Strategies for improving prescription medication labels for the elderly

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Assistant Professor, Health Services and Systems Research
Duke-NUS Medical School, Singapore
- Why focus on the elderly?
- Evidence from the literature

Our research findings, from Singapore

Further investigation on prescription medication labels for elderly Singaporeans
Prescription medication labelling practices and strategies

- Why the elderly?
- Evidence from the literature
Understanding of prescription medication labels is important – especially among the Elderly

- Essential for proper medication adherence and patient safety 1-3
- Lack ~ related to increased healthcare consumption in outpatient settings 4,5
- Elderly are more likely to interpret medication labels incorrectly 6-9
- Increased healthcare utilization with age 10-12 = Elderly are more likely to receive prescription medications (vs younger) 13

Ensuring understanding of prescription medication labels:
- Empowers the elderly for self-care
- Enables the elderly to take responsibility for own medication, supporting higher-level functioning (i.e., an Instrumental Activity of Daily Living)

Prescription medication labels are the principal source of medication information for the elderly (in Singapore)

Key adjunct to medication counselling

Increasing proportion of elderly living alone (Singapore included)

Do they actually use the internet to access medication information?
Strategies for improving patients’ understanding of prescription medication labels

Medication use process

Improving medication labels

• Best practices in labelling
• Content, format and design
• Patient-centered labels
• Bilingual/Multilingual text
• Pictograms
Strategies for improving patients’ understanding of prescription medication labels

Prescribing
- assess the need, selecting the correct drug and customizing the therapeutic regimen to the patient

Supplying
- route the prescription
- key into pharmacy dispensing and labelling system
- pick, pack and dispense the prescription

Administration
- administer the right medication to the right patient, in the right manner and only when indicated

The Ministry of Health Singapore (2006) identified key elements affecting the medication use process including the improvement of the medication labelling and packaging.

There are other elements in the medication use process – besides specific improvements in medication labeling – that will help patients in understanding their medication labels and promote medication safety and adherence (e.g., health literacy strategies, provider-patient communication).
Evidence-based best practices in prescription medication labelling

Advancing Best Practices for Prescription Drug Labeling

Stacy Cooper Bailey, PhD, MPH¹, Prakash Navaratnam, PhD, MPH², Heather Black, PhD³, Allison L. Russell, BA⁴, and Michael S. Wolf, PhD, MPH⁴
Evidence-based best practices in prescription medication labelling

1. Explicit text for dosage and interval (grounding; Universal Medication Schedule)
2. Inclusion of indication for use
3. Simple language
4. Minimal medical jargon
5. Numeric characters for numbers
6. Large font
7. Sans serif (Arial vs Times New)
8. Horizontal text
Evidence-based best practices in prescription medication labelling

9. Patient-centered organization
10. Typographic cues (bold, highlight) for patient content

11. Standard icon system (signaling)
12. Recognizable visual aid
Evidence-based best practices in prescription medication labelling

Standard Rx label in the US

Proposed improvement

Bailey, SC et al., 2015; Bailey et al., 2012
Patient-centered labels

• Prioritize content **most important to patients**
  • Drug name
  • Dosing
  • Indications
  • Warnings and Adverse effects

• Organized in a way that **considers limitations** in visual acuity and health literacy (and literacy)
  • **Font**: Largest possible
  • Use of **categorized lists** (i.e. with headers) >> simple lists >> paragraph
  • **Numbers** for dosage, and communication of risk
  • **Language**: Simple, and….
Bi/Multilingual text

- **ConcordantRx** labels considered patient literacy, language, and culture: Improved outcomes (vs standard) for patient **understanding**, regimen **dosing** and regimen **consolidation**

- Among Spanish-speaking consumers, bilingual (non-prescription) labels scored better in terms of **ease** of use, product **knowledge**, and **purchase intention** versus the old label format and the FDA standardized label

- For Latino patients and pharmacists, the inclusion of Spanish and English instructions in one label was helpful in helping both **patients and providers understand** the content (qualitative study)

- Legally mandated in some states or cities in the USA (e.g. California; New York City)

- Commercial (US specific) translational services. E.g. [http://www.rxtran.com/](http://www.rxtran.com/)

- Singapore?
Regulations and Guidelines in Singapore

- Labelling and marking of containers and packages
  - Health Products [Therapeutic Products] Regulations in The Health Products Act: November 2016 onwards

- Required information:
  1. name of person to whom the medication is to be administered
  2. details of licensed dispensing institution or retail pharmacy
  3. date of dispensing
  4. directions for use
  5. name of the medication
  6. where the appropriate non-proprietary name is included on the label, the appropriate quantitative particulars of any active ingredient of the therapeutic product

- LANGUAGE
  - Medicines (Labelling) Regulations in The Medicines Act: *In English*, and “*Nothing in these Regulations shall prohibit the addition in any language of such matter descriptive of the contents of the container or of any other particulars provided that such addition is not contrary to or in modification of the particulars required by these Regulations to be printed on a label.*”
  - Health Products [Therapeutic Products] Regulations in The Health Products Act: *In English*
Prescription medication labels in Singapore
Pictograms

“A picture is worth a thousand words”?

The mosquito….

It depends!
## Pictograms

<table>
<thead>
<tr>
<th>Study</th>
<th>Study population</th>
<th>Pictograms</th>
<th>Key findings</th>
</tr>
</thead>
<tbody>
<tr>
<td>Barros, 2014</td>
<td>Brazilian elderly aged 60-90 years (n=116)</td>
<td>USP</td>
<td>Most pictograms were not well understood; need for cultural adaptation</td>
</tr>
<tr>
<td>Bethernet, 2016</td>
<td>Elderly outpatients in community pharmacy in Canada (n=135)</td>
<td>FIP</td>
<td>Pictograms were well interpreted and understood by the elderly; they may be used combined with counselling</td>
</tr>
<tr>
<td>Dowse, 2005</td>
<td>Respondents with low literacy in S Africa (n=87; ctrl vs exp group)</td>
<td>Modified USP</td>
<td>Adding pictograms to medicine labels improved understanding of instructions and medication adherence to antibiotic therapy</td>
</tr>
<tr>
<td>Kheir, 2014</td>
<td>Foreign employees in Qatar aged 18-65 years (n=123)</td>
<td>Developed for the study</td>
<td>Pictograms used with verbal instructions showed better comprehension versus text-only labels</td>
</tr>
<tr>
<td>Mansoor, 2003</td>
<td>Low-literate participants in S Africa (n=60)</td>
<td>USP</td>
<td>Pictograms improved acquisition and comprehension of drug information</td>
</tr>
</tbody>
</table>

Barros et al., 2014; Berthenet et al., 2016; Dowse et al., 2001, 2005; Kheir et al., 2014; Mansoor et al., 2003
# Pictograms

<table>
<thead>
<tr>
<th>Study</th>
<th>Study population</th>
<th>Pictograms</th>
<th>Key findings</th>
</tr>
</thead>
<tbody>
<tr>
<td>Mbuagbaw, 2012</td>
<td>Patients in a referral hospital in Cameroon (n=204)</td>
<td>Developed for the study</td>
<td>76% understood the labels with pictograms; 41% preferred prescriptions with pictograms</td>
</tr>
<tr>
<td>Montagne, 2013</td>
<td>Proposed model of pharmaceutical pictograms</td>
<td>NA</td>
<td>Outlined steps in developing and testing individual pictograms and pictogram sequences for comprehension and use</td>
</tr>
<tr>
<td>Ng, 2016</td>
<td>Hong Kong Chinese elderly (n=50)</td>
<td>USP</td>
<td>Addition of pictograms can help elderly improve comprehension of medication information and instructions</td>
</tr>
<tr>
<td>Wolpin, 2016</td>
<td>Focus group participants aged 18 or older, English speaking, and with any experience in prescription medication</td>
<td>USP</td>
<td>Up to 25% of the pictograms were difficult for low-literate participants to understand</td>
</tr>
</tbody>
</table>

**USP:** [http://www.usp.org/usp-healthcare-professionals/related-topics-resources/usp-pictograms](http://www.usp.org/usp-healthcare-professionals/related-topics-resources/usp-pictograms)

**FIP:** [https://www.fip.org/pictograms](https://www.fip.org/pictograms)

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**Improving medication labels**
Pictograms (Reviews)

• Help the elderly by minimizing difficulties in cognitive or educational deficits

• Should always be used together with verbal communication

• Help patients understand how to take their medications especially with written or oral instructions

• Adult patients with low literacy found difficulty in understanding pharmaceutical pictograms

• Better understood when used in the proper cultural context

• Must be developed for specific target population and subjected to rigorous validation following relevant standard recommendations – ISO, European Commission, ANSI
Improving the understanding of prescription medication labels: Does the use of bilingual text and pictograms work for elderly Singaporeans?

Research findings from Singapore
Outstanding Research Award (Health Services Research)
SGH 22nd Annual Scientific Meeting (April 2017)

Rahul Malhotra¹,², Mary Ann C Bautista¹, Ngiap Chuan Tan³, Wern Ee Tang⁴, Sarah Tay⁵, Audrey Tan⁶, Annie Pouliot⁷, Seyed Ehsan Saffari⁸, Choy-Lye Chei¹,², Regis Vaillancourt⁷

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² Centre for Ageing Research and Education, Duke-NUS Medical School, Singapore
³ Department of Research, SingHealth Polyclinics, Singapore
⁴ National Healthcare Group Polyclinics, Singapore
⁵ Clinic Pharmacy, SingHealth Polyclinics, Singapore
⁶ Health Promotion, National Healthcare Group Headquarters, Singapore
⁷ Pharmacy, Children’s Hospital of Eastern Ontario, Canada
⁸ Centre for Quantitative Medicine, Duke-NUS Medical School, Singapore

ACKNOWLEDGEMENT
This research is supported by the Singapore Ministry of Health’s National Medical Research Council under its Clinician Scientist – Individual Research Grant – New Investigator Grant (NMRC-CNIG-1124-2014). This work is also supported by the Duke-NUS Geriatric Research Fund.
Prescription medication labels in Singapore

Key medication information

- drug name, dose, quantity dispensed
- dosage and route
- indications
- precautions and side-effects (if any)

- Non-standard format and presentation
- English is the commonly used language
Prescription medication labels of elderly Singaporeans on regular prescription medications

SAFE-PHASE examined 1,167 prescription medication labels. 99.7% used the English language (with or without any other language).

Language used in medication instructions:

- English ONLY (81.15%)
- English with another language (18.85%)

n=947
n=216
Many elderly Singaporeans (65 years and older) CANNOT read English

- **Cannot read**, 61%
- **Can read**, 39%

Self-reported ability to read with understanding an English newspaper

Possible challenges in understanding prescription medication labels in English
REVIEW: Strategies for improving understanding of prescription medication labels

Multilingual instructions 1-4
- Adults with limited English proficiency
- Benefit for care provider and patients
- Effective communication of product use information
- Improved product knowledge
- Improved mean scores for ease of use

Pictograms 5-8
- Low literate and elderly populations
- Use in combination with written text
- Requires proper cultural adaptation and validation in the target population

Can these strategies help the elderly Singaporeans in understanding prescription medication labels?

Aim

To compare the understanding* of prescription medication labels among elderly Singaporeans randomized to 1 of 4 prototype labels, which contain the same medication information and instructions but vary in their use of an additional language along with English and/or pictograms

*Based on the response to a standard set of questions

<table>
<thead>
<tr>
<th>Prototype</th>
<th>Three medication labels (Augmentin, Metformin and Phenytoin) with the same information and instructions provided in:</th>
</tr>
</thead>
<tbody>
<tr>
<td>ET label</td>
<td>English Text</td>
</tr>
<tr>
<td>ETP label</td>
<td>English Text with FIP Pictograms</td>
</tr>
<tr>
<td>BLT label</td>
<td>Bi-Lingual Text (i.e., English with Chinese or Malay or Tamil)</td>
</tr>
<tr>
<td>BLTP label</td>
<td>Bi-Lingual Text (i.e., English with Chinese or Malay or Tamil) with FIP Pictograms</td>
</tr>
</tbody>
</table>

FIP, International Pharmaceutical Federation
Hypotheses

**Primary:** The proportion of elderly respondents with *complete understanding* of the medication labels is **higher** among those randomized to the ETP label, the BLT label, and the BLTP label relative to those randomized to the ‘usual practice’ ET label

*Correct answer/response to ALL the questions*

**Secondary:** The proportion of elderly respondents *any understanding* of the medication labels is **higher** among those randomized to the ETP label, the BLT label and the BLTP label relative to those randomized to the ‘usual practice’ ET label

**Correct answer/response to AT LEAST ONE question**
SAFE-PHASE: A national survey of community-dwelling elderly Singaporeans

PHASE Wave 1 (2009)
- 4,990 community-dwelling Singaporeans (aged ≥60 years)

PHASE Wave 2 (2011)
- 3,103 elderly Singaporeans from Wave 1

PHASE Wave 3 (2015)
- Also known as SAFE-PHASE
- 1,572 elderly/proxy respondents interviewed

Randomized to 4 prototype labels

Analytical sample
- 1,414 elderly respondents
Assume that your doctor prescribed a medication for you that you received in a packet with this label.

Q1. How many times a day do you have to take this medication?

________ times / Don’t know / Not sure

Q2. How many tablets do you have to take each time you take this medication?

________ tablets / Don’t know / Not sure

Q3. If you were to take this medication correctly as prescribed by the doctor, how many days will your medication last?

_________ days / Don’t know / Not sure

Q4. Assume that you took the first dose of this medication at 8 o’clock this morning. About what time, or when, should you take the next dose?

____________________________ / Don’t know / Not sure

Q5. For which specific side effect of this medication should you consult a doctor?

____________________________ / Don’t know / Not sure
Assume that your doctor prescribed a medication for you that you received in a packet with this label.

<table>
<thead>
<tr>
<th>Question</th>
<th>Answer Options</th>
</tr>
</thead>
<tbody>
<tr>
<td>Q6 How many times a day do you have to take this medication?</td>
<td>________ times / Don’t know / Not sure</td>
</tr>
<tr>
<td>Q7 How many tablets do you have to take each time you take this medication?</td>
<td>________ tablets / Don’t know / Not sure</td>
</tr>
<tr>
<td>Q8 Assume that you took one dose of this medication at 7 o’clock this morning. About what time, or when, should you take the next dose?</td>
<td>____________________ / Don’t know / Not sure</td>
</tr>
<tr>
<td>Q9 And, about what time, or when, should you take the next dose?</td>
<td>____________________ / Don’t know / Not sure</td>
</tr>
<tr>
<td>Q10 Do you take this medication before food or after food?</td>
<td>Before food / After food / Before or after food / Don’t know / Not sure</td>
</tr>
<tr>
<td>Q11 What food or drink should be avoided when one is taking this medication?</td>
<td>____________________ / Don’t know / Not sure</td>
</tr>
</tbody>
</table>

**Metformin**
Assume that your doctor prescribed a medication for you that you received in a bottle with this label.

<table>
<thead>
<tr>
<th>Q12</th>
<th>How many times in a day do you have to take this medication?</th>
</tr>
</thead>
<tbody>
<tr>
<td></td>
<td>__________ times / Don’t know / Not sure</td>
</tr>
</tbody>
</table>

<table>
<thead>
<tr>
<th>Q13</th>
<th>When should you take this medication? In the morning, in the afternoon, in the evening or at night?</th>
</tr>
</thead>
<tbody>
<tr>
<td></td>
<td>Morning / Afternoon / Evening / Night / Don’t know / Not sure</td>
</tr>
</tbody>
</table>

<table>
<thead>
<tr>
<th>Q14</th>
<th>How much of this medication or how many ml of this medication should you take each time?</th>
</tr>
</thead>
<tbody>
<tr>
<td></td>
<td>__________ ml / Don’t know / Not sure</td>
</tr>
</tbody>
</table>

<table>
<thead>
<tr>
<th>Q15</th>
<th>Do you take this medication before food or after food?</th>
</tr>
</thead>
<tbody>
<tr>
<td></td>
<td>Before food / After food / Before or after food / Don’t know / Not sure</td>
</tr>
</tbody>
</table>

<table>
<thead>
<tr>
<th>Q16</th>
<th>What should you do before you pour the medication from the bottle?</th>
</tr>
</thead>
<tbody>
<tr>
<td></td>
<td>_________________________ / Don’t know / Not sure</td>
</tr>
</tbody>
</table>

<table>
<thead>
<tr>
<th>Q17</th>
<th>If the person taking this medication has or develops has a certain condition then the person is advised to inform the doctor. Can you name this condition?</th>
</tr>
</thead>
<tbody>
<tr>
<td></td>
<td>_________________________ / Don’t know / Not sure</td>
</tr>
</tbody>
</table>
## Demographic characteristics of the elderly randomized to the 4 prototype medication labels

<table>
<thead>
<tr>
<th>Prototype Medication Labels</th>
<th>Mean age in years (SD)</th>
<th>English-text label (n = 357)</th>
<th>English-text-with-pictogram label (n = 356)</th>
<th>Bilingual-text label (n = 352)</th>
<th>Bilingual-text-with-pictogram label (n = 349)</th>
</tr>
</thead>
<tbody>
<tr>
<td>Mean age in years (SD)</td>
<td>75.7 (6.8)</td>
<td>75.7 (6.6)</td>
<td>76.4 (7.2)</td>
<td>76.1 (7.1)</td>
<td></td>
</tr>
</tbody>
</table>

- Gender (male)  
- Ethnicity (Chinese)  
- Marital status (married)  
- Education (with formal education)  
- Employment (employed)  
- Living arrangement (alone/with maid only)

**Prototype Medication Labels**

<table>
<thead>
<tr>
<th>English-text label</th>
<th>English-text-with-pictogram label</th>
<th>Bilingual-text label</th>
<th>Bilingual-text-with-pictogram label</th>
</tr>
</thead>
</table>

- **Proportion of elderly with specified characteristics (vs without) across the four labels groups**

**ET, English text only; ETP, English text and pictograms; BLT, Bilingual text; BLTP, Bilingual text and pictograms; ANOVA and Chi-squared tests were used for continuous and binary/categorical variables, respectively and all p-values for difference across the four prototype medication labels are not statistically significant; SD, standard deviation; Characteristics are binary variables unless specified otherwise**
### Literacy characteristics of the elderly randomized to the 4 prototype medication labels

<table>
<thead>
<tr>
<th></th>
<th>Self-reported reading ability in English</th>
<th>Self-reported reading ability in Chinese</th>
<th>Self-reported reading ability in Malay</th>
<th>Self-reported reading ability in Tamil</th>
</tr>
</thead>
<tbody>
<tr>
<td>English-text label</td>
<td>32.2</td>
<td>49.7</td>
<td>19.9</td>
<td>3.6</td>
</tr>
<tr>
<td>English-text-with-</td>
<td>34.5</td>
<td>45.4</td>
<td>22.4</td>
<td>5.0</td>
</tr>
<tr>
<td>pictogram label</td>
<td></td>
<td></td>
<td></td>
<td></td>
</tr>
<tr>
<td>Bilingual-text label</td>
<td>34.2</td>
<td>49.7</td>
<td>24.1</td>
<td>6.8</td>
</tr>
<tr>
<td>Bilingual-text-with-</td>
<td>33.1</td>
<td>50.0</td>
<td>19.4</td>
<td>4.6</td>
</tr>
<tr>
<td>pictogram label</td>
<td></td>
<td></td>
<td></td>
<td></td>
</tr>
</tbody>
</table>

Proportion of elderly with specified characteristics (vs without) across the four label groups

<table>
<thead>
<tr>
<th></th>
<th>Can read English only</th>
<th>Can read English, can read Chinese/Malay/Tamil</th>
<th>Cannot read English, can read Chinese/Malay/Tamil</th>
<th>Cannot read English, cannot Chinese/Malay/Tamil</th>
</tr>
</thead>
<tbody>
<tr>
<td>English-text label</td>
<td>5.3</td>
<td>26.9</td>
<td>42.3</td>
<td>25.5</td>
</tr>
<tr>
<td>English-text-with-</td>
<td>7.8</td>
<td>26.6</td>
<td>41.2</td>
<td>24.4</td>
</tr>
<tr>
<td>pictogram label</td>
<td></td>
<td></td>
<td></td>
<td></td>
</tr>
<tr>
<td>Bilingual-text label</td>
<td>4.3</td>
<td>30.0</td>
<td>45.6</td>
<td>20.1</td>
</tr>
<tr>
<td>Bilingual-text-with-</td>
<td>8.0</td>
<td>25.1</td>
<td>44.0</td>
<td>22.9</td>
</tr>
<tr>
<td>pictogram label</td>
<td></td>
<td></td>
<td></td>
<td></td>
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</tbody>
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*ET, English text only; ETP, English text and pictograms; BLT, Bilingual text; BLTP, Bilingual text and pictograms; ANOVA and Chi-squared tests were used for continuous and binary/categorical variables, respectively and all p-values for difference across the four prototype medication labels are not statistically significant; Characteristics are binary variables unless specified otherwise; Few elderly (n=31) reported ability to read in other languages/dialects: Arabic, Guji, Jawi, French, German, Hindi, Japanese, Malayalam, Myanmar, Pakistan, Punjabi, Sanskrit, Sindhi, Hindi, Singlish, Latin, Urdu; the proportion of respondents who opted to receive bilingual labels in Chinese, Malay, and Tamil respectively were 72.7%, 1.0% and 6.3% for the BLT group and 75.6%, 18.3%, and 6.0% for the BLTP group.*
Health-related characteristics of the elderly randomized to the 4 prototype medication labels

<table>
<thead>
<tr>
<th>Prototype Medication Labels</th>
<th>English-text label (n = 357)</th>
<th>English-text-with-pictogram label (n = 356)</th>
<th>Bilingual-text label (n = 352)</th>
<th>Bilingual-text-with-pictogram label (n = 349)</th>
</tr>
</thead>
<tbody>
<tr>
<td>Mean no. of chronic diseases (SD)</td>
<td>1.9 (1.3)</td>
<td>2.0 (1.5)</td>
<td>2.0 (1.5)</td>
<td>1.9 (1.5)</td>
</tr>
<tr>
<td>Mean personal mastery score (SD)</td>
<td>14.2 (2.4)</td>
<td>14.6 (2.6)</td>
<td>14.4 (2.6)</td>
<td>14.5 (2.5)</td>
</tr>
</tbody>
</table>

Proportion of elderly with specified characteristics (vs without) across the four labels groups

- Self-reported healthier than average or better
- Self-reported visual acuity (good to excellent)
- Self-reported hearing ability (good to excellent)
- Diagnosed with diabetes

<table>
<thead>
<tr>
<th></th>
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<th>English-text-with-pictogram label</th>
<th>Bilingual-text label</th>
<th>Bilingual-text-with-pictogram label</th>
</tr>
</thead>
<tbody>
<tr>
<td>English-text label</td>
<td>22.7</td>
<td>63.9</td>
<td>79.3</td>
<td>29.7</td>
</tr>
<tr>
<td>English-text-with-pictogram label</td>
<td>24.4</td>
<td>72.0</td>
<td>77.6</td>
<td>30.5</td>
</tr>
<tr>
<td>Bilingual-text label</td>
<td>21.9</td>
<td>69.9</td>
<td>77.0</td>
<td>32.6</td>
</tr>
<tr>
<td>Bilingual-text-with-pictogram label</td>
<td>25.4</td>
<td>68.3</td>
<td>76.3</td>
<td>29.1</td>
</tr>
</tbody>
</table>

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Scores were summarized into 2 main outcomes

<table>
<thead>
<tr>
<th>Hypothesis</th>
<th>Outcome</th>
<th>Definition</th>
<th>Statistical analysis</th>
</tr>
</thead>
<tbody>
<tr>
<td>Primary</td>
<td>Complete understanding</td>
<td>Correctly answered all 16 questions</td>
<td>Logistic regression</td>
</tr>
<tr>
<td>Secondary</td>
<td>Any understanding</td>
<td>Correctly answered at least 1 question</td>
<td>Logistic regression</td>
</tr>
</tbody>
</table>

- STATA 14 was used in the descriptive and statistical analysis
- ANOVA and Chi-squared test for comparing means and proportions
- Unadjusted logistic regression models for hypotheses testing
Proportions of elderly with complete understanding and any understanding, by label

- **Complete understanding**
  - English-text label: 17.9%
  - English-text-with-pictogram label: 25.6%
  - Bilingual-text label: 36.9%
  - Bilingual-text-with-pictogram label: 40.1%

- **Any understanding**
  - English-text label: 50.4%
  - English-text-with-pictogram label: 62.6%
  - Bilingual-text label: 75.9%
  - Bilingual-text-with-pictogram label: 76.5%
Odds of complete understanding and any understanding among elderly Singaporeans randomized to the 4 prototype labels: UNADJUSTED logistic regression

Reference: ‘usual practice’
English-text label

**p<0.01 **
Proportions of elderly with complete understanding and any understanding, by label and English-reading ability

Elderly who can read English

<table>
<thead>
<tr>
<th>Label Type</th>
<th>Complete Understanding</th>
<th>Any Understanding</th>
</tr>
</thead>
<tbody>
<tr>
<td>English-text label</td>
<td>99.1%</td>
<td>48.7%</td>
</tr>
<tr>
<td>English-text-with-pictogram label</td>
<td>95.1%</td>
<td>53.7%</td>
</tr>
<tr>
<td>Bilingual-text label</td>
<td>95.0%</td>
<td>54.6%</td>
</tr>
<tr>
<td>Bilingual-text-with-pictogram label</td>
<td>99.1%</td>
<td>59.5%</td>
</tr>
</tbody>
</table>

Elderly who cannot read English

<table>
<thead>
<tr>
<th>Label Type</th>
<th>Complete Understanding</th>
<th>Any Understanding</th>
</tr>
</thead>
<tbody>
<tr>
<td>English-text label</td>
<td>3.3%</td>
<td>27.3%</td>
</tr>
<tr>
<td>English-text-with-pictogram label</td>
<td>10.7%</td>
<td>45.5%</td>
</tr>
<tr>
<td>Bilingual-text label</td>
<td>27.7%</td>
<td>65.2%</td>
</tr>
<tr>
<td>Bilingual-text-with-pictogram label</td>
<td>30.5%</td>
<td>65.8%</td>
</tr>
</tbody>
</table>
Odds of *complete understanding* and *any understanding* among elderly Singaporeans randomized to the 4 prototype labels, by English reading ability: UNADJUSTED logistic regression

**Elderly who can read English**

- English-text-with-pictogram label: Odds Ratio [95% CI] = 1.22 [0.73, 2.03]
- Bilingual-text label: Odds Ratio [95% CI] = 1.26 [0.78, 2.11]
- Bilingual-text-with-pictogram label: Odds Ratio [95% CI] = 1.55 [0.92, 2.60]
- English-text label: Odds Ratio [95% CI] = 1.01 [0.66, 1.53]

**Elderly who cannot read English**

- English-text-with-pictogram label: Odds Ratio [95% CI] = 3.52 [1.83, 6.76]
- Bilingual-text label: Odds Ratio [95% CI] = 2.23 [1.52, 3.28]
- Bilingual-text-with-pictogram label: Odds Ratio [95% CI] = 5.13 [3.47, 7.60]
- English-text label: Odds Ratio [95% CI] = 5.00 [3.39, 7.40]

*p<0.05; **p<0.01

Reference: ‘usual practice’ English-text label

Duke-NUS Medical School
Conclusion

- Adding another **preferred official language** and/or **pictograms** to ‘usual practice’ purely English text labels will **enhance** the **understanding** of medication labels among elderly Singaporeans
- **Greater benefit to elderly who cannot read English**
- Low proportions (<50%) with **complete understanding** across all prototypes ~ more careful assessment of **other issues related to label design and content**
- **Pictograms helped?**
  - **BLTP label** had the **highest proportion** of elderly with **complete** and **any understanding**, similar to the BLT label and much higher than the ETP label
  - **Local adaptation of the FIP pictograms**
Challenges

- **Bilingual labels**
  - Finding equivalent terms
  - Maintaining similar reading levels
  - Accounting for dialects and regional differences

- **Pictograms**
  - Cultural adaptation
  - Pre-testing

- **Standardization across providers and settings**

- **Administrative and Financial (and Environmental)**

Bailey et al., 2012
Prescription medication labelling in Singapore

Improving medication labels
Further investigation on prescription medication labels for elderly Singaporeans
**AIM 1**: Document the experience of elderly patients, family caregivers of the elderly, and healthcare providers (pharmacists/pharmacy technicians in public polyclinics) with prescription medication labels from primary healthcare clinics in Singapore

**AIM 2**: Adapt the FIP pictograms to the Singapore context

**AIM 3**: Assess the prevalence and correlates of errors made by elderly primary healthcare patients in understanding the Singapore-specific pictograms and their own prescription medication labels

**AIM 4**: Enable the implementation of improved prescription medication labels
### Schematic of the six study components

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