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Time-scarcity, ready-meals, ill-health and the obesity epidemic

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Abstract
In this 3-part paper, we firstly review the interaction of time-scarcity with food-choices, specifically ready-meals, and potential health consequences from their consumption. Secondly we review declared nutrients, in relation to the standard 30% of Guideline Daily Amounts, concluding that popular ready-meals from major UK supermarkets are currently nutritionally haphazard. Thirdly, we present a simple scheme to establish standards for nutritional composition of ready-meals: unless otherwise specified, any meal (the smallest unit of nutrition) as recommended to be eaten or as offered should provide 30%±10% of GDA for energy and pro rata for key nutrients (e.g. sodium, sat fat, vitamin C).

Keywords: Public Health, convenience foods, food-choice, nutritional standards, supermarket, catering, nutrient profiling
Introduction – food, eating and convenience

Convenience foods are increasingly popular. Defined as “any fully or partially prepared foods in which significant preparation time, culinary skills or energy inputs have been transferred from the home kitchen to the food processor and distributor”, they include ready-meals, fast food, meals from restaurants or takeaways (Traub & Odland, 1979). Naturally convenient foods, such as fruits, are usually excluded. The UK convenience-food market was an estimated £26 billion in 2006 (Mahon et al., 2006). Convenience is as important as taste, “healthiness” and price in determining food-choices (Candel, 2001; Dave et al., 2009). However, convenience foods have been associated with less healthy diets, obesity and related chronic diseases such as cardiovascular disease, diabetes and cancer (Jabs & Devine, 2006).

While consumers may view food-choices as essentially practical they are parts of intricate integrations of attitudes, beliefs, biological needs and environmentally-led social behaviours. Behavioural research methods and psychosocial models are required, together with physical and biological measures, to explore why consumers value “convenience” so highly (Mahon et al., 2006). People recognise convenience in acquisition, storage and preparation of foods, whether they eat them or not, and believe they permit time-savings for other activities (Costa et al., 2007). The perceived benefits extend beyond merely leaving more time for social activities: they include stress-reduction, more relaxed lifestyle, and facilitation of hosting of social events. These beliefs might reflect marketing messages which depend on, but may generate, “perceived time-scarcity” with possible trade-offs between convenience against “healthiness” and taste. Lack of skills or dislike of cooking, perceived value for money and variable family eating times all encourage solutions such as ready-meals (De Boer et al., 2004). The notion that marketing ready-meals may actually promote the concept of time-scarcity resonates with the concept of a “Food –Related Lifestyle” (Brunso & Grunert 1995; Perez-Cueto et al., 2010; Hoek et al., 2004).

The present paper has three sections. It presents first an overview of “time-scarcity”, then illustrates nutritional analyses of selected supermarket ready-meals, and finally discusses ready-meals health and obesity, with proposals for nutritional standards for ready-meals.
**Time-scarcity: an overview**

“Time-scarcity” is a key determinant of many behaviours, including food-choice (convenience-foods”) in industrialized nations (Zuzanek et al., 1998). Feelings of time-scarcity within households relate to employment status, and poverty. Replacing gender-defined roles as “home-maker” or “bread-winner”, both parents may now both work outside the home (Jabs & Devine, 2006), meaning household tasks (e.g. feeding, housework, bill-paying, relationship-maintenance, physical activity, creative arts, study, recreation etc) must be completed in relatively short evening periods. People feel time-pressurised, with less time for leisure and relaxation. These problems are exacerbated further for single-parents, and families in poverty who cannot afford to “buy time” by employing household help, child-care, or eating out (Cohen, 1998).

Consumers perceiving time-scarcity try to reduce time performing household tasks, such as cooking. The food industry responded with convenience foods, dating from TV dinners in the 1950s to the current wide range of ready-meals (Jekanowski, 1999). Time-scarcity is largely a perception, possibly not equating to actual loss of free time. The American Time Use Study showed that between 1965-1995, average meal preparation time fell from 44 to 27 minutes daily, the reduction attributed to busy lifestyles and varying schedules (Robinson & Godbey, 1997). Over the same period, people have spent less time in all components of domestic life, and feel pressurised by time-scarcity, yet have increased time spent watching TV, more recently web-surfing (Sturm, 2004). Thus perceptions of busy lifestyles and time-scarcity have resulted in shifts from traditional family meals towards convenience options. Takeaways or ready-meals for microwaving, prepared for easy packaging, storage and transportation and quick consumption, may satisfy perceived time-scarcity, but are often high in dietary fat; calories; and sodium, and low in fruits; vegetables; fibre; calcium, and iron. In the UK, meals and snacks eaten outside the home contained about 40% of calories from fat (National Diet & Nutrition Survey, 2002), with a negative effect on health (Videon & Manning, 2003).

Various perspectives have been explored to conceptualise relationships between time and food-choice. Economic theory considers consumers as rational agents striving within market economies to maximize satisfaction; and homes as factories producing commodities (food and entertainment) by utilising market goods and services (ingredients), resources (equipment and individual skills) and time (for shopping and food preparation). Within this framework,
time and money are interlinked, time-allocation dependent on available money and vice versa. Economists have related the obesity epidemic to changes in time-allocation and available income (Cawley, 2004). Many people choose the least expensive and most time-saving options, which are likely to be energy-dense (high fat, sugar, etc) and contribute to obesity. Those whose incomes fall eat cheaply and gain weight and say they would make healthier food-choices if they had more money (Eley et al., 1997). However, there is no simple relationship between wealth and diet quality. More money would not necessarily buy healthier food; nor more time cooking, as other factors such as taste and habit influence food-choices, with variable discounting and time-preferences. More expensive foods are not necessarily nutritionally superior (Cooper & Nelson, 2003), when incomes rise, diet quality again often falls, and weight gain results (Eley et al., 1997).

In psycho-social theory, time is considered a social construct, the purpose of which is to regulate social behaviours (when meals are eaten, household tasks are carried out, journeys commenced, etc). In richer, industrialised societies, time is viewed as scarce (Dickens & Fontana, 2002). For any activity (based on complexity and need for precision) and individual (based on motivation and personal preferences), modulated by the demands of others, productivity is optimal at a certain level of perceived time-pressure, above or below which productivity falls. Thus, employed parents may experience more time pressure than those without children, and these feelings may be exacerbated in single-parent households and those living in poverty. These people would, therefore, be more likely to utilise convenience foods, (with marketing directed towards them), contributing to health inequalities if nutritional quality is lower.

Role-theory relates social structures to behaviours. A person fulfilling multiple roles (worker; parent, housekeeper, and cook) may experience “role-overload”, when demand is perceived to exceed available time and resources. Sacrifices must then be made, including reduced time for sleeping and leisure activities, further aggravating the feeling of time-scarcity. Under these circumstances, obligatory activities, such as food preparation, are perceived as greater burdens, with solutions in convenience. Marketing strategies recognise that role-overload and time-scarcity are common problems, possibly carrying social cache, justifying personal rewards through the purchase of added-value convenience items.
People affected by perceived time-scarcity, adopt “time-deepening” behavioural responses: speeding-up, shortening and substituting activities, and multi-tasking (Godbey et al., 1998). Speeding-up food-related behaviour means eating faster. Shortening activities include grazing to cut out time spent preparing and eating meals. Substituting a shorter activity for a longer one might include ordering takeaways or ready-meals in place of preparing a home-cooked meal. Multi-tasking includes eating while watching TV; driving; or working. While some people may use time management strategies, and preserve conventional food and eating habits, most adapt eating behaviours to increase convenience, and the marketing of convenience foods map onto these strategies.

Perception of time-scarcity varies between individuals, within broad time-allocation categories: at home (waking/sleeping), at work, in transport, and leisure-activities outside home (National Diet & Nutrition Survey, 2002). Ranking these categories is influenced by demands including employment; family/domestic role; sex and income. In industrialised nations, most adults fulfil multiple roles, (e.g. worker and parent) reducing time for food preparation and eating. Increased consumption of ready-meals and fast-foods (Naska et al., 2011) can therefore be attributed to consumers perceptions of time-scarcity, and a food industry ready to capitalise on opportunities to sell more (cheap) food with perceived added-value (convenience) at the maximum price the market will permit. This raises important issues for health promotion if such foods are energy-dense, high-fat foods associated with increased risks of obesity, diabetes and other chronic diseases (Jabs & Devine, 2006; WHO, 2002). Nutritional advice often focuses on what to eat, without matching recommendations to hectic lifestyles. Understanding how time-scarcity affects food-choices may lead to more realistic and useful strategies to promote healthy behaviours. By settling for convenience foods, consumers restrict their choices, compounding further the effect of poor cooking skills, and dependence on a nutrient balance defined by manufacturers. By definition, “convenience foods” such as ready-meals are purchased by consumers without time to read detailed nutrient composition information. In some fields, food/catering industries have accepted some responsibility for impact of their products on health and make appropriate changes. For example, reduction in salt content was pioneered by a group of manufacturers (Neptune Project website). Much more could be done through minor recipe and menu modification, and examples of how to incorporate existing products into healthy, nutritionally-balanced meals.
As populations become more overweight, people must eat more calories in order to remain overweight and avoid weight loss. The rates of weight gain in Europe and the US are similar, higher in younger people and averaging about 0.5kg/year up to age 60 years of age (Heitmann & Garby, 2002; Ebrahimi-Mameghani et al., 2008). This requires consumption of only 3,500 kcal extra (1kg 200 carbohydrate or 0.5kg fat) (i.e. above the requirement for a stable weight) each year - undetectably small for any individual. However, the effect of the obesity epidemic has an even greater effect on food consumption through the increased requirement to avoid weight loss. An adult population with an BMI averaging 27kg/m² weighs only about 15kg more than a pre-1980s population with an average of 23kg/m² (Floud, 2006). That extra 15kg increases metabolic rates and food requirement by 200 kcal/d, representing a major selling opportunity for not only convenience foods. It is noteworthy that fast-food outlets are located preferentially in areas of greater deprivation (Burns & Inglis, 2007; Macintyre et al., 2005) where people are under greater economic and time stress, where obesity is more frequent, and where low educational backgrounds make negotiating an obesogenic environment more difficult.

**Evaluation of nutrient compositions of selected ready-meals**

Nutrient-profiling has been proposed as a tool for health promotion (Lobstein & Davies 2009) but categorising individual foods as ‘healthy’/’unhealthy’ is misleading since foods are eaten in combination, in meals and snacks comprising the overall diet, and it is the overall diet that affects long-term health. The quantities of nutrients in foods are inter-dependent, and subtly different emphases towards certain nutrients can be portrayed as contradictions (Verhagen & van der Berg 2008). Getting the energy content right is essential before other nutrients can be considered. An appropriate first step would be to establish nutrient-based criteria for complete meals, particularly pre-prepared meals where the consumer cannot influence nutrient intake.

To illustrate the range of meal compositions, and nutritional issues, we first explored the energy contents of some popular ready-meals from five major supermarkets (Table 1). Four popular meal-types were chosen, within four ranges which are sold in UK supermarkets, without any agreed definition (normal, value/economy, “healthy”, special/fine). The declared on-packaging nutrient contents from the largest supermarket in Scotland, Tesco, were studied in greater detail for examples from within its four ranges. Data were gathered from on-product labelling, checked against the information provided on the supermarket...
website for Tesco, Asda and Sainsbury. The data used for the present analyses were correct in April 2012. The specific compositions of ready-meals bearing the same name may fluctuate as recipes and ingredient sources change. The ready-meals chosen were all sold as “meals” without any instruction to add other items, so analysed as representing the entire meal. The acceptable energy content of “a meal” was predetermined to be 500-700kcal, an arbitrary range about the FSA standard of 30% of a woman’s requirement or Guideline Daily Amount (GDA) (600kcal). For the meal to be nutritionally balanced, 30% GDA should be present for all other nutrients (Table 2), similar to the Caroline Walker Trust nutrient-based standards (Anderson et al., 2008).

Energy contents

Table 3 shows the energy contents per portion, from four supermarkets:

Macaroni cheese: Energy content ranged 271-765kcal, several being outside the meal-sized 500-700kcals, without any warning. ‘Healthy’ and ‘value’ ranges were consistently low.

Lasagne: ‘Healthy’ options tended to contain more calories than ‘value/economy’ and both contained less calories than ‘normal’ and ‘special’ options. None exceeds 700 kcals.

Cottage pie: None reached 600kcals and several contained less than half of the calories required to constitute a meal, without any warning to consumers. ‘Value’ options were particularly low. ‘Healthy’ options could contain more, or fewer, calories than the other ranges: one contained only 200kcals.

Chicken tikka masala: There was a wide range of energy contents, most exceeded 600kcals, almost half above 700kcal. ‘Healthy’ options all contained well under 600kcals.

Nutritional balance in ranges from one supermarket (Table 4)

Complete information, about all essential nutrients, was not provided, with no assurance that this has been considered in any of the recipes.

Macaroni cheese: Examples from both ‘normal’ and ‘special’ ranges both contained more than 30%GDA of fat, and most calories and sugar. All options contained excess saturated fat above 30%GDA; ‘normal’ and ‘special’ both approaching 100%GDA – i.e. more than an adult should eat in an entire day, without warning and ‘special’ exceeded 30%GDA for salt. Both the “healthy” and “value” could be potentially improved, as ‘meals’, by adding other items, such as fruit, whilst the ‘normal’ and ‘special’ options could not be redeemed by adding extra foods, since they already contained over 30%GDA for energy.
Lasagne: ‘Normal’ contained >30%GDA for fat. None contained under 30%GDA for saturated fat. All contained over 30%GDA for salt, highest in ‘normal’. ‘Healthy’, ‘normal’ and ‘special’ lasagnes contained too few calories to be a satisfying meal without extra items, but no guidance was provided.

Cottage pie: Despite small, low-calorie portion sizes, 30%GDA was exceeded for fat in ‘normal’ and both saturated fats and salt in ‘normal’, and ‘special’ ranges.

Chicken tikka masala: Portion sizes varied widely, only ‘healthy’ provided less than 30%GDA for fat, saturated fat or salt.

Labelling
Most items sampled provided the recommended GDA of calories, sugars, fat, saturated fat and salt, subject to available space on the packaging, but its presentation varied between supermarkets. For example, Asda, gave recommended daily amounts for men and women, while Tesco provided information for women. Tesco, but not Asda, showed nutritional values of its products as %GDAs. The traffic light depiction was only used by Sainsbury. Some packaging showed vegetables which were not included in the ready-meal.

Discussion: Ready-meals and the Obesity Time Bomb
There is little published specifically on the relationship between ready-meals and obesity, although a Brazilian study of almost 50,000 subjects found statistically significant correlations between obesity in women and intakes of sugar and soft drinks, ready-to-eat meals, and potatoes (Lobato et al., 2009). Food-choice depends on balancing advantages, availability, accessibility, attractiveness and affordability. Health promotion campaigns almost exclusively use educational approaches and whilst nutrient compositions labelling is important it has led to minimal changes (Review of Scottish Diet Action Plan, 2006). Non-verbal schemes have been developed to try to guide consumers towards better nutritional balance (e.g. the Swedish ‘Green Keyhole’ (website), the UK Balance of Good Health or “traffic light” system (website)). These remove the need to read and understand complex factual information, with particular value for low socioeconomic group consumers. The UK “traffic light” scheme was introduced to guide individuals towards foods low in fat particularly saturated fat, low in sugar and low in sodium (website). For practical reasons, other nutrients were not included. Moreover, the traffic light system provides no guidance with respect to energy, which is relevant for obesity. There is some evidence that consumers understand non-verbal schemes (Fjellstrom, 2004; Green Keyhole), but little that they affect...
consumers’ choices alone. Non-verbal guidance has rarely been applied to meals, although a “Plate-Model” has been developed to guide meal construction using carefully estimated optimal plate-segment sizes (Armstrong & Lean, 1993; Health Scotland) (Figure 1).

The meal is the smallest unit of human nutrition, and there is little justification for providing nutritionally unbalanced meals if they can be improved and remain attractive and affordable. It can be argued that all normal meals provided in catering, or as ready-meals, should be nutritionally balanced, unless otherwise stated. The currently negative health-impact of convenience foods be improved by modifying recipes to meet criteria for a healthful diet, through agreed action between consumers, manufacturers, processors and retailers. The food industry is usually portrayed as entirely demand-led, but it can clearly make or shape demand. It is understandably viewed as having a responsibility to facilitate healthful choices, by improving the nutritional quality of foods and meals, and then communicating the dietary roles and potential health benefits of foods to consumers to allow healthy choices to be easy choices (Roodenberg & Leenen, 2007). For this reason, voluntary nutritional labelling, including GDAs, was introduced by major food retailers and manufacturers widely across Europe. GDAs were based on Dietary Reference Values (COMA, 1991), as consumer-friendly information to help consumers relate nutritional information to their overall diets. Essentially, a sensible daily intake, for health, was defined for energy (calories) and essential nutrients using an average woman’s requirement of 2000 kcal. The content in a food or meal is expressed as a percentage of that amount. Figures are similar for children aged about 11 upwards, and men need to scale up their intakes a little (COMA, 1991).

Assuming we eat three meals a day, a meal with >30%GDA, constitutes a potential problem for nutrients which are hazardous in excess (e.g. energy, fat, saturated fat, sugar, salt). One with <30% (or whatever the % energy RDA of that meal) is not balanced for that nutrient. In principle, any food or ingredient, in appropriate amount, can be incorporated into a nutritionally balanced meal. However, some relatively high-calorie foods (e.g. sausage rolls) contain such a high proportion of saturated fat, or salt, that this becomes practically impossible. The publicly-available data on four meal-types included in this review illustrate several nutritional problems in common ready-meals. This is not a comprehensive survey of all ready-meals, and other issues may exist. However, it is sufficient to draw some important conclusions.
Over half (32/68) of our selected ‘ready-meals’ did not contain enough calories to constitute a ‘meal’ (500-700kcal), while others, 10/68 meals were over 700kcal. Anderson et al (2008) similarly found only 62 out of 300 “ready-meals” contained enough calories to constitute a proper meal. The ‘value/economy’ and ‘healthy’ ranges tend to have smaller portion sizes, accounting for some differences in energy contents, but they are still marketed as “meals”. Meals in ranges labelled ‘light’ all contained below 400kcal – as low as 200 kcal for Tesco Little Dish Salmon Macaroni Cheese. None of the ready-meals offered any advice for serving, e.g. extra items to add to make a balanced meal when energy content is below what is needed for a ‘meal’, so this becomes haphazard and could lead to imbalances in other nutrients.

The population consumes too much fat, saturated fat, sugar and salt (Jabs & Devine 2006; Sturm 2004), which is why components feature on food labels. Of the four ready-meals ranges from Tesco, the ‘healthy’ options contained least sugars, fats, saturated fats and salt, justifying the label only in comparison with the standard range. However there is clearly more work to be done by manufacturers in reducing fat, saturated fat and salt contents to bring them in line with nutritional recommendations. Some of the contents are inappropriate, but the examples chosen for Table 2 are not the most extreme: Tesco Chicken Tikka and Korma with rice contains 1395kcal per serving, with 98%GDA for saturated fat, 80%GDA for salt, while Tesco ‘value’ Shepherd’s Pie only 210kcal per serving: even an inactive adult would need at least 10 of these ‘meals’ to satisfy energy requirements. The ‘special’ or ‘finest’ ranges include many meals which contain 80-100% of GDA for saturated fat. A consumer with some understanding of nutrition and GDAs might realise that these meals are unsuitable for normal/regular consumption. However, a manufacturer could easily modify the recipes to satisfy nutritional criteria, without reference to the retailer or consumer. Slow progress by manufacturers has been blamed on low demand from consumers, and the retail sector, although dietary recommendation for health have changed little over 50 years. In recent years there has been some calling of the worst nutrient excesses in ready-meals, but still little to indicate that manufacturers of ready-meals understand dietary recommendations, or access the readily-available simple food composition databases (Cannon, 1992). Labelling foods as ‘extra special’ or ‘finest’ can be misleading for consumers, who might expect health benefits a higher price-point. This does not seem to be the case.
Using only the limited data provided by manufacturers, the present results broadly agree with Cooper and Nelson (Cooper & Nelson, 2003) in concluding that ‘value/economy’ lines are not nutritionally inferior, and generally represent good value for money. However, the four meal-types studied varied greatly. Using 30%GDA as a standard, based on the FSA’s recommendations that a meal should contribute 30% energy intake for the day, is not a requirement. Other meals in the day may compensate for an unbalanced ready-meal, however this places a considerable burden of nutritional understanding, and application, with the consumer. Serving suggestions could indicate appropriate accompaniments to make up a balanced meal. Conscious compensation with other snacks and meals is not a plausible route to achieve a healthy balanced overall diet for time-scarce ready-meal consumers. Moreover some ready-meals have salt and saturated fat contents that exceed the amount an average adult should consume in an entire day, making compensation impossible. Nutrition labelling aims to help consumers make healthier choices. However, it is considered complicated and time-pressed consumers become weary and confused. To understand the implications of a meal which contains over 100%GDA for saturated fat is in practice beyond most consumers. Nutritional labelling only contains information about a few nutrients that influence health. At present, no assurance is provided that other important nutrients (e.g. vitamins, minerals) have been considered in the recipes or meal preparation. If supermarkets fail to provide an appropriate balance of the nutrients they disclose, it seems unlikely that ready-meals are balanced for all the undisclosed nutrients.

The way ahead

Proposals – nutritional standards for ready-meals

Action is required to improve overall the national diet. The evidence collected by Anderson et al indicates that food manufacturers need guidance, since even ready-meals labelled “healthy” can be nutritionally undesirable. Only 27% of 300 popular ready-meals fulfilled the Caroline Walker Trust nutrient-based standards (Anderson et al., 2008). Specific action should be well received to help consumers with increasing ranges of ready- and catered meals, especially young people. Introducing simple nutritional standards for entire meals could be effective and less contentious, than trying to categorise individual foods as “healthy” or otherwise.

The first necessary step to help consumers should be to establish a sensible size for “meals” in terms of energy content (Table 5). This scheme could be readily applied to re-labelling
existing ready-meals, provided suppliers are given time and support to do this. Customers might tend to move towards the lower-energy, better-balanced, meals and new options would be likely to be better nutritionally. A dish as purchased need not be nutritionally balanced, as a meal on its own, but may still be acceptable if consumers are guided as to how to incorporate it within a balanced meal (e.g. by adding potatoes, or fruit). Some meals very high in energy, saturated fat or salt may not be salvageable in this way. As part of its strategy to prevent obesity, the Scottish government announced in 2011 that it will be working with producers, retailers and caterers to ensure that portion sizes served, or suggested by labels, better reflect consumers' energy needs, and specifically that this will involve standardising the sizes of ready-meals (The Route Map 2010). There are similar issues the catering industry regarding eating out. Lachat et al have commented that Nutritional Policies in Europe are 'embryonic' (Lachat et al., 2009). In Table 5 we propose a solution to ensure nutritional balance of ready-meals that should not be costly or contentious. There are inevitably costs, which could be burdensome for smaller companies, so any change in food supply to improve health does require some support to the companies involved. This scheme could also be used in restaurants very simply to illustrate, with examples, how nutritionally balanced meals (e.g. containing 30% of daily energy and nutrient needs) can be provided from an available menu. There should remain a right for consumers to choose, and caterers to provide very small, very large or nutritionally unbalanced meals. However, these should be identified very clearly for consumers, especially for consumers in a hurry.

This paper has presented firstly a brief overview of the concepts linking ready-meals and perceived time-scarcity. It then illustrates how, using a snapshot of very popular ready-meals, marketing for convenience has allowed nutritional principles to be ignored. How this contributes to the obesity epidemic needs better documentation. Food-choices of both obese and non-obese are driven by convenience, while the obese more often use “snack” foods (Perez-Cueto et al., 2010). Specific research is lacking on ready-meals in relation to weight gain and maintenance of obesity. A comprehensive survey of all ready-meals and their consumers would be needed to refine predictions, but the present results indicate a real problem which is likely to be much more widespread than the 63 meals considered here. Generating simple standards for ready-meals with the scheme in Table 5 would cost little, upset few, and would help consumers.
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Table 1 - What is a meal?
The word ‘meal’ describes not only food, but social actions surrounding food (Makela, 1991). Food is a social tool which can bring people together, sharing foods and the meanings surrounding them.

Food Standards Agency (FSA) guidance: Daily energy consumption should be split over 4 eating occasions, or meals, each day (FSA, 2006):
- Breakfast – 20% of daily energy intake
- Lunch – 30%
- Evening meal – 30%
- Food between meals (snacks) - 20%

Health-promoting meal
Using the same rationale as RDAs for daily nutrient intakes, “main meals” should each contain 30% of recommended daily energy and nutrient intake for women (2000 kcals) i.e. 600-700 kcals. Men need about 20% more. Ready-meals which contain <500 kcal are misleading consumers, unless there are clear instructions to add extra items, e.g. bread, fruit. A meal with >700 kcal provides >35% of RDA, risking weight gain unless consumers are unusually active. If meals contain nutrients with radically different % RDA than energy, then that meal is nutritionally unbalanced, and 24h nutrient-balance may be difficult to achieve.

EC guidance on ready-meals
Nutritional content of meals is provided for information. No limits are placed on what is sold. The EC propose “Ready-meals” to provide 200g as a serving size, with at least 2 ingredients of over 30g. Nutritional contents are not defined.

Supermarket ready-meals
“Ready-meals” are designed for “main meals” (lunch or evening time), typically in four ranges: (1) ‘healthy’ (2) ‘economy’ or ‘value’ (3) ‘normal’ and (4) ‘special’ “finest”. There are no agreed nutritional criteria within or between these ranges.
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<td>----</td>
<td>515</td>
</tr>
<tr>
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<td>427</td>
<td>589</td>
<td>715</td>
<td>570</td>
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<th>ASDA</th>
<th>TESCO</th>
<th>SAINSBURY</th>
<th>MORRISONS</th>
<th>CO-OP</th>
</tr>
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<td>300</td>
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<td>270</td>
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<th>SAINSBURY</th>
<th>MORRISONS</th>
<th>CO-OP</th>
</tr>
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<tbody>
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<td>415</td>
<td>400</td>
<td>300</td>
<td>345</td>
</tr>
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<td>Value/economy</td>
<td>----</td>
<td>585</td>
<td>----</td>
<td>----</td>
<td>----</td>
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<tr>
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<td>875</td>
<td>552</td>
<td>771</td>
<td>525</td>
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<tr>
<td>Special</td>
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<td>652</td>
<td>827</td>
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</table>
Table 4 – Nutritional information expressed as % Guideline Daily Amounts per serving provided to consumers by one major supermarket (Tesco)

Macaroni Cheese

<table>
<thead>
<tr>
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<th>Healthy/Light</th>
<th>Value/economy</th>
<th>Normal</th>
<th>Special</th>
</tr>
</thead>
<tbody>
<tr>
<td>Portion size (g)</td>
<td>200</td>
<td>300</td>
<td>400</td>
<td>450</td>
</tr>
<tr>
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<td>14</td>
<td>21</td>
<td>38</td>
<td>37</td>
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<tr>
<td>Sugars</td>
<td>-3</td>
<td>3</td>
<td>4</td>
<td>9</td>
</tr>
<tr>
<td>Fat</td>
<td>21</td>
<td>24</td>
<td>46</td>
<td>44</td>
</tr>
<tr>
<td>Saturated fat</td>
<td>44</td>
<td>54</td>
<td>91</td>
<td>90</td>
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<tr>
<td>Salt</td>
<td>-9</td>
<td>30</td>
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<td>43</td>
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</table>

Lasagne

<table>
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<td>21</td>
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<tr>
<td>Sugars</td>
<td>8</td>
<td>4</td>
<td>8</td>
<td>7</td>
</tr>
<tr>
<td>Fat</td>
<td>18</td>
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<td>40</td>
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<tr>
<td>Saturated fat</td>
<td>32</td>
<td>39</td>
<td>74</td>
<td>33</td>
</tr>
<tr>
<td>Salt</td>
<td>33</td>
<td>33</td>
<td>42</td>
<td>37</td>
</tr>
</tbody>
</table>

Cottage Pie/Shepherd’s Pie

<table>
<thead>
<tr>
<th>% GDA</th>
<th>Healthy/Light</th>
<th>Value/economy</th>
<th>Normal</th>
<th>Special</th>
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</thead>
<tbody>
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<td>450</td>
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<tr>
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<tr>
<td>Sugars</td>
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<td>1</td>
<td>&lt;1</td>
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<tr>
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<td>41</td>
<td>27</td>
</tr>
<tr>
<td>Saturated fat</td>
<td>15</td>
<td>18</td>
<td>63</td>
<td>39</td>
</tr>
<tr>
<td>Salt</td>
<td>25</td>
<td>25</td>
<td>42</td>
<td>52</td>
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</table>

Chicken Tikka Masala

<table>
<thead>
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<th>Value/economy</th>
<th>Normal</th>
<th>Special</th>
</tr>
</thead>
<tbody>
<tr>
<td>Portion size (g)</td>
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<td>400</td>
<td>550</td>
<td>500</td>
</tr>
<tr>
<td>Energy</td>
<td>21</td>
<td>29</td>
<td>44</td>
<td>42</td>
</tr>
<tr>
<td>Sugars</td>
<td>7</td>
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<tr>
<td>Fat</td>
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<tr>
<td>Salt</td>
<td>22</td>
<td>37</td>
<td>58</td>
<td>50</td>
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</tbody>
</table>

Footnote: precise contents of these and other meals may vary over time. Current data available [http://www.tesco.com/](http://www.tesco.com/). Several different compositions are listed for the same meal in some cases.
Table 5 – Proposed steps to establish agreed nutritional standards for ready-meals

1. Establish a sensible bench-mark or ‘default size’ for all meals unless labelled otherwise – e.g. a notional standard of 600 kcals

2. Establish a sensible range – e.g. ± 10%, or ± 100 kcals

3. Establish sensible terminology to allow provision of larger or smaller meals for customers who want, or need them, and inform consumers

4. Assure consumers that unless clearly stated otherwise, all meals sold to the public are balanced for all nutrients - i.e. the same %RDA as for energy: 30% ± 10%.

5. Establish agreement than no meal should contain >10%GDA above the %GDA for energy, for salt, or saturated fat

6. Ensure that all caterers have basic training in nutrition and use of nutrient-content tables

7. Agree to independent random checking of nutrient content of meals.
Figure 1 – Plate Model

```
potato rice pasta

meat, fish, cheese, eggs

vegetables
```