THE BEHAVIOURAL IMPACT OF NUTRITIONAL LABELLING

Rachel Crockett PhD, University of Greenwich.
Why nutritional labelling

- Unhealthy diets associated with serious preventable diseases e.g. CVD, type 2 diabetes and many forms of cancer.

- People are aware that they need to eat more healthily but find it difficult to do so.

- Nutritional labelling proposed as a means to enable people to make healthier choices about what they buy and how they eat it.
Suggested impact of nutritional labelling on behaviour

Environment → Behaviour → Intervention

Better understanding → Outcomes

Improved population health
Does nutritional labelling promote healthier food purchasing and consumption behaviours?

- There is research into the effect of nutritional labelling on behaviour but it has limitations:
  - Range of labelling schemes tested and implemented.
  - Use of student samples.
  - Measurement of non behavioural outcomes such as knowledge.
  - Use of measures of intended/self report behaviour rather than actual behaviour.

- A systematic review of the literature would allow us to identify and draw together research to inform an evaluation of the effectiveness of nutritional labelling on behaviour.
The systematic literature review

- Review registered with the Cochrane Collaboration.
  - The Cochrane Collaboration synthesizes health research to help healthcare providers, policy-makers, patients, their advocates and carers, make well-informed decisions about health care.

- The review protocol was published in 2011 and the review itself is currently in revision.
Protocol 1

Objectives

To assess whether nutritional labelling of foods in comparison to the same foods presented without a label promotes:

- Healthier food purchasing behaviour from a) food shops, b) vending machines, c) restaurants.
- Healthier food consumption behaviour.
Inclusion Criteria

- **Design:** RCTs, non randomised controlled studies, non randomised uncontrolled studies.

- **Participants:** Adults and children either buying food for themselves or a group of which they are a part or eating.

- **Intervention:** A nutritional label visible at point at which choices are made, giving information about the content of at least one nutrient, or energy, compared to the same food presented without a label.

- **Outcome:** an objective measure of behaviour:
  - Food purchasing: till receipts, electronic sales data or field observation.
  - Food consumption: measurement of food consumed using before- and after-consumption weighing of food.
Searches

- Search strategy used to search 17 electronic databases covering health, food, psychology, social science, business and marketing.

- Cited reference and reference list searches on included studies.

- Contact with authors of included studies for information about unpublished work.

- Searches conducted up to end of 2012 and currently being updated.
Data selection and management

- Data and relevant information extracted from included studies.
- Review Manager Software used to manage and analyse data.

- Titles and abstracts of 31,608 papers assessed against inclusion criteria.

- Full text assessment of 154 studies independently by two researchers.

- 31 discrete studies assessed as meeting inclusion criteria.
Data synthesis

- Data from non-randomised trials were synthesised in a narrative summary.
  - Characteristics of the studies and their results were recorded in tables allowing comparison between studies.

- Data from randomised controlled trials were combined statistically.
  - Data summarised using a standardised difference because the same outcome was measured in different ways (e.g. energy consumed over one day vs. at one meal, etc.).
  - Random effects model used.
Summary of included studies

- Thirty-one studies included.
- Eighteen studies (2 RCTs) evaluated effects of labelling on food purchasing:
  - Twelve concerned purchasing for immediate consumption (i.e. in a restaurant or vending machine).
  - Six concerned purchasing for later consumption (i.e. from a store).
- Thirteen (9 RCTs and 4 Q-RCTs) assessed the impact of labelling on consumption.
- Quality of the included studies was assessed using the Effective Public Health Practice Project ratings:
  - Overall all quality was low or moderate with only 5 studies (all RCTs) being assessed as high quality.
Preliminary Results - food purchasing for immediate consumption

- Two RCTs:
  - In one there was no significant effect of labelling on food as either a more or a less healthy choice on purchasing.
  - In the other a reliable effect size could not be calculated.

- Three non-randomised studies with a control group,
  - Two reported no significant effects.
  - One reported greater purchasing of healthier food.

- Seven non-randomised, uncontrolled studies,
  - Four reported significantly greater purchasing of healthier foods.
  - Three found no effects.
Preliminary Results: Food purchasing for later consumption

- Two non-randomised studies with a control group.
  - One study reported significantly greater purchasing of healthier foods, and one reported significantly less purchasing of healthier foods.

- Four nonrandomised uncontrolled studies
  - None were possible to interpret, involving multiple endpoints generating varied effects.

- In summary it was not possible to identify a consistent effect of nutritional labeling on food purchasing for either immediate or later consumption.
Preliminary Results: Food consumption

- Eight RCTs and one Q-RCT each assessed the effectiveness of labelling on energy intake. Meta-analysis revealed no impact of nutritional labelling on this outcome (Pooled SMD = -0.08, 95% CI: -0.21 to +0.05, \( p=0.23 \)).

- Two studies assessing non-energy based outcomes (volume of soft drinks, and grams of breakfast cereal) reported no significant effects.

- In the remaining two Q-RCT studies, nutritional labelling increased the consumption of less healthy foods.
Impact of nutritional labelling on food consumption.

1.1.1 Impact of energy (calorie) labelling, nutrition fact or 'low fat' labelling on energy consumption

<table>
<thead>
<tr>
<th>Study or Subgroup</th>
<th>Experimental Mean</th>
<th>SD</th>
<th>Total</th>
<th>Control Mean</th>
<th>SD</th>
<th>Total</th>
<th>Weight</th>
<th>Std. Mean Difference IV, Random, 95% CI</th>
</tr>
</thead>
<tbody>
<tr>
<td>Crockett In submission</td>
<td>402.44</td>
<td>288.68</td>
<td>103</td>
<td>468.07</td>
<td>361.93</td>
<td>88</td>
<td>16.2%</td>
<td>-0.20 [-0.49, 0.08]</td>
</tr>
<tr>
<td>Girz 2011a</td>
<td>401.88</td>
<td>197.87</td>
<td>98</td>
<td>419.95</td>
<td>238.52</td>
<td>49</td>
<td>12.0%</td>
<td>-0.08 [-0.43, 0.26]</td>
</tr>
<tr>
<td>Girz 2011b</td>
<td>631.19</td>
<td>329.19</td>
<td>66</td>
<td>642.92</td>
<td>342.89</td>
<td>128</td>
<td>15.2%</td>
<td>-0.03 [-0.33, 0.26]</td>
</tr>
<tr>
<td>Girz unpub</td>
<td>433.14</td>
<td>260.16</td>
<td>24</td>
<td>426.54</td>
<td>237.39</td>
<td>25</td>
<td>5.0%</td>
<td>0.03 [-0.53, 0.59]</td>
</tr>
<tr>
<td>Harnack 2008a</td>
<td>804.7</td>
<td>423.9</td>
<td>151</td>
<td>739</td>
<td>358.2</td>
<td>150</td>
<td>22.7%</td>
<td>0.17 [-0.06, 0.39]</td>
</tr>
<tr>
<td>Kral 2002</td>
<td>1534</td>
<td>335.4</td>
<td>20</td>
<td>1569</td>
<td>451.7</td>
<td>20</td>
<td>4.2%</td>
<td>-0.09 [-0.71, 0.53]</td>
</tr>
<tr>
<td>Platkin 2010</td>
<td>898.82</td>
<td>392.01</td>
<td>20</td>
<td>995.4</td>
<td>429.36</td>
<td>22</td>
<td>4.3%</td>
<td>-0.23 [-0.84, 0.38]</td>
</tr>
<tr>
<td>Roberto 2010</td>
<td>1333</td>
<td>620.65</td>
<td>92</td>
<td>1459</td>
<td>724.62</td>
<td>92</td>
<td>15.8%</td>
<td>-0.19 [-0.48, 0.10]</td>
</tr>
<tr>
<td>Temple 2010</td>
<td>620.4</td>
<td>203.6</td>
<td>24</td>
<td>822.8</td>
<td>408.7</td>
<td>23</td>
<td>4.6%</td>
<td>-0.62 [-1.21, -0.03]</td>
</tr>
<tr>
<td><strong>Subtotal (95% CI)</strong></td>
<td><strong>598</strong></td>
<td></td>
<td></td>
<td><strong>597</strong></td>
<td></td>
<td>100.0%</td>
<td></td>
<td><strong>-0.08 [-0.21, 0.05]</strong></td>
</tr>
</tbody>
</table>

Heterogeneity: Tau² = 0.01; Chi² = 9.47, df = 8 (P = 0.30); I² = 15%
Test for overall effect: Z = 1.21 (P = 0.23)

1.1.2 Impact of energy (calorie) labelling on soft drink consumption

<table>
<thead>
<tr>
<th>Study or Subgroup</th>
<th>Experimental Mean</th>
<th>SD</th>
<th>Total</th>
<th>Control Mean</th>
<th>SD</th>
<th>Total</th>
<th>Weight</th>
<th>Std. Mean Difference IV, Random, 95% CI</th>
</tr>
</thead>
<tbody>
<tr>
<td>Vermeer 2011</td>
<td>376.3</td>
<td>125.4</td>
<td>48</td>
<td>382.14</td>
<td>147.6</td>
<td>41</td>
<td>100.0%</td>
<td>-0.04 [-0.46, 0.37]</td>
</tr>
<tr>
<td><strong>Subtotal (95% CI)</strong></td>
<td><strong>48</strong></td>
<td></td>
<td></td>
<td><strong>41</strong></td>
<td></td>
<td>100.0%</td>
<td></td>
<td><strong>-0.04 [-0.46, 0.37]</strong></td>
</tr>
</tbody>
</table>

Heterogeneity: Not applicable
Test for overall effect: Z = 0.20 (P = 0.84)

1.1.3 Impact of 'healthy choice' labelling on quantity of food consumed (grams)

<table>
<thead>
<tr>
<th>Study or Subgroup</th>
<th>Experimental Mean</th>
<th>SD</th>
<th>Total</th>
<th>Control Mean</th>
<th>SD</th>
<th>Total</th>
<th>Weight</th>
<th>Std. Mean Difference IV, Random, 95% CI</th>
</tr>
</thead>
<tbody>
<tr>
<td>Roberto 2012</td>
<td>219.21</td>
<td>133.44</td>
<td>76</td>
<td>219.86</td>
<td>127.08</td>
<td>69</td>
<td>100.0%</td>
<td>-0.00 [-0.33, 0.32]</td>
</tr>
<tr>
<td><strong>Subtotal (95% CI)</strong></td>
<td><strong>76</strong></td>
<td></td>
<td></td>
<td><strong>69</strong></td>
<td></td>
<td>100.0%</td>
<td></td>
<td><strong>-0.00 [-0.33, 0.32]</strong></td>
</tr>
</tbody>
</table>

Heterogeneity: Not applicable
Test for overall effect: Z = 0.03 (P = 0.98)

Test for subgroup differences: Chi² = 0.19, df = 2 (P = 0.91); I² = 0%
There were no significant effects of nutritional labelling on behaviour.

Little evidence that nutritional labelling promotes healthier food purchasing and consumption.

But research often poor quality, with a variety of interventions and outcomes assessed.
Acknowledgements

- The National Institute of Health Research for funding for this research as part of a Postdoctoral fellowship (PDF-2009-02-14).

- My collaborators:
  - Professor Theresa Marteau & Dr Gareth Hollands (Health and Behaviour Research Unit, University of Cambridge)
  - Professor Susan Jebb (Department of Primary Care Health Sciences, Oxford)
  - Professor Toby Prevost (King’s College London)
  - Dr Sarah King (RAND UK)