

In this Issue

Food labelling, food retail availability and food pricing – moving from research to action?

'Making the healthy choice the easy choice' is a commonly heard phrase and seemingly one of the most evident ways to stimulate healthier food choices. Indeed, when about a third of the total global population is overweight or obese⁽¹⁾, it makes little sense to focus entirely on the individual rather than on strategies that can have a population impact. There is a growing call to implement structural interventions such as fiscal policies and front-of-pack labelling to create a more supportive food environment^(2–4). This issue of *Public Health Nutrition* features some of the latest studies in this area, including new work on food labelling^(5,6), policy-induced changes in retail food availability⁽⁷⁾ and monetary fruit and vegetable incentives⁽⁸⁾.

Structural nutrition interventions generally operate at the point of purchase in the retail setting^(9,10). Two of the most important food retail settings are supermarkets and fast-food restaurants. Supermarkets have long been the most important point of purchase for food items in developed countries and their share of retail sales is growing globally, including both developed and developing countries⁽¹¹⁾. Likewise, fast food provides an increasing share of dietary energy and nutrient intakes, which is concerning since high fast-food intake is associated with increased obesity risk^(12,13). Interventions within these retail settings have clear potential to improve the healthfulness of food purchases by making healthy food more available, apparent and affordable.

Food labelling

Food labelling, along with food pricing, is one of the most promising structural interventions in the retail setting⁽²⁾. This issue of *Public Health Nutrition* features two new labelling studies: Cawley *et al.* investigated the effects of a supermarket nutrition rating system⁽⁵⁾ and Liu *et al.* examined the potential of menu labelling in fast-food restaurants to improve food choices⁽⁶⁾.

Fast-food restaurants

In March 2010, the US President signed the health-care reform legislation into law. As part of this law, restaurants and food outlets with twenty or more locations are now required to list energy (calorie) content information for standard menu items on restaurant menus and menu boards⁽¹⁴⁾. The rationale behind this measure is that

calorie labelling will help consumers more accurately estimate energy intakes from fast food⁽¹⁵⁾. However, as Liu *et al.* point out in this issue⁽⁶⁾, many menu items are likely to appear with energy ranges instead of specific energy values. This is because items are customizable; for example, total energy will differ for pizza depending on the selected toppings. These energy ranges might confuse consumers, leading them to misestimate the total energy value of their meal. Also, the authors hypothesize that consumers might confuse the energy range with healthiness, believing that the item with the lowest energy content is the healthiest instead of the item with the least ingredients⁽⁶⁾.

In a series of four well-conducted randomized experiments, Liu *et al.* examine whether energy range information improves energy estimation accuracy (compared with no information) and whether people's energy estimates can be improved by providing explicit information about the contents of items at the end points (identifying the items with the lowest and the highest energy content). In study 1, a total of 306 participants were asked to estimate the energy content of their selected entrée at a fast-food restaurant. They were randomly assigned to see either (i) no energy information or (ii) energy range information. Results revealed that energy estimation significantly improved in the second condition, but consumers continued to misestimate. Studies 2–4 expanded on these results by asking people to select hypothetical fast-food items in an online survey. In addition to the two conditions tested in study 1, these studies looked at whether pointing people to the energy information and/or adding specific end point content information (ingredients in lowest and highest energy option) would improve accuracy. Results showed that defining the specific end points generally did improve accuracy, but misestimating persisted in some cases. Also, even when participants were specifically asked to pay attention to the range end points, accuracy was not improved – suggesting that inaccuracy is not caused by lack of awareness⁽⁶⁾.

These results suggest that energy labelling with ranges on fast-food menus might not have the anticipated impact on improved energy estimation, which is also supported by other study findings⁽¹⁶⁾. If misinterpretation remains, it is unlikely that energy labelling will have a significant impact on the energy content of fast-food purchases or consumption. Indeed, a systematic review (2011) including outcomes from natural and laboratory experiments

comparing calorie labelling *v.* no labelling on calorie ordering and consumption concluded that its impact was modest at best⁽¹⁷⁾. Likewise, a recent meta-analysis of experimental studies concluded that labelling menus with calorie information alone had no effects on calories selected or consumed⁽¹⁸⁾. On the other hand, a review of quasi-experimental studies showed that the addition of contextual or interpretive information did affect calorie consumption⁽¹⁸⁾, suggesting that the effects of the labels can be enhanced when designed in the right way.

Supermarkets

This brings us to nutrition labelling in supermarkets, the focus of a study by Cawley *et al.* in this issue⁽⁵⁾. In this setting, labels generally appear either on the front of the pack or on the shelf and provide 'at a glance' information that is easy for consumers to understand and act upon. There is now substantial evidence indicating that interpretative labels (using graphics, symbols or colours) are better understood than quantitative or informative (text) nutrition labels⁽¹⁹⁾. However, evidence of the effects on actual purchases, sales or consumption is more inconclusive⁽¹⁹⁾. This evidence is important as understanding a nutrition label does not necessarily mean people will positively change their purchases. In fact, effects could even be negative because people might link health with a bad taste⁽²⁰⁾.

Cawley *et al.*'s study used objective sales data to measure the impact of the introduction of a nutrition labelling system, Guiding Stars, in 168 supermarkets in the USA⁽⁵⁾. Beginning in September 2006, Guiding Stars – which assigns scores of zero, one, two or three stars to food items, with three stars indicating the most nutritious – was added on shelf labels. Cawley *et al.* analysed aggregated weekly sales data from January 2005 to December 2007 and looked at overall weekly food sales, sales of less nutritious foods and sales of nutritious foods before and after the introduction of the labelling. While sales of nutritious foods did not change significantly, weekly sales of less nutritious foods decreased significantly by 8.3%, meaning that the overall nutritional quality of purchases improved. These effects are promising. However, since this study used aggregate sales data and did not have a control group, some important issues remain unclear. First, we do not know how the labels impacted individual consumers or the extent to which population trends or other factors could account for the observed effects. Besides, any effects on purchases outside the participating supermarkets or long-term impacts are uncertain. These are all potential targets of future studies. Still, the fact that this study used objective sales data and was able to monitor the effects of a real-life labelling scheme are significant strengths. There are only a few other studies that have examined impacts of labels on supermarket sales or purchases, and evidence is mixed. Two studies looking at the impact of 'traffic light' nutrition systems did not find

significant impacts on unit sales of healthier *v.* unhealthier products^(21,22), while two other studies testing the effects of the Guiding Stars programme did find effects on healthier ready-to-eat cereals demand⁽²³⁾ and purchases⁽²⁴⁾.

Food labelling – conclusion

Summing up the evidence on labelling, it appears this strategy might have some impact on purchases, but no miracles should be expected. As outlined in earlier work, the best potential for labelling might lie in reformulation, as labels could form an incentive for producers to develop healthier products⁽²⁵⁾. It can be argued that clear labelling is the least we can do to support consumers in making healthier choices, but other measures are clearly needed to have a real impact.

Food availability

One way to enhance the effects of nutrition labelling is by increasing the availability and accessibility of healthy food. Principally, if healthy options are not available, of poor quality or expensive, they are not very likely to be purchased, in particular among poorer households who have limited access to resources including cars to travel to food establishments.

As the subject of the study by O'Malley *et al.* in this issue of *Public Health Nutrition*⁽⁷⁾, food packages for the US Special Supplemental Nutrition Program for Women, Infants, and Children (WIC)* underwent substantial revisions in 2009 to align them with US dietary guidelines. The changes included the addition of low-fat dairy, whole grains and cash vouchers for fruits and vegetables. While the primary goal was to improve dietary quality of the target population, the policy change also required retail stores authorized to accept WIC to meet minimum stocking requirements for the new items. In their study, O'Malley *et al.* report interesting findings showing that the availability of foods meeting WIC requirements improved significantly pre- to post-policy in small and medium-sized stores. These stores are important points of purchase in many lower-income and racial/ethnic minority neighbourhoods due to the lack of supermarkets. This finding supports other prior published studies showing small improvements in healthier food availability (and pricing) following the WIC food package revision^(26–29).

O'Malley *et al.* examined the impact of the WIC food package revision using a new audit instrument, the WIC Availability Index (WIC-AI), and argue that their instrument is not only useful to monitor WIC adoption but also to measure the healthfulness of retail food environments in general. Advantages of the WIC-AI tool are that it is easy to use and provides a way to summarize complex food

* WIC is the US Special Supplemental Nutrition Program for Women, Infants, and Children providing supplemental food and nutrition education to low-income women, infants and children under the age 5 years.

store environment data⁽⁷⁾. However, as also acknowledged by the authors, there are some shortcomings to consider. For example, as recognized previously by members of the research team and others, there is evidence that not only the availability of healthy items is of importance, but also the availability of unhealthy items^(30,31). In fact, when measuring the retail food environment, multiple aspects of the consumer food environment – beyond availability – should be considered, including prices, marketing and food quality (i.e. freshness, expiration dates)^(32–34). A large number of food store and even restaurant audit instruments are now available, each with strengths and limitations. As research on the consumer retail food environment continues, investigators need to grapple with achieving the right balance between the creation of innovative tools that improve our ability to capture relevant aspects of the food environment or best suit their study aims *v.* the use of standardized instruments that allow for easier comparisons across places and over time. When making these decisions, researchers may find a recently proposed step-wise framework to monitor local food environments within and across countries useful⁽³⁵⁾.

Food pricing

This brings us to the final promising strategy, food pricing. Food pricing interventions can broadly be divided into taxes on unhealthy foods or subsidies on healthy foods. This issue of *Public Health Nutrition* features a new well-designed food pricing study on the latter. Andreyeva and Luedicke examined the effects of cash-value vouchers (\$US 10 for women and \$US 6 for children per month) for fruits and vegetables through the WIC programme on fruit and vegetable purchases, using a one-group pre–post design⁽⁸⁾. Results showed that the vouchers were effective in increasing monthly fruit and vegetable purchases, with a 17.5% increase in fresh vegetable and 28.6% increase in fresh fruit purchases following the introduction of the vouchers. There were some substitution effects (e.g. people now using the vouchers instead of other funds to pay for fruits and vegetables) but these were small and the authors conclude that the efforts to encourage consumption of fruits and vegetables by people receiving federal food assistance are paying off⁽⁸⁾.

Effectiveness of food pricing interventions

The first economic law of demand states that if prices of a certain product increase, the demand will decrease and vice versa⁽³⁶⁾. Indeed, there is growing evidence supporting the findings by Andreyeva and Luedicke in this issue showing that people are responsive to price changes of food^(8,37,38). Also, in other fields it has long been known that price is one of the most effective ways to steer consumer behaviour^(39,40) and when thinking about implementing population-wide nutrition interventions, price should definitely be part of the

strategy. Nevertheless, it is important to be mindful of some potential side-effects that could influence the ultimate effects of pricing interventions.

For pricing strategies to be effective, we not only want them to impact on purchases of the targeted product (fruit and vegetables, in this issue) but also on the overall healthiness of the purchases. An important limitation of the study by Andreyeva and Luedicke is that it did not examine this overall effect. A concern with healthy food subsidies is that people might purchase the subsidized foods on top of their regular purchases, thereby ending up with a higher total energy value. Or, even worse, people might use the money they saved through the subsidy to buy extra unhealthier items^(41,42). Other mechanisms to consider include ‘product substitution’, ‘forward buying’, ‘purchase acceleration’, ‘brand switching’, ‘product testing’ and ‘repeat purchasing’, which all are expected to have different effects on consumption patterns and might not necessarily improve the healthiness of the diet⁽⁴⁰⁾. Also, there is the issue of cross-price elasticity which has important consequences for the effectiveness of both subsidies and taxes.

Cross-price elasticity is a term from micro-economics relating to the change in demand of one product (full-fat milk) in response to the change in price of another product (low-fat milk), either through complementing or substitution. When products are complements, they are often purchased together (for example, milk and breakfast cereal) and if the price of one product changes, the demand for both changes. If products are substitutes, it means that people swap one product (regular soft drink) for another (diet soft drink) due to a price change (soft drink tax). These price-elasticity effects can have important impacts on the overall effects of pricing interventions. For example, Mytton and colleagues found that fruit purchases tended to fall as a result of taxation on milk and cream⁽⁴³⁾ and Nederkoorn and colleagues found that people tended to replace more expensive energy-dense products with cheaper alternatives as a result of a tax on energy-dense foods⁽⁴⁴⁾.

There is a clear lack of high-quality studies that have looked into price elasticity effects of food price interventions in detail. Most evidence comes from natural experiments/observational studies and modelling studies which generally do not provide detailed insight into cross-price elasticity effects⁽⁴⁵⁾. Apart from a field experiment aiming to simulate a tax by manipulating discount levels on unhealthier items and some experiments in simulated supermarket environments^(46,47), no randomized controlled supermarket trials testing the effects of food taxes exist in the literature. The main reason for the dearth of high-quality trials is that they are complex and costly to conduct. Opposition from the food industry against several proposed intervention strategies is another important reason for the lack of experimental studies⁽⁴⁸⁾. There are a few examples of high-quality supermarket randomized

controlled trials on healthy food subsidies^(49–51). While no randomized controlled trial, the paper by Andreyeva and Luedicke in this issue of *Public Health Nutrition* is an important addition to this evidence base and key strengths include that it was conducted in a real-life supermarket setting and used objective loyalty card purchasing data of a large sample of 2137 households. With other studies showing that the cash-value vouchers were also associated with small improvements in fruit and vegetable availability⁽²⁷⁾ and pricing^(28,29) and improvements in dietary intakes⁽⁵²⁾, vouchers for fruits and vegetables and possibly other healthier foods seem a promising strategy worth further investigation⁽⁵⁰⁾, particularly since they can be directly targeted to the groups most in need of this intervention.

Finally, the major challenge in future food pricing research is to unfold the effects on health outcomes. This includes not only estimating more precise price elasticities, but also the long-term effects of price changes. People may eventually become unaware of new prices, especially when prices of a whole product range are changed at a certain point in time⁽⁵³⁾. An important aspect to also consider is tax salience, referring to how the tax/subsidy is communicated. Here, it may be more important to tell people that products are taxed than to actually tax them⁽⁵⁴⁾. Also, we should not forget the importance of industry response to taxes and subsidies. Companies can make decisions about absorbing (parts of) the tax and the cost change might only be partially passed on to the consumer. Furthermore, the abolishment of the Danish fat tax (mainly for economic reasons) within one year of its introduction shows that feasibility aspects are crucial to consider⁽⁵⁵⁾.

In conclusion, there is still much to learn about the effects of food taxes and subsidies, however time is ripe for action too. It is encouraging that different countries, including Hungary, France and Mexico, have introduced fiscal food policies⁽⁵⁶⁾ and it would be very interesting to learn the effects of these policies to inform further policy making.

Conclusion

The papers discussed in this editorial show potential for several structural nutrition interventions including food labelling, retail food availability and pricing interventions. While some important evidence is still missing, most importantly regarding the long-term effects of these interventions and the effects on dietary and health outcomes, the rising prevalence of obesity and non-communicable diseases also calls for more immediate action and the time seems right to start implementing a range of promising measures.

It is evident that our food environment is highly commercialized and it has been argued that unhealthy diets are simply the consequence of peoples' incapability of

choosing right from plenty⁽⁵⁷⁾ or that obesity is 'a robust sign of commercial success'⁽⁵⁸⁾. If we are serious about population health, we should do something to change this environment, which might include doing something about vested commercial and political interests. There is clear evidence showing that promotional campaigns or nutrition education are not enough to achieve healthier population diets⁽⁵⁹⁾. Indeed, as outlined in a recent viewpoint in *JAMA*, we need governments and health bodies to take action and lead by example⁽⁶⁰⁾. Incentives such as the Danish fat tax should be given the opportunity to prove effects before being overturned by giving priority to other (economic or political) interests. Also, we should be mindful that the introduction of less hefty interventions, such as calorie labelling, are not used as 'window-dressing' and confine the introduction of any further measures. Calorie labelling is arguably the least we can do and should be seen as a first step to create healthier food environments. A range of measures are clearly needed where it is crucial that health, as opposed to economic interests, achieves a central role in food policy decisions.

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