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Best Practices in Policy Approaches to Obesity Prevention

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Abstract

The rapidly rising rate of obesity has prompted a variety of policy responses at national, regional, and local levels. Yet, many have expressed concern that these policy responses have a limited evidence base, are overly paternalistic, and have the potential to increase rather than shrink obesity-related disparities. The purpose of this article is to evaluate obesity policies in terms of the adequacy of evidence for action and along two ethical dimensions: their potential effect on liberty and equity. To evaluate evidence, we engage in a systematic review of reviews and rate policies in terms of the sufficiency of evidence of effectiveness at combating obesity. We then apply a libertarian-paternalist framework to assess policies in terms of their impact on liberty and inverse-equity theory to assess impact on disparities. This article provides a framework to assist decision-makers in assessing best practices in obesity using a more multi-faceted set of dimensions.

Keywords

Obesity; policy; ethics; review; evidence; best practices

The meteoric rise of obesity over the last decade as a public health priority has precipitated a flurry of research to evaluate potential policy levers to reduce and control this condition.¹ However, due to the urgent need to adopt policies in the face of scientific uncertainty, researchers have raised concerns about the adequacy of the evidence base for action and have turned their attention towards identifying *best practices* in obesity prevention. Researchers continue to debate the definition of best practices, with some interpreting the term as meaning evidence-based practice and others suggesting a slightly lower standard of promising practices, which may not be grounded exclusively in presently available empirical evidence. The U.S. Department of Health and Human Services' definition of best practices reflects this indecision, defining a best practice as "one with at least preliminary evidence of effectiveness in small-scale interventions *or* for which there is potential to generate data that will be useful for making decisions about taking the intervention to scale . . ." (emphasis added).^{2[p.1]} In addition to concerns about the adequacy of evidence to inform best practices, many of the more popular obesity policies have prompted complaints about the so-called "nanny state."^{1,3} Others have expressed concern about the potential of widening disparities

when policies are geared towards the population as a whole rather than targeted at particular groups most at risk.⁴

The purpose of this article is three-fold. The first aim is to identify the major policy approaches that have been adopted in response to the obesity epidemic among adults, including those explicitly aimed at reducing obesity in underserved communities. Second, we will summarize the evidence base, either used to develop policies, or that emerged from analysis of obesity-related policies in order to assess the adequacy of present knowledge base in support of these approaches. Third, our team will explore ethical dimensions of obesity policies in terms of their potential impacts on liberty and health equity. The result is a multi-dimensional framework that can be used to assist decision makers in assessing the pros and cons of different policy approaches to addressing the obesity epidemic.

Background

Researchers frequently bemoan the lack of an evidence-base for policies and disagree about the threshold of evidence required to make a sound policy recommendation.^{5,6} In fact, there is no formal mechanism for incorporating research findings into the political process.⁶ Governmental bodies often commission reports and hear evidence from experts, but this process is not standardized and determining when a policy's "time has come" is considered more of an art than a science.^{7,8} In public policy, best practices are understood to be at best partial since the research required to identify an absolute best practice is almost never available.⁹ The rational analytic model of public policymaking assumes a systematic process of defining goals, searching for all possible policy alternatives, evaluating consequences and choosing the alternative is most likely to achieve the defined goal.¹⁰ Research suggests that contrary to this rational model, policymakers consider only a subset of alternatives, have limited information, and satisfice rather than maximize in decision making (stop searching for the perfect solution when they have found a satisfactory one).¹⁰ Thus, the actual evidence base only minimally factors into decisions. Consequently, students of public policy have searched for ways to integrate evidence into decision-making processes more effectively in order to increase (if not perfect) their rationality.

The Institute of Medicine (IOM) recently issued a policy brief that outlines a framework for bridging the evidence gap in obesity prevention through a four step process: Locate, Evaluate and Assemble evidence to inform Decisions (LEAD).¹¹ However, this framework does not offer insight into when an evidence base is sufficient to prompt action and does not address other factors apart from evidence that decision makers may wish to take into account, including the degree to which the policy may be construed as paternalistic and its impact on equity. With multiple potential policy options to choose from, decision makers require a broader picture of the trade-offs of different policy approaches.

Swinburn, Gill, and Kumanyika propose a framework for classifying different types of evidence with regard to obesity prevention and balancing evidence of effectiveness against the potential population effect.¹² They then identify five filter criteria to make judgements about which policies to select out of a portfolio of options. These filter criteria include feasibility, sustainability, effects on equity, potential side effects, and acceptability to

stakeholders. The effect of policies on liberty is not explicitly considered, but could be encompassed by potential side effects or acceptability. They identify the lack of evidence for obesity prevention policies as the single greatest challenge to applying their framework. Another framework for health research suggests employing a triangle of evidence, theory, and ethical principles to inform decisions made through an explicit process that weighs relevant trade-offs.¹³ Evidence may lack strength, either to support a need to address a specific problem, or to support a particular approach to address the problem. Where evidence is incomplete, but action is required due to the potential harms of inaction, ethicists have suggested utilizing a precautionary principle, a “better safe than sorry” approach to deciding on the adequacy of the evidence base.¹⁴ Where immediate action is not required, the ground thins and new ethical concerns arise that require examination apart from an evaluation of policy effectiveness. Some policies raise concerns about public health paternalism, overreaching bounds to take actions with uncertain benefits and costs to taxpayers, while others have the potential to either increase or reduce equity.¹³

To address concerns about paternalism in public policies, Sunstein and Thaler propose a libertarian-paternalist framework which argues in favor of policies that induce people to act in a direction that will make their lives better, while maintaining freedom of choice.^{11,12} Libertarian paternalism opposes outright bans on particular behaviors but encourages policies that make an individuals’ default choice a healthier option while preserving the freedom to opt-out.^{15,16} This perspective is informed by behavioral economics and neoinstitutionalism, which emphasizes the importance of starting conditions in how people process and respond to information and framing effects (how information is framed in a positive or negative light).^{15,16} For instance, placing unhealthy items near the register encourages people to purchase these items at the last minute. Rearranging these foods would constitute a minimum invasion of liberty, but could substantially influence behavior.

The key insight in libertarian-paternalism is that existing institutions impose a default choice on individuals regardless of whether they have made an active decision.^{15,16} This type of “soft paternalism” (nudges as opposed to shoves)³ is being increasingly endorsed as a limit on strong paternalist tendencies in public health, while maintaining a role for the state in regulating behavior. Strict market liberals would likely still find libertarian paternalism objectionable since its starting point accepts that some intervention in the market is inevitable and unavoidable.^{15,16} Drawing on insights from libertarian paternalism, this article analyses obesity policies according to their likelihood of limiting or preserving liberty.

A second ethical concern is how policies might affect equity and inadvertently widen racial, ethnic, or social class disparities. This consideration is explicitly raised in Swinburn, Gill, and Kumanyika's framework.¹² Researchers increasingly recognize that in addition to determining whether a policy works to improve health at a population level, it is important to consider how policies might affect particular sub-groups and the distribution of health outcomes across a population.⁴ There are few available frameworks to assess the potential impact of policy approaches on health equity and equity concerns have been relatively ignored in systematic reviews.⁴

Based on diffusion theory,¹⁷ the inverse equity hypothesis argues that health inequities tend to be reproduced because the most advantaged will be the first to incorporate emerging knowledge of preventive and care and treatment innovations.¹⁸ This theory can help to explain why policy innovations often benefit more advantaged groups first and reinforce disparities.¹⁹ A recent systematic review of public health interventions and their effects on disparities found that downstream interventions are more likely than upstream interventions to generate or widen disparities, though the distinction between downstream and upstream is somewhat unclear and few studies were uncovered that included adequate information on which to judge the impact of policies on health equity.⁴ In addition to widening disparities, distributive justice is concerned with whether the financing of different policy solutions is regressive, progressive or neutral on the whole.²⁰ Financing from income taxes is generally the most progressive since this mechanism is able to take proportionally more from wealthier individuals. Sales taxes, including so-called *sin taxes* on unhealthy products, are modestly regressive since the percentage of income that is spent is higher at lower incomes.²⁰

Financing mechanisms also affect equity by determining who bears the burdens of costs and who benefits. Perhaps most importantly, inverse equity theory suggests that policies that rely on information alone without addressing underlying economic and social conditions, or social determinants of health, will tend to reinforce rather than reduce disparities.^{18,19} Living in obesogenic environments, disproportionate marketing of unhealthy foods to poor/minority communities, high levels of stress from crime, and low levels of health literacy, among other factors, may make the best public health efforts fail.¹⁹ Using inverse-equity theory and the findings from the systematic review, the article analyzes the impact of obesity policies on health equity in terms of its potential to be progressive or regressive both with regards to equity in health outcomes and in terms of who bears the economic burden of added costs.

The combination of evidence and ethical concerns provides a framework to assist decision makers in assessing best practices in obesity using a more multi-faceted set of dimensions (see Figure 1). Other concerns in selecting from available policy options include the cost-effectiveness and political feasibility of policies being adopted and implemented. These concerns warrant attention but require separate analysis and are not explicitly reviewed here, though are discussed briefly for further consideration.

Methods

To assess the evidence base used to develop policies and that emerged from analysis of obesity-related policies, we engaged in a rapid review of existing review studies on a subset of policies that have been the most prominent on the policy agenda. Like full systematic reviews, rapid reviews aim to minimize selection bias, but are not fully comprehensive, and therefore cannot rule out publication bias.^{4,21,22} We engaged in a rapid review because we were interested in simulating the type of readily available evidence on which policymakers and individuals without specialized training would be the most likely to draw. We were interested in the degree to which researchers had reached consensus on a topic and their impressions of the degree to which more research is needed. We were particularly interested

in evaluation research of actual policy changes as opposed to observational research of the problem that the policy is intended to address and experimental research with policy implications, but not evaluating an actual policy change, but we reviewed all evidence available in systematic reviews.

In order to identify the subset of obesity-related policies on which we would focus, we first searched the Rudd Center Legislative Database (<http://www.yaleruddcenter.org/legislation/>) to determine the extent to which different policy solutions had been adopted or were being considered. This source is updated daily and contains bills that are in progress, have passed or were deliberated over but failed to pass (see Table 1). One limitation of the Rudd Center database is that it does not contain bills from local jurisdictions such as cities such as New York, which has been a leader in obesity policy. Nevertheless, it provides a means of assessing the popularity of different policy approaches on state and national agendas. Based on policies that have either been adopted or proposed across states, we selected the four most common policy approaches and conducted a literature review to establish the current evidence base in support of these policy options (Figure 2).

We excluded policies related to the built environment and physical activity, as they were too diverse to identify a coherent policy, and school-based policies, since children are a captive audience at school and concerns about a nanny state do not extend as much to children. We also excluded diet-related policies that target health risks but are not hypothesized to affect weight, such as bills to ban trans fats and to reduce sodium intake. Thus, we concentrated our review on diet-related adult obesity policy.

With the above exclusion criteria, the four most widespread policies to address adult obesity fell into four general categories: 1. Availability: improving access to/availability of healthy foods through farmers markets and community gardens proposed in 37 bills across 13 states/federal government, and policies addressing food deserts, pursued in 28 bills across 11 states/federal government for a total of proposed 65 bills; 2. Cost: taxing unhealthy foods including sugar sweetened beverage taxes (50 bills across 17 states/federal government) 3. Food assistance reform: targeted healthy food subsidies and reform of food assistance programs (25 bills across 13 states/federal government); 4. Information: restaurant calorie labeling on menus (12 bills across nine states/federal government) (see Table 1 for summary of ranking of policy categories). Menu-labeling became national law in 2010 with the passing of the Affordable Care Act and will go into effect in 2014; it was introduced in New York City in 2008 (see <http://www.fda.gov/food/labelingnutrition/ucm217762.html> and <http://www.yaleruddcenter.org/resources/upload/docs/what/policy/NYCityMenuLabelingLaw.pdf>).

We performed a targeted literature review of these four major policy areas by searching Medline, Pubmed and JSTOR, CINAHL and Academic Search Premier for review articles using strings of the following search terms, limited to title or abstract: obesity, nutrition, policy, review, and words specific to the four identified policies (e.g., menu or calorie labeling, point of purchase, taxes, fiscal policy, food deserts, grocery store, access, subsidy, food assistance, Supplemental Nutritional Assistance Program (SNAP), Women, Infants, and Children (WIC), food insecurity, food insufficiency). In all, we identified 198 unique

titles, which we narrowed down through title and abstract review (see Figure 2). We considered review articles published within the past 12 years (2000-present), including those citing earlier evidence. A majority were eliminated because they were not systematic reviews. Where we were unable to find any (or few) reviews that met the inclusion criteria on a given topic, or where reviews were older and did not include published recent articles, we searched for recent articles and included these although they were not review articles. We also conducted a search of the gray literature and included book sources and grey literature sources that were cited within reviews. In total we located two systematic reviews on restaurant calorie labeling, four on taxes and fiscal policy, three on food deserts (plus a government report and a book chapter), and one on food assistance reform as well as a book chapter. In some cases, the reviews cut across different policies—such as reviewing both taxes and targeted subsidies and food deserts and food assistance programs. In this instance, we summarize the findings from particular studies in the pertinent section. The key findings from the review articles included in the systematic review are summarized in Box 1 and the authors' principal conclusions are summarized in Box 2, categorized by 1) sufficiency of evidence for action, 2) potential effect on liberty, 3) potential effect on equity, and 4) other considerations, for each policy.

The author's assessment of the sufficiency of the evidence for action is based on the degree to which studies of actual policy changes with adequate designs are available. Where studies of actual policy changes were not available, experimental evidence in controlled settings were given the next highest weight, followed by observational studies. While we review evidence from a broader range of studies, including observational studies, if few or no studies existed examining impact of actual policies or experimental designs, we considered the evidence base to be insufficient to make a judgment about potential policy efficacy. This does not necessarily imply that the policy is ineffective; rather, that the evidence is insufficient given current studies. Author's judgments regarding the potential effects on liberty and equity are based on the authors' own analyses, according to available definitions of soft and hard paternalism, and theory regarding health equity and the progressiveness and regressiveness of financing mechanisms for public health. These analyses are intended to be suggestive rather than definitive. Other researchers may disagree with the author's interpretations and further legal and ethical analyses could shed additional light on identifying an acceptable threshold of liberty and equity in policy decision-making.

Policies Addressing Healthy Food Availability: Food Deserts

Problem and policy solutions—Food deserts, or the absence of an accessible and affordable assortment of healthy food options, is thought to be one cause of obesity and obesity-related disparities.^{8,23} The U.S. Department of Agriculture (USDA) defines a *food desert* as a place more than a mile from a large grocery store with no or limited means of transit to the nearest grocery store.²⁴ People who live in neighborhoods without a supermarket have been shown to eat fewer fruits and vegetables and weigh more.^{25,26} This relationship has not been clearly demonstrated for smaller corner stores or for access to community gardens or greenmarkets, and the association does not determine the direction of causality (i.e., the lack of availability may be due to lack of demand).²⁷ There is also new

evidence that low-income neighborhoods do not have decreased access to large food stores.²⁸

In order to address this evidence and the gap in access to less expensive large food retail chains, a number of states and local communities have started to experiment with different types of policy initiatives aimed at eliminating the geographical disparities in access to fresh fruits and vegetables including the use of zoning laws to create a healthier food environment. Eleven states and the federal government currently have legislation under review to reduce food deserts. A portion of these are specific to changing zoning laws. Thirteen states and the federal government also have bills aimed at increasing access to locally grown produce through community gardens or farmers markets.

Evidence

With regard to the evidence on the effect of food deserts on obesity, we found three review articles^{29–31} and one book chapter.³² We also found one review of the evidence regarding farmers markets/community gardens on food consumption.³³ No reviews of the evidence of policies to address food deserts were identified, but two natural experiments that simulate the effect were identified and one article critical of the evidence base used to justify policies to redress food deserts.^{34–36} No studies were identified that have evaluated whether a policy change in zoning laws or related incentive programs to attract more grocery stores has been successful at increasing the presence of large supermarkets/grocery stores in deprived areas. One study assessed the impact of an ordinance to ban new fast-food restaurants in South Los Angeles, but did not measure outcomes.³⁷

The evidence in support of policies to bring more healthy eating options to places categorized as food deserts is weak and insufficient to judge policy impact on obesity. Though there is a large body of evidence in the U.S. that certain communities, particularly inner city areas, can rightfully be described as food deserts, and there is descriptive evidence of a relationship with obesity, there is little evidence to show that providing more access to a wider variety of fruits and vegetables on its own leads to greater consumption of fruits and vegetables or weight loss. The two studies that evaluated the impact of the opening of a grocery store in previously deprived areas found no effect on overall fruit and vegetable consumption patterns.^{34–35}

The review study of the impact of farmers' markets/community gardens on healthy food consumption found some evidence of associations between increased access to fruits and vegetables through farmers markets and community gardens and higher consumption across 16 studies, though study designs varied greatly.³³ Furthermore, they found few studies that utilized experimental designs and valid measures of food consumption.³³

The literature also suggests that an over-availability of poor-quality food options, rather than a lack of availability of healthy food options, may contribute more to obesity in low-income communities.³² This would suggest that policies to limit availability or affordability of unhealthy foods might be more effective than increasing availability of healthy food options on its own.

Potential impact on liberty and equity

As widening the availability of healthful food options would increase freedom of choice, currently constrained by lack of availability, this policy should enhance rather than limit liberty and should not be objectionable on libertarian grounds. Most policies involve providing some incentive to the private sector to make healthier food options more available, which should be less objectionable on liberty grounds than more direct subsidies. Changing zoning laws is a relatively low-cost approach ; it entails altering an existing default rule that puts up barriers to access. With regard to equity, if the hypothesized mechanism (the underavailability of healthy food options) is the reason for the association between food deserts and higher obesity rates in low-income communities (still shaky evidence), then greater availability should lead to a reduction in obesity disparities. However, if the issue is a lack of demand in low-income communities, or the simultaneous presence of unhealthy foods, or cost, increased supply alone may not induce demand in the absence of other changes to the environment and may divert resources from other policies or programs. Actual policies to reduce food deserts and increase availability of healthy foods are quite diverse and the cost would vary greatly depending on the proposed policy. Where new revenue sources are needed, financing of programs to increase availability of fruit and vegetable options would likely constitute a progressive transfer.

Conclusions

Access programs are based on evidence of an association between supermarket prevalence, diet and obesity. There is limited evidence (and there are limited studies) to demonstrate that improving access on its own will improve diet or reduce obesity. While policies to remediate food deserts do not unduly constrain liberty and are aimed at reducing health disparities, there is insufficient evidence to judge whether these policies will have the intended effect. More natural experiments and evaluation studies of actual policy changes as well as studies to understand demand for healthy food in low-income communities would be important additions to enhance the evidence base.

Taxes on Unhealthy Foods

Problem and policy solutions—The lower cost of soft drinks and other sources of calorie-dense, nutrient-poor food items is believed to contribute to weight gain.³⁸ This cost differential is also believed to contribute to obesity-related disparities, as lower-income individuals with limited budgets will tend to select cheaper, higher-calorie food sources.³⁹ The goal of taxing unhealthy foods is to discourage consumption and to reverse the economic incentive to over-consume energy-dense, less healthy foods. Some policy approaches in the U.S. focus specifically on sales taxes on sugar-sweetened beverages, while others focus on the general category of junk foods.

Evidence—We found four review articles on the relationship between food pricing policies and consumption of unhealthy foods/obesity^{40–43} and a review article on the status of current state laws pertaining to junk food taxation, though not specific to its effects on obesity.⁴⁴ An additional article that we considered reviewed the literature on price elasticity of demand for food, providing insight into the likelihood and thresholds at which a price

increase will result in reduced consumption.⁴⁵ One of the review articles reviewed evidence from the U.S.,⁴⁰ whereas the other slightly more recent article included global research, with a focus on Canada.⁴¹ This article reviewed evidence only from correlational studies examining the relationship between food prices and behavioral and weight outcomes.⁴¹ In contrast, a recent review article focused exclusively on evidence from controlled experiments of food price manipulations (both in laboratory and real world settings).⁴² Most reviews considered evidence on subsidies in addition to taxes. However, most policy solutions focusing on subsidizing healthy food choices target participants in food assistance programs as opposed to untargeted subsidies for the general population. Since there are few states that are considering legislation on untargeted subsidies, we concentrated our analysis on results from studies on the effect of taxes, though the results from subsidies on healthy foods found similar effects to taxes on unhealthy foods: when healthy foods were cheaper, people substituted these for unhealthy foods.⁴²

The review found little evidence of any direct impact of food taxes on obesity, but did find evidence that pricing policies can significantly affect consumption patterns, especially when prices are raised steeply (though *steeply* is left undefined). A common theme across the reviews, and especially in the review of actual existing tax rates,⁴⁴ was that existing tax rates are too low to substantially affect consumption patterns and that taxes would need to be raised on unhealthy food across the board to prevent substitution of other unhealthy foods. Substitution of taxed foods with other unhealthy foods when taxes are selectively applied was another overarching concern identified across different reviews. The review of experimental studies found that where taxes were applied to broad categories of foods (e.g., based on energy density, fat grams), healthier foods were substituted for less healthy foods even without reducing the cost of healthy foods.⁴² The article strongly recommended taxes on broad categories of foods rather than selective taxes to reduce the substitution of unhealthy foods, even though it did not uncover any studies that demonstrated a clear substitution effect.⁴² The review on price elasticity of demand found the highest elasticities for food away from home, with soft drinks, juices, and meats being most responsive.⁴² As an example, they estimate that a 10% increase in soft drink prices should reduce consumption by 8% to 10%.⁴² The reviews also stressed that because sin taxes can generate revenue that can be put towards health-promotion campaigns or possibly towards subsidies of healthier foods they may be desirable to implement even in the absence of a demonstrated effect on obesity.

Potential impact on liberty and equity—Because it is not an outright ban, taxation is liberty-preserving. Individuals are still free to purchase whatever they wish if they are willing to pay. However, Sunstein and Thaler caution that as the tax or fine increases in amount, liberty begins to shrink.¹⁵ Certain unhealthy foods are already widely taxed, though perhaps not substantially enough to alter behavior. This approach could be contrasted with the sugar-sweetened beverage size limitation, which does constrain free choice by placing a cap on the absolute quantity that can be sold in a given serving. Some might consider raising the cost of unhealthy foods coercive, but current subsidies that make many processed foods inexpensive are also coercive and market distorting by artificially setting prices lower than they would be if purely market driven. Removing subsidies that serve to make sugar-

sweetened beverages and other corn/soy-based products inexpensive, as some have proposed,⁴⁶ could function as a tax since prices of these subsidized products would increase, although it is not clear by how much. This option would merely be a reversal of an existing subsidy, and therefore should not be objectionable (and in fact may be preferable) even to market liberals. Policies where revenue from sin taxes on unhealthy foods is earmarked towards health promotion activities are more popular than policies where sales taxes on unhealthy foods go into general public funds, which tend to be less popular (see <http://www.yaleruddcenter.org/newsletter/issue.aspx?id=34>). Sin taxes are frequently opposed by grocers and vendors in small establishments as the increased price may reduce sales and profits for these popular products.

As lower-income individuals have a higher price elasticity of demand, making unhealthy foods substantially more expensive should decrease their consumption more, which could therefore narrow disparities in unhealthy food consumption. Studies on the impact of tobacco pricing on disparities offer a hopeful tale and several studies have found that cigarette price increases had a greater effect in those with lower incomes, who were more likely to reduce consumption in response to higher cigarette prices.⁴⁷ However, for lower-income individuals who continue purchasing more expensive unhealthy products, the policy is in effect regressive. Although there is evidence that pricing policies have reduced inequalities in smoking, wide disparities in smoking status persist. For those low-income individuals who continue to smoke, the high cost of cigarettes constitutes a regressive tax. Similarly, raising the cost of foodstuffs would be regressive on individuals who continue to purchase those foods in spite of the price increase.

Conclusions—There is limited evidence that current unhealthy food taxes would affect consumption in a positive way, unless they were significantly higher than those proposed. For instance, if a 10% increase in soft drink prices should reduce consumption by 8% to 10%, a 50% increase would likely reduce consumption substantially. Modest taxation would not substantially affect liberty, but may affect equity in two ways: if taxation were to lead low-income populations to purchase fewer unhealthy foods because of their greater price sensitivity, obesity disparities would likely narrow. However, increased taxes on unhealthy foods would be regressive on lower-income individuals for those who continue to purchase unhealthy foods that cost more.

Reform of Food Assistance Programs

Problem and policy solutions—The SNAP is the largest and most widely available nutritional assistance program. It provides electronic benefit transfer (EBT) cards to eligible low-income households (not individuals) for the exclusive purchase of food. Participants in food assistance programs have been found to have higher obesity rates than otherwise similar non-participants.^{48,49} States are experimenting with a number of policies to reform food assistance benefits through subsidies that encourage people to purchase fruits and vegetables as well as restrictions on what participants can purchase. Three states have put forward bills to expand items that can be purchased with food assistance (including healthier options), and seven states have put forward legislation aimed at restricting items that can be purchased by food assistance (i.e., unhealthy items) (see Table 1). Related policies include

efforts to ensure that SNAP EBT cards are accepted at farmers markets as they currently often are not. In addition to SNAP, the Special Supplemental Nutrition Program for WIC has had a Farmers' Market Nutrition Program (FMNP) in effect since 1992, which provides coupons to purchase locally grown fruits and vegetables to WIC participants.^{47,48} Most evidence on targeted subsidies comes from the FMNP though most attention at the moment is being paid to efforts to expand subsidies for fruits and vegetables among SNAP participants.

Evidence—We were unable to locate any specific reviews of the relationship between food assistance reform and healthy food purchasing. Two reports describe the association between food assistance and obesity, but not the impact of explicit subsidies or restrictions.^{48,49} The book chapter found evidence from consumer pricing studies indicating that consumption of fruits and vegetables is relatively price-inelastic, even for lower-income individuals.⁴⁸ This suggests that subsidies would not make a large difference in consumption patterns. The review of farmers markets and community gardens included seven studies examining the effect of subsidies on fruit and vegetable consumption among WIC recipients, and a recently published article reviews evidence from two experimental studies on subsidies targeted at individuals on food assistance.^{33,42} The experimental studies included in these two review articles specific to subsidies for individuals receiving food assistance found evidence of increased fruit and vegetable consumption compared with controls.^{33,42}

Potential impact on liberty and equity—As with policies to address food deserts, subsidies would increase liberty for consumers as lower costs on healthier foods would remove cost as a barrier to access to healthy foods. This would expand people's choice set rather than limiting it. Market liberals might nonetheless object to widespread subsidies on healthy food options. In contrast, a number of states are advancing legislation that would try to restrict or limit the purchasing of unhealthy junk foods by food assistance recipients. Such as outright ban would constrain liberty, but has received a great deal of traction as an alternative to targeted benefits and would be budget neutral since it would not add to the assistance already received.

Subsidies constitute a progressive income transfer and could reduce health disparities by leveling the playing field in the affordability of healthy foods. However, unlike taxes, which generate a new financing source, the cost of subsidies would have to be derived from new or existing revenue sources, which may be unpopular and detract resources from other programs. Reversing corn and soy subsidies and putting these towards fruit and vegetable production might be budget neutral, but this would affect the corn and soy industry and would be politically difficult to achieve.

Conclusions—We found no studies directly testing the effect of changing population-wide subsidies on healthy food consumption patterns or weight. Studies on targeted subsidies to individuals receiving food assistance suggested that they may be effective at increasing consumption of fruits and vegetables, but the evidence is preliminary. Consensus from experts, however, supports the idea of an extension of fruit and vegetable subsidies targeted to low-income households and the expansion of policies that would review new and

current agricultural policies.³⁶ Subsidies would preserve liberty and even enhance liberty for low-income individuals whose choice is constrained by lower affordability of fruits and vegetables vis-a-vis more calorie dense foods. The potential impact of simultaneously taxing unhealthy foods and subsidizing healthier foods should be explored further.

Calorie-Labeling on Menus in Restaurants

Problem and policy solutions—Approximately half of total food expenditures are spent outside the home, and customers have no effective means of estimating the amount of calories in these foods, which tend to be higher in fat, lower in nutritional value, and larger in portion than what individuals would ordinarily consume at home.⁵⁰ Frequent eating outside the home has been found to be associated with excess weight gain over time.⁵¹ Whereas foods that people purchase in grocery stores are required to have labels with nutritional information, the same requirement does not extend to prepared foods purchased at restaurants.⁵¹ Calorie-labeling on menus in restaurants, like the labeling of foods individuals purchase in the store, is one proposed strategy to empower customers with information in order to make healthier choices.

Evidence—As calorie-labeling has been in effect in New York City since 2008 and has been implemented elsewhere, we were able to identify two review articles which include six studies that have evaluated the impact of an actual menu label policy change on calorie consumption, five from New York and one from Washington State.^{52–53} There was no overall measurable effect on calories purchased across the studies. One study found that in a subset of the sample that noticed the labels and used calorie information, customers ordered 75 fewer kilocalories, on average, than before.⁵⁴ Significant reductions in calories have been found for food purchased at some specific chains (e.g., Starbucks),⁵⁵ and significant increases at certain other chains (e.g., Subway).⁵⁶ Two studies further found that the calorie reductions were significantly higher among higher socioeconomic status customers⁵⁶ and stores serving higher-socioeconomic status customers,⁵⁵ but a study focused on lower-income individuals found no changes in ordering behavior.⁵⁷

Potential impact on liberty and equity—Calorie-labeling on menus preserves liberty and even enhances liberty by giving people more information on which to base their decisions. However, as an informational intervention, menu-labeling on its own is likely to compound health disparities, according to available evidence: low-income groups have not benefited from this additional information while higher-income customers have. The fast food and restaurant industries have opposed menu-labeling, which adds increased costs (both in terms of set up costs and lost revenue).⁵⁸ Nevertheless, regulations have been accepted and implemented in New York City since 2008 and will go nationwide in 2014.

Conclusion—The collective findings from these studies suggest that menu-labeling brings about a significant reduction in calories consumed among higher socioeconomic-status individuals, but that it has no effect overall, or in lower-income groups. The public cost of this program is minimal since it is born primarily by industry. While enhancing liberty, this policy may widen disparities if it continues to demonstrate benefit only in high socioeconomic-status groups.

Discussion

Major findings across policies and domains are summarized in Box 2. To summarize, current obesity policy rests on a very narrow evidence base. Few suitable evaluations exist on which to judge the merit of different policy approaches. Calorie-labeling on menus is one of the few policy approaches that have been rigorously evaluated in real-world settings, and the findings reveal no overall effect, and a potential to widen disparities due to an apparent significant effect in higher-SES groups and restaurants catering to higher-SES customers (e.g., Starbucks). The food desert literature is vast, but most studies are descriptive. Much time has been spent trying to define what constitutes a food desert, with few experimental studies and no studies specifically looking at real world policy changes and its impact on availability. With regard to taxes, there is good experimental evidence from both controlled and real-world settings that shows a significant effect of raising the cost of unhealthy foods on purchasing behavior. The consensus is that current taxes are too low and that prices would have to be substantially higher, perhaps double current prices as has been the case with tobacco, to bring about dramatic changes in behavior.⁵⁹ This recommendation stands in contrast to most actual policies that have specifically targeted sugar-sweetened beverages for higher taxes. Furthermore, broad-based taxes by food category rather than selective taxes would likely reduce substitution of other unhealthy foods. Taxes have the advantage of generating revenue, and that revenue can be earmarked towards health programs, but this kind of tax imposes undue cost burdens on low-income individuals. The limited number of experiments evaluating the impact of targeted subsidies for individuals on food assistance show promising results with regards to increasing fruit and vegetable consumption. There is little to no evidence on policies that would restrict purchases of certain junk foods, though legislation imposing such restrictions is being widely considered.

Specific areas that beg for further investigation include research on impact of different policies on specific sub-groups including low-income and minority shoppers who have the highest rates of obesity, especially for the effects of taxation.⁴ In lieu of available evidence, we have tried to speculate on the potential impact of different policies on disparities and distributional impacts. Additionally, given the number of policy changes that are emerging at state and municipal levels, more natural experiments, as have been conducted on calorie-labeling, are needed to evaluate policy changes in real time.

With regard to liberty, none of the policies examined here were judged to constrain rights from a paternalist-libertarian perspective, primarily because none were outright bans. This suggests that a range of policies could fall under the umbrella of soft-paternalism. Some studies suggest that policies that are closer to outright bans (such as sugar-sweetened beverage size limitations, which bans the sale of certain sugar-sweetened beverages 16 ounces or larger) are both harmful to liberty and may be counterproductive as banning items makes people want them more.⁵⁶ Instead of outright bans on particular sizes, reversing existing pricing policies, which incentivize people to spend a marginal amount more to purchase a substantially larger quantity (similar to a tax) may be preferable: consumers would pay more for more. Even the size limitation regulation could fall under the soft paternalism umbrella, however, since it does not ban the sale of sugar-sweetened beverages outright, but rather imposes an upper limit on the quantity that can be purchased for any one

drink. With regard to fiscal policies, however, libertarian paternalism does present a case that that past a certain amount, pricing policies may become overly restrictive on liberty. High, broad-based taxes on junk foods could have the effect of turning these foods into luxury items.

Regarding equity, menu-labeling was found to have the potential to widen health disparities whereas the other three policies were judged likely to shrink health disparities. This may be related to health literacy: menu-labeling may be processed differently by groups with different levels of health literacy. It has been suggested that labeling strategies that include additional information about recommended daily caloric intake could be more effective overall and specifically for individuals with lower health literacy.⁶⁰ As calorie labeling will go into effect nationally in 2014, it will be important to test different types of disclosure statements regarding how many calories one should consume in a day, as there is still time to affect the FDA's interpretation of the law. Importantly, efforts are likely to fail or not meet their potential if they do not acknowledge or address social determinants of health that underlie disparities.

Whereas actual evidence has demonstrated an increase in disparities from menu-labeling, for fiscal policies (taxes and subsidies), the potential effects on equity rest on the assumption that price and availability of healthy foods are a primary source of inequality. Consumer-pricing studies suggest otherwise.⁴⁸ Most existing studies are unable to disentangle supply-side and demand-side factors and the degree to which health literacy and cultural capital affect consumption patterns among low-income groups. Future studies should endeavor to disentangle these factors. Evidence from tobacco pricing suggests that taxes do reduce disparities in smoking rates, but also serve as a cautionary tale, in that huge disparities still exist in smoking even with the steep price increase in tobacco. This has in effect meant that tobacco taxes are regressive. Smoking cigarettes is discretionary, but eating food is not; caution should be used in raising costs on basic foodstuffs.

Evidence, liberty, and equity are not the only considerations that impinge upon decisions about which policies to pursue. Other considerations include the political feasibility of policies and public opinion about the policy. These differ among local political institutions and processes. The cost-effectiveness of policies is an additional important consideration, as policies should not be pursued at any cost. At the same time, cost should be balanced against other considerations. All policies will meet resistance from groups who are on the losing end or who are negatively affected by the policy. The impact on these sectors should be considered as well. These factors were not explicitly considered here but also affect which policies are likely to succeed and fail and additional criteria considered in decisions about which policies to pursue. We have speculated on these additional considerations in Box 2.

Conclusions

A number of different policy solutions to the obesity epidemic are currently being widely pursued and there is a need for better information about how to select among this array of options. Although obesity is a clear public health crisis, it does not rise to the degree of an urgent crisis in the way that a disease outbreak would. Thus, while there is a great need to

identify best practices and strategies that work, throwing evidence to the wind is not justified on the grounds that they will do no harm. Rather policies should be carefully monitored and evaluated in terms of impact and cost, and should be discontinued when they are not shown to be beneficial.

It is also important to look at the issues of liberty and equity. Most systematic reviews do not incorporate these dimensions, and indeed most studies do not collect adequate information to answer these questions. We urge that policymakers consider taking liberty and equity considerations into account as they develop and implement policies. Where both liberty and equity are neutral or enhanced, and cost is not overly burdensome, decision-makers may want to pursue policies that appear will do no harm, and have a potential for benefit even in the absence of strong evidence. Where liberty or equity are threatened, decision-makers may consider adapting policies to avoid such threats, particularly when public health costs are great (e.g., less money available for other things), or when individual costs are great.

This study has certain limitations. The rapid review (review of reviews) methodology we undertook may produce different results from those of a direct review of primary studies on each policy according to our own inclusion criteria since systematic reviews are conducted with different inclusion criteria. We believe that this method is appropriate for assessing best practices, which we understand as “promising practices” rather than strictly “evidence-based practices.” Furthermore, we did not find that the different inclusion criteria used in reviews made a large difference in the conclusions that the authors drew and most studies used similar inclusion criteria. Our assessment of the potential impact of policies on liberty and equity were based on our own analysis rather than formal legal analysis of court decisions or other methods and are subject to interpretation and disagreement (which we welcome). The strength of our study is that, unlike other systematic reviews that concentrate on one specific policy, our goal was to review available evidence on four policy approaches in the space of a journal article to be able to provide planners and policymakers with a broader assessment of available obesity policy options and a broader set of criteria on which to assess the desirability of particular policies.

We have reviewed the evidence base and two ethical dimensions of four of the most prominent adult obesity policies and present a framework to assist decision-makers in assessing best practices in obesity policy using a more multi-faceted set of dimensions. We hope that decision-makers and researchers who act as intermediaries to decision-makers, will find this framework useful.

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SUMMARY OF ARTICLES

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Box 1

SUMMARY OF ARTICLES

Review Article	# of Studies Reviewed	Types of Studies and Major Conclusions	Recommendations
Food Deserts			
Beautrais et al., 2009	49	<ul style="list-style-type: none"> Reviewed mainly correlational studies. Only two natural experiments of a grocery store opening since 1966. Strong enough evidence to conclude that food deserts exist in some low-income and minority areas in the US, but not in other countries. 	<ul style="list-style-type: none"> More experimental and evaluation studies needed that directly assess the impact of specific policies to remediate food deserts.
Walker et al 2010	31	<ul style="list-style-type: none"> Reviewed mainly correlational studies. Consistent evidence of racial/ethnic and socioeconomic disparities in access to large supermarkets in the U.S. 	<ul style="list-style-type: none"> Provided few interpretations of the evidence.
Ver Ploeg, et al 2009	Unspecified	<ul style="list-style-type: none"> A small proportion of Americans live in food deserts (more than a mile from a large grocery store with no or limited means of transit to the nearest grocery store). There are also low-income individuals who lack access even in places that are not food deserts. Results are mixed about whether improving access to specific healthy foods will reduce obesity. 	<ul style="list-style-type: none"> A large-scale, national level program may have difficulty addressing localized pockets of limited access; Policy solutions are unlikely to help low-income individuals with limited access living outside of food deserts.
White 2007	Unspecified	<ul style="list-style-type: none"> Clear evidence of associations between access and obesity, but existing studies suffer from methodological limitations. Few experimental designs. 	<ul style="list-style-type: none"> Cross-sectional studies need to incorporate more controls and assess intervening mechanisms. Need longitudinal studies.
McCormack et al 2010	16	<ul style="list-style-type: none"> Six of the 16 studies reported that participation in a farmers' market program or a community garden was associated with greater intake of fruits and vegetables An additional three studies found an association with increased intake of vegetables but not fruit. 	<ul style="list-style-type: none"> There is reasonable evidence that farmers markets are a viable means of increasing access and consumption of vegetables (and likely fruit as well). There is a need for more experimental research studies utilizing valid and reliable dietary assessment and control groups.
Taxes/Fiscal policy			
Powell & Chaloupka, 2009	9	<ul style="list-style-type: none"> Included peer-reviewed studies that examine the relationship between food and restaurant prices or taxes and weight outcomes (excluded purchasing behavior as an outcome). Modest evidence of a relationship between food price and obesity; 	<ul style="list-style-type: none"> Taxes need to be higher to have a more significant impact on obesity outcomes; Taxes need to be applied across a range of unhealthy foods and not exclusively SSB to prevent substitution.
Faulkner 2011	38	<ul style="list-style-type: none"> Excluded studies looking at consumption patterns. Only included observational and experimental studies (no simulation studies) with behavioral outcomes. Also conducted a Delphi survey with experts. Strong evidence from experiments that consumption is responsive to prices. Uncertainty of results from observational studies likely due to the low existing tax rate on SSB. 	<p>Made three major recommendations:</p> <ul style="list-style-type: none"> Review new and current agricultural policies. Implement a caloric sweetened beverage tax. Examine how to implement fruit and vegetable subsidies targeted at children and low income households.
Andrejeva, Long & Brownell 2010	14	<ul style="list-style-type: none"> A 10% increase in soft drink prices should reduce consumption by 8% to 10%. The highest price elasticities they find are for food away from home, soft drinks, juice, meats, and fruit. 	<ul style="list-style-type: none"> Unhealthy foods have a higher price elasticity than other foods and consumption patterns will likely be responsive to tax increases.

Review Article	# of Studies Reviewed	Types of Studies and Major Conclusions	Recommendations
Thow, Jan, Leeder & Swinburn, 2010	24	<ul style="list-style-type: none"> Included both empirical and modeling studies. Food taxes and subsidies have the potential to contribute to healthy consumption patterns at the population level. 	<ul style="list-style-type: none"> Need more experiments, particularly natural experiments. Modeling studies should examine changes in the entire diet rather than single food items. Little information on administrative costs of implementing taxation strategies, which may impact the cost-effectiveness of this strategy.
Epstein, et al., 2012	24	<ul style="list-style-type: none"> Reviews only evidence from experiments of both targeted price increases on unhealthy foods as well as subsidies on healthy foods. Finds broad support across both experiments in controlled settings and in real world (e.g., cafeteria and vending machines) that price changes can modify purchases of unhealthy and healthy foods. Even without adjusting the price of other foods, subsidies on healthy foods can decrease the purchase of unhealthy foods. 	<ul style="list-style-type: none"> In complementary interventions, pricing effects are larger than the effects of information alone. Thus, price is more influential than information. Substitution effects pose a major challenge to the a targeted approach Suggests taxing broad categories of food (e.g., with fat content exceeding a certain amount) to reduce substitution effects.
Reform of Food Assistance			
Ver Ploeg, 2011	Unspecified.	<ul style="list-style-type: none"> Reviewed consumer purchasing studies and studies on the association between food assistance and obesity. Consumer purchasing studies suggests that an untargeted increase in food benefits may not have much of an impact on the consumption of healthier foods. 	<ul style="list-style-type: none"> Even significant subsidies may not greatly increase consumption levels of fruits and vegetables on their own and may need to be complemented with higher costs on unhealthy foods.
McCormack et al 2010	7	<ul style="list-style-type: none"> Identified seven studies examining the effect of a targeted fruit and vegetable subsidy for farmer's markets on fruit and vegetable consumption. The four studies incorporating more sound evaluation methods did find evidence of increased fruit and vegetable consumption between pre and post and in the intervention group. 	<ul style="list-style-type: none"> There is reasonable evidence that farmers markets are a viable means of increasing access and consumption of vegetables (and likely fruit as well). There is a need for more experimental research studies utilizing valid and reliable dietary assessment and control groups.
Epstein, et al., 2012	24	<ul style="list-style-type: none"> Reviews only evidence from experiments of both targeted price increases on unhealthy foods as well as subsidies on healthy foods. Finds broad support across both experiments in controlled settings and in real world (e.g., cafeteria and vending machines) that price changes can modify purchases of unhealthy and healthy foods. Even without adjusting the price of other foods, subsidies on healthy foods can decrease the purchase of unhealthy foods. 	<ul style="list-style-type: none"> In complementary interventions, pricing effects are larger than the effects of information alone. Thus, price is more influential than information. Substitution effects pose a major challenge to the a targeted approach Suggests taxing broad categories of food (e.g., with fat content exceeding a certain amount) to reduce substitution effects.
Calorie Labeling on Menus			
Harnack, L., & French, S, 2008	6	<ul style="list-style-type: none"> Most studies show a weak or inconsistent effect on food choice by calorie labeling. Some studies show significant reductions in calories purchased in certain subgroups. 	<ul style="list-style-type: none"> Authors stress need for more efficacy research in realistic settings, with higher methodological quality; Suggest that calorie labeling may need to be more multi-faceted and comprehensive in implementation.
Swartz, Braxton & Viera, 2011	7	<ul style="list-style-type: none"> Reviewed most of the same studies as Harnack & French and came to similar conclusions. Only two studies reported a statistically significant reduction in calories purchased among consumers who made use of calorie labels Calorie labeling had a modest effect on calories purchased in both real world and experimental settings. 	<ul style="list-style-type: none"> Many people fail to notice the calorie labels. Policies should concentrate on more multi-faceted implementation to get customers to notice the labels.

SUMMARY OF RESULTS

Box 2**SUMMARY OF RESULTS**

Policy Approach	Evidence base for action (Sufficient, Insufficient to make a judgment)	Effect on Liberty (liberty-preserving, liberty-constraining)	Effect on Equity (Likelihood of increasing or reducing disparities and distributional impact—regressive, progressive or neutral)	Other Considerations (Cost effectiveness, political feasibility, unintended consequences)
Healthy Food Availability	Insufficient. Few experiments of change in food environment.	Liberty-preserving (nudge rather than shove)	Progressive for health equity and economically progressive.	Could be harmful to local business; Could increase access to unhealthy as well as healthy foods.
Taxes on unhealthy foods	Sufficient. Expert consensus that existing taxes will need to be substantially higher and cross-cutting to avoid substitution.	Liberty-preserving (nudge rather than shove)	Mixed—Progressive for health equity, regressive economically.	Even if not effective, can raise revenue and be earmarked towards other health promotion activities; Harmful to industry; Reversal of subsidies for unhealthy foods could function in a similar way to a tax.
Reform of Food Assistance Programs	Sufficient evidence regarding subsidies. Insufficient regarding restrictions.	Liberty-preserving (nudge rather than shove)	Subsidies on fruits and vegetables would be progressive for equity and economically.	Concern that any restriction on the use of food assistance could be used as a pretense for deep cuts to assistance; Deep partisan divisions of how to reform—increase subsidies or implement restrictions.
Calorie Labeling on Menus	Sufficient. Works in some sub-groups but not others.	Liberty-preserving (nudge rather than shove)	Mixed—Regressive, for health equity (may increase disparities), economically neutral.	Budget neutral; Places burden of implementation on industry.

Figure 1.
Framework for assessing best practices in obesity policy

Figure 2.
Search and selection flow chart to identify appropriate review articles

Table 1

RUDD CENTER BILL DATA SUMMARY, ADULT OBESITY POLICY^a

Issue	Number of Bills	States	# of States/Federal
Farms and Gardens + Access to Healthy Foods	65	Alabama, Alaska, California, District of Columbia, Federal, Florida, Georgia, Hawaii, Illinois, Indiana, Iowa, Mississippi, Nebraska, New Hampshire, New Jersey, New York, Oklahoma, South Carolina, Tennessee, Vermont, Virginia	21
Sales, Sugar-Sweetened Beverages, and other taxes	50	California, Federal, Hawaii, Idaho, Illinois, Indiana, Kansas, Maine, Massachusetts, Mississippi, Nebraska, New York, Oklahoma, Rhode Island, Tennessee, Vermont, Washington, West Virginia	17
Food Assistance Programs, subsidies	25	California, Federal, Florida, Hawaii, Illinois, Maine, Michigan, Nebraska, New Jersey, New York, Pennsylvania, Texas, Vermont	13
Obesity, General	23	California, District of Columbia, Federal, Kentucky, Massachusetts—Boston, Michigan, Minnesota, Mississippi, New York, Oklahoma, South Carolina, Washington	12
Trans Fats	21	Colorado, Delaware, Illinois, Indiana, Maryland, Massachusetts, New York, Rhode Island, Wisconsin	9
Councils and Task Forces	18	Arizona, District of Columbia, Illinois, Kansas, Missouri, New York, North Carolina, Ohio, Oklahoma, West Virginia	10
Built Environment	15	California, Federal, Massachusetts, New York, Rhode Island, Texas, Vermont, Washington, West Virginia	9
Menu and Package Labeling	12	Alabama, Arizona, California, Federal, Maine, New York, Pennsylvania, Rhode Island, Texas	9
Physical Activity, General	12	Federal, Florida, Kentucky, Mississippi, New York, Rhode Island, Vermont, Wisconsin	8
Lawsuits/Personal Responsibility	3	Alabama	1
Preemption	1	Ohio	1
Weight Bias	1	Mississippi	1

^a Edited from data available at <http://www.yaleruddcenter.org/legislation/>.