Monitoring the Scottish diet using the Living Costs and Food Survey

Karen Barton
Centre for Public Health Nutrition Research
University of Dundee

Dr Wendy L Wrieden
Robert Gordon University

Advised by: Julie Armstrong, Glasgow Caledonian University; Andrea Sherriff, University of Glasgow; Annie Anderson and Angela Craigie, University of Dundee
The Scottish Diet

• Published by the Scottish Office Home and Health Department 1993
• Provided the evidence base for the Scottish Dietary Targets which form the basis of the Scottish Diet Action Plan
The Scottish Diet Action Plan

• Scottish Dietary Targets (SDTs) set in 1996
• Mixture of food and nutrient based targets
The Scottish Diet

“The Scottish Diet is notoriously bad and, next to smoking, is the most significant cause of our poor health record, including our high rates of early death from coronary heart disease, cancers and stroke”

James Douglas Hamilton
Minister of State, Scottish Office 1996
In Foreword to “Eating for Health A Diet Action Plan for Scotland”
Scottish Dietary Targets

• Set of POPULATION LEVEL nutrient and food based targets originally set for achievement in 2005
• Derivation of the nutrient based targets:
  – Dietary Reference Values for Food Energy and Nutrients for the UK (Department of Health, 1991)
• Derivation of the food based targets:
  – Scottish Diet Report (Scottish Office, 1993)
• The “Targets” were renamed as “Goals” (SDG) in the National Food and Drink Policy *Recipe for Success* in 2009
# Scottish Diet Action Plan Dietary Targets

<table>
<thead>
<tr>
<th>Target Food / Nutrient</th>
<th>Scottish Dietary Target*</th>
</tr>
</thead>
<tbody>
<tr>
<td>Fruit and Vegetables</td>
<td>More than 400g per day</td>
</tr>
<tr>
<td>Bread (all types)</td>
<td>154g per day</td>
</tr>
<tr>
<td>Brown/Wholemeal Bread</td>
<td>More than 77g per day</td>
</tr>
<tr>
<td>Breakfast Cereals (all types)</td>
<td>34g per day</td>
</tr>
<tr>
<td>Oil Rich Fish</td>
<td>88g per week</td>
</tr>
<tr>
<td>White Fish</td>
<td>No decrease (107g per week**)</td>
</tr>
<tr>
<td>Fat</td>
<td>≤35% food energy</td>
</tr>
<tr>
<td>Saturated Fat</td>
<td>≤11% of food energy</td>
</tr>
<tr>
<td>Non-milk Extrinsic Sugars (NMES)</td>
<td>Adults - No Increase Children - &lt;10% of food energy</td>
</tr>
<tr>
<td>Total Complex Carbohydrates</td>
<td>155g per day</td>
</tr>
</tbody>
</table>

*Figures deduced from targets

**NFS intake 1996
Strategic Frameworks

• Commitment to dietary targets/goals expressed in:
  – Eating for Health: Meeting the Challenge 2004
    • Extension from 2005 to 2010
    • Commitment to monitoring
  – Healthy Eating Active Living (2008)
  – Recipe for Success (2009)
  – Preventing Overweight and Obesity in Scotland (2010)
Working Group on Monitoring Scottish Dietary Targets Concluded:

• “There is no single existing survey that addresses the Scottish Dietary targets”
• “The Expenditure and Food Survey (now the Living Costs and Food Survey) should be used to monitor progress towards the Scottish Dietary Targets in 2005 and beyond”
• “Where data is lacking, as is the case for the targets for sodium and non-milk extrinsic sugar in children, interim studies may need to be set up”
Purpose of the Work

• Monitoring the Scottish diet in relation to the Scottish Dietary Targets/Goals
• Providing data for the indicators of the Obesity Route Map
• Additional monitoring of red meat and energy density
### INDICATORS FOR SCOTLAND SUMMARY

#### Long term Indicators
1. Proportion of men and women overweight and obese
2. Proportion of children overweight and obese
3. Prevalence of type 2 diabetes in Scottish population

#### Intermediate term indicators
4. Total and saturated fat: average intake as a percentage of food energy
5. Added sugars (NMEs): average intake as a percentage of food energy
6. Proportion of adults meeting physical activity guidelines
7. Proportion of adults engaging in sedentary activities
8. Proportion of children engaging in sedentary activities
9. Proportion of children meeting physical activity guidelines

#### Short term Indicators
10. Number of businesses securing healthyliving award (and HLA Plus)
11. Volume of sales of soft drinks with added sugar
12. Volume of sales of confectionery, biscuits, cakes and pastries
13. Proportion of population who have tried making positive behaviour change in relation to healthy eating and physical activity.
14. Proportion of adults engaging in active travel to work
15. Proportion of children engaging in active travel to school
16. Number of workplaces securing Healthy Working Lives Award
Monitoring the Scottish diet 2001-2010

- Monitoring work has been on-going since 2005 following the recommendations of a working group

- Secondary analysis of the Scottish data from Expenditure and Food Survey (EFS) (since 2008 the Living Costs and Food Survey (LCF)) 2001-2009

- Results compared
  - By year
  - By socioeconomic group (SIMD) and area of residence (URC)
  - With Scottish Dietary Targets/Goals
Living Costs and Food Survey

- Household purchase survey (conducted annually)
- Average annual Scottish sample: 560 households and 1270 people
- Collects information about household and eating out food and expenditure (from every person over 7 years in each household) over 14 day period
- Valuable source of information about food purchases of the population
- Translated into estimates of the food consumption and nutrient intake per capita
- Can be used to calculate energy density and linked to indices of deprivation and diet cost

- However it is not:
  - Designed to measure intakes of specific individuals
  - Possible to produce median intakes
Methodology

- Food and nutrient data obtained from UK Data Archive and ONS
- Area based deprivation index (Scottish Index of Multiple Deprivation or SIMD) and Urban Rural Classification mapped by postcode by ONS
- Coding frame derived to categorise individual foods into food groupings relevant to the SDT’s e.g. fruit and vegetables
- Adjustments made for fractions of composite foods and waste
- Sorted in MS Access, MS Excel and SPSS
- Statistical analysis carried out using the complex samples component of SPSS
  - Allows for survey sampling methods to be taken into account
- Mean food consumption and nutrient intake with 95% CI’s calculated by year, SIMD and URC
- Household foods and foods eaten outside the home combined to give total food and nutrient intake per capita
Scottish Index of Multiple Deprivation (SIMD)

- Area based - identifies small area concentrations of multiple deprivation across all of Scotland in a consistent way
- Based on 7 domains: Current Income; Employment; Housing; Health; Education, Skills and Training; Geographical Access to Services and Telecommunications; Crime
- Allows effective targeting of policies and funding
- Presented at data zone level, enabling small pockets of deprivation to be identified
  - Median population size of 769, are ranked from most deprived (1) to least deprived (6,505)
    - On overall SIMD
    - Each of the individual domains
- Presented here as quintiles with 1 being most deprived and 5 being least deprived

Scottish Government, 2009
Urban Rural Classification (URC)

Aids in developing our understanding of the issues facing urban, rural and remote Scotland

– Government’s core definition of rurality defines settlements of 3,000 or less people to be rural
– It also classifies areas as remote based on drive times from settlements of 10,000 or more people
– 8 fold classification is presented here in 3 categories
  • Urban
  • Accessible (accessible small towns and accessible rural)
  • Remote (remote small towns, remote rural and very remote rural)
Monitoring 2001 to 2010

- Extended and updated previous reports to 2009, published July 2012
- Interim report including 2010 data published Sept 2012
- None of the Scottish Dietary Targets/Goals achieved
- Lower intakes of foods targeted for increase in more deprived communities
## Progress Against the SDTs/SDGs

<table>
<thead>
<tr>
<th>Target Food</th>
<th>Scottish Dietary Target/Goal</th>
<th>2001</th>
<th>2010</th>
<th>Change from 2001 to 2010</th>
<th>Highest Consumption by SIMD¹</th>
<th>Highest Consumption by URC²</th>
</tr>
</thead>
<tbody>
<tr>
<td>Fruit and Vegetables</td>
<td>More than 400g per day</td>
<td>259g</td>
<td>286g</td>
<td>↑*</td>
<td>Least Deprived</td>
<td>Remote</td>
</tr>
<tr>
<td>Bread (all types)</td>
<td>154g per day</td>
<td>111g</td>
<td>94.4g</td>
<td>↓**</td>
<td>Most Deprived</td>
<td>No Difference</td>
</tr>
<tr>
<td>Brown/Wholemeal Bread</td>
<td>More than 77g per day</td>
<td>18.2g</td>
<td>23.0g</td>
<td>↑**</td>
<td>Least Deprived</td>
<td>Remote</td>
</tr>
<tr>
<td>Breakfast Cereals</td>
<td>34g per day</td>
<td>19.6g</td>
<td>22.0g</td>
<td>↑*</td>
<td>Least Deprived</td>
<td>No Difference</td>
</tr>
<tr>
<td>Oil Rich Fish</td>
<td>88g per week</td>
<td>29.2g</td>
<td>28.3g</td>
<td>No Change</td>
<td>Least Deprived</td>
<td>No Difference</td>
</tr>
<tr>
<td>White Fish</td>
<td>No decrease (figures per week)</td>
<td>96.4g</td>
<td>92.6g</td>
<td>No Change</td>
<td>Least Deprived</td>
<td>No Difference</td>
</tr>
</tbody>
</table>

¹SIMD = Social Index of Multiple Deprivation, for combined years 2001-2003, 2004-2006 or 2007-2009
²URC = Urban Rural Classification after multivariable adjustment for combined years 2001-2009 (Categories: Urban; Accessible small towns/rural; Remote
Significance Level: *P<0.05; **P<0.001
Progress Against the SDTs/SDGs

<table>
<thead>
<tr>
<th>Target Nutrient</th>
<th>Scottish Dietary Target/Goal</th>
<th>2001</th>
<th>2010</th>
<th>Change from 2001 to 2010</th>
<th>Highest Consumption by SIMD&lt;sup&gt;1&lt;/sup&gt;</th>
<th>Highest Consumption by URC&lt;sup&gt;2&lt;/sup&gt;</th>
</tr>
</thead>
<tbody>
<tr>
<td>Fat</td>
<td>≤35% of food energy</td>
<td>38.8%</td>
<td>38.7%</td>
<td>No Change</td>
<td>No Difference</td>
<td>Accessible</td>
</tr>
<tr>
<td>Saturated Fat</td>
<td>≤11% of food energy</td>
<td>15.5%</td>
<td>15.0%</td>
<td>↓*</td>
<td>No Difference</td>
<td>No Difference</td>
</tr>
<tr>
<td>NMES</td>
<td>Adults - No ↑&lt;sup&gt;3&lt;/sup&gt; Children - &lt;10%</td>
<td>15.5%</td>
<td>15.4%</td>
<td>↓*</td>
<td>Most Deprived</td>
<td>No Difference</td>
</tr>
<tr>
<td>Total Complex Carbohydrates</td>
<td>155g per day</td>
<td>146g</td>
<td>151g</td>
<td>No Change</td>
<td>No Difference</td>
<td>No Difference</td>
</tr>
</tbody>
</table>

<sup>1</sup>SIMD = Social Index of Multiple Deprivation, for combined years 2001-2003, 2004-2006 or 2007-2009
<sup>2</sup>URC = Urban Rural Classification after multivariable adjustment for combined years 2001-2009 (Categories: Urban; Accessible small towns/rural; Remote
<sup>3</sup>DRV for Adults 11% Food Energy (Department of Health, 1991)
Significance Level: *P<0.05; **P<0.001
Consumption of foods and drinks indicative of diet quality - significant differences by deprivation

<table>
<thead>
<tr>
<th></th>
<th>Most deprived g/day</th>
<th>Least Deprived g/day</th>
</tr>
</thead>
<tbody>
<tr>
<td>Cakes and Pastries</td>
<td>15</td>
<td>20*</td>
</tr>
<tr>
<td>Sugar containing soft drinks</td>
<td>284**</td>
<td>180</td>
</tr>
<tr>
<td>Total soft drinks</td>
<td>377**</td>
<td>262</td>
</tr>
<tr>
<td>Red meat products*</td>
<td>33**</td>
<td>23</td>
</tr>
<tr>
<td>Whole milk</td>
<td>91*</td>
<td>43</td>
</tr>
<tr>
<td>Processed potatoes</td>
<td>35**</td>
<td>23</td>
</tr>
<tr>
<td>Take-away foods</td>
<td>24*</td>
<td>18</td>
</tr>
</tbody>
</table>

*meat portion of sausages, meat pies, corned beef, burgers and pate
Significance Level: *P<0.05; **P<0.001
Red and Processed Meat

• In 2009 red meat intake in the Scottish population (2001-2006) was estimated to inform SACN Iron and Health report
• Intakes continue to be monitored
• Total red meat includes unprocessed and processed red meat (e.g. bacon, ham, and other meat products i.e. the meat portion of sausages, meat pies, corned beef, burgers and pate)
# Red Meat Consumption

<table>
<thead>
<tr>
<th>Red Meat</th>
<th>2001</th>
<th>2010</th>
<th>Change from 2001 to 2010</th>
<th>Highest Consumption by SIMD(^1)</th>
<th>Highest Consumption by URC(^2)</th>
</tr>
</thead>
<tbody>
<tr>
<td>Total Red Meat</td>
<td>64.6</td>
<td>60.2</td>
<td>↓*</td>
<td>No Difference</td>
<td>No Difference</td>
</tr>
<tr>
<td>Bacon and Ham</td>
<td>12.4</td>
<td>12.0</td>
<td>No Change</td>
<td>No Difference</td>
<td>No Difference</td>
</tr>
<tr>
<td>Other Meat Products*</td>
<td>28.8</td>
<td>26.9</td>
<td>↓*</td>
<td>Most Deprived</td>
<td>Urban</td>
</tr>
</tbody>
</table>

*meat portion of sausages, meat pies, corned beef, burgers and pate

\(^1\)SIMD = Social Index of Multiple Deprivation, for combined years 2001-2003, 2004-2006 or 2007-2009

Significance Level: *P<0.05; **P<0.001
Summary of Progress Against the SDTs/SDGs

• Little progress has been made towards the Scottish Dietary Targets/Goals
• Where small improvements, seen across all deprivation categories
• There is no evidence to suggest that the gap between the most and least deprived is increasing
• Clear inequalities are apparent in food consumption and NMES intake
Energy Density

“the amount of energy per unit weight of foods or diets.

“The units of measure are kilocalories (kcal) or kilojoules (kJ) per 100 grams (g)”.  

World Cancer Research Fund (2007)
WCRF Public Health Goal

The World Cancer Research Fund (WCRF) public health goal:

Average ED of the overall diet be reduced towards 125kcal/100g (523 kJ/100g)
Low Energy Density Foods

10 to 100 kcals/100g
Non starch vegetables, roots and tubers, and fruit

60 to 150 kcals/100g
Cereals (grains) and pulses (legumes)

100 to 225 kcals/100g
Bread, lean meat, poultry and fish
High Energy Density Foods

Good source of desirable nutrients
>225 to 275 kcals +/-100g

Savoury
>225 to 275 kcals+/100g

Sweet
>225 to 275 kcals+/100g
Energy Density

• In 2011 a method to estimate the mean Energy Density (ED) of the diet of the Scottish population (2001-2008) was explored
• ED from Food and Milk chosen as most appropriate method due to most similarity to criteria used by WCRF
• Data were examined for differences by deprivation, and whether households met the dietary targets for fat and fruit & vegetables
• Food intakes examined by quintiles of energy density
• Monitoring of ED continues
## Energy Density of the Diet of the Scottish population (5020 households 2001-2009)

**WCRF Public Health Goal 125kcals/100g**

<table>
<thead>
<tr>
<th></th>
<th>Mean (kcal/100g)</th>
<th>P-value</th>
</tr>
</thead>
<tbody>
<tr>
<td><strong>Overall ED</strong></td>
<td></td>
<td></td>
</tr>
<tr>
<td>ED Quintile</td>
<td></td>
<td></td>
</tr>
<tr>
<td>1 least dense</td>
<td>122</td>
<td>&lt;0.001&lt;sup&gt;a&lt;/sup&gt;</td>
</tr>
<tr>
<td>2</td>
<td>150</td>
<td></td>
</tr>
<tr>
<td>3</td>
<td>167</td>
<td></td>
</tr>
<tr>
<td>4</td>
<td>186</td>
<td></td>
</tr>
<tr>
<td>5 most dense</td>
<td>230</td>
<td></td>
</tr>
<tr>
<td>SIMD Quintile</td>
<td></td>
<td></td>
</tr>
<tr>
<td>1 least deprived</td>
<td>167</td>
<td>&lt;0.001&lt;sup&gt;a&lt;/sup&gt;</td>
</tr>
<tr>
<td>2</td>
<td>170</td>
<td></td>
</tr>
<tr>
<td>3</td>
<td>172</td>
<td></td>
</tr>
<tr>
<td>4</td>
<td>174</td>
<td></td>
</tr>
<tr>
<td>5 most deprived</td>
<td>176</td>
<td></td>
</tr>
<tr>
<td><strong>Targets/Goals</strong>&lt;sup&gt;b&lt;/sup&gt;</td>
<td></td>
<td></td>
</tr>
<tr>
<td>Meeting targets/goals</td>
<td>138</td>
<td>&lt;0.001</td>
</tr>
<tr>
<td>Not meeting targets/goals</td>
<td>175</td>
<td></td>
</tr>
</tbody>
</table>

<sup>a</sup>P-value for linear association

<sup>b</sup>Fat target ≤35% food energy; Fruit & vegetable target/goal >400g/day
Foods and Energy Density

• Consumption of SDT/SDG foods (fruits and vegetables, wholemeal bread, wholegrain/high fibre breakfast cereals and fish) highest in the lowest quintile of energy density

• In contrast consumption of cakes, sweet pies and pastries; confectionery, sugar containing soft drinks; red and processed meat was lowest in households within the lowest quintile of energy density
Energy Density Summary

• Average ED of the Scottish diet is considerably higher than the public health goal recommended by the WCRF
• ED was not uniform across the population
• The analysis suggests that only a small fraction of the population were able to achieve an ED close to the WCRF public health goal
• The diet of households within the lowest quintile of ED were closest to the food based dietary targets
• These findings suggest that adherence to healthy eating advice can assist in reducing ED and may help prevent obesity
• Soft drinks have a relatively low ED in comparison to food but relationship with obesity due to volumes consumed. Should be monitored separately
Where now?

• Funded to continue to monitor the Scottish Diet for 2011 and 2012
• Revised dietary goals for Scotland were published in early May 2013, which include additional goals for red meat and energy density which will monitored as part of the above work\(^1\)
• Also looking at contributions made to the diet from all foods to establish if there are any changes since the targets were originally set

\(^1\text{http://www.scotland.gov.uk/Resource/0042/00421385.pdf}\)
Acknowledgements

• Project Steering Group
  • Annie Anderson, University of Dundee
  • Julie Armstrong, Glasgow Caledonian University
  • Andrea Sheriff, University of Glasgow
  • Chris Dibben, University of St Andrews
  • Jim Holding, DEFRA
  • Anne Milne, Gillian Purdon and Heather Peace FSA

• Data Archive, University of Essex
• UK Office of National Statistics

• Geraldine McNeill and colleagues, University of Aberdeen