.2 (0.3–10.2)			
For every AU\$1 reduction in cost	1.6 (1.4–1.7)	2.9 (2.4–3.4)	1.5 (1.3–1.8)	1.7 (1.4–1.9)
Comprehensive care compared to basic treatment from a clinician you can understand with no interruptions	104.9 (90.5–119.3)	149.2 (110.4–188.1)	171.8 (136.3–207.4)	104.7 (82.5–128.0)
Basic treatment from a clinician you understand compared to basic treatment from a clinician you can't understand and some interruptions	33.1 (28.0–38.2)	29.5 (17.1–41.8)	57.5 (45.8–69.2)	30.0 (21.6–38.4)

STROBE Statement—checklist of items that should be included in reports of observational studies

	Item No	Recommendation
Title and abstract	1	(a) Indicate the study's design with a commonly used term in the title or the abstract
<i>(In Abstract)</i>		(b) Provide in the abstract an informative and balanced summary of what was done and what was found
Introduction		
Background/rationale (pp.4-5 of 33)	2	Explain the scientific background and rationale for the investigation being reported
Objectives (p.5)	3	State specific objectives, including any prespecified hypotheses
Methods		
Study design (pp. 5-8)	4	Present key elements of study design early in the paper
Setting (pp.8-10)	5	Describe the setting, locations, and relevant dates, including periods of recruitment, exposure, follow-up, and data collection
Participants (p. 9)	6	(a) <i>Cohort study</i> —Give the eligibility criteria, and the sources and methods of selection of participants. Describe methods of follow-up <i>Case-control study</i> —Give the eligibility criteria, and the sources and methods of case ascertainment and control selection. Give the rationale for the choice of cases and controls <i>Cross-sectional study</i> —Give the eligibility criteria, and the sources and methods of selection of participants
		(b) <i>Cohort study</i> —For matched studies, give matching criteria and number of exposed and unexposed <i>Case-control study</i> —For matched studies, give matching criteria and the number of controls per case
Variables (pp. 5-7)	7	Clearly define all outcomes, exposures, predictors, potential confounders, and effect modifiers. Give diagnostic criteria, if applicable
Data sources/ measurement (pp. 6-10; Table 2)	8	For each variable of interest, give sources of data and details of methods of assessment (measurement). Describe comparability of assessment methods if there is more than one group
Bias (p. 9; p. 17; Table 2)	9	Describe any efforts to address potential sources of bias
Study size (based on sample size calculations e.g. Dillman, 2007)	10	Explain how the study size was arrived at
Quantitative variables (p. 10)	11	Explain how quantitative variables were handled in the analyses. If applicable, describe which groupings were chosen and why
Statistical methods	12	(a) Describe all statistical methods, including those used to

(pp. 10)

- Missing data coded with -999 with high data quality evident based on inspection of missing values

- Confidence level of 95% used for sample size calculations and significance level for preference weights set at $p=0.05$

- Consistency check responses included (e.g Richardson et al., 2009)

Continued on next page

control for confounding

(b) Describe any methods used to examine subgroups and interactions

(c) Explain how missing data were addressed

(d) *Cohort study*—If applicable, explain how loss to follow-up was addressed

Case-control study—If applicable, explain how matching of cases and controls was addressed

Cross-sectional study—If applicable, describe analytical methods taking account of sampling strategy

(e) Describe any sensitivity analyses

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Results		
Participants (p. 10 ; Table 2)	13*	(a) Report numbers of individuals at each stage of study—eg numbers potentially eligible, examined for eligibility, confirmed eligible, included in the study, completing follow-up, and analysed (b) Give reasons for non-participation at each stage (c) Consider use of a flow diagram
Descriptive data (pp. 10 – 12; Table 2)	14*	(a) Give characteristics of study participants (eg demographic, clinical, social) and information on exposures and potential confounders (b) Indicate number of participants with missing data for each variable of interest (c) <i>Cohort study</i> —Summarise follow-up time (eg, average and total amount)
Outcome data (Tables 3-6)	15*	<i>Cohort study</i> —Report numbers of outcome events or summary measures over time <i>Case-control study</i> —Report numbers in each exposure category, or summary measures of exposure <i>Cross-sectional study</i> —Report numbers of outcome events or summary measures
Main results (Tables 5-6)	16	(a) Give unadjusted estimates and, if applicable, confounder-adjusted estimates and their precision (eg, 95% confidence interval). Make clear which confounders were adjusted for and why they were included (b) Report category boundaries when continuous variables were categorized (c) If relevant, consider translating estimates of relative risk into absolute risk for a meaningful time period
Other analyses (further research to explore preference heterogeneity to be reported in subsequent publications)	17	Report other analyses done—eg analyses of subgroups and interactions, and sensitivity analyses
Discussion		
Key results (pp. 15-17)	18	Summarise key results with reference to study objectives
Limitations (pp. 17-18)	19	Discuss limitations of the study, taking into account sources of potential bias or imprecision. Discuss both direction and magnitude of any potential bias
Interpretation (p. 18)	20	Give a cautious overall interpretation of results considering objectives, limitations, multiplicity of analyses, results from similar studies, and other relevant evidence
Generalisability (p. 18)	21	Discuss the generalisability (external validity) of the study results
Other information		
Funding (p. 23 of 33)	22	Give the source of funding and the role of the funders for the present study and, if applicable, for the original study on which the present article is based

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DCE SURVEY INSTRUMENT

Part A (DCE Task)

In this section, we will ask you to imagine yourself in a situation in which you might choose to access emergency care.

The different choices included in the survey are hypothetical. Sometimes there are many differences between the alternatives presented and sometime the differences are few.

While some alternatives such as being treated by a specialist emergency doctor at your hospital emergency department or a General Practitioner (GP) at a local clinic are current realities, other alternatives will require you to imagine that these services can be delivered in new and different ways. For example, one of the alternatives that will be presented involves being treated by an “emergency health care professional”. This new role could combine extended skills for health professionals (e.g. nurses or paramedics) wishing to undertake specialist training in emergency care.

Other alternatives will require you to imagine being able to be treated at home or your local medical clinic, at varying levels of cost to you and waiting time. Each alternative also presents varying levels of service quality. This includes where healthcare providers may or may not be easy to understand (in terms of language proficiency and ability to explain medical concepts), provide only basic care or comprehensive assessment and treatment, and are interrupted or free from disruptions. Please note that we are not interested in exploring alternatives to how hospitals treat severe medical emergencies, but only possible alternatives to how moderate and less urgent presentations could be cared for.

For this task you are asked to make a series of choices based upon hypothetical scenarios for the delivery of emergency care. Each choice is between two options, each offering a different alternative in terms of the healthcare professional who could treat you, your preferred service location, how much you would be prepared to pay, how long you are prepared to wait and the level of service quality.

Example Scenario

	Option A	Option B
Treating healthcare professional	Emergency healthcare professional (other than a doctor)	Specialist emergency doctor
Location	Home	Hospital
Potential cost to you	\$0	\$0
Maximum waiting time	2 hours	4 hours
Quality of service	Healthcare professional is <u>easy</u> to understand, <u>basic</u> treatment provided with <u>some</u> interruptions	Healthcare professional is <u>easy</u> to understand, <u>comprehensive</u> treatment provided with <u>some</u> interruptions

Please note that for each of the alternatives presented you are asked to respond to two (2) questions:

1. Which would you prefer?	Option A <input type="checkbox"/>	Option B <input type="checkbox"/>
2. If your preferred option was available, would you take it, or would you delay accessing care for 24 hours to see if your condition improves?	YES <input type="checkbox"/> (take preferred option) <input type="checkbox"/> (delay for 24 hours)	

The imaginary choices you are asked to make will be described by the following characteristics. You might like to refer to this when you answer the questions.

Treating healthcare professional	<p>Your treating healthcare professional may be:</p> <ul style="list-style-type: none"> • Specialist emergency doctor • General practitioner – i.e. a doctor who works in the community but without specialist training in emergency medicine (may not be your usual GP) • Emergency healthcare professional (other than a doctor) – i.e. a “new” type of professional, where a health professional (e.g. nurse or paramedic) has received specialist training in emergency care
Location	<p>The location where are you seen and treated. This may be:</p> <ul style="list-style-type: none"> • Your own home • A local clinic • A Hospital
Potential cost to you	<p>Although public health services are often provided for free, there can be a charge for some private services. How much might you be asked to pay out of your own pocket to receive the service that is described? This may be:</p> <ul style="list-style-type: none"> • \$0 • \$50 • \$100 • \$200
Maximum waiting time	<p>Patients accessing emergency care usually have to wait to be seen by a health professional, unless their condition is very urgent. What is the maximum length of time you might need to wait? This might be:</p> <ul style="list-style-type: none"> • 30 minutes • 1 hour • 2 hours • 4 hours
Quality	<p>What is the quality of the emergency care service you receive? This might be:</p> <ul style="list-style-type: none"> • The healthcare professional is easy to understand, and comprehensive treatment is provided with no interruptions • The healthcare professional is easy to understand, and only basic treatment is provided and with some interruptions • The healthcare professional is not easy to understand, and only basic treatment is provided and with some interruptions

Please turn the page to begin Part A of the survey

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Part A Questions

In this section you are asked to consider yourself in the following situation.

You are asked to imagine that you have fallen from the top of a ladder and landed heavily. Although you may not have lost consciousness, you hit your head hard and are feeling dazed and nauseous (sick). You are also experiencing pain in your right arm and shoulder, and have some cuts and abrasions.

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Question 1. We understand you may not have any medical knowledge, but would like your perspective on urgency of treatment. Do you think that emergency staff should classify the urgency of this presenting problem as needing to be seen?

Tick one option

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|---|--------------------------|
| Immediately – condition is immediately life-threatening | <input type="checkbox"/> |
| Within 10 minutes - imminently life-threatening condition and/or very severe pain | <input type="checkbox"/> |
| Within 30 minutes - Potentially life threatening condition and/or severe discomfort or distress | <input type="checkbox"/> |
| Within 60 minutes - Potentially serious condition and/or significant discomfort or distress | <input type="checkbox"/> |
| Within 120 minutes - Less urgent problems | <input type="checkbox"/> |

For all these choices you are asked to imagine the following situation:

You have fallen from the top of a ladder and landed heavily. Although you may not have lost consciousness you hit your head hard and are feeling dazed and nauseous (sick). You are also experiencing pain in your right arm and shoulder, and have some cuts and abrasions.

Question 2. For all the scenarios in this section you are asked to consider yourself in the situation described at the top of the page.

Scenario 1

D1P5V18B2S1

	Option A	Option B
Treating healthcare professional	General Practitioner (may not be your usual GP)	Emergency healthcare professional (other than a doctor)
Location	Local clinic	Home
Potential cost to you	\$0	\$200
Maximum waiting time	4 hours	30 mins
Quality of service	Healthcare professional is <u>easy</u> to understand, <u>comprehensive</u> treatment provided with <u>no</u> interruptions	Healthcare professional is <u>not easy</u> to understand, <u>basic</u> treatment provided with <u>some</u> interruptions
1. Which would you prefer?	Option A <input type="checkbox"/>	Option B <input type="checkbox"/>
2. If your preferred option was available, would you take it, or would you delay accessing care for 24 hours to see if your condition improves?	YES <input type="checkbox"/> (take preferred option) NO <input type="checkbox"/> (delay for 24 hours)	

For all these choices you are asked to imagine the following situation:

You have fallen from the top of a ladder and landed heavily. Although you may not have lost consciousness you hit your head hard and are feeling dazed and nauseous (sick). You are also experiencing pain in your right arm and shoulder, and have some cuts and abrasions.

Scenario 2

D2P5V18B2S2

	Option A	Option B
Treating healthcare professional	Specialist emergency doctor	General Practitioner (may not be your usual GP)
Location	Hospital	Local clinic
Potential cost to you	\$0	\$50
Maximum waiting time	4 hours	30 mins
Quality of service	Healthcare professional is <u>easy</u> to understand, <u>comprehensive</u> treatment provided with <u>no</u> interruptions	Healthcare professional is <u>not easy</u> to understand, <u>basic</u> treatment provided with <u>some</u> interruptions
1. Which would you prefer?	Option A <input type="checkbox"/>	Option B <input type="checkbox"/>
2. If your preferred option was available, would you take it, or would you delay accessing care for 24 hours to see if your condition improves?	YES <input type="checkbox"/> (take preferred option) NO <input type="checkbox"/> (delay for 24 hours)	

Scenario 3

D4P5V18B2S3

	Option A	Option B
Treating healthcare professional	General Practitioner (may not be your usual GP)	Specialist emergency doctor
Location	Hospital	Local clinic
Potential cost to you	\$200	\$0
Maximum waiting time	30 mins	4 hours
Quality of service	Healthcare professional is <u>not easy</u> to understand, <u>basic</u> treatment provided with <u>some</u> interruptions	Healthcare professional is <u>easy</u> to understand, <u>comprehensive</u> treatment provided with <u>no</u> interruptions
1. Which would you prefer?	Option A <input type="checkbox"/>	Option B <input type="checkbox"/>
2. If your preferred option was available, would you take it, or would you delay accessing care for 24 hours to see if your condition improves?	YES <input type="checkbox"/> (take preferred option) NO <input type="checkbox"/> (delay for 24 hours)	

For all these choices you are asked to imagine the following situation:

You have fallen from the top of a ladder and landed heavily. Although you may not have lost consciousness you hit your head hard and are feeling dazed and nauseous (sick). You are also experiencing pain in your right arm and shoulder, and have some cuts and abrasions.

Scenario 4

D5P5V18B2S4

	Option A	Option B
Treating healthcare professional	Emergency healthcare professional (other than a doctor)	General Practitioner (may not be your usual GP)
Location	Local clinic	Hospital
Potential cost to you	\$0	\$200
Maximum waiting time	2 hours	30 mins
Quality of service	Healthcare professional is <u>easy</u> to understand, <u>basic</u> treatment provided with <u>some</u> interruptions	Healthcare professional is <u>easy</u> to understand, <u>comprehensive</u> treatment provided with <u>no</u> interruptions
1. Which would you prefer?	Option A <input type="checkbox"/>	Option B <input type="checkbox"/>
2. If your preferred option was available, would you take it, or would you delay accessing care for 24 hours to see if your condition improves?	YES <input type="checkbox"/> (take preferred option) NO <input type="checkbox"/> (delay for 24 hours)	

Scenario 5

D6P5V18B2S5

	Option A	Option B
Treating healthcare professional	Specialist emergency doctor	General Practitioner (may not be your usual GP)
Location	Local clinic	Hospital
Potential cost to you	\$100	\$100
Maximum waiting time	1 hour	1 hour
Quality of service	Healthcare professional is <u>not easy</u> to understand, <u>basic</u> treatment provided with <u>some</u> interruptions	Healthcare professional is <u>easy</u> to understand, <u>comprehensive</u> treatment provided with <u>no</u> interruptions
1. Which would you prefer?	Option A <input type="checkbox"/>	Option B <input type="checkbox"/>
2. If your preferred option was available, would you take it, or would you delay accessing care for 24 hours to see if your condition improves?	YES <input type="checkbox"/> (take preferred option) NO <input type="checkbox"/> (delay for 24 hours)	

For all these choices you are asked to imagine the following situation:

You have fallen from the top of a ladder and landed heavily. Although you may not have lost consciousness you hit your head hard and are feeling dazed and nauseous (sick). You are also experiencing pain in your right arm and shoulder, and have some cuts and abrasions.

Scenario 6

D7P5V18B2S6

	Option A	Option B
Treating healthcare professional	Emergency healthcare professional (other than a doctor)	General practitioner (may not be your usual GP)
Location	Home	Local clinic
Potential cost to you	\$0	\$200
Maximum waiting time	2 hours	2 hours
Quality of service	Healthcare professional is <u>not easy</u> to understand, <u>basic</u> treatment provided with <u>some</u> interruptions	Healthcare professional is <u>easy</u> to understand, <u>comprehensive</u> treatment provided with <u>no</u> interruptions
1. Which would you prefer?	Option A <input type="checkbox"/>	Option B <input type="checkbox"/>
2. If your preferred option was available, would you take it, or would you delay accessing care for 24 hours to see if your condition improves?	YES <input type="checkbox"/> (take preferred option) NO <input type="checkbox"/> (delay for 24 hours)	

Scenario 7

D10P5V18B2S7

	Option A	Option B
Treating healthcare professional	General Practitioner (may not be your usual GP)	Emergency healthcare professional (other than a doctor)
Location	Hospital	Home
Potential cost to you	\$0	\$200
Maximum waiting time	4 hours	30 mins
Quality of service	Healthcare professional is <u>easy</u> to understand, <u>basic</u> treatment provided with <u>some</u> interruptions	Healthcare professional is <u>easy</u> to understand, <u>comprehensive</u> treatment provided with <u>no</u> interruptions
1. Which would you prefer?	Option A <input type="checkbox"/>	Option B <input type="checkbox"/>
2. If your preferred option was available, would you take it, or would you delay accessing care for 24 hours to see if your condition improves?	YES <input type="checkbox"/> (take preferred option) NO <input type="checkbox"/> (delay for 24 hours)	

For all these choices you are asked to imagine the following situation:

You have fallen from the top of a ladder and landed heavily. Although you may not have lost consciousness you hit your head hard and are feeling dazed and nauseous (sick). You are also experiencing pain in your right arm and shoulder, and have some cuts and abrasions.

Scenario 8

D11P5V18B2S8

	Option A	Option B
Treating healthcare professional	Emergency healthcare professional (other than a doctor)	Specialist emergency doctor
Location	Local clinic	Hospital
Potential cost to you	\$200	\$50
Maximum waiting time	1 hour	2 hours
Quality of service	Healthcare professional is <u>easy</u> to understand, <u>basic</u> treatment provided with <u>some</u> interruptions	Healthcare professional is <u>not easy</u> to understand, <u>basic</u> treatment provided with <u>some</u> interruptions
1. Which would you prefer?	Option A <input type="checkbox"/>	Option B <input type="checkbox"/>
2. If your preferred option was available, would you take it, or would you delay accessing care for 24 hours to see if your condition improves?	YES <input type="checkbox"/> (take preferred option) NO <input type="checkbox"/> (delay for 24 hours)	

Scenario 9

D14P5V18B2S9

	Option A	Option B
Treating healthcare professional	Specialist emergency doctor	General Practitioner (may not be your usual GP)
Location	Local clinic	Home
Potential cost to you	\$200	\$0
Maximum waiting time	2 hours	2 hours
Quality of service	Healthcare professional is <u>easy</u> to understand, <u>comprehensive</u> treatment provided with <u>no</u> interruptions	Healthcare professional is <u>not easy</u> to understand, <u>basic</u> treatment provided with <u>some</u> interruptions
1. Which would you prefer?	Option A <input type="checkbox"/>	Option B <input type="checkbox"/>
2. If your preferred option was available, would you take it, or would you delay accessing care for 24 hours to see if your condition improves?	YES <input type="checkbox"/> (take preferred option) NO <input type="checkbox"/> (delay for 24 hours)	

For all these choices you are asked to imagine the following situation:

You have fallen from the top of a ladder and landed heavily. Although you may not have lost consciousness you hit your head hard and are feeling dazed and nauseous (sick). You are also experiencing pain in your right arm and shoulder, and have some cuts and abrasions.

Scenario 10

D15P5V18B2S10

	Option A	Option B
Treating healthcare professional	General Practitioner (may not be your usual GP)	Emergency healthcare professional (other than a doctor)
Location	Home	Hospital
Potential cost to you	\$100	\$0
Maximum waiting time	1 hour	4 hours
Quality of service	Healthcare professional is <u>easy</u> to understand, <u>comprehensive</u> treatment provided with <u>no</u> interruptions	Healthcare professional is <u>easy</u> to understand, <u>basic</u> treatment provided with <u>some</u> interruptions
1. Which would you prefer?	Option A <input type="checkbox"/>	Option B <input type="checkbox"/>
2. If your preferred option was available, would you take it, or would you delay accessing care for 24 hours to see if your condition improves?	YES <input type="checkbox"/> (take preferred option) NO <input type="checkbox"/> (delay for 24 hours)	

Scenario 11

D22 P5V18B2S11

	Option A	Option B
Treating healthcare professional	Emergency healthcare professional (other than a doctor)	General Practitioner (may not be your usual GP)
Location	Home	Hospital
Potential cost to you	\$50	\$50
Maximum waiting time	30 mins	2 hours
Quality of service	Healthcare professional is <u>not easy</u> to understand, <u>basic</u> treatment provided with <u>some</u> interruptions	Healthcare professional is <u>easy</u> to understand, <u>basic</u> treatment provided with <u>some</u> interruptions
1. Which would you prefer?	Option A <input type="checkbox"/>	Option B <input type="checkbox"/>
2. If your preferred option was available, would you take it, or would you delay accessing care for 24 hours to see if your condition improves?	YES <input type="checkbox"/> (take preferred option) NO <input type="checkbox"/> (delay for 24 hours)	

For all these choices you are asked to imagine the following situation:

You have fallen from the top of a ladder and landed heavily. Although you may not have lost consciousness you hit your head hard and are feeling dazed and nauseous (sick). You are also experiencing pain in your right arm and shoulder, and have some cuts and abrasions.

Scenario 12

D24P5V18B2S12

	Option A	Option B
Treating healthcare professional	Emergency healthcare professional (other than a doctor)	General Practitioner (may not be your usual GP)
Location	Hospital	Home
Potential cost to you	\$200	\$0
Maximum waiting time	30 mins	4 hours
Quality of service	Healthcare professional is <u>easy</u> to understand, <u>basic</u> treatment provided with <u>some</u> interruptions	Healthcare professional is <u>not easy</u> to understand, <u>basic</u> treatment provided with <u>some</u> interruptions
1. Which would you prefer?	Option A <input type="checkbox"/>	Option B <input type="checkbox"/>
2. If your preferred option was available, would you take it, or would you delay accessing care for 24 hours to see if your condition improves?	YES <input type="checkbox"/> (take preferred option) NO <input type="checkbox"/> (delay for 24 hours)	

Scenario 13

R2P5V18B2S1

	Option A	Option B
Treating healthcare professional	General Practitioner (may not be your usual GP)	Specialist emergency doctor
Location	Local clinic	Hospital
Potential cost to you	\$50	\$0
Maximum waiting time	30 mins	4 hours
Quality of service	Healthcare professional is <u>not easy</u> to understand, <u>basic</u> treatment provided with <u>some</u> interruptions	Healthcare professional is <u>easy</u> to understand, <u>comprehensive</u> treatment provided with <u>no</u> interruptions
1. Which would you prefer?	Option A <input type="checkbox"/>	Option B <input type="checkbox"/>
2. If your preferred option was available, would you take it, or would you delay accessing care for 24 hours to see if your condition improves?	YES <input type="checkbox"/> (take preferred option) NO <input type="checkbox"/> (delay for 24 hours)	

Part B (Attitudinal Scales)

We would like to ask you some questions about how you think about your social interactions and community responsibilities and how conscious you are of your own health.

Please circle the response most relevant to you.

	Strongly Agree	Agree	Neither Agree or Disagree	Disagree	Strongly Disagree
1. It is no use worrying about current events or public affairs; I can't do anything about them anyway	1	2	3	4	5
2. Every person should give some of their time for the good of their community	1	2	3	4	5
3. Our country would be a lot better off if we didn't have so many elections and people didn't have to vote so often	1	2	3	4	5
4. Letting your friends down is not so bad because you can't do good all the time for everybody	1	2	3	4	5
5. It is the duty of each person to do their job the very best they can	1	2	3	4	5
6. People would be a lot better off if they could live far away from other people and never have to do anything for them	1	2	3	4	5
7. I usually volunteer for special projects and community groups	1	2	3	4	5
8. I feel very bad when I have failed to finish a job I promised I would do	1	2	3	4	5
9. I am very aware of social disadvantage and how it impacts the community	1	2	3	4	5

Please turn the page to answer the remaining questions

	Strongly Agree	Agree	Neither Agree or Disagree	Disagree	Strongly Disagree
10. I reflect about my health a lot	1	2	3	4	5
11. I'm very self-conscious about my health	1	2	3	4	5
12. I'm generally attentive to my inner feeling about my health	1	2	3	4	5
13. I'm constantly examining my health	1	2	3	4	5
14. I'm alert to changes in my health	1	2	3	4	5
15. I'm usually aware of my health	1	2	3	4	5
16. I'm aware of the state of my health as I go through the day	1	2	3	4	5
17. I notice how I feel physically as I go through the day	1	2	3	4	5
18. I'm very involved with my health	1	2	3	4	5

Part C (Participant characteristics)

Finally, we would like to ask you a few short questions about yourself and your general health.

You do not need to answer every question unless you wish to do so.

1. **Thinking about your life in the last 4 weeks, how would you rate your quality of life?** Please choose the answer that appears most appropriate.

Very poor	Poor	Neither poor nor good	Good	Very good
1	2	3	4	5

Questions 2 to 13 Tick the box next to the response that best fits your situation

2. Do you need any help looking after yourself?

- I need no help at all
- Occasionally I need some help with personal care tasks
- I need help with the more difficult personal care tasks
- I need daily help with most or all personal care tasks

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3. When doing household tasks: (For example: preparing food, gardening, using the video recorder, radio, telephone or washing the car.)

- I need no help at all
- Occasionally I need some help with household tasks
- I need help with the more difficult household tasks
- I need daily help with most or all household tasks

4. Thinking about how easily you can get around your home and community:

- I get around my home and community by myself without any difficulty
- I find it difficult to get around my home and community by myself
- I cannot get around the community by myself, but I can get around my home with some difficulty
- I cannot get around either the community or my home by myself

5. Because of your health, your relationships (for example: with your friends, partner or parents) generally:

- Are very close and warm
- Are sometimes close and warm
- Are seldom close and warm
- I have no close and warm relationships

6. Thinking about your relationship with other people:

- I have plenty of friends, and am never lonely
- Although I have friends, I am occasionally lonely
- I have some friends, but am often lonely for company
- I am socially isolated and feel lonely

7. Thinking about your health and my relationship with my family:

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- My role in the family is unaffected by my health
 - There are some parts of my family role I cannot carry out
 - There are many parts of my family role I cannot carry out
 - I cannot carry out any part of my family role

8. Thinking about your vision, including when using your glasses or contact lenses if needed:

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- I see normally
 - I have some difficulty focusing on things, or I do not see them sharply
For example: small print, a newspaper or seeing objects in the distance.
 - I have a lot of difficulty seeing things
My vision is blurred. For example: I can see just enough to get by with.
 - I only see general shapes, or am blind
For example: I need a guide to move around.

9. Thinking about your hearing, including using your hearing aid if needed:

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- I hear normally
 - I have some difficulty hearing or I do not hear clearly
For example: I ask people to speak up, or turn up the TV or radio volume.
 - I have difficulty hearing things clearly
For example: Often I do not understand what is said. I usually do not take part in conversations because I cannot hear what is said.
 - I hear very little indeed
For example: I cannot fully understand loud voices speaking directly to me.

10. When you communicate with others: (For example: by talking, listening, writing or signing.)

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- I have no trouble speaking to them or understanding what they are saying
 - I have some difficulty being understood by people who do not know me. I have no trouble understanding what others are saying to me.
 - I am only understood by people who know me well. I have great trouble understanding what others are saying to me.
 - I cannot adequately communicate with others

11. Thinking about how you sleep:

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- I am able to sleep without difficulty most of the time
 - My sleep is interrupted some of the time, but I am usually able to go back to sleep without difficulty
 - My sleep is interrupted most nights, but I am usually able to go back to sleep without difficulty
 - I sleep in short bursts only. I am awake most of the night

12. Thinking about how you generally feel:

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- I do not feel anxious, worried or depressed
 - I am slightly anxious, worried or depressed
 - I feel moderately anxious, worried or depressed
 - I am extremely anxious, worried or depressed

13. How much pain or discomfort do you experience:

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- None at all
 - I have moderate pain
 - I suffer from severe pain
 - I suffer unbearable pain

14. Have you or a close family member ever been treated for any of the following:

	Self	Close family member
Diabetes	<input type="checkbox"/>	<input type="checkbox"/>
Heart Disease	<input type="checkbox"/>	<input type="checkbox"/>
Asthma	<input type="checkbox"/>	<input type="checkbox"/>
Other respiratory disease	<input type="checkbox"/>	<input type="checkbox"/>
Skin Cancer	<input type="checkbox"/>	<input type="checkbox"/>
Other Cancer	<input type="checkbox"/>	<input type="checkbox"/>
Depression	<input type="checkbox"/>	<input type="checkbox"/>
Anxiety	<input type="checkbox"/>	<input type="checkbox"/>
Other emotional problems	<input type="checkbox"/>	<input type="checkbox"/>
Chronic neck/back pain	<input type="checkbox"/>	<input type="checkbox"/>
Arthritis	<input type="checkbox"/>	<input type="checkbox"/>
Stomach ulcer/heartburn	<input type="checkbox"/>	<input type="checkbox"/>
Weight Management	<input type="checkbox"/>	<input type="checkbox"/>

15. How many times have you been admitted to hospital in the last 12 months?

None 1-3 4 or more

16. How many times have you visited an Emergency Department in the last 12 months?

None 1-3 4 or more

17. How many times have you visited a General Practitioner in the last 12 months?

None 1-3 4 or more

18. What is your age in years? _____

19. Are you:

Male Female

20. Which best describes your current relationship status:

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- Married/Living with a partner
Separated/Divorced
Widowed
Single

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21. Do you identify as an Aboriginal and/or Torres Strait Islander?

- Yes No

22. Were you born in Australia?

- Yes No

23. Is English the main language spoken at home?

- Yes No

24. Have you worked in the health system in the last 10 years?

- Yes No

25. Which of the following best describes your main activity?

- In employment or self-employment
Retired
Homemaker
Student
Seeking work
Other (please specify) _____

26. Did your education continue after the minimum school leaving age?

- Yes No

27. Do you have a Degree or equivalent professional qualification?

- Yes No

28. What is your postcode? _____

29. Which annual income bracket does your household fall into?

- Up to \$40,000
\$40,001 - \$70,000
\$70,001 - \$100,000
\$100,001 - \$130,000
\$130,001 plus
Prefer not to answer

30. Do you have private health insurance?

	Yes	No
Hospital Cover	<input type="checkbox"/>	<input type="checkbox"/>
Extras Cover	<input type="checkbox"/>	<input type="checkbox"/>

31. Do you hold a health concession card? (E.g. a Commonwealth Seniors Health Card)?

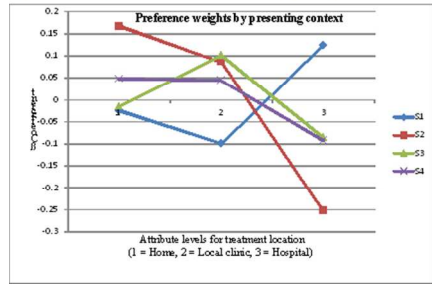
Yes No

Date survey completed: _____

For peer review only

Thank you for completing this survey

Figure 1. Pattern of preferences for treatment location by presenting scenario



Note: S1 (possible concussion); S2 (w/child/parent related - self); S3 (w/child/parent related - daughter); S4 (senior related presentation)

266x166mm (96 x 96 DPI)

Review only

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The Australian public's preferences for emergency care alternatives and the influence of the presenting context: A Discrete Choice Experiment

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Manuscripts

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5 **The Australian public's preferences for emergency care alternatives and the influence**
6 **of the presenting context: A Discrete Choice Experiment**
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Running title: The public's preferences for emergency care

ABSTRACT

Objectives: The current study seeks to quantify the Australian public's preferences for emergency care alternatives and determine if preferences differ depending on presenting circumstances.

Setting: Increasing presentations to Emergency Departments have led to overcrowding, long waiting times and suboptimal health system performance. Accordingly, new service models involving the provision of care in alternative settings and delivered by other practitioners continue to be developed.

Participants: A stratified sample of Australian adults (n=1838), 1382 from Queensland and 456 from South Australia, completed the survey. This included 951 females and 887 males from the 2045 people who met screening criteria out of the 4,354 people who accepted the survey invitation.

Interventions: A discrete choice experiment was used to elicit preferences in the context of one of four hypothetical scenarios; a possible concussion, a rash/asthma-related problem involving oneself or one's child and an anxiety-related presentation. Mixed logit regression was used to analyse the dependent variable choice and identify the relative importance of care attributes and the propensity to access care in each context.

Results: Results indicated a preference for treatment by an emergency physician in hospital for possible concussion and treatment by a doctor in ambulatory settings for rash/asthma-related and anxiety-related problems. Participants were consistently willing to wait longer before making trade-offs in the context of the rash/asthma-related scenario compared to when the same problem affected their child. Results suggest a clear preference for lower costs, shorter wait times and strong emphasis on quality care; however, significant preference heterogeneity was observed.

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2
3 **Conclusion:** This study has increased awareness that the public's emergency care choices
4 will differ depending on the presenting context. It has further demonstrated the importance of
5 service quality as a determinant of health care choices. The findings have also provided
6 insights into the Australian public's reactions to emergency care reforms.
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11 12 13 14 **STRENGTHS AND LIMITATIONS OF THIS STUDY**

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17 • This study represents the first investigation of the Australian public's preferences for
18 emergency care and, internationally, the first examination of preferences for both the
19 characteristics of emergency care and service uptake decisions, irrespective of the
20 care options available.
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- 23
24 • The demonstration of the importance of contextual factors represents a novel
25 contribution to the literature.
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29 • The results offer some explanations to the apparent inconsistencies in the literature
30 indicating 'inappropriate' presentations to emergency departments even when there
31 are ambulatory alternatives available.
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35 • Although the sample was stratified by age and sex, participants were less diverse and
36 reported higher levels of morbidity compared to the general population.
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INTRODUCTION

Emergency Departments (EDs) primarily exist to treat people experiencing medical emergencies, but often provide services to patients with a range of presenting problems of less urgency.^[1-4] Both within Australia and internationally, demand for emergency care has been increasing each year leading to substantial ED pressures.^[2, 3, 5-7] Although the causes of ED overcrowding are complex, socio-demographic changes, including population growth and ageing, and clinical considerations such as increasing co-morbidities are key contributors to excessive demand.^[3] Other contributing factors relate to system issues such as decisions about resourcing and the increasing cost of health care,^[8, 9] the availability and type of bed stock and lack of service alternatives.^[2, 3, 5] An additional factor, however, is the public's understanding of ED and when it should be accessed;^[10] with 'inappropriate' patient attendance considered to adversely impact the performance of ED.^[11] Despite some conjecture in the literature about the degree to which presentations deemed lower acuity, often referred to as 'GP type patients', contribute to overcrowding and the utility of alternative service models^[3, 12, 13], some Australian health authorities have launched social marketing campaigns to redirect the public to alternative care.^[14] Further reforms including the introduction of user co-payments for accessing care have also been proposed.^[e.g. 14, 15]

EDs have been described as being "amongst the biggest 'hotspots' in Australia's healthcare system".^[16, p. 6] Increasing demand has led to considerable pressures on emergency care resources and staff, overcrowding and "access block"; with ambulances having to queue to deliver patients and hospitals having to be bypassed due to excessive waiting times.^[16-18] This situation contributes to sub-optimal management of critically ill patients and inefficiencies in the health system,^[3, 17] and has been identified as the most important barrier to the provision of quality care in ED.^[16] Indeed, estimates of the increased mortality rate

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2
3 that can be directly associated with access block and overcrowding in ED range between 10%
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5 and 30%, as a results of the mix of contributing factors identified, in particular, the lack of
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7 inpatient beds for people who require hospital admission.^[3, 16]
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11 In an attempt to address this burden, health decision-makers both internationally and
12
13 in Australia, have sought to understand the way in which the public access ED and under
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15 what circumstances. Alternative models of care have been recommended as part of global
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17 efforts to manage ED demand, reduce wait times and drive innovation.^[19] Despite
18
19 recognition of the need to consider contextual issues,^[20] there has been limited research on
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21 how different presenting problems and contexts may be associated with different patterns of
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23 preferences or access to care. Indeed, the public's preferences for emergency care
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25 alternatives remain largely unknown.^[21] The results of a recent Hong Kong study suggest
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27 that how patients perceive their presentation is key to their care choices.^[11] There are also
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29 indications that members of the public understand health emergencies differently to that
30
31 espoused in clinical guidelines.^[22] This suggests that understanding how patient perceptions
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33 influence care choices in different scenarios may provide important insights to drive demand
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35 management solutions. However, investigations regarding how different presenting contexts
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37 impact preferences for emergency care are limited.^[11]
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43 Researchers have begun responding to calls for knowledge about public preferences
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45 for emergency care ^[23-25] and the impact of different care alternatives on ED presentations.^{[11,}
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47 ^{26]} However, no previous study has to date explored the impact of different presentations on
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49 preferences for the characteristics of care and service uptake decisions. Thus, the current
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51 study compared preference patterns of the general public for the delivery of emergency care
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53 in the context of different hypothetical scenarios.
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METHODS

A Discrete Choice Experiment (DCE) was developed to elicit the preferences of a representative Australian population sample about the characteristics of an emergency care service and the use of ED in different circumstances. A DCE involves presenting a series of hypothetical scenarios to participants who are asked to indicate their preferred option from a set of mutually exclusive alternatives.^[27] The value of DCE methods in eliciting preferences for emergency care^[11, 21, 23-25] and primary health care or alternative settings^[25, 28-31] has previously been established.

To explore the impact of the presenting context, participants were asked to make their choices in the context of one of four presenting scenarios. The hypothetical scenarios reflected a mix of potentially life-threatening and less-urgent presentations (i.e. within the range of emergency care alternatives for which different models of care might potentially exist), and were developed in consultation with health service partners. The primary scenario was designed to represent a typical ED presentation involving injuries from an accident or fall - in this case a possible concussion. In Scenario 1 (S1) participants were told to imagine; *“you have fallen from the top of a ladder and landed heavily. Although you may not have lost consciousness, you hit your head hard and are feeling dazed and nauseous. You are also experiencing pain in your right arm and shoulder and have some cuts and abrasions”*. The alternative scenarios were designed to represent potential ‘GP type presentations’, varying both the type of concern and person presenting. In Scenario 2 (S2), participants were told *“you have been diagnosed with asthma. Over the last couple of days you have developed a heavy cough. After showering this morning you noticed you are developing a rash on your upper body which has made you worry about what is going on?”* Scenario 3 (S3) involved the same presentation involving a rash, and possibly an asthma-related problem, but

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3 participants were asked to imagine the symptoms concerned their 12 year old daughter.
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5 These scenarios are hereafter referred to as a rash/asthma-related self (S2) and child (S3).
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7 The fourth scenario involved an anxiety related presentation (S4). Participants were asked to
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9 imagine being “*in distress because your heart won’t stop racing. After trying to calm*
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11 *yourself you are still feeling extremely anxious and decide to seek help having previously*
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13 *been diagnosed and treated for anxiety*”.

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17 A DCE was developed for each scenario in accordance with best practice
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19 guidelines.^[27, 32, 33] The DCE presented a series of hypothetical choices between two service
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21 models defined by different levels of five key attributes. Attributes of ED care were initially
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23 identified through focus group discussions.^[21] Relevant literature was used to refine attribute
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25 descriptions and derive attribute-levels.^[e.g. 24, 25, 28, 29, 31, 34] Five attributes comprising key
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27 features of ED service models were included in the choice scenarios; namely, treating
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29 healthcare professional, treatment location, waiting time, out of pocket cost and service
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31 quality.
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36 Levels for treating professional included being treated by an ED physician, general
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38 practitioner (GP) or an emergency care professional other than a doctor, whilst levels for
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40 treatment location were at home, in a local clinic or at hospital. Currently the vast majority of
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42 Australians choose to access an ED at a public hospital with no ‘out-of-pocket’ expenses as
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44 opposed to paying for treatment privately.^[16] Cost levels therefore varied from no cost up to
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46 a maximum of \$200 based on the range of out-of-pocket expenses that may be incurred if
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48 emergency care were accessed privately. National and international benchmarks designed to
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50 reduce overcrowding and excessive wait times were used to set waiting times of half an hour,
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52 1 hour, 2 hours and maximum of 4 hours.^[5, 19] Levels for service quality were based on a
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54 combination of attribute-levels used in related studies,^[24, 28, 29] and ranged from
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3 comprehensive care to basic treatment from a clinician who was not easy to understand with
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5 some interruptions.
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8 *Table 1 goes here*
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12 To select pairs of service profiles to be presented to participants, a fractional factorial
13 main effects D_p -efficient design was generated using *NGENE software (Version 1.1.1, 2012)*.
14 The combination of attribute levels whereby an emergency care physician treats people in
15 their own homes was considered to be implausible, and was therefore prohibited in the
16 design.^[27] The resulting design generated 24 choice sets, each consisting of a choice
17 between two alternative services (A and B). A blocked design was used to divide the 24
18 choice sets into a manageable number of 12 choice sets per participant,^[35] with participants
19 randomly allocated to each block. To increase the realism of scenarios, an *opt out* option was
20 included for each choice set, whereby participants could choose to delay accessing care for
21 24 hours to see if their condition improved.^[6, 36] For each block, one choice set was repeated
22 as a consistency check, to provide an indication of data quality; however, responses to the
23 repeat choice set were excluded from the preference models.^[37] A sample choice profile is
24 presented in Table 1.
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42 Following ethical approval^[21] the DCE was pilot tested on a convenience sample of
43 21 adults. The pilot results were used to make minor amendments, and the coefficients
44 generated from analysis of the pilot data were used as prior parameters to improve the
45 efficiency of the experimental design. The survey was then administered via the internet to a
46 sample of adults (n = 1838) residing in two Australian States (Queensland and South
47 Australia). Participants were recruited from a survey panel by a third party provider
48 (PureProfile) between September and December 2012. Quotas were set to ensure the sample
49 reflected the age and gender distribution of the corresponding state populations. All
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3 participants were provided with an information sheet to explain the study and informed
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5 consent was assumed upon completion and submission of the survey responses. A copy of
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7 the information sheet and survey based on the possible concussion scenario is provided as an
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9 online Appendix.
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11
12 The survey was administered online and consisted of three main components; the
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14 DCE choice sets , socio-demographic characteristics and attitudinal measures of
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16 responsibilities for one's own health. Members of the general public (n= 909); 453
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18 participants from Queensland (QLD) and 456 from South Australia (SA) were randomly
19
20 assigned to complete the main survey version involving a possible concussion. Smaller
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22 samples from QLD were assigned to consider the alternative scenarios (rash/asthma – self;
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24 n=311, rash/asthma – child; n=309, and the anxiety related issue; n=309).
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30 After being introduced to their respective scenarios, participants were asked to rate
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32 the urgency of the situation based on a brief description of triage categories. This rating
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34 provided an indicator of their perceived urgency of the situation prior to the consideration of
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36 choice sets. Non-parametric tests (Kruskal-Wallis test and Mann-Whitney U tests with
37
38 Bonferroni corrections for post-hoc comparisons of categorical variables) were used to
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40 examine if there were significant differences in in the public's perceptions of urgency across
41
42 presenting contexts as well as their intentions to access emergency care alternatives [e.g. 38, 39].
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46 Preferences for emergency care were analysed in *NLOGIT (Version 5)* [40] using
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48 mixed logit (MXL) regression models. MXL models estimate the effect of the different
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50 service attribute levels (independent variables) on choice of service (dependent variable),
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52 whilst allowing service preferences to vary (i.e. to be heterogeneous) across the sample. MXL
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54 models were generated using 1000 Halton draws, an intelligent simulation method that
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56 requires a tenth of the number of draws used with other random approaches.^[27] Treating
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3 health professional, location and service quality were specified using effects coding and cost
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5 and waiting time were coded continuously after confirming their level effects were linear in
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7 preliminary analyses. The resulting patterns of preferences were descriptively compared to
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9 identify any variations in intentions to access healthcare or the public's preferences for how
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11 this care is delivered. Further, marginal willingness to wait was estimated to quantify trade-
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13 offs and used to compare the public's preferences for service delivery across different
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15 scenarios.^[27, 41] Marginal willingness to wait represents the additional time an individual
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17 would be willing to wait in order gain an improvement in a characteristic of service delivery,
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19 and is estimated as the ratio between the relevant attribute coefficients in the model.^[41, 42]
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21 Parameters were specified as random and following a normal distribution with confidence
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23 intervals calculated using the delta method, as described by Daly *et al.*^[43] and software
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25 developed by Hess.^[44]
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30 RESULTS

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32 From the 4,354 members of the general public who accepted the survey invitation, a total of
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34 2045 people (46.97%) met screening criteria and commenced the survey. Of these, 89.88%
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36 (n=1838) completed the survey to achieve the required sample quotas. The average
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38 completion time was 14.37 minutes, with 99.4% of participants taking five seconds or longer
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40 to choose their preferred option. A total of 1672 participants (90.96%) passed the consistency
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42 check. In recognition of some concerns about excluding those who fail consistency checks,
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44 for example evidence of lexicographic healthcare preferences, all responses were included in
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46 the analysis as a kind of sensitivity analysis employed by Richardson *et al.*^[37]
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51 Although the stratified sample was selected according to quotas to ensure
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53 demographic representativeness, comparisons of socioeconomic and health status measures
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55 were made with population norms (Table 2). Overall the sample appeared to represent the
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respective state and national population distributions. Notable exceptions included comparatively higher morbidity levels (e.g. asthma rates and poorer quality of life) and less culturally diverse and Aboriginal and Torres Strait peoples in the study sample compared to the general population.

Table 2 goes here

Perceived urgency of presenting problem

Table 3 presents the triage ratings assigned by participants for each of the presenting scenarios based on a brief description on the categories used in the Australasian Triage Scale where higher scores represent lower levels of urgency. Relatively equal numbers of participants rated the possible concussion scenario (S1) as a Triage Category 1, 2 or 3. The median score was 2, with an interquartile range (IQR) of 1 to 3, and a mode of 3. For the rash/asthma-related (self) presentation (S2), the median was 3, IQR 2 to 4, and mode 4. When the scenario involved the participants' daughter (S3), the median and mode were 3 with the same IQR, providing some indication that more participants considered this a more urgent presentation compared to Scenario 2. Notably, the highest level of urgency was assigned to the anxiety-related presentation (S4) with a median score of 2, IQR 1 to 3.5, and a mode of 1.

Table 3 goes here

Does presenting context influence uptake of ED services?

In accordance with participants' differing levels of perceived urgency across the four scenarios, the "opt out" data (i.e., the decision to delay care and monitor the situation)

suggested that the degree to which people would take up any service also differed depending on the presenting problem. Table 4 indicates the number of times participants chose to access, rather than delay accessing care. It suggests participants most often elected to access services when considering the rash/asthma-related presentation involving their child (S3) and least frequently for the same problem involving themselves (S2). Interestingly, the pattern of responses for S3 was similar to S1 (a possible concussion). Kruskal-Wallis results indicated significant differences between presenting contexts ($H_{(3)} = 83.65, p = <0.001$). Using Mann-Whitney tests (with Bonferroni corrections where $p = 0.008$), significant differences were found between all scenarios except for S1 and S3 ($z = -1.39, p = 0.164$) and S2 and S4, ($z = -1.92, p = 0.054$). Thus, while the anxiety scenario was most frequently perceived to be more urgent, participants were most likely to delay accessing care in the context of a possible concussion or rash/asthma related presentation involving their daughter.

Table 4 goes here

Preferences for emergency care: Results of Mixed Logit (MXL) analyses

MXL models for all four scenarios revealed a good model fit for a choice model^[27] (S1: McFadden Pseudo $R^2 = 0.371$, AIC/N = 1.386; S2: Pseudo $R^2 = 0.367$, AIC/N = 1.401; S3: Pseudo $R^2 = 0.395$, AIC/N = 1.338; S4: Pseudo $R^2 = 0.367$, AIC/N = 1.400). The results are presented for each scenario in Table 5. The mean parameters represent the preference weight associated with each attribute-level. Positive weights indicate the part-worth utility associated with each characteristic and a negative weight the associated disutility. The standard deviation parameters and significance levels indicate the extent of preference heterogeneity around mean parameters across participants.

As indicated in Table 5, the constants in each of the models were large, negative and significant suggesting a strong propensity to access any type of emergency care rather than delay care in all scenarios. However, there was marked heterogeneity indicated by the significance of standard deviations. This heterogeneity and the size and statistical significance of the constant terms suggest the impact of factors beyond the observed service attributes on healthcare choices.

Table 5 goes here

For S1, the results indicate an overall preference to be treated by an ED clinician ($\beta = 0.261$) compared to a GP ($\beta = -0.073$, $p < 0.001$) or any emergency health professional other than a doctor ($\beta = -0.188$, $p < 0.001$). Participants also preferred treatment at hospital ($\beta = 0.119$, $p < 0.001$) over treatment at a local clinic ($\beta = -0.091$, $p = 0.002$) or treatment at home ($\beta = -0.028$). As expected, lower personal costs ($\beta = -0.019$, $p < 0.001$) and shorter wait times were clearly valued ($\beta = -0.012$, $p < 0.001$), as was comprehensive treatment ($\beta = 0.557$) compared to basic treatment for a clinician who was easy to understand ($\beta = 0.156$, $p < 0.001$) and not easy to understand ($\beta = -0.713$, $p < 0.001$). Indeed, the preference weights for service quality suggest that an improvement in this service characteristic was relatively more important when compared to marginal improvements in the other attributes in the DCE.

Although treatment by an emergency health professional other than a doctor was the least preferred in all contexts, a different pattern of preferences were observed for S1 compared to the other scenarios. Whereas treatment at hospital was clearly preferred in S1, for each of the remaining scenarios, preferences were strongest for treatment in ambulatory settings such as a local clinic (S3 and S4) or at home (S2). The different patterns of preferences for treatment location, by presenting context are depicted in Figure 1. In all four scenarios, there were clear preferences for lower costs (for every dollar of out-of-pocket

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3 expense), shorter wait times (for every minute waited) and higher levels of service quality.
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5 The marked heterogeneity observed across all contexts and variations observed in both
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7 patterns of service uptake and preferences for the different characteristics of care suggest
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9 different presenting problems are associated with differences in healthcare choices. Choices
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11 differed even when the same problem affected different people (e.g. S2 and S3).
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15 *Figure 1 goes here*
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18 Willingness to wait

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20 In order to directly compare between models, the public's marginal willingness to
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22 wait for improvements in service characteristics were estimated. As indicated in Table 6,
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24 there was a clear preference to be treated by an ED clinician rather than an emergency health
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26 care professional in all contexts. The public were willing to wait between an additional 22.0
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28 minutes (95%CI 9.6 to 34.4; S2) and 60.2 minutes (95%CI 46.3 to 74.1; S3) in order to be
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30 treated by an ED clinician rather than another emergency health care professional. In the
31
32 context of a possible concussion the public were also prepared to wait an additional 27.5
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34 minutes (95%CI 22.3 – 32.7) to be treated by an ED Clinician instead of a GP. Participants
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36 were willing to wait an additional 29.4 (95%CI 16.3 to 42.5) minutes to be treated at home
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38 rather than in hospital in the context of S2 (rash/asthma), but the opposite effect was observed
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40 in relation to willingness to wait estimates for S1, confirming a complex interaction between
41
42 willingness to wait, preferences for treatment location and the presenting problem. On
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44 average, people were willing to wait almost twice as long for every one dollar saved in out-
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46 of-pocket expenses for their preferred option when the presenting problems concerned
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48 themselves as opposed to their child.
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56 *Table 6 goes here*
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3 The marginal willingness to wait estimates for trade-offs in quality varied by level of
4 quality and scenario, ranging from a minimum of an additional 29.5 (95%CI 17.1 to 41.8)
5 minutes for a moderate improvement in quality in S1, to a maximum of 171.8 (95%CI 136.3
6 to 207.4) minutes for a large improvement in quality in S3. Participants were willing to wait
7 substantially longer to receive comprehensive care, even in circumstances where one would
8 expect to see a desire for more immediate care. Overall, these results suggest that the public
9 clearly place significant value on high quality care.
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19 DISCUSSION

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21 The preferences for emergency care elicited in this study suggest that regardless of cost and
22 waiting time, the Australian public have a clear preference for treatment by a doctor across all
23 presenting contexts. Although researchers and policy makers have identified a role for
24 models led by nurses and ambulance officers to reduce ED workloads,^[45] the results suggest
25 there is currently little public support for such innovations in Australia when this is described
26 as care led by ‘emergency care practitioners (other than a doctor)’. Consistent with previous
27 results from other countries^[11,24] there were clear preferences for shorter wait times, higher
28 service quality and support for treatment in proximal service locations including a local GP
29 clinic for ‘GP type’ presentations. Indeed, the extraordinary amount of time people were
30 prepared to wait before trading for lower levels of service quality provide further support that
31 this is a primary determinant of health care choices.^[e.g. 34] The findings suggest that the
32 public are clearly adverse to contributing out-of-pocket expenses or receiving treatment from
33 health professionals other than a doctor, suggesting they may be unwilling to support such
34 changes should they be introduced in the future.^[15,46] Nonetheless, these findings provide
35 guidance about how to improve current efforts aimed at reducing wait times and support
36 further investments in ambulatory care alternatives, in particular, for problems involving
37 chronic issues.
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3 Specifically, our analyses have suggested that the presenting context influences
4 preferences for emergency care, both in terms of propensity to access emergency care and
5 preferences for the different characteristics of service options. Differences were observed not
6 only for different conditions, but also according to who was being treated (i.e. when the
7 problem affected their daughter rather than themselves). These findings are to be expected
8 given the literature on social constructions of childhood and heightened notions of
9 vulnerability,^[47, 48] which in part have led to the establishment of dedicated paediatric ED
10 and/or treatment areas within ED.^[e.g. 6, 7] Indeed, triage categories reflect an urgency rather
11 than a complexity scale and clinicians may also assign different urgency ratings to similar
12 presenting problems in different patients.^[12] Further, presentations involving skin rashes are
13 also recognised as being particularly challenging to assess.^[49] However, the urgency ratings
14 assigned by participants, including for the anxiety-related scenario, also support the assertion
15 that the public understand health emergencies differently to that outlined in triage guidelines,
16 ^[e.g. 4] and may give more weight to psychosocial considerations rather than just physiological
17 metrics or threats to life.^[22] The implication of these findings for health policy and decision-
18 makers is that although the public may have differing views about how quickly non-life
19 threatening problems need to be treated, they also recognise that different problems may be
20 treated in different settings; even if they still want to be treated urgently, as evidenced in the
21 anxiety-related scenario.

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46 Our results are similar to findings from a recent Hong Kong study^[11], demonstrating
47 the need to further examine how patient perceptions of presenting problems drive healthcare
48 decision-making. Although recent international studies have suggested that more than half of
49 all visits to ED are classified as non-emergencies, the availability of alternative ambulatory
50 care services has done little to reduce demand.^[26, 50] Our study sheds light on this persistent
51 problem, demonstrating clear preferences for higher levels of service quality delivered by
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3 doctors (and emergency specialists in the case of suspected concussion). The preferences
4 elicited for the ‘GP type scenarios’ suggest the Australian public generally prefer to be
5 treated at their local GP clinic in these circumstances. However, other doctor-led models
6 including integration of GP clinics within ED, extended hours GP co-operatives and in-home
7 care [e.g. 11, 45] and re-designing patient flow processes (e.g. fast-track streams for chronic-
8 disease related issues)^[3, 5, 6, 12, 13, 51] could gain public acceptance in future.

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18 The levels of preference heterogeneity observed across all DCE scenarios raise the
19 need for further analyses and exploration of the public’s preferences. Although there was a
20 different pattern of preferences evident for accessing care when presentations involved new
21 concerns and possible chronic problems compared to an acute injury, the heterogeneity
22 observed may also help explain why a substantial proportion of ED presentations continue to
23 be considered ‘inappropriate’^[11, 22, 50, 52] even when ambulatory alternatives are available.^[26]
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33 It is likely that a range of situational or socio-demographic factors may impact preferences,
34 [e.g. 1] and these will be explored in future analyses.

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The moderate response rate, although comparable to other internet and paper based choice studies,^[e.g. 30, 53, 54] and the under-representation of culturally diverse participants in our sample is noteworthy. Sample bias may have originated from the use of a panel recruitment company and internet-administered surveys.^[e.g. 55] Whereas future researchers would benefit from undertaking their formative qualitative research with consumer representatives, the initial focus groups used to design the DCE survey largely comprised health professionals. Another limitation of our study was that the description of each of the hypothetical scenarios was brief, using simple everyday language which may have left too much opportunity for participants to infer missing information. Although this was a deliberate strategy, it is acknowledged that our brief description of presenting context may

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3 not have been as useful as anticipated. Nevertheless, the research was exploratory and many
4 of the challenges are overshadowed by our large relatively representative sample and the use
5 of multiple scenarios and systematic comparison of different attributes. Although caution
6 should be applied in generalising the results of this study, findings suggest future research
7 should examine other variations of the patient, nature and time of presenting problems as well
8 as models of care led by other health professionals. The public's apparent aversion to non-
9 doctor led care may have been influenced by our framing of this choice as 'other than a
10 doctor'. This change was made to improve clarity in response to feedback from the pilot
11 study, however, may have resulted in this being perceived as a loss or 'substandard' choice
12 [e.g. 56] The findings also suggest the need to investigate the influence of other individual
13 factors on healthcare decision-making. Researchers and decision-makers may then be able to
14 isolate the preferences of specific groups, such as high services users or people found to be
15 less likely to delay care to inform demand management strategies.
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32 **CONCLUSION**

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36 Overall, the findings from this study suggest that the Australian public do not support being
37 treated by an emergency health practitioner other than a doctor, irrespective of the presenting
38 problem, or reductions in cost or wait times. This conclusion appears to be supported by the
39 high value the public have placed on service quality. Results do, however, provide support
40 for reforms focussing on providing greater access to GP-based ambulatory care as well as
41 efforts to reduce wait times without increasing cost. Although the literature is mixed about
42 the degree to which ambulatory care alternatives reduce pressures on ED, our findings
43 provide evidence that citizens do make different decisions about when to access emergency
44 care according to their presenting situation, as reflected in the different pattern of choices
45 evident. They also suggest different presenting contexts including when the same problem
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3 affects different people influence these choices. Indeed, when the presenting problems
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5 affected a child they were perceived as more urgent, led to higher rates of service uptake and
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7 also marked differences in the public's willingness to wait before making trade-offs in care.
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10 Future investigations are needed to clarify how these contextual issues and other
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12 differentiating factors influence these decision-making processes. This type of knowledge
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14 will assist us to not only better understand the public's preferences for accessing services but,
15
16 more broadly, develop and target specific demand management strategies for emergency care
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18 services and related primary health care initiatives
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20 21 **FOOTNOTES**

22 *Authors' Contributions*

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27 All authors contributed to the research design. The DCE was developed by JW, PH, JR, EK
28
29 and PS. PH and JW led data analysis. All authors contributed to, reviewed and approved the
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31 final manuscript led by PH.
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46
47 Institute for Health and Care Excellence (NICE).
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50 *Competing Interests*

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55 All authors declare they have no competing interests.
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57 *Ethics Approval*

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3 Ethics approval was obtained from the Griffith University Human Research Ethics
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5 Committee (Reference Number: MED/10/12/HREC).
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8 ***Data Sharing Statement***
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11 Requests for results of preliminary analyses, coding and other information can be directed to
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13 the corresponding author.
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Table 1. Sample profile based on DCE design

<i>Imagine you have been diagnosed with asthma. Over the last couple of days you have developed a heavy cough. After showering this morning you noticed you are developing a rash on your upper body which has made you worry about what is going on?</i>		
	Option A	Option B
Treating healthcare professional	General Practitioner (may not be your usual GP)	Emergency healthcare professional (other than a doctor)
Location	Local clinic	Home
Potential cost to you	\$0	\$200
Maximum waiting time	4 hours	30 mins
Quality of service	Healthcare professional is <u>easy</u> to understand, <u>comprehensive</u> treatment provided with <u>no</u> interruptions	Healthcare professional is <u>not easy</u> to understand, <u>basic</u> treatment provided with <u>some</u> interruptions
Which would you prefer?	Option A <input type="checkbox"/>	Option B <input type="checkbox"/>
If this option was available, would you take it, or would you delay for 24 hours to see if your condition improves before accessing care?	I would take my preferred option..... <input type="checkbox"/>	I would delay for 24 hours to see if my condition improves before accessing care <input type="checkbox"/>
<i>Note:</i>		
<ul style="list-style-type: none"> • Health professionals options; were ED clinician; GP (may not be your usual GP) or an Emergency health professional (other than a doctor) • Treatment locations were; home, local clinical, or hospital, • Potential out of pocket expenses were; \$0, \$50, \$100 or \$200 • Maximum wait times were; 30 mins, 1 hour, 2 hours or up to 4 hours • Levels of service quality were; healthcare professional is easy to understand, comprehensive treatment provided with no interruptions; healthcare professional is easy to understand, basic treatment provided with some interruptions, or healthcare professional is not easy to understand, basic treatment provided with some interruptions 		

Table 2. Breakdown of sample by selected individual characteristics and available norms

Individual characteristics	Categories	Scenario 1 (n= 909)	Scenario 2 (n=311)	Scenario 3 (n=309)	Scenario 4 (n=309)	Population norms ^[57]	
Demographics:	Gender	<i>Male</i>	439 (48.3%)	150 (48.2%)	150 (48.5%)	148 (47.9%)	49.4%
		<i>Female</i>	470 (51.7%)	161 (51.8%)	159 (51.5%)	161 (52.1%)	50.6%
	Age cohorts	<i>18- 24 years</i>	109 (12.0%)	36 (11.6%)	36 (11.7%)	38 (12.3%)	13.3%*
		<i>25-34 years</i>	157 (17.3%)	58 (18.6%)	57 (18.4%)	56 (18.1%)	13.8%
		<i>35-44 years</i>	165 (18.2%)	58 (18.6%)	57 (18.4%)	59 (19.1%)	14.3%
		<i>45-54 years</i>	165 (18.2%)	55 (17.7%)	55 (17.8%)	55 (17.8%)	13.7%
		<i>55-64 years</i>	141 (15.5%)	51 (16.4%)	49 (15.9%)	49 (15.9%)	11.6%
		<i>65 years and over</i>	172 (18.9%)	53 (17.0%)	55 (17.8%)	52 (16.8%)	14.0%
	Relationship status	<i>Married/partner</i>	572 (62.9%)	214 (68.8%)	209 (67.6%)	212 (68.6%)	58.7%
		<i>Separated/divorced</i>	86 (9.5%)	32 (10.3%)	36 (11.7%)	25 (8.1%)	11.4%
		<i>Widowed</i>	26 (2.9%)	7 (2.3%)	4 (1.3%)	12 (3.9%)	5.5 %
		<i>Single</i>	220 (24.2%)	55 (17.7%)	57(18.4%)	58 (18.8%)	34.3% ^
	English as main spoken language	<i>Yes</i>	848 (93.3%)	293 (94.2%)	287 (92.9%)	288 (93.2%)	70.6% +
<i>No</i>		48 (5.4%)	11 (3.6%)	12 (3.9%)	15 (5.2%)	-	
Aboriginal and/or Torres Strait Islander	<i>Yes</i>	13 (1.4%)	5 (1.6%)	1 (0.3%)	5 (1.6%)	2.5%	
	<i>No</i>	887 (98.6%)	301 (96.8%)	299 (96.8%)	300 (97.1%)	-	

Individual characteristics		Categories	Scenario 1 (n= 909)	Scenario 2 (n=311)	Scenario 3 (n=309)	Scenario 4 (n=309)	Population norms
Socioeconomic factors:	Have a professional qualification/degree	<i>Yes</i>	369 (40.6%)	131 (42.1%)	146 (47.2%)	142 (46.0%)	32.4%
		<i>No</i>	526 (57.9%)	175 (56.3%)	158 (51.1%)	164 (53.1%)	
	Main activity (employment)	<i>Employed/self-employed</i>	452 (49.7%)	170 (54.7%)	163 (52.8%)	181 (58.6%)	59.7% [#]
		<i>Retired</i>	212 (23.3%)	67 (21.5%)	69 (22.3%)	60 (19.4%)	-
		<i>Homemaker</i>	100 (11.0%)	28 (9.0%)	36 (11.7%)	26 (8.4%)	-
		<i>Student</i>	63 (6.9%)	19 (6.1%)	22 (7.1%)	24 (7.8%)	-
		<i>Seeking work</i>	48 (5.3%)	17 (5.5%)	13 (4.2%)	14 (4.5%)	5.6%
		<i>Other</i>	28 (2.9%)	6 (1.9%)	3 (0.9%)	3 (1.0%)	-
	Annual household income	<i>Up to \$40,000</i>	265 (29.2%)	84 (27.0%)	75 (24.3%)	69 (22.3%)	<i>Md = \$68,800</i>
		<i>\$40,001 - \$70,000</i>	203 (22.3%)	73 (23.5%)	57 (18.4%)	71 (23.0%)	
		<i>\$70,001- \$100,000</i>	159 (17.5%)	48 (15.4%)	50 (16.2%)	53 (17.2%)	
		<i>\$100,001 - \$130,000</i>	92 (10.1%)	27 (8.7%)	35 (11.3%)	34 (11.0%)	
<i>Over \$130,000</i>		67 (7.4%)	30 (9.6%)	35 (11.3%)	28 (12.3%)		

Individual characteristics		Categories	Scenario 1 (n= 909)	Scenario 2 (n=311)	Scenario 3 (n=309)	Scenario 4 (n=309)	Population norms
Health status and experiences:	Quality of life	(AQoL4D)	$\chi = 0.67$ (± 0.26)	$\chi = 0.68$ (± 0.26)	$\chi = 0.70$ (± 0.24)	$\chi = 0.72$ (± 0.23)	$\mu = 0.81$ (± 0.22) ^[58]
	Asthma	(self)	175 (19.3%)	65 (20.9%)	64 (20.7%)	52 (16.8%)	11.8% ^[59]
		(close family)	239 (26.3%)	93 (29.9%)	80 (26.1%)	90 (29.1%)	-
	Use of ED in past 12 months	None	671 (73.8%)	241 (77.5%)	225 (72.8%)	236 (76.4%)	13% at least once ^[60]
		1-3 times	210 (23.1%)	61 (19.6%)	72 (23.3%)	65 (21.0%)	
		4 or more	20 (2.2%)	5 (1.6%)	4 (1.3%)	5 (1.6%)	
	Use of GP services in past 12 months	None	114 (12.5%)	40 (12.9%)	33 (10.7%)	35 (11.3%)	81% at least once ^[60]
		1-3 times	467 (51.4%)	144 (46.3%)	162 (52.4%)	151 (48.9%)	
		4 or more	321 (35.3%)	124 (39.9%)	11 (35.9%)	120 (38.8%)	
	Previously employed in health industry	Yes	75 (8.3%)	15 (4.8%)	34 (11.0%)	31 (10.0%)	6% ^[61]
No		827 (91.0%)	292 (93.9%)	272 (88.0%)	277 (89.6%)	-	

*Note young people defined as 15-24 and Australian Census data includes children and young people aged 0-15 collectively comprising 19.3% of the population as

^ Defined as never married in 2011 Australian Census data

+ Defined as English only spoken at home in 2011 Australian Census data

Defined as worked full-time in 2011 Australian Census data

Residual percentages represent the small number of missing values observed

Table 3. Frequency of triage ratings assigned for presenting scenarios

Scenario	Sample	Australasian Triage Scale ^[4]	Frequency
(S1) Presentation involving possible concussion (self)	(n=909) (n= 453 QLD) (n= 456 SA)	1 (immediately life-threatening)	233 (25.6%)
		2 (imminently life-threatening)	230 (25.3%)
		3 (potentially life-threatening)	255 (28.1%)
		4 (potentially serious)	153 (16.8%)
		5 (less urgent)	38 (4.2%)
(S2) Rash/asthma-related presentation (self)	(n=311) (QLD)	1 (immediately life-threatening)	51 (16.4%)
		2 (imminently life-threatening)	46 (14.8%)
		3 (potentially life-threatening)	61 (19.6%)
		4 (potentially serious)	80 (25.7%)
		5 (less urgent)	73 (23.5%)
(S3) Rash/asthma-related presentation (daughter)	(n=309) (QLD)	1 (immediately life-threatening)	55 (17.8%)
		2 (imminently life-threatening)	52 (16.8%)
		3 (potentially life-threatening)	85 (27.5%)
		4 (potentially serious)	82 (26.5%)
		5 (less urgent)	35 (11.4%)
(S4) Anxiety related presentation (self)	(n=309) (QLD)	1 (immediately life-threatening)	81 (26.2%)
		2 (imminently life-threatening)	76 (24.6%)
		3 (potentially life-threatening)	75 (24.3%)
		4 (potentially serious)	51 (16.5%)
		5 (less urgent)	26 (8.4%)

Table 4. Number of times participants chose to access care by presenting context

Scenario	n =	Minimum (frequency)	Maximum (frequency)	Median	Inter-quartiles		Mean (\pm s.d.)
					25%	75%	
(S1) Possible concussion (self)	909	0 (28, 3.1%)	12 (600, 66.0%)	12	10	12	10.46 \pm 2.98
(S2) Rash/asthma-related presentation (self)	311	0 (24, 7.7%)	12 (139, 44.7%)	11	6	12	8.78 \pm 3.98
(S3) Rash/asthma-related presentation (daughter)	309	0 (10, 3.2%)	12 (215, 69.6%)	12	11	12	10.73 \pm 2.77
(S4) Anxiety related presentation (self)	309	0 (16, 5.2%)	12 (161, 52.1%)	12	7	12	9.28 \pm 3.92

Table 5. Results of MXL analyses on opt out data by presenting scenario

Attribute	Levels	Part-worth utilities											
		S1 (possible concussion - self)				S2 (rash/asthma related - self)				S3 (rash/asthma related - daughter)			
		Mean parameter	P	Standard deviation	P	Mean parameter	P	Standard deviation	P	mean parameter	P	Standard deviation	P
Principal healthcare professional	• <i>ED clinician</i>	<i>0.261</i>		<i>-0.527</i>		<i>0.054</i>		<i>-0.454</i>		<i>0.293</i>		<i>-0.031</i>	
	• GP (may not be your usual GP)	** <i>-0.073</i>	.001	0.161	.233	0.095	.062	** <i>0.302</i>	.001	0.049	.239	0.004	.974
	• Emergency health professional (other than a doctor)	** <i>-0.188</i>	<.001	** <i>0.366</i>	<.001	** <i>-0.149</i>	.003	0.152	.196	** <i>-0.342</i>	<.001	0.027	.772
Location	• <i>Home</i>	<i>-0.028</i>		<i>-0.934</i>		<i>0.100</i>		<i>-0.600</i>		<i>-0.027</i>		<i>-0.785</i>	
	• local clinic	** <i>-0.091</i>	.002	** <i>0.357</i>	<.001	0.073	.200	** <i>0.369</i>	<.001	0.063	.206	** <i>0.358</i>	<.001
	• hospital	** <i>0.119</i>	<.001	** <i>0.577</i>	<.001	** <i>-0.173</i>	.004	** <i>0.594</i>	<.001	-0.036	.451	** <i>0.427</i>	<.001
Potential cost to you	Per \$1 of out of pocket expense (continuously coded based on levels of \$0, \$50, \$100, \$200)	** <i>-0.019</i>	<.001	** <i>0.019</i>	<.001	** <i>-0.027</i>	<.001	** <i>0.023</i>	<.001	** <i>-0.016</i>	<.001	** <i>0.018</i>	<.001
Maximum waiting time	Per 1 minute of waiting time (based on attribute-levels of 30mins, 1 hour, 2 hours and 4 hours)	** <i>-0.012</i>	<.001	** <i>0.008</i>	<.001	** <i>-0.009</i>	<.001	** <i>0.007</i>	<.001	** <i>-0.011</i>	<.001	** <i>0.005</i>	<.001
	• <i>Healthcare professional is easy to understand, comprehensive treatment; no interruptions</i>	<i>0.557</i>		<i>-0.918</i>		<i>0.552</i>		<i>-0.981</i>		<i>0.806</i>		<i>-1.017</i>	
Quality	• Healthcare professional is <u>easy to understand, basic treatment; some interruptions</u>	** <i>0.156</i>	<.001	0.092	.149	** <i>0.279</i>	<.001	* <i>0.227</i>	.042	** <i>0.200</i>	<.001	0.161	.143
	• Healthcare professional is <u>not easy to understand, basic treatment; some interruptions</u>	** <i>-0.713</i>	<.001	** <i>0.826</i>	<.001	** <i>-0.831</i>	<.001	** <i>0.754</i>	<.001	** <i>-1.006</i>	<.001	** <i>0.856</i>	<.001
Constant	(associated with delaying care)	** <i>-6.502</i>	<.001	** <i>3.722</i>	<.001	** <i>-4.736</i>	<.001	** <i>3.474</i>	<.001	** <i>-6.715</i>	<.001	** <i>3.601</i>	<.001

p= probability level where **<.01; *<.05 Note: referent levels in italics

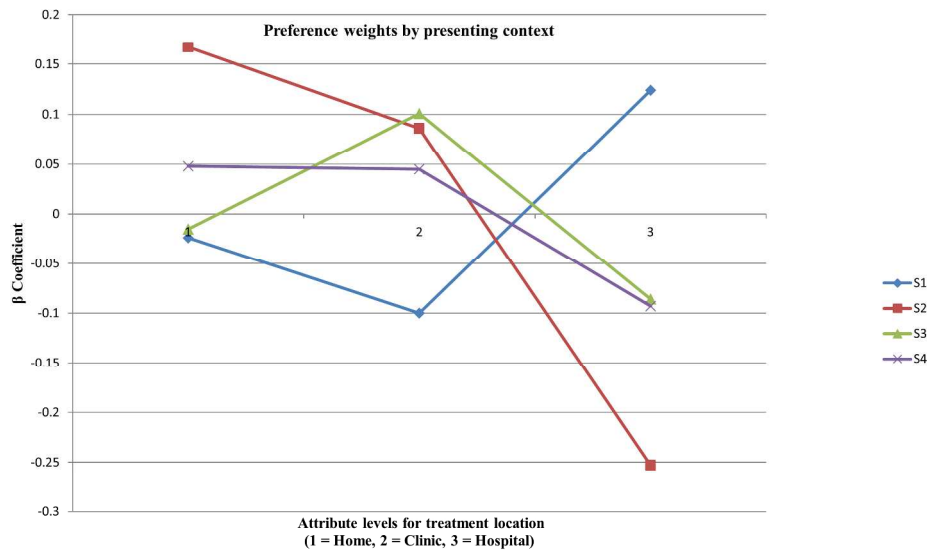
		Part-worth utilities			
		S4 (anxiety related - self)			
Attribute	Levels	Mean parameter	P	Standard deviation	P
Principal healthcare professional	• <i>ED clinician</i>	<i>0.163</i>		<i>-0.720</i>	
	• GP (may not be your usual GP)	0.005	.927	**0.430	<.001
	• Emergency health professional (other than a doctor)	**-.0158	.002	**0.290	.001
Location	• <i>Home</i>	<i>0.038</i>		<i>-1.132</i>	
	• local clinic	0.067	.263	**0.538	<.001
	• hospital	-0.105	.083	**0.594	<.001
Potential cost to you	Per \$1 of out of pocket expense (continuously coded based on levels of \$0, \$50, \$100, \$200)	**-.022	<.001	**0.022	<.001
Maximum waiting time	Per 1 minute of waiting time (based on levels of 30mins, 1 hour, 2 hours and 4 hours)	**-.013	<.001	**0.008	<.001
Quality	• <i>Healthcare professional is easy to understand, comprehensive treatment; no interruptions</i>	<i>0.599</i>		<i>-0.759</i>	
	• Healthcare professional is <u>easy to understand, basic treatment; some interruptions</u>	**0.199	<.001	0.005	.977
	• Healthcare professional is <u>not easy to understand, basic treatment; some interruptions</u>	**-.0.798	<.001	**0.754	<.001
Constant	(associated with delaying care)	**-.5.477	<.001	**3.726	<.001

p = probability level where **<.01, *<.05 Note: referent levels in italic

Table 6 Willingness to wait trade-offs between service characteristics.

Perceived improvement in service characteristics	Marginal willingness to wait in minutes to gain improvement (with 95% confidence intervals)			
	S1	S2	S3	S4
ED Clinician instead of an emergency health professional	37.0 (30.7–43.4)	22.0 (9.6–34.4)	60.2 (46.3–76.1)	24.0 (15.0–33.1)
ED Clinician instead of GP	27.5 (23.3–32.7)			
Treatment at hospital instead of home	12.1 (7.0–17.2)			
Treatment at home instead of hospital		29.4 (16.3–42.5)		
Treatment at home instead of a local clinic	5.2 (0.3–10.2)			
For every AU\$1 reduction in cost	1.6 (1.4–1.7)	2.9 (2.4–3.4)	1.5 (1.3–1.8)	1.7 (1.4–1.9)
Comprehensive care compared to basic treatment from a clinician you can understand with no interruptions	104.9 (90.5–119.3)	149.2 (110.4–188.1)	171.8 (136.3–207.4)	104.7 (82.5–128.0)
Basic treatment from a clinician you understand compared to basic treatment from a clinician you can't understand and some interruptions	33.1 (28.0–38.2)	29.5 (17.1–41.8)	57.5 (45.8–69.2)	30.0 (21.6–38.4)

Figure 1. Pattern of preferences for treatment location by presenting scenario



Note: S1 (possible concussion); S2 (rash/asthma related – self); S3 (rash/asthma related – daughter); S4 (anxiety related presentation)

254x190mm (300 x 300 DPI)

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DCE SURVEY INSTRUMENT

Part A (DCE Task)

In this section, we will ask you to imagine yourself in a situation in which you might choose to access emergency care.

The different choices included in the survey are hypothetical. Sometimes there are many differences between the alternatives presented and sometime the differences are few.

While some alternatives such as being treated by a specialist emergency doctor at your hospital emergency department or a General Practitioner (GP) at a local clinic are current realities, other alternatives will require you to imagine that these services can be delivered in new and different ways. For example, one of the alternatives that will be presented involves being treated by an “emergency health care professional”. This new role could combine extended skills for health professionals (e.g. nurses or paramedics) wishing to undertake specialist training in emergency care.

Other alternatives will require you to imagine being able to be treated at home or your local medical clinic, at varying levels of cost to you and waiting time. Each alternative also presents varying levels of service quality. This includes where healthcare providers may or may not be easy to understand (in terms of language proficiency and ability to explain medical concepts), provide only basic care or comprehensive assessment and treatment, and are interrupted or free from disruptions. Please note that we are not interested in exploring alternatives to how hospitals treat severe medical emergencies, but only possible alternatives to how moderate and less urgent presentations could be cared for.

For this task you are asked to make a series of choices based upon hypothetical scenarios for the delivery of emergency care. Each choice is between two options, each offering a different alternative in terms of the healthcare professional who could treat you, your preferred service location, how much you would be prepared to pay, how long you are prepared to wait and the level of service quality.

Example Scenario

	Option A	Option B
Treating healthcare professional	Emergency healthcare professional (other than a doctor)	Specialist emergency doctor
Location	Home	Hospital
Potential cost to you	\$0	\$0
Maximum waiting time	2 hours	4 hours
Quality of service	Healthcare professional is <u>easy</u> to understand, <u>basic</u> treatment provided with <u>some</u> interruptions	Healthcare professional is <u>easy</u> to understand, <u>comprehensive</u> treatment provided with <u>some</u> interruptions

Please note that for each of the alternatives presented you are asked to respond to two (2) questions:

1. Which would you prefer?	Option A <input type="checkbox"/>	Option B <input type="checkbox"/>
2. If your preferred option was available, would you take it, or would you delay accessing care for 24 hours to see if your condition improves?	YES <input type="checkbox"/> (take preferred option) <input type="checkbox"/> (delay for 24 hours)	

The imaginary choices you are asked to make will be described by the following characteristics. You might like to refer to this when you answer the questions.

Treating healthcare professional	<p>Your treating healthcare professional may be:</p> <ul style="list-style-type: none"> • Specialist emergency doctor • General practitioner – i.e. a doctor who works in the community but without specialist training in emergency medicine (may not be your usual GP) • Emergency healthcare professional (other than a doctor) – i.e. a “new” type of professional, where a health professional (e.g. nurse or paramedic) has received specialist training in emergency care
Location	<p>The location where are you seen and treated. This may be:</p> <ul style="list-style-type: none"> • Your own home • A local clinic • A Hospital
Potential cost to you	<p>Although public health services are often provided for free, there can be a charge for some private services. How much might you be asked to pay out of your own pocket to receive the service that is described? This may be:</p> <ul style="list-style-type: none"> • \$0 • \$50 • \$100 • \$200
Maximum waiting time	<p>Patients accessing emergency care usually have to wait to be seen by a health professional, unless their condition is very urgent. What is the maximum length of time you might need to wait? This might be:</p> <ul style="list-style-type: none"> • 30 minutes • 1 hour • 2 hours • 4 hours
Quality	<p>What is the quality of the emergency care service you receive? This might be:</p> <ul style="list-style-type: none"> • The healthcare professional is easy to understand, and comprehensive treatment is provided with no interruptions • The healthcare professional is easy to understand, and only basic treatment is provided and with some interruptions • The healthcare professional is not easy to understand, and only basic treatment is provided and with some interruptions

Please turn the page to begin Part A of the survey

Part A Questions

In this section you are asked to consider yourself in the following situation.

You are asked to imagine that you have fallen from the top of a ladder and landed heavily. Although you may not have lost consciousness, you hit your head hard and are feeling dazed and nauseous (sick). You are also experiencing pain in your right arm and shoulder, and have some cuts and abrasions.

Question 1. We understand you may not have any medical knowledge, but would like your perspective on urgency of treatment. Do you think that emergency staff should classify the urgency of this presenting problem as needing to be seen?

Tick one option

- Immediately – condition is immediately life-threatening
- Within 10 minutes - imminently life-threatening condition and/or very severe pain
- Within 30 minutes - Potentially life threatening condition and/or severe discomfort or distress
- Within 60 minutes - Potentially serious condition and/or significant discomfort or distress
- Within 120 minutes - Less urgent problems

For all these choices you are asked to imagine the following situation:

You have fallen from the top of a ladder and landed heavily. Although you may not have lost consciousness you hit your head hard and are feeling dazed and nauseous (sick). You are also experiencing pain in your right arm and shoulder, and have some cuts and abrasions.

Question 2. For all the scenarios in this section you are asked to consider yourself in the situation described at the top of the page.

Scenario 1

D1P5V18B2S1

	Option A	Option B
Treating healthcare professional	General Practitioner (may not be your usual GP)	Emergency healthcare professional (other than a doctor)
Location	Local clinic	Home
Potential cost to you	\$0	\$200
Maximum waiting time	4 hours	30 mins
Quality of service	Healthcare professional is <u>easy</u> to understand, <u>comprehensive</u> treatment provided with <u>no</u> interruptions	Healthcare professional is <u>not easy</u> to understand, <u>basic</u> treatment provided with <u>some</u> interruptions
1. Which would you prefer?	Option A <input type="checkbox"/>	Option B <input type="checkbox"/>
2. If your preferred option was available, would you take it, or would you delay accessing care for 24 hours to see if your condition improves?	YES <input type="checkbox"/> (take preferred option) NO <input type="checkbox"/> (delay for 24 hours)	

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For all these choices you are asked to imagine the following situation:

You have fallen from the top of a ladder and landed heavily. Although you may not have lost consciousness you hit your head hard and are feeling dazed and nauseous (sick). You are also experiencing pain in your right arm and shoulder, and have some cuts and abrasions.

Scenario 2

D2P5V18B2S2

	Option A	Option B
Treating healthcare professional	Specialist emergency doctor	General Practitioner (may not be your usual GP)
Location	Hospital	Local clinic
Potential cost to you	\$0	\$50
Maximum waiting time	4 hours	30 mins
Quality of service	Healthcare professional is <u>easy</u> to understand, <u>comprehensive</u> treatment provided with <u>no</u> interruptions	Healthcare professional is <u>not easy</u> to understand, <u>basic</u> treatment provided with <u>some</u> interruptions
1. Which would you prefer?	Option A <input type="checkbox"/>	Option B <input type="checkbox"/>
2. If your preferred option was available, would you take it, or would you delay accessing care for 24 hours to see if your condition improves?	YES <input type="checkbox"/> (take preferred option) NO <input type="checkbox"/> (delay for 24 hours)	

Scenario 3

D4P5V18B2S3

	Option A	Option B
Treating healthcare professional	General Practitioner (may not be your usual GP)	Specialist emergency doctor
Location	Hospital	Local clinic
Potential cost to you	\$200	\$0
Maximum waiting time	30 mins	4 hours
Quality of service	Healthcare professional is <u>not easy</u> to understand, <u>basic</u> treatment provided with <u>some</u> interruptions	Healthcare professional is <u>easy</u> to understand, <u>comprehensive</u> treatment provided with <u>no</u> interruptions
1. Which would you prefer?	Option A <input type="checkbox"/>	Option B <input type="checkbox"/>
2. If your preferred option was available, would you take it, or would you delay accessing care for 24 hours to see if your condition improves?	YES <input type="checkbox"/> (take preferred option) NO <input type="checkbox"/> (delay for 24 hours)	

For all these choices you are asked to imagine the following situation:

You have fallen from the top of a ladder and landed heavily. Although you may not have lost consciousness you hit your head hard and are feeling dazed and nauseous (sick). You are also experiencing pain in your right arm and shoulder, and have some cuts and abrasions.

Scenario 4

D5P5V18B2S4

	Option A	Option B
Treating healthcare professional	Emergency healthcare professional (other than a doctor)	General Practitioner (may not be your usual GP)
Location	Local clinic	Hospital
Potential cost to you	\$0	\$200
Maximum waiting time	2 hours	30 mins
Quality of service	Healthcare professional is <u>easy</u> to understand, <u>basic</u> treatment provided with <u>some</u> interruptions	Healthcare professional is <u>easy</u> to understand, <u>comprehensive</u> treatment provided with <u>no</u> interruptions
1. Which would you prefer?	Option A <input type="checkbox"/>	Option B <input type="checkbox"/>
2. If your preferred option was available, would you take it, or would you delay accessing care for 24 hours to see if your condition improves?	YES <input type="checkbox"/> (take preferred option) NO <input type="checkbox"/> (delay for 24 hours)	

Scenario 5

D6P5V18B2S5

	Option A	Option B
Treating healthcare professional	Specialist emergency doctor	General Practitioner (may not be your usual GP)
Location	Local clinic	Hospital
Potential cost to you	\$100	\$100
Maximum waiting time	1 hour	1 hour
Quality of service	Healthcare professional is <u>not easy</u> to understand, <u>basic</u> treatment provided with <u>some</u> interruptions	Healthcare professional is <u>easy</u> to understand, <u>comprehensive</u> treatment provided with <u>no</u> interruptions
1. Which would you prefer?	Option A <input type="checkbox"/>	Option B <input type="checkbox"/>
2. If your preferred option was available, would you take it, or would you delay accessing care for 24 hours to see if your condition improves?	YES <input type="checkbox"/> (take preferred option) NO <input type="checkbox"/> (delay for 24 hours)	

For all these choices you are asked to imagine the following situation:

You have fallen from the top of a ladder and landed heavily. Although you may not have lost consciousness you hit your head hard and are feeling dazed and nauseous (sick). You are also experiencing pain in your right arm and shoulder, and have some cuts and abrasions.

Scenario 6

D7P5V18B2S6

	Option A	Option B
Treating healthcare professional	Emergency healthcare professional (other than a doctor)	General practitioner (may not be your usual GP)
Location	Home	Local clinic
Potential cost to you	\$0	\$200
Maximum waiting time	2 hours	2 hours
Quality of service	Healthcare professional is <u>not easy</u> to understand, <u>basic</u> treatment provided with <u>some</u> interruptions	Healthcare professional is <u>easy</u> to understand, <u>comprehensive</u> treatment provided with <u>no</u> interruptions
1. Which would you prefer?	Option A <input type="checkbox"/>	Option B <input type="checkbox"/>
2. If your preferred option was available, would you take it, or would you delay accessing care for 24 hours to see if your condition improves?	YES <input type="checkbox"/> (take preferred option) NO <input type="checkbox"/> (delay for 24 hours)	

Scenario 7

D10P5V18B2S7

	Option A	Option B
Treating healthcare professional	General Practitioner (may not be your usual GP)	Emergency healthcare professional (other than a doctor)
Location	Hospital	Home
Potential cost to you	\$0	\$200
Maximum waiting time	4 hours	30 mins
Quality of service	Healthcare professional is <u>easy</u> to understand, <u>basic</u> treatment provided with <u>some</u> interruptions	Healthcare professional is <u>easy</u> to understand, <u>comprehensive</u> treatment provided with <u>no</u> interruptions
1. Which would you prefer?	Option A <input type="checkbox"/>	Option B <input type="checkbox"/>
2. If your preferred option was available, would you take it, or would you delay accessing care for 24 hours to see if your condition improves?	YES <input type="checkbox"/> (take preferred option) NO <input type="checkbox"/> (delay for 24 hours)	

For all these choices you are asked to imagine the following situation:

You have fallen from the top of a ladder and landed heavily. Although you may not have lost consciousness you hit your head hard and are feeling dazed and nauseous (sick). You are also experiencing pain in your right arm and shoulder, and have some cuts and abrasions.

Scenario 8

D11P5V18B2S8

	Option A	Option B
Treating healthcare professional	Emergency healthcare professional (other than a doctor)	Specialist emergency doctor
Location	Local clinic	Hospital
Potential cost to you	\$200	\$50
Maximum waiting time	1 hour	2 hours
Quality of service	Healthcare professional is <u>easy</u> to understand, <u>basic</u> treatment provided with <u>some</u> interruptions	Healthcare professional is <u>not easy</u> to understand, <u>basic</u> treatment provided with <u>some</u> interruptions
1. Which would you prefer?	Option A <input type="checkbox"/>	Option B <input type="checkbox"/>
2. If your preferred option was available, would you take it, or would you delay accessing care for 24 hours to see if your condition improves?	YES <input type="checkbox"/> (take preferred option) NO <input type="checkbox"/> (delay for 24 hours)	

Scenario 9

D14P5V18B2S9

	Option A	Option B
Treating healthcare professional	Specialist emergency doctor	General Practitioner (may not be your usual GP)
Location	Local clinic	Home
Potential cost to you	\$200	\$0
Maximum waiting time	2 hours	2 hours
Quality of service	Healthcare professional is <u>easy</u> to understand, <u>comprehensive</u> treatment provided with <u>no</u> interruptions	Healthcare professional is <u>not easy</u> to understand, <u>basic</u> treatment provided with <u>some</u> interruptions
1. Which would you prefer?	Option A <input type="checkbox"/>	Option B <input type="checkbox"/>
2. If your preferred option was available, would you take it, or would you delay accessing care for 24 hours to see if your condition improves?	YES <input type="checkbox"/> (take preferred option) NO <input type="checkbox"/> (delay for 24 hours)	

For all these choices you are asked to imagine the following situation:

You have fallen from the top of a ladder and landed heavily. Although you may not have lost consciousness you hit your head hard and are feeling dazed and nauseous (sick). You are also experiencing pain in your right arm and shoulder, and have some cuts and abrasions.

Scenario 10

D15P5V18B2S10

	Option A	Option B
Treating healthcare professional	General Practitioner (may not be your usual GP)	Emergency healthcare professional (other than a doctor)
Location	Home	Hospital
Potential cost to you	\$100	\$0
Maximum waiting time	1 hour	4 hours
Quality of service	Healthcare professional is <u>easy</u> to understand, <u>comprehensive</u> treatment provided with <u>no</u> interruptions	Healthcare professional is <u>easy</u> to understand, <u>basic</u> treatment provided with <u>some</u> interruptions
1. Which would you prefer?	Option A <input type="checkbox"/>	Option B <input type="checkbox"/>
2. If your preferred option was available, would you take it, or would you delay accessing care for 24 hours to see if your condition improves?	YES <input type="checkbox"/> (take preferred option) NO <input type="checkbox"/> (delay for 24 hours)	

Scenario 11

D22 P5V18B2S11

	Option A	Option B
Treating healthcare professional	Emergency healthcare professional (other than a doctor)	General Practitioner (may not be your usual GP)
Location	Home	Hospital
Potential cost to you	\$50	\$50
Maximum waiting time	30 mins	2 hours
Quality of service	Healthcare professional is <u>not easy</u> to understand, <u>basic</u> treatment provided with <u>some</u> interruptions	Healthcare professional is <u>easy</u> to understand, <u>basic</u> treatment provided with <u>some</u> interruptions
1. Which would you prefer?	Option A <input type="checkbox"/>	Option B <input type="checkbox"/>
2. If your preferred option was available, would you take it, or would you delay accessing care for 24 hours to see if your condition improves?	YES <input type="checkbox"/> (take preferred option) NO <input type="checkbox"/> (delay for 24 hours)	

For all these choices you are asked to imagine the following situation:

You have fallen from the top of a ladder and landed heavily. Although you may not have lost consciousness you hit your head hard and are feeling dazed and nauseous (sick). You are also experiencing pain in your right arm and shoulder, and have some cuts and abrasions.

Scenario 12

D24P5V18B2S12

	Option A	Option B
Treating healthcare professional	Emergency healthcare professional (other than a doctor)	General Practitioner (may not be your usual GP)
Location	Hospital	Home
Potential cost to you	\$200	\$0
Maximum waiting time	30 mins	4 hours
Quality of service	Healthcare professional is <u>easy</u> to understand, <u>basic</u> treatment provided with <u>some</u> interruptions	Healthcare professional is <u>not easy</u> to understand, <u>basic</u> treatment provided with <u>some</u> interruptions
1. Which would you prefer?	Option A <input type="checkbox"/>	Option B <input type="checkbox"/>
2. If your preferred option was available, would you take it, or would you delay accessing care for 24 hours to see if your condition improves?	YES <input type="checkbox"/> (take preferred option) NO <input type="checkbox"/> (delay for 24 hours)	

Scenario 13

R2P5V18B2S1

	Option A	Option B
Treating healthcare professional	General Practitioner (may not be your usual GP)	Specialist emergency doctor
Location	Local clinic	Hospital
Potential cost to you	\$50	\$0
Maximum waiting time	30 mins	4 hours
Quality of service	Healthcare professional is <u>not easy</u> to understand, <u>basic</u> treatment provided with <u>some</u> interruptions	Healthcare professional is <u>easy</u> to understand, <u>comprehensive</u> treatment provided with <u>no</u> interruptions
1. Which would you prefer?	Option A <input type="checkbox"/>	Option B <input type="checkbox"/>
2. If your preferred option was available, would you take it, or would you delay accessing care for 24 hours to see if your condition improves?	YES <input type="checkbox"/> (take preferred option) NO <input type="checkbox"/> (delay for 24 hours)	

Part B (Attitudinal Scales)

We would like to ask you some questions about how you think about your social interactions and community responsibilities and how conscious you are of your own health.

Please circle the response most relevant to you.

	Strongly Agree	Agree	Neither Agree or Disagree	Disagree	Strongly Disagree
1. It is no use worrying about current events or public affairs; I can't do anything about them anyway	1	2	3	4	5
2. Every person should give some of their time for the good of their community	1	2	3	4	5
3. Our country would be a lot better off if we didn't have so many elections and people didn't have to vote so often	1	2	3	4	5
4. Letting your friends down is not so bad because you can't do good all the time for everybody	1	2	3	4	5
5. It is the duty of each person to do their job the very best they can	1	2	3	4	5
6. People would be a lot better off if they could live far away from other people and never have to do anything for them	1	2	3	4	5
7. I usually volunteer for special projects and community groups	1	2	3	4	5
8. I feel very bad when I have failed to finish a job I promised I would do	1	2	3	4	5
9. I am very aware of social disadvantage and how it impacts the community	1	2	3	4	5

Please turn the page to answer the remaining questions

	Strongly Agree	Agree	Neither Agree or Disagree	Disagree	Strongly Disagree
10. I reflect about my health a lot	1	2	3	4	5
11. I'm very self-conscious about my health	1	2	3	4	5
12. I'm generally attentive to my inner feeling about my health	1	2	3	4	5
13. I'm constantly examining my health	1	2	3	4	5
14. I'm alert to changes in my health	1	2	3	4	5
15. I'm usually aware of my health	1	2	3	4	5
16. I'm aware of the state of my health as I go through the day	1	2	3	4	5
17. I notice how I feel physically as I go through the day	1	2	3	4	5
18. I'm very involved with my health	1	2	3	4	5

Part C (Participant characteristics)

Finally, we would like to ask you a few short questions about yourself and your general health.

You do not need to answer every question unless you wish to do so.

1. **Thinking about your life in the last 4 weeks, how would you rate your quality of life?** Please choose the answer that appears most appropriate.

Very poor	Poor	Neither poor nor good	Good	Very good
1	2	3	4	5

Questions 2 to 13 Tick the box next to the response that best fits your situation

2. Do you need any help looking after yourself?

- I need no help at all
- Occasionally I need some help with personal care tasks
- I need help with the more difficult personal care tasks
- I need daily help with most or all personal care tasks

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3. When doing household tasks: (For example: preparing food, gardening, using the video recorder, radio, telephone or washing the car.)

- I need no help at all
- Occasionally I need some help with household tasks
- I need help with the more difficult household tasks
- I need daily help with most or all household tasks

4. Thinking about how easily you can get around your home and community:

- I get around my home and community by myself without any difficulty
- I find it difficult to get around my home and community by myself
- I cannot get around the community by myself, but I can get around my home with some difficulty
- I cannot get around either the community or my home by myself

5. Because of your health, your relationships (for example: with your friends, partner or parents) generally:

- Are very close and warm
- Are sometimes close and warm
- Are seldom close and warm
- I have no close and warm relationships

6. Thinking about your relationship with other people:

- I have plenty of friends, and am never lonely
- Although I have friends, I am occasionally lonely
- I have some friends, but am often lonely for company
- I am socially isolated and feel lonely

7. Thinking about your health and my relationship with my family:

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- My role in the family is unaffected by my health
 - There are some parts of my family role I cannot carry out
 - There are many parts of my family role I cannot carry out
 - I cannot carry out any part of my family role

8. Thinking about your vision, including when using your glasses or contact lenses if needed:

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- I see normally
 - I have some difficulty focusing on things, or I do not see them sharply
For example: small print, a newspaper or seeing objects in the distance.
 - I have a lot of difficulty seeing things
My vision is blurred. For example: I can see just enough to get by with.
 - I only see general shapes, or am blind
For example: I need a guide to move around.

9. Thinking about your hearing, including using your hearing aid if needed:

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- I hear normally
 - I have some difficulty hearing or I do not hear clearly
For example: I ask people to speak up, or turn up the TV or radio volume.
 - I have difficulty hearing things clearly
For example: Often I do not understand what is said. I usually do not take part in conversations because I cannot hear what is said.
 - I hear very little indeed
For example: I cannot fully understand loud voices speaking directly to me.

10. When you communicate with others: (For example: by talking, listening, writing or signing.)

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- I have no trouble speaking to them or understanding what they are saying
 - I have some difficulty being understood by people who do not know me. I have no trouble understanding what others are saying to me.
 - I am only understood by people who know me well. I have great trouble understanding what others are saying to me.
 - I cannot adequately communicate with others

11. Thinking about how you sleep:

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- I am able to sleep without difficulty most of the time
 - My sleep is interrupted some of the time, but I am usually able to go back to sleep without difficulty
 - My sleep is interrupted most nights, but I am usually able to go back to sleep without difficulty
 - I sleep in short bursts only. I am awake most of the night

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12. Thinking about how you generally feel:

- I do not feel anxious, worried or depressed
- I am slightly anxious, worried or depressed
- I feel moderately anxious, worried or depressed
- I am extremely anxious, worried or depressed

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13. How much pain or discomfort do you experience:

- None at all
- I have moderate pain
- I suffer from severe pain
- I suffer unbearable pain

14. Have you or a close family member ever been treated for any of the following:

	Self	Close family member
Diabetes	<input type="checkbox"/>	<input type="checkbox"/>
Heart Disease	<input type="checkbox"/>	<input type="checkbox"/>
Asthma	<input type="checkbox"/>	<input type="checkbox"/>
Other respiratory disease	<input type="checkbox"/>	<input type="checkbox"/>
Skin Cancer	<input type="checkbox"/>	<input type="checkbox"/>
Other Cancer	<input type="checkbox"/>	<input type="checkbox"/>
Depression	<input type="checkbox"/>	<input type="checkbox"/>
Anxiety	<input type="checkbox"/>	<input type="checkbox"/>
Other emotional problems	<input type="checkbox"/>	<input type="checkbox"/>
Chronic neck/back pain	<input type="checkbox"/>	<input type="checkbox"/>
Arthritis	<input type="checkbox"/>	<input type="checkbox"/>
Stomach ulcer/heartburn	<input type="checkbox"/>	<input type="checkbox"/>
Weight Management	<input type="checkbox"/>	<input type="checkbox"/>

15. How many times have you been admitted to hospital in the last 12 months?

None 1-3 4 or more

16. How many times have you visited an Emergency Department in the last 12 months?

None 1-3 4 or more

17. How many times have you visited a General Practitioner in the last 12 months?

None 1-3 4 or more

18. What is your age in years? _____

19. Are you:

Male Female

20. Which best describes your current relationship status:

- 1 Married/Living with a partner
2 Separated/Divorced
3 Widowed
4 Single
5
6
7

21. Do you identify as an Aboriginal and/or Torres Strait Islander?

- 8 Yes No
9

22. Were you born in Australia?

- 10 Yes No
11

23. Is English the main language spoken at home?

- 12 Yes No
13

24. Have you worked in the health system in the last 10 years?

- 14 Yes No
15

25. Which of the following best describes your main activity?

- 16 In employment or self-employment
17 Retired
18 Homemaker
19 Student
20 Seeking work
21 Other (please specify) _____
22

26. Did your education continue after the minimum school leaving age?

- 23 Yes No
24

27. Do you have a Degree or equivalent professional qualification?

- 25 Yes No
26

28. What is your postcode? _____

29. Which annual income bracket does your household fall into?

- 27 Up to \$40,000
28 \$40,001 - \$70,000
29 \$70,001 - \$100,000
30 \$100,001 - \$130,000
31 \$130,001 plus
32 Prefer not to answer
33

30. Do you have private health insurance?

	Yes	No
Hospital Cover	<input type="checkbox"/>	<input type="checkbox"/>
Extras Cover	<input type="checkbox"/>	<input type="checkbox"/>

31. Do you hold a health concession card? (E.g. a Commonwealth Seniors Health Card)?

Yes No

Date survey completed: _____

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Thank you for completing this survey

STROBE Statement—checklist of items that should be included in reports of observational studies

	Item No	Recommendation
Title and abstract <i>(In Title and Abstract)</i>	1	(a) Indicate the study's design with a commonly used term in the title or the abstract (b) Provide in the abstract an informative and balanced summary of what was done and what was found
Introduction		
Background/rationale (pp. 5-6 of 86)	2	Explain the scientific background and rationale for the investigation being reported
Objectives (p.6)	3	State specific objectives, including any prespecified hypotheses
Methods		
Study design (pp. 7-10)	4	Present key elements of study design early in the paper
Setting (pp.8-10)	5	Describe the setting, locations, and relevant dates, including periods of recruitment, exposure, follow-up, and data collection
Participants (p. 10)	6	(a) <i>Cohort study</i> —Give the eligibility criteria, and the sources and methods of selection of participants. Describe methods of follow-up <i>Case-control study</i> —Give the eligibility criteria, and the sources and methods of case ascertainment and control selection. Give the rationale for the choice of cases and controls <i>Cross-sectional study</i> —Give the eligibility criteria, and the sources and methods of selection of participants (b) <i>Cohort study</i> —For matched studies, give matching criteria and number of exposed and unexposed <i>Case-control study</i> —For matched studies, give matching criteria and the number of controls per case
Variables (pp. 7-10)	7	Clearly define all outcomes, exposures, predictors, potential confounders, and effect modifiers. Give diagnostic criteria, if applicable
Data sources/ measurement (pp. 9-11; Table 2)	8	For each variable of interest, give sources of data and details of methods of assessment (measurement). Describe comparability of assessment methods if there is more than one group
Bias (p. 9; p. 18; Table 2)	9	Describe any efforts to address potential sources of bias
Study size (based on sample size calculations e.g. Dillman, 2007)	10	Explain how the study size was arrived at
Quantitative variables (pp. 10-11)	11	Explain how quantitative variables were handled in the analyses. If applicable, describe which groupings were chosen and why
Statistical methods	12	(a) Describe all statistical methods, including those used to

(pp. 10-11)

- Missing data coded with -999 with high data quality evident based on inspection of missing values

- Confidence level of 95% used for sample size calculations and significance level for preference weights set at $p=0.05$

- Consistency check responses included (e.g. Richardson et al., 2009)

- Confidence intervals calculated for marginal utility analyses (Table 6)

Continued on next page

control for confounding

(b) Describe any methods used to examine subgroups and interactions

(c) Explain how missing data were addressed

(d) *Cohort study*—If applicable, explain how loss to follow-up was addressed

Case-control study—If applicable, explain how matching of cases and controls was addressed

Cross-sectional study—If applicable, describe analytical methods taking account of sampling strategy

(e) Describe any sensitivity analyses

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Results		
Participants (p. 11 ; Table 2)	13*	(a) Report numbers of individuals at each stage of study—eg numbers potentially eligible, examined for eligibility, confirmed eligible, included in the study, completing follow-up, and analysed (b) Give reasons for non-participation at each stage (c) Consider use of a flow diagram
Descriptive data (pp. 11 – 13; Table 2)	14*	(a) Give characteristics of study participants (eg demographic, clinical, social) and information on exposures and potential confounders (b) Indicate number of participants with missing data for each variable of interest (c) <i>Cohort study</i> —Summarise follow-up time (eg, average and total amount)
Outcome data (Tables 3-6)	15*	<i>Cohort study</i> —Report numbers of outcome events or summary measures over time <i>Case-control study</i> —Report numbers in each exposure category, or summary measures of exposure <i>Cross-sectional study</i> —Report numbers of outcome events or summary measures
Main results (Tables 5-6)	16	(a) Give unadjusted estimates and, if applicable, confounder-adjusted estimates and their precision (eg, 95% confidence interval). Make clear which confounders were adjusted for and why they were included (b) Report category boundaries when continuous variables were categorized (c) If relevant, consider translating estimates of relative risk into absolute risk for a meaningful time period
Other analyses (further research to explore preference heterogeneity to be reported in subsequent publications)	17	Report other analyses done—eg analyses of subgroups and interactions, and sensitivity analyses
Discussion		
Key results (pp. 16-17)	18	Summarise key results with reference to study objectives
Limitations (pp. 17-18)	19	Discuss limitations of the study, taking into account sources of potential bias or imprecision. Discuss both direction and magnitude of any potential bias
Interpretation (p. 16-18)	20	Give a cautious overall interpretation of results considering objectives, limitations, multiplicity of analyses, results from similar studies, and other relevant evidence
Generalisability (p. 18, p. 20)	21	Discuss the generalisability (external validity) of the study results
Other information		
Funding (p. 20)	22	Give the source of funding and the role of the funders for the present study and, if applicable, for the original study on which the present article is based

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