Introduction

- Specialized pharmacy service models
  - Pharmacy Asthma Management Service (PAMS)
  - Diabetes Medication Assistance Service (DMAS)
  - Home Medicines Review (HMR)

- Future use and sustainability
- Market demand → PATIENT
- Patient preferences
Introduction

- Stated preference methods (DCE’s)
- Economics and Market research
- Hypothetical scenarios
  - Important attributes
  - Trade-offs
  - Combination of attributes
An example DCE for car choices

<table>
<thead>
<tr>
<th></th>
<th>Option A</th>
<th>Option B</th>
<th>Option C</th>
</tr>
</thead>
<tbody>
<tr>
<td>Make</td>
<td>BMW</td>
<td>Holden</td>
<td>Lexus</td>
</tr>
<tr>
<td>Fuel Economy (km/L)</td>
<td>10</td>
<td>7.5</td>
<td>11.5</td>
</tr>
<tr>
<td>Colour</td>
<td>Silver</td>
<td>Yellow</td>
<td>Red</td>
</tr>
<tr>
<td>Price</td>
<td>$40,000</td>
<td>$25,000</td>
<td>$50,000</td>
</tr>
<tr>
<td>Which option would you prefer?</td>
<td><img src="gray" alt="Option A" /></td>
<td><img src="yellow" alt="Option B" /></td>
<td><img src="red" alt="Option C" /></td>
</tr>
</tbody>
</table>
An example DCE for car choices

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<td>[ ]</td>
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<td>[ ]</td>
</tr>
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</table>
AIM

To elicit patient preferences for community pharmacy-based services using discrete choice experiments (DCE’s) [PAMS]
Overview of PAMS

VISIT 1
(1 month)

VISIT 2
(3 months)

VISIT 3
(6 months)

Patient Preferences
DCE

• Assessment of asthma control
• Asthma medication review
• Inhaler technique review
• Lung function testing
• Asthma action plan review
• Goal setting
• Referral
• Documented intervention
• Follow-up: 3 months, 6 months

Methods: Stages of a DCE

Stage 1: Identification of service attributes and levels

Stage 2: Construction of hypothetical service models

Stage 3: Development of DCE questionnaire and pilot testing

Stage 4: Data collection

Stage 5: Econometric modelling and analysis

Stage 6: Data interpretation

Methods
Stage 1: Service attributes/levels identification: Qualitative interviews

<table>
<thead>
<tr>
<th>Attributes</th>
<th>Levels</th>
</tr>
</thead>
</table>
| Frequency of visits                 | Once per year
3 times per year
12 times per year                   |
| Access to pharmacist                | • Appointment with pharmacist
• Clinic setting at pharmacy
• Walk-in at pharmacy               |
| Interaction with pharmacy staff     | • Friendly
• Friendly and helpful                                                  |
| Availability of private area        | • Yes
• No                                                                    |
| Lung function testing at pharmacy   | • Yes
• No                                                                    |
| Type of advice provided             | • Comprehensive
• Medium
• Minimal                                                                |
| Symptoms of asthma                  | • 7 days a week
• 3 days a week
• 0 days a week                                                               |
| Cost of service                     | • $0
• $40
• $80                                                                   |

Methods
Stage 2-3: Development of DCE questionnaire

- $3^5 \times 2^3 = 1944$ possible hypothetical service models
- Fractional factorial design (Orthogonal design)
- Street and Burgess software
- 72 choice sets (8 versions $\times$ 9 choice sets)
- Each DCE questionnaire version
  - 9 choice sets
  - Socio-demographic characteristics

An example of a choice set

<table>
<thead>
<tr>
<th>Choice Scenario</th>
<th>Service A</th>
<th>Service B</th>
</tr>
</thead>
<tbody>
<tr>
<td>How often the service would be offered to you by your pharmacist</td>
<td>Once every 12 months</td>
<td>Once every month</td>
</tr>
<tr>
<td>How you would access your pharmacist for a visit</td>
<td>Service only available one set day per week as a clinic</td>
<td>Appointment with pharmacist</td>
</tr>
<tr>
<td>How the pharmacy staff interact with you during a visit</td>
<td>Friendly and will go out of the way to help you</td>
<td>Friendly</td>
</tr>
<tr>
<td>The pharmacy has a private area where you can talk to your pharmacist during the visit</td>
<td>No</td>
<td>Yes</td>
</tr>
<tr>
<td>Lung function checking (Spirometry) is provided at the pharmacy</td>
<td>No</td>
<td>Yes</td>
</tr>
<tr>
<td>The type and depth of advice provided on asthma and medications</td>
<td>Advice on when and how to take asthma medications</td>
<td>Advice on asthma, medications, when and how to take them, how to keep asthma under control and setting goals for your asthma</td>
</tr>
<tr>
<td>How many days of the week you have symptoms of asthma</td>
<td>3 days of the week</td>
<td>None</td>
</tr>
<tr>
<td>How much the service would cost you</td>
<td>$ 40</td>
<td>$ 80</td>
</tr>
</tbody>
</table>

If your pharmacy were to offer one of the services above—either A or B, which one would you choose? PLEASE TICK EITHER ONE

![Service A](Service A) ![Service B](Service B)
Methods
Stage 4: Data collection

- Pilot tested (8 PAMS experienced patients)
- Questionnaires mailed to patients (by PAMS pharmacists) at the end of 6 months PAMS visit
Methods
Stage 5: Econometric modelling and analysis

- NLOGIT 4.0 used for estimating models
- Different models
  - Multinomial logit (MNL) model
  - Latent Class (LC) model
  - Mixed multinomial logit (MMNL) model
  - Multinomial logit with interactions model
Methods
Stage 5: Econometric modelling and analysis

- Random utility maximisation (RUM) framework

- The observed component $V_{nsj}$ is described by a linear relationship of observed attribute levels $x$ and their corresponding weights $\beta$ and is represented as

\[
V_{nsj} = \sum_{k=1}^{K} \beta_{jk} x_{nsjk}.
\]
Methods

Stage 6: Data interpretation

- **Sign of $\beta$:**
  Whether the attribute has a positive or negative effect on utility

- **Size of $\beta$:**
  Relative importance of the corresponding attribute

- **Statistical significance of $\beta$:**
  Respondent considered the attribute as important
Marginal willingness-to-pay (MWTP)

\[ \beta \text{ coefficient of the cost attribute (}\beta \text{ Cost}) \] may be used to estimate the MWTP for one-unit increase in each of the other attributes

\[ \text{MWTP} = - \beta \times \text{ATTRIBUTE} \]

\[ \beta \times \text{COS} \]
## Results

- Response rate 47.1% (80/170 questionnaires)

<table>
<thead>
<tr>
<th>Respondent characteristics</th>
<th>All respondents (%)</th>
</tr>
</thead>
<tbody>
<tr>
<td></td>
<td>(n=80)</td>
</tr>
<tr>
<td><strong>Age (years)</strong></td>
<td></td>
</tr>
<tr>
<td>18 – 64</td>
<td>54 (67.5)</td>
</tr>
<tr>
<td>65 and above</td>
<td>24 (30.0)</td>
</tr>
<tr>
<td><strong>Gender</strong></td>
<td></td>
</tr>
<tr>
<td>Females</td>
<td>53 (66.3)</td>
</tr>
<tr>
<td><strong>Educational level attained</strong></td>
<td></td>
</tr>
<tr>
<td>Less than high school, high school certificate, diploma</td>
<td>56 (70.0)</td>
</tr>
<tr>
<td>University degree or higher</td>
<td>23 (28.8)</td>
</tr>
<tr>
<td><strong>Annual household income</strong></td>
<td></td>
</tr>
<tr>
<td>Less than $20,000</td>
<td>20 (25.0)</td>
</tr>
<tr>
<td>$20,000 – $30,000</td>
<td>10 (12.5)</td>
</tr>
<tr>
<td>$30,000 – $50,000</td>
<td>10 (12.5)</td>
</tr>
<tr>
<td>$50,000 – $100,000</td>
<td>19 (23.8)</td>
</tr>
<tr>
<td>More than $100,000</td>
<td>8 (10.0)</td>
</tr>
<tr>
<td>Prefer not to state</td>
<td>12 (15.0)</td>
</tr>
</tbody>
</table>
## Results

Multinomial Logit (MNL) model regression results

<table>
<thead>
<tr>
<th>Service attributes</th>
<th>Coefficient</th>
<th>test-statistic</th>
<th>p-value</th>
</tr>
</thead>
<tbody>
<tr>
<td><strong>Frequency of visits</strong></td>
<td></td>
<td></td>
<td></td>
</tr>
<tr>
<td>(Once/month, once/4 months, once/12 months)</td>
<td>-0.0090</td>
<td>-0.913</td>
<td>0.3613</td>
</tr>
<tr>
<td><strong>Access to pharmacist</strong></td>
<td></td>
<td></td>
<td></td>
</tr>
<tr>
<td>Appointment with pharmacist</td>
<td>0.1889</td>
<td>2.829</td>
<td>0.0047*</td>
</tr>
<tr>
<td>Clinic setting at pharmacy</td>
<td>-0.0628</td>
<td>-0.942</td>
<td>0.3463</td>
</tr>
<tr>
<td>Walk-in at pharmacy (Base category)</td>
<td></td>
<td></td>
<td></td>
</tr>
<tr>
<td><strong>Interaction with pharmacy staff</strong></td>
<td>0.0889</td>
<td>1.070</td>
<td>0.2847</td>
</tr>
<tr>
<td>(Friendly and helpful, Friendly)</td>
<td></td>
<td></td>
<td></td>
</tr>
<tr>
<td><strong>Availability of private area</strong></td>
<td>0.3991</td>
<td>4.654</td>
<td>0.0000*</td>
</tr>
<tr>
<td>(Yes, No)</td>
<td></td>
<td></td>
<td></td>
</tr>
<tr>
<td><strong>Lung function testing at pharmacy</strong></td>
<td>0.7567</td>
<td>7.489</td>
<td>0.0000*</td>
</tr>
<tr>
<td>(Yes, No)</td>
<td></td>
<td></td>
<td></td>
</tr>
<tr>
<td><strong>Type of advice provided</strong></td>
<td></td>
<td></td>
<td></td>
</tr>
<tr>
<td>Comprehensive</td>
<td>0.3904</td>
<td>5.582</td>
<td>0.0000*</td>
</tr>
<tr>
<td>Medium</td>
<td>-0.0667</td>
<td>-1.030</td>
<td>0.3032</td>
</tr>
<tr>
<td>Minimal (Base category)</td>
<td></td>
<td></td>
<td></td>
</tr>
<tr>
<td><strong>Symptoms of asthma</strong></td>
<td>-0.0039</td>
<td>-0.205</td>
<td>0.8373</td>
</tr>
<tr>
<td>(None, 3 days/week, 7 days/week)</td>
<td></td>
<td></td>
<td></td>
</tr>
<tr>
<td><strong>Cost of service</strong></td>
<td>-0.0112</td>
<td>-5.423</td>
<td>0.0000*</td>
</tr>
<tr>
<td>($0,$40, $80)</td>
<td></td>
<td></td>
<td></td>
</tr>
</tbody>
</table>

p-value < 0.05

Results

Relative importance of attributes

- Lung function testing (0.76)
- Private area (0.40)
- Comprehensive advice (0.39)
- Appointment with pharmacist (0.16)
- Cost (0.01)

Weightage for the different attributes of the service
Results

Marginal willingness-to-pay (MWTP)

- Appointment with pharmacist: $16.87
- Comprehensive advice provision: $34.86
- Private area availability: $35.63
- Lung function testing provision: $67.56
Discussion

Strengths

- Novel study – Pharmacy services
- Value of experienced vs. naive patient preferences
- Identified key elements for future asthma services
- WTP
- Consistent and sustainable service model
Acknowledgements

- Supervisors: Prof Carol Armour
  Dr Bandana Saini
- Dr John Rose (Institute of Transport and Logistic Studies, University of Sydney)
- Faculty of Pharmacy, The University of Sydney
- PAMS team
- PAMS pharmacists and patients
- Family and Friends
Thank You
Methods
Stage 2: Construction of hypothetical service models

- Five attributes with 3 levels and three attributes with 2 levels
- Fractional factorial design (Orthogonal design)
- 36 hypothetical service models
Methods
Stage 5: Econometric modelling and analysis

- Random utility maximisation (RUM) framework

- Utility $U_{nsj}$ of alternative $j$ obtained by respondent $n$ in a choice situation $s$, may be partitioned into two components, an observed component $V_{nsj}$ and an un-observed component $\epsilon_{nsj}$

$$U_{nsj} = V_{nsj} + \epsilon_{nsj}.$$
The observed component \( V_{nsj} \) is described by a linear relationship of observed attribute levels \( x \) and their corresponding weights \( \beta \) and is represented as

\[
V_{nsj} = \sum_{k=1}^{K} \beta_{jk} x_{nsjk}.
\]

The probability \( P_{nsj} \) that respondent \( n \) chooses alternative \( j \) in choice situation \( s \) is given by

\[
P_{nsj} = \frac{\exp(V_{nsj})}{\sum_{i \in J_{ns}} \exp(V_{nsi})}.
\]
Methods
Stage 5: Econometric modelling and analysis

- Thus our estimating model becomes

\[ V_j = \beta_1 \times \text{Frequency of visits} + \]
\[ \beta_2 \times \text{Private area availability} + \]
\[ \beta_3 \times \text{Lung function testing} + \]
\[ \beta_4 \times \text{Cost} + \cdots + \]
\[ \beta_{15} \times \text{Age} + \beta_{16} \times \text{Gender} \]

where

\( \beta_1-\beta_{16} \) are the parameters/weights of the attribute levels and the covariate terms (respondent characteristics)
Results

- Response rate 47.1% (80/170 questionnaires)
- No statistically significant differences between respondents and non-respondents
- Mean time of completion of questionnaire was 15 minutes (Std dev: 8 mins)
## Results

### Goodness of fit of estimated model

<table>
<thead>
<tr>
<th></th>
<th>Value</th>
</tr>
</thead>
<tbody>
<tr>
<td>Log likelihood (Estimated model)</td>
<td>-437.927</td>
</tr>
<tr>
<td>Log likelihood (Base model)</td>
<td>-498.355</td>
</tr>
<tr>
<td>Log likelihood ratio test $\chi^2$</td>
<td>120.855</td>
</tr>
<tr>
<td>$\rho^2$</td>
<td>0.1213</td>
</tr>
</tbody>
</table>
Future direction

- Patient preferences for other pharmacy-based services
- Provider Preferences
- Consistent and sustainable service model