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Confronting the crisis in public health

A background paper

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About the paper

This paper was prepared as background material for the Canada 2020 event 'Confronting the crisis in public health' on May 28, 2013 in Ottawa, Canada. It was written by Aqsa Malik, who is finishing her Ph.D. in Neuroscience at the University of British Columbia's Brain Research Centre. The Foreword was written by Diana Carney, Canada 2020's Vice President, Research, who was also the editor.

This paper joins other research and commentary written for our Securing the Health System for the Future policy stream, one of five areas of work that comprise the *Canada We Want in 2020* project.

Questions and comments can be directed to info@canada2020.ca.

Foreword

By Diana Carney, Canada 2020

Securing our health system for the future is something that all Canadians care about. It is therefore fitting that this should be one of Canada 2020's five priorities in our *Canada We Want in 2020* project.

Of all the areas in which we work, this is the one that has seen the most dramatic changes since we conceptualized our project in early 2011. At that time we were focused on what we thought would be a protracted negotiations and discussion around the 2014 renewal of the federal–provincial Health Care Accord. As it turns out, shortly after we produced our opening book in November 2011, the federal finance minister handed down the terms of the new accord and effectively withdrew from the healthcare area. Federal money will be passed over (at a level pegged to GDP after 2017) to the provinces and territories with no strings attached. The federal role in this space will be reduced as far as possible, notwithstanding the fact that the federal government still retains responsibilities for providing healthcare to two key groups: First Nations and veterans. The first of these groups is growing rapidly and exhibits significantly worse health indicators (including levels of overweight/obesity) and outcomes than any other segment of the population.[1]

It is our conviction at Canada 2020 that there is and should be a role for the federal government in assuring the health of Canadians. This role may involve convening and brokering agreements between other players, or it may entail the setting and maintenance of standards across the country. Another possibility is for the federal government to develop and implement policies in other areas that help reduce the stresses that our various provincial health systems currently confront.

Thinking about the latter possibility led us to the issue of public health, the epidemic of chronic diseases and overweight/obesity that we are currently facing. While the provinces work on the mechanics of healthcare delivery, is there scope for the federal government to provide true leadership around public health issues, both to ease the financial burden on health systems and increase Canadians' quality of life?

This issue is of particular interest to us at Canada 2020 given the links between public health and one of our other areas of work, income inequality. Lower socio-economic groups tend to be more overweight (this is markedly true for First Nations and more true for women than men). Overweight people have greater difficulty in finding jobs, meaning that cycles of deprivation and inequality of opportunity can easily become established.

Our May 2013 event, *Confronting the crisis in public health*, and this background paper, will begin to explore ways of breaking out of current patterns of ill health. They will do this by looking at the type of interventions/policies that are in place to address obesity and chronic disease[2] and identifying common challenges and/or pillars of success.

This is an area in which there is already some measure of agreement between Canada's various governments. In October 2005, our Federal/ Provincial/Territorial Ministers of Health agreed that:

> 'As a nation, we aspire to a Canada in which every person is as healthy as they can be—physically, mentally, emotionally and spiritually.'[3]

The strategy to achieve this is based on five guiding principles including that: prevention is a priority; health promotion has many approaches that should be used; and health promotion is everyone's business. There is also an existing federal/provincial/territorial framework for action on *Curbing Childhood Obesity*: all parties are exhorted to respond effectively to this 'national crisis'.[4]

Just last month, the Public Health Agency of Canada produced a 2013–2016 *Preventing Chronic Disease Strategic Plan*[5] which goes a good way towards demonstrating the type of leadership and strategic thought which we seek. The plan underscores the importance of continued work on childhood obesity but also outlines key priorities and principles upon which future preventative action will be based.

Importantly, it notes the need to improve the availability of data in order to facilitate evidence-based policy making. An intermediate step is to identify 'best practices' and 'promising practices' and make these readily available through a knowledge portal. Another defining feature of the plan is its emphasis on partnerships (which are 'at the heart of [its] work' (p.6)) both with other government agencies (outside the health sector) and non-governmental partners (it highlights an existing partnership with the YMCA and Air Miles aimed at increasing family physical activity). Both these emphases resonate strongly with comprehensive OECD work on public health as we shall see below.

This paper provides information on many of the most well-known public health approaches. It draws heavily on the work of the OECD, which has done an excellent job of bringing together evidence in an area that frequently seems to be characterized more by hope than hard evidence. The paper represents a starting point rather than an ending point, which is not surprising given the complexity of this policy area.

The causes of obesity (and related chronic diseases) are multiple and interdependent. At a macro level they range from urban planning and transportation policies to the composition of the workforce and modern nature of work, from the behaviours of food processors and retailers to the price distortions produced by different agricultural policies. On a personal level they derive from tastes and preferences, from genetic makeup to individual discount rates with hard and fast economic considerations always playing an important role. These factors come together and manifest themselves in ever-changing social norms around how we view and relate to food and exercise as well as the acceptability of different body sizes and modes of living.

While parallels are frequently drawn between the battle against tobacco and the battle against obesity, the challenges of the former pale in comparison to the latter. Once it had been established that smoking tobacco was unequivocally 'bad', this was a *relatively* easy area to address. As a necessity of life, food will never be a 'bad'. There is, unsurprisingly far greater emotion around food than tobacco and far less willingness to see the state intervening in this area (as was demonstrated

recently with the failed 'fat tax' in Denmark). In the past several years, a number of well-known authors (such as Michael Pollan and Michael Moss) have gone to significant lengths to expose the 'evils' of the processed food industry. But these companies will likely never be considered to be on a moral par with big tobacco companies, for example.

It is also important to recognize that there is an increasingly vocal group that argues that concern over overweight/obesity is in fact a form of prejudice, and that there is no economic or societal justification for policy action in this area.[6] A final source of complexity lies in the potential for unintended negative consequences from policy action, manifested in the form of potentially devastating eating disorders.[7]

It is not surprising, then, that governments have typically focused on providing information, (especially on a healthy diet), as their main strategy for addressing obesity. They have erred away from banning products (reducing the risk of conflict with food and beverage companies and limiting the scope for emotional backlash from the public) and though they have manipulated prices to some extent through taxation and otherwise, they typically under-report their own activity in this area when surveyed.[8] Often they do not really know what works, what the cost effectiveness of different approaches is expected to be[9] or, indeed, how broadly their goals should be defined. Not only are they unwilling to take bold policy steps, but they may not even be ready to engage in open discussions with their populations about why action might be necessary at all.

Given these difficulties, it is somewhat surprising that we have seen any progress in this area. But progress there has been, as this paper shows. Indeed Canadian provinces have been at the forefront of certain efforts (e.g. banning junk food advertising to kids in Québec) and appear determined to remain so (if Ontario's Healthy Kids Strategy is implemented). Likewise, the federal Public Health agency clearly recognizes its own responsibility for leadership.

Our objective is to move this debate forward through our dialogue and open discussion of the challenges we face. The main author of the seminal OECD report, *Obesity and the Economics of Prevention – Fit not Fat*, Dr. Franco Sassi, sums these up well when he calls for a comprehensive approach to obesity prevention that:

> 'focus(es) on how social norms are defined and how they change; on the influence of education and information on obesity but also on the potential for government regulation to affect behaviours; and on the role of individual choice and value.' (p. 21–22)

Certainly this is a broad agenda. Our intention in our event is to remain focused and draw out concrete proposals around the future role of the federal government.

1. Introduction

In a recent *New York Times* article 'The Extraordinary Science of Addictive Junk Food',[10] Pulitzer Prize winning reporter Michael Moss provides an in-depth look into the processed-food industry. Having interviewed more than 300 people associated with food industry operations – in roles as diverse as CEO, scientist, and marketing executive – Moss explains the reasons why a large portion of the public is unable to moderate its consumption of manufactured foods.

He describes an engineering approach that is used to optimize formulations of different processed foods. This approach couples data obtained from food scientists on sensory perceptions created by various ingredients with marketing data on widespread flavour preferences. The result is highly-engineered, processed foods that evoke emotions of happiness. He concludes, after four years of research, that rather than there being a passive societal trend that has normalized the availability of low-nutrient foods, the food industry has made a conscious effort to create products that are inherently addictive (in that they dull neuronal responses to satiation), convenient, and inexpensive.

When coupled with societal structures that yield sedentary lifestyles (e.g. modern work environments, long work days, etc.) and increasing time pressures at home, it is not surprising that diabetes, hypertension and obesity rates continue to rise in many developed countries.

This paper examines various strategies that have been employed internationally to try to keep obesity in check. These strategies differ in their breadth, their focus and their effectiveness. One of the key fault-lines is whether programs target children or adults, and it is along this fault-line that the paper is organized. But there are also other ways of categorizing programs, such as: whether they target calorific intake or exercise (or both); whether they are information-based or based on other incentives/sanctions; whether they are narrowly targeted to high-risk groups or operate at a population level; whether they involve multiple stakeholders, a simple partnership or just a single agency; and whether they are national-level or community-level. Since these are all important characteristics, programs that are profiled are also identified along these axes.

The paper starts with a brief analysis of the extent and cost of obesity in OECD countries and concludes with a discussion of what we, in Canada, can learn from the various efforts that have been made to tackle obesity, globally.

2. Obesity rates and costs

Overall obesity levels in the Organization for Economic Cooperation and Development (OECD) vary from a low of 4% in Japan and Korea, to over 25% in Canada, United States, and Mexico. The OECD's 2012 update on obesity shows that over the past decade, modest (2–3%) increases have been observed in Spain and France, while countries such as Canada, Ireland, and the United States have experienced a significant (4–5%) increase in obesity levels (from already high levels: see Figures 1 & 2).[11] No country has managed to reverse its obesity trend, but obesity rates have stabilized in

countries as diverse as Korea (at 3–4%), Switzerland (at 7–8%), Hungary (at 17–18%), and England (at 22–23%).

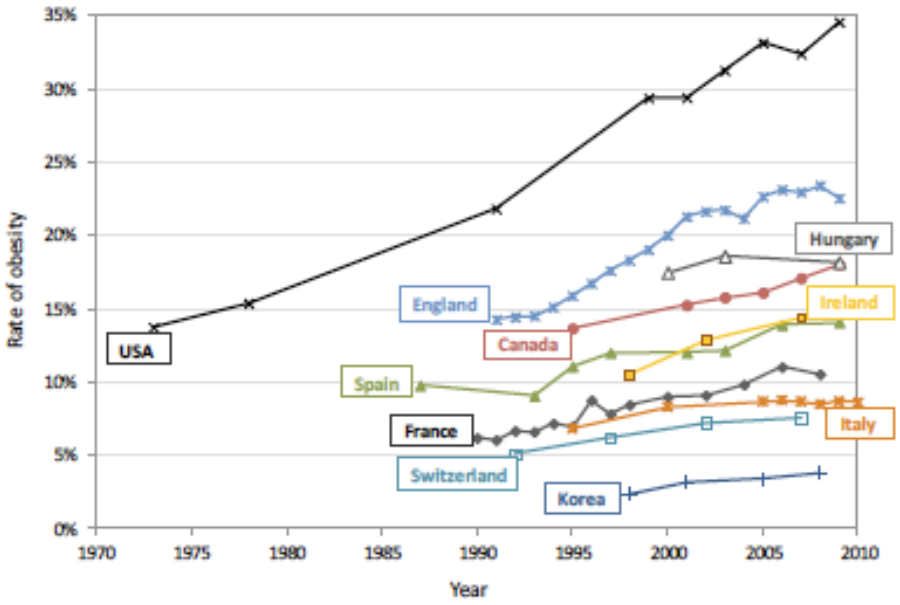

Figure 1: Obesity Rates (© Obesity Update, OECD Health Division 2012)[1]

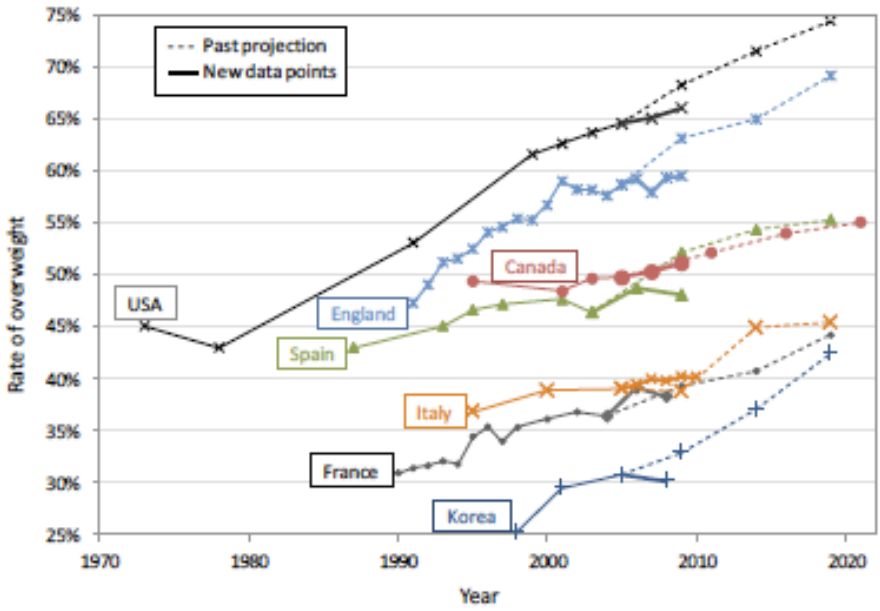

Figure 2: Overweight Rates (© Obesity Update, OECD Health Division 2012)

[1] N.B. Obesity and overweight rates in Figures 1 and 2 are self-reported. The discrepancy between self-reported and measured rates can be as large as 10% for certain countries.

Healthcare costs of obesity

The result of such high obesity rates is that 1–3% of total health expenditure is directly attributable to obesity in most countries. In the U.S. the estimates are much higher, at 5–10% of health expenditures.[12]

At the individual level, obesity-related healthcare expenditures are 25% higher than those for normal weight persons. When the economic costs of lost production (due to health issues) are added to healthcare costs, obesity accounts for over 1% of GDP in the U.S. and over 4% in China.[13] It is important to note that due to the time lag between the onset of obesity and related chronic diseases, the marked increase in obesity levels we have seen over the past two decades (Figure 1) has yet to be fully accounted for in healthcare costs.[14] In England, for example, obesity-related healthcare costs could be 70% higher in 2015 compared to 2007.[15]

Discussions of the healthcare costs of obesity are, though, complicated by different measures and particular discrepancies between whether costs are measured over a short time period or a lifetime. An obese person will generate higher healthcare costs than a normal-weight person at any given point in time. However, the average lifespan of an obese person is up to 8–10 years shorter than that of a normal weight person.[16] The net result is that, over a lifetime, existing estimates show that an obese person actually generates *lower* healthcare expenditures than a person of normal weight.

This is not, though, universally accepted. Studies based on U.S. empirical data conclude that obesity does increase lifetime healthcare expenditures: the healthcare costs of the obese are out-paced by those of the non-obese at the age of 80, but they are so much higher at earlier ages that, overall, the obese tend to have higher costs over the course of a lifetime.[17] Another U.S. simulation analysis echoes this finding for a cohort of individuals alive at the age of 70. The study found that during their remaining life spans, healthcare costs of overweight individuals were 7% higher than those of a normal weight, and over 20% higher for obese persons.[18]

Other costs of obesity

Obesity and being overweight have other associated costs. Most particularly, the quality of life of obese people is typically well below that of normal weight people. This is partly because the obese live with greater risk of chronic disease (the severely obese have a risk of developing type 2 diabetes that is 60% larger than those at the lower end of the normal weight spectrum[19]) and partly because they are limited in what they can do (for example mobility and choice is limited at the extreme). Obese women, in particular, are also less likely to be employed than their normal-weight counterparts.[20]

3. Interventions that target obesity

In his 2010 seminal work in this area, *Obesity and the Economics of Prevention – Fit not Fat*, OECD researcher Franco Sassi notes that:

'OECD governments have been taking action in the last five to ten years...without a strong body of evidence on the effectiveness, efficiency and distributional impact of interventions' (p. 162)

In this section we review some of the interventions that have been put in place in OECD countries, despite this lack of information, in an attempt to draw out some lessons.

Table 1 provides a summary of the characteristics of the various programs profiled in this section.

Intervention	Target ages	Population scale or high- risk	Diet or exercise	What is offered?	Scale	Led by	Evidence of success
Various school lunch programs	kids	population	diet	information + meals	national	govt. schools	
EPODE	kids	population narrowing to high-risk	diet & exercise	information + other activities	community	community partnership	-9% girls -3% boys obesity reduction
Trim and Fit	kids	population narrowing to high-risk	diet & exercise	information + other activities	national	govt. partnership	2-4% obesity reduction
Food advertising bans	kids	population	diet	Information restriction	regional or national	govt.	Québec 13% reduction in fast food consumption
Workplace meals	adults	population (within workplace)	diet	meals	national	govt. agency with employers	
Green prescriptions	adults	high risk	exercise	information + incentives	national or regional	govt. health dept	significant fitness improvements
North Karelia	adults	high risk	diet & exercise	information +	community	govt, community, multi stakeholder	annual mortality reduced by 73%
Disease management programs	adults	population narrowing to high-risk	diet & exercise	intensive counseling	national	govt.	significant disease reduction
Food tax	adults	population	diet	high prices for unhealthy foods	national	govt.	10-20% decrease in fat consumption

Table 1: Summary: characteristics of the profiled interventions

Child-focused interventions

The World Health Organization (WHO) has identified schools as a critical setting for the dissemination of positive messages that improve the lives of young people.[21] The following are some of the main child-focused obesity programs from around the world. Not all focus on schools but many do.

School lunches as pedagogic meals

Many European countries place a strong emphasis on educating children about the nutritional quality of their food, as well as providing children with the opportunity to enjoy a nutritious meal in a relaxed environment. Finnish researcher Päivi Palojoki argues that although families have traditionally played the role of exposing children to the national food culture, schools should take on a supporting role because eating in an institutional setting can serve pedagogic functions.[22]

Schools in France are notable for providing students with well-balanced lunches, comprising several courses. Portion size and the content of meals have been regulated by government guidelines since 1971 and the government subsidizes at least half the cost of meals (payment for the remainder is means-tested: parents who are both employed full-time pay approximately $3 per meal).[23] There is a complete ban on snack or pop machines in schools.[24]

Several European countries subsidize school meals but, globally, only three countries (Estonia, Finland, and Sweden) cover the entire cost of school lunches. In Swedish culture school meals provide education on nutrition but also help create a healthy citizenry.[25,26] They have been provided free of charge to parents since 1946, two years longer than in Finland where part of the rationale for introducing free school meals was social equity (children from diverse socioeconomic backgrounds would have access to the same meal).[27,28]

Another goal in Finland is to increase students' consumption of fruits and vegetables by providing them with diverse foods presented in an appetizing manner. Research suggests that early exposure to a variety of foods is associated with better eating habits and broader dietary preferences later in life and that forced consumption is associated with food rejection.[29,30]

Studies in Finland have shown that eating school lunches is associated with higher consumption of vegetables, fruits, rye bread, milk and cheese while consumption of food that is lower in nutritional quality (French fries, potato chips, hamburgers, ice cream, pizza) is associated with failure to eat the lunch that is provided at school.[31,32] By providing food based on national dietary recommendations and presenting 'ideal meals', the Finnish school meal program manages to improve students' diets at a critical period in which their food preferences are beginning to develop and solidify.

EPODE, France and now international

The French approach to preventing obesity in children has focused on the development of healthy communities. Launched in 2004 in 10 different regions of France, EPODE ('Ensemble, prévenons l'obésité des enfants' or 'Together, let's prevent obesity in children') is a community-based campaign that aims to improve the health of children by monitoring obesity levels on a large scale and then providing intensive support and guidance to overweight or at-risk youth.

The success of the program is completely dependent on community engagement, as interested towns have to apply to be considered for inclusion and each town designs initiatives that are based on local food preferences, lifestyles, and access to appropriate facilities (which makes implementation easier).

The original EPODE campaign aimed to measure body mass index (BMI) of children between 5 and 12 years on an annual basis over the course of 5 years.[33] Through the course of the program, arrangements are made for overweight or at-risk children to see a doctor and intervention strategies (activities, diets, participation in local initiatives) are discussed with parents to help them manage their child's weight.[34] Examples of different community initiatives include a mini-Olympics with games for 5-10 year olds, hiking, a sports and health drawing competition, and safe routes for walking to school.[35]

The program started with 10 towns and has now been implemented in 113 French towns under the guidance of an expert committee with the support of Ministry of Health and Family as well as several private sector partners (e.g. Nestlé and the insurance company APS).[36]

Case studies from two different French towns show that four years of EPODE implementation has reversed the trend in mean BMI of overweight children and reduced the prevalence of obesity by 9% in girls and 3% in boys.[37] EPODE's success is attributed to the fact that this is a long-term program that manages to change local culture and behaviours by involving all relevant stakeholders (without stigmatization). This creates an environment in which healthy eating and active lifestyles are choices that can be made easily and routinely.[38]

The program has now been adopted by more than 500 communities in six countries including Belgium, Spain, Greece, Australia, and Mexico.[39] Since 2011 it has been extended through an international support network (the Epode International Network[40]). Joining Epode International and adopting a coordinated, community-driven approach to developing healthy communities for kids was one of the core recommendations of Ontario's 2013 Healthy Kids Panel report.

Trim and Fit Program, Singapore

Government reports from Canada, Australia, and the U.K. all indicate the need for a national policy to address obesity problems.[41,42,43] Nevertheless, very few countries have adopted an intensive, comprehensive strategy that targets specific groups in the population.

Singapore stands out for its success in decreasing obesity rates through a coordinated set of programs promoting healthy lifestyles.[44] TAF is a program for primary, secondary, and pre-university schools introduced by the Health Promotion Board of Singapore (under the auspices of the health ministry) in conjunction with the Singapore education ministry.[45]

Like EPODE, TAF aims to improve the physical fitness of schoolchildren through a multidisciplinary approach that targets children, parents, teachers, and the school environment.[46] Students found to be overweight are given specific guidance through intensive exercise programs and education on healthier eating habits.[47] Obese students that require immediate support are referred to the student health centre for assessment and continuous management by dieticians and doctors.[48]

Since the implementation of the program in 1992, obesity has declined by 2-4% in primary and secondary school students, and the percentage of students who pass the physical fitness test has risen from 62 to 81% percent.[49] Following a review in 2005, TAF has evolved into a broader program that works with schools to promote health and wellness. The new program goes beyond exercise and fitness to promote a holistic concept of overall wellbeing.[50]

Food advertising bans that target children

A survey conducted by Ontario's Healthy Kids Panel found that although parents try to educate their kids about healthy eating, information from the mass media – often in the form of marketing by junk and fast food companies – has a more persuasive, consistent, and powerful influence on kids' food preferences.[51]

According to one parent in the survey,

> 'the manufacturers and advertising/marketing companies are... bombard(ing our kids) from everywhere with visions on junk food in all the media and everywhere they go. If we can teach our kids healthy eating habits without having the marketing/advertising and media companies sabotage our efforts, we might stand a chance to raise healthy kids.'

This parental sentiment is backed by research. For example, a study of grade three schoolchildren in northern California found that TV and other screen media exposure are risk factors for children's requests for advertised products.[52] The relationship between total TV viewing time and future requests for advertised foods/drinks remained significant even after adjusting the data for baseline product requests and demographic variables.

Data also shows that television food advertising results in broad, generalized unhealthy eating behaviours beyond the consumption of specific advertised brands.[53] It is not therefore surprising that a survey conducted by Ipsos-Reid for the Public Health Agency of Canada found that Canadian parents support bans on marketing of unhealthy foods to young children.[54,55]

Restrictions on such marketing already exist in the province of Québec, in the U.K. (since 2007), Sweden, Norway, and Greece. In 2008 a report to Congress by the American Federal Trade Commission recommended that advertising to children should be restricted to healthy food products.[56]

The Québec advertising ban targeting children has been in place since 1980; it appears to have had an important impact. Using household expenditure data from 1984 to 1992, Dhar and Baylis examined whether expenditure on fast food was different in groups targeted by the ban compared to those who were not affected by the Consumer Protection Act.[57] The authors concluded that the advertising regulation had resulted in a 13% reduction in fast food consumption (US$88 million annually) equaling to roughly 2–4 billion fewer calories consumed by children. In addition, French-speaking young adults were 38% less likely to purchase fast food when compared to their French-speaking counterparts in Ontario.

Based on this the authors suggest that the positive impact of reduced exposure to food advertising during childhood extends into adulthood.[58,59] There is a concern, though, about leakage: advertising bans are likely only effective when media-markets do not overlap (so, in this case, when Québec children are not exposed to 'spillover' media from Ontario or the U.S.).

Adult-focused interventions

Healthy workplace meals

Almost all employed adults eat one or more meals per day at work, making the workplace an ideal setting for health promotion (as was noted by the WHO in its 1986 Ottawa Charter for Health Promotion).[60,61]

Recognizing this potential, the Finnish Institute of Occupational Health has, since the 1970s, provided guidelines and recommendations for workplace meals.[62] In the 1970s catering services at work were included in trade union agreements for both the public and private sector. That has now changed, but there are tax provisions and subsidies in place to ensure healthy workplace meals.[63] Norway, Sweden and Denmark also have a long tradition of employers providing workplace meals. This partially shifts the responsibility for healthy eating from the individual to the employer and the government.[64]

It should be noted, though, that healthy food consumption is not always associated with worksite cafeteria use: only 5% of the meals served in Belgian workplaces adhere to the national nutritional recommendations and worksite lunches served in Norway are rich in salt, fat, and red meat.[65,66] In Finland it is the adherence to recommended nutritional guidelines that makes workplace meals the healthy option, as does the accessibility of the meals, especially to lower socioeconomic groups.[67]

The Finnish government has devoted considerable resources to monitoring catering services and food consumption patterns in the Finnish population. In 2001, the Finnish Institute for Health and Welfare, together with Finnish Institute for Occupational Health and the Finnish Heart Association proposed a comprehensive evaluation system for catering services.[68] This system used data collected between 1979 and 2007 and included men and women between the ages of 15–64.[69] It was found that 50% of Finnish adults who have access to workplace cafeterias regularly use them and, although Finland went through an economic recession in the 1990s workplace cafeteria use remained stable from the late 1970s to the early 2000s.[70] Those who regularly eat lunch at a workplace cafeteria consume food of higher nutritional quality compared to those who eat packed lunches or use other eating facilities (a finding that is also true in other Scandinavian countries[71]).[72,73,74]

More highly-educated Finns have a higher propensity to eat meals provided at work, but data from the city of Helsinki shows that employees' financial status is not associated with eating worksite meals and that this trend has not changed between 1979–2001.[75,76] There is a negative correlation between the use of workplace cafeterias and a reduction in subsidies for catering services.[77,78] Another key variable is the occupational status of employees. Finns with irregular working hours and jobs in the service or trade industries are more likely to eat packed meals.[79]

A caveat to the above correlations is that well-educated people tend to be more health-conscious and thus more likely to choose a more balanced meal at the workplace and/ to work at places where organized meals are not only available but also where healthy eating is encouraged.[80]

Green prescriptions

It is estimated that sedentary lifestyles contribute 1.5–3% of direct health care costs in developed countries. Physical inactivity is also an independent risk factor for chronic conditions including type 2 diabetes, depression, osteoporosis, obesity, depression, and cardiovascular disease.[81,82]

Various approaches have been employed in an attempt to increase population-wide physical activity. In New Zealand and the U.K., general practice (meetings with GPs or family doctors) has been identified as the ideal setting for physical activity counseling, due to the regularity with which people consult primary care agents (e.g. more than 80% of the New Zealand population accesses primary healthcare annually).[83] Patients are receptive to making lifestyle changes – such as becoming involved in community-based interventions – in this setting because they have a long-term relationship with their primary care provider and they expect to receive health-related advice.[84]

So-called 'green prescription' interventions work through primary care providers to provide advice on the benefits of increased physical activity.[85] Primary care clinicians receive training in motivational interviewing techniques. They then screen patients for inactivity and provide prescriptions to encourage increased physical activity where necessary (e.g. joining a local walking or running group). Clinicians establish appropriate goals and allocate support and motivational resources to help patients achieve these. In some jurisdictions (e.g. Waikato region of New Zealand), a copy of the green prescription is forwarded to the local sports foundation with the patient's consent and, over the following three months, exercise specialists from the sports foundation contact the patient to provide advice on their specific regimen or refer them to appropriate community initiatives.[86]

In a randomized control trial of green prescription programs in two urban centers in New Zealand, researchers asked the question: 'Does written advice from a general practitioner increase physical activity more than verbal advice alone?'[87] Sedentary patients were given verbal advice on increasing physical activity and then randomized to a verbal advice group or a green prescription group. The researchers found that over a 13-week period, a greater number of participants in the green prescription group increased their level of physical activity compared to the verbal advice group. This led them to conclude that a written, goal-oriented exercise prescription is a better tool than verbal advice alone for motivating patients to increase physical activity.

In a separate study, conducted in rural and urban regions of New Zealand, the green prescription was proven to be effective in increasing physical activity and improving quality of life of patients aged 40–79 over the course of 12 months.[88] Although a larger sample of participants was needed to assess changes in the risk for coronary heart disease, a trend towards reduced blood pressure by an average of 1–2mm Hg was observed.

In Canada, it is estimated that 21% of the adult population, and only 17% of those aged 55 years and older, were physically active in 2000–2001.[89] To determine if the green prescription would improve physical fitness in Canadians aged 55–85 years, a 12-month cluster randomized trial was conducted involving participants from British Columbia, Ontario, Nova Scotia and New Brunswick.[90] The study found that exercise prescriptions provided in a primary care setting led to significant

fitness improvements in older adults, as measured by maximum predicted oxygen consumption, for at least a year. The addition of behavioural counseling to the exercise program improved cardiovascular clinical measures even further and seemed to benefit women more than men.

General practitioners have an overwhelmingly positive response to green prescriptions. They prefer giving written advice to verbal advice; find green prescriptions to be a valuable tool to record and structure mutually agreed goals; and identify time constraints as the only major barrier to pervasive implementation of this intervention.[91] They highlight resource materials, appropriate training, and patient follow-ups as necessary elements of successful outcomes.[92]

Finland's North Karelia Project

In an effort to combat the alarmingly high mortality rate from coronary heart disease (CHD), the Finnish government, in cooperation with the WHO, devised a community-based intervention in the Eastern Finnish province of North Karelia.

Launched in 1972, the North Karelia Project was the first major community-based intervention for cardiovascular disease (CVD) prevention in the world.[93] Risk factors for CVDs are closely linked to community life-styles. The fact that the North Karelia project was community-based and that it targeted the prevention of diseases that share common risk factors (such as various CVDs) was a key element of its success.

Importantly, the project was collaborative and involved all local stakeholders including health services, schools, NGOs, local media, supermarkets, food industry, agriculture, etc.[94] Knowledge gained from this initiative has informed the development of policies and the implementation of community-based interventions throughout the world.

Over the course of the project, significant changes took place in the levels of CVD risk factors. Changes in dietary consumption, especially reduced saturated fat intake, caused a 17% reduction in mean serum cholesterol level of the population.[95] The annual mortality rate of CHD in the male population under 65 years of age was reduced by 73% compared to the pre-program years (1967–71).

Drawing on the success of the North Karelia program a national health policy was drawn up. This population-wide initiative focused on reducing salt intake. The Ministry of Trade and Industry, in cooperation with the Ministry of Social Affairs and Health, established new salt-labeling regulations for manufactured food items.[96] A consensus agreement between governmental and scientific organizations and the food industry resulted in tempting health-related logos that publicized the salt contents of popular food items.[97]

By 2002, the average urinary sodium excretion in Finland decreased from more than 5200 mg per day to less than 4000 mg per day for men and from 4200 mg per day to less than 3000 mg for women. This reduction in sodium intake led to a corresponding decrease in blood pressure (more than 10 mm Hg) and a 75 to 80% reduction in mortality rate due to stroke and CHD.[98]

National Disease Management Programs

Disease management programs have been launched in several countries, including Japan and Germany, to reduce the prevalence of, and/or prevent chronic diseases through coordinated comprehensive healthcare interventions combined with social support networks.

In 2008, the **Japanese** Ministry of Health, Labour and Welfare introduced a new screening and intervention program specifically targeting obesity and associated cardiovascular risk factors. Focusing on the 40–74 age group, the program aims to help individuals at risk of developing cardiovascular diseases (e.g. coronary heart disease, stroke, etc.) through early screening, support for the family doctor relationship, cooperation of medical specialists with family doctors, and education for patients to allow for systems-level disease management.[99]

The primary prevention program introduced two main types of statutory health checkups: (i) a workplace health checkup program conducted by employers as part of the Occupational Safety and Health Act; and (ii) a health checkup program for the elderly conducted by municipalities as part of the Geriatric Health Act.[100] The cost of the workplace program is covered by employers, while the municipalities cover the cost for the elderly health checkup.

Health assessments include mandatory annual monitoring of indicators such as blood pressure, body mass index (BMI) and triglycerides/HDL/LDL cholesterol levels. Results are provided to insurers who analyze health checkup and health expenditure data for every individual and design optimal intervention plans in order to minimize projected financial costs.[101]

Patients are divided into different categories of severity based on their clinical results and counseling is provided accordingly (by or under the supervision of medical doctors, community health nurses, or dieticians). At-risk individuals – those unable to manage their condition and considered to be in need of support and motivation – are enrolled in counseling programs where they learn to recognize unhealthy lifestyle habits and set goals to overcome their health problems. Six months after the initial meeting, an evaluation is conducted to determine if the patient is achieving predetermined goals and progressing adequately.[102]

Since 2002, the public healthcare system in **Germany** has also been employing a disease management approach at the national level. Unlike in Japan, however, Germany's efforts are aimed at secondary disease prevention. The program has improved patient satisfaction and lowered hospitalization rates, patient mortality, and drug costs within the context of a weak primary care system.[103] It makes use of information technology support, a patient-centered approach that encourages patient self-care efforts by providing appropriate financial incentives for physicians and patients.

Small case studies, including one randomized trial in Northern **Sweden**, suggest that counseling intervention programs with short periods between follow-ups are effective in minimizing cardiovascular risks in high-risk individuals.[104] In general, disease management programs have proven especially effective in enhancing primary care and improving appropriate health outcomes for chronically ill patients.[105]

Food taxation

Drawing on the experience of anti-smoking legislation, many obesity crusaders advocate the imposition of punitive taxes on unhealthy food and drinks. Taxation is what is known as a 'population approach' to the obesity problem, in that there is no specific targeting of at-risk individuals.

Though a low-cost approach in one sense, this is also an extremely controversial approach for a number of reasons. First, so-called 'fat taxes' are typically regressive and mean that governments profit from 'bad behaviour' (both arguments are also in play in discussions of gambling). Second, they are intrusive and often unpopular. Third, they are hard to implement and can give birth to smuggling and parallel economies. And, fourth, they typically pit governments against food companies. This can be counter-productive for developing the type of multi-stakeholder alliances which are likely required to address obesity and chronic disease problems in a meaningful and lasting way.

Many countries manipulate prices. For example, here in Canada, most food is exempt from value added taxes, but this is not the case for unhealthy snack foods and drinks. It has, however, proven difficult to implement more overt taxes on particular categories of food.

The most well-known recent attempt to do so hails from Denmark where a 'fat tax' was introduced in October 2011. The Danish government aimed to reduce the consumption of unhealthy foods with an across-the-board tax on all foods with saturated fat content above 2.3%.[106] Although econometric analyses show a 10-20% decrease in the consumption of fat products compared with levels before the introduction of the tax,[107] the Danish government abolished the tax a year later as part of ongoing budget negotiations. Many skeptics argued that the tax failed to impact consumers financially; instead it shifted consumer habits as many Danes began to buy lower-cost alternatives, or traveled across the border to Germany and Sweden where prices are almost 20% lower.[108]

The Danish fat tax was touted as the 'first tax of its kind in the world' because it targeted a nutrient instead of specific food groups. Other, more targeted taxes also exist. For example, a tax on sugared drinks was introduced in France in 2011.[109] Also in 2011, in Hungary, taxes were introduced on various ready-to-eat foods rich in sugar, salt, fat, and caffeine.[110] Finland currently imposes an excise tax on candy, ice cream, and soft drinks and the Finnish Ministry of Finance is considering extending the tax to other products based on the total sugar content or the amount of added sugar in a product.[111]

It is very difficult to predict how consumers will react to price changes caused by taxation. As the OECD points out, an unintended result might be that consumers reduce their consumption of healthy foods to pay for the more expensive unhealthy products.[112] Or, as was the case in Denmark, consumers may seek equally unhealthy substitutes for the taxed product, or engage in parallel trade. One thing is certain, though, any government action in this area is certain to be controversial as Mayor Bloomberg discovered in New York when he tried to ban trans-fats and limit the size of sugary drinks.

4. Discussion

A key consideration in drawing lessons from interventions such as those described above is whether they are cost effective. Does the cost of implementing the program make sense in light of the benefits yielded? And which types of intervention are most cost effective?

This turns out to be an extremely difficult question to answer. As noted in the foreword to this paper, obesity and overweight are extremely complex issues with multiple drivers and no magic solution.

Evidence compiled by the OECD nevertheless suggests that:[113]

- Most interventions are efficient and cost effective relative to a scenario in which no systematic prevention in undertaken and chronic diseases are treated when they emerge. (p. 41)
- Gains are, though, surprisingly small. Typical interventions will generate no more than 1% of total expenditure for major chronic diseases. (p. 21)
- It is harder to show that interventions that target children are effective as there is often a long lag before the benefits of reduced healthcare costs are realized.
- The cost-effectiveness of an intervention will depend upon how broadly one defines the benefits. Usually the cost of an intervention will outweigh the direct healthcare benefits (reduced expenditure) but when a broader view of costs is taken (for example, factoring in quality of life and disability) cost effectiveness rises.
- Strategies targeted towards individuals (e.g. green prescriptions) tend to generate the largest gains but are also the most expensive to implement.[114]
- A key determinant of the cost-effectiveness of any given intervention will be the rate of participation, which can vary hugely, even within the same program.
- Population approaches are, overall, more cost effective and generate the greatest multipliers because of their breadth and relatively low cost. Unsurprisingly these are often the ones that are favoured by governments. (p. 225)

A key conclusion of the OECD work is that the greatest gains are likely to be made when individual and population approaches go hand in hand and when a variety of stakeholders cooperate. Complex problems require the formation of complex alliances.

Strategies for addressing obesity and chronic disease vary from one country to another. To some extent this reflects the culture of the country in which they originate. For example, the degree to which children's nutrition is a responsibility shared between parents and educational institutions is culturally dependent.[115] The acceptability of governments intervening in what may be seen as a private decision-making sphere also varies – as does the degree to which this is seen as a personal rather than a societal problem – making it complicated to apply lessons from one jurisdiction to another.

Efforts have been made to categorize states into groupings that share more in common and between which there might be more transferability of lessons. Esping-Andersen defines three models of a welfare state, based on how social responsibilities are shared between the private and the public domain.[116]

- In liberal welfare state models, such as **Canada** and **Australia**, a minimal state is characterized by market dominance and private provision such that basic needs of citizens are provided for but social policies are directed only towards the poor.
- In social democratic states, such as **Sweden** and **Finland**, welfare is based on a principle of universalism whereby public services are directed towards everyone and access to benefits is distributed equally. Traditional family responsibilities are shared between the family and state.[117] The school and workplace meal is a good example of this shared task as a state-funded institution carries out social and health-related policies by taking over some of the responsibilities of the family.[118]
- In conservative welfare regimes such as **Germany** and **Italy**, the provision of benefits through 'status differentiating' welfare programs is related to earnings and administered by employers. The role of the family is emphasized and programs are geared towards the maintenance of existing social norms.

Should this analysis be valid, we would, for example, expect it to be difficult to introduce Nordic-style programs, such as workplace or school meals, in Canada.

Esping-Andersen's typology is used extensively to examine differences between and within welfare states. However, many public health researchers that focus on the social determinants of health have criticized the typology.[119] They argue that welfare provision varies greatly between countries of the same regime type and that 'health-based taxonomies' of welfare states should be compared with existing typologies to determine which one is most predictive.[120,121]

Certainly, the cultural acceptability of particular interventions will vary between countries. But there are also lessons that apply across countries. Wherever the threshold of acceptability lies, actions that involve a higher degree of interference with individual choice are likely to be more problematic, except when those actions are targeted to population groups that require greater protection (such as children, groups at-risk of obesity-related chronic diseases, or disadvantaged socioeconomic groups[122]). Financial costs may be relatively low, but political costs can be very high – indeed, unacceptably so – as was the case with the Danish fat tax and possibly has been the case with the demise of Canadian efforts to reduce sodium intake.[123]

An example of the type of multi-stakeholder approach that the OECD proposes is that recommended by the Ontario Healthy Kids Strategy Panel. This panel proposed launching EPODE-like programs in at least 10 communities to reach 'critical mass' along with introducing legislation that bans the marketing of high-calorie, low-nutrient foods, beverages and snacks to children under the age of 12.[124]

The latter is an important consideration because although Canada's food and beverage industry launched the voluntary Canadian Children's Food and Beverage Advertising Initiative in 2007, only

18 companies out of a possible constituency of 50 have thus far participated. In order to be effective, a policy that sets consistent advertising requirements and applies to all companies is needed especially because according to the OECD '*cooperation between governments and the food industry is the single most important link in the generation of a multi-stakeholder approach towards obesity prevention*.'[125]

A different, but effective, approach has been to focus on providing programs to reduce obesity in a primary care setting. However, in many OECD countries there are insufficient doctors to provide such care, particularly given overall levels of chronic disease (about half of American adults have a chronic condition)[126]. One possible response to this could be to harness new technologies that place greater onus on patients themselves and facilitate the links between patient and doctor.

Dr. Eric Topol, director of the Scripps Translational Science Institute in La Jolla, California, foresees a solution in 'personalized medicine' – the digitalization of medical information that will allow patients to make better use of their diagnoses and treatments. He argues that this will lead to personal management of health through information sharing between patient and doctor, something he calls the democratization of medical information.[127]

The use of technology to offset medical costs is gaining momentum in many countries. Montefiore Medical Centre, the largest hospital system in the Bronx borough of New York, uses Health Buddy technology to examine data gathered from health records and medical devices in patients' homes to manage chronic conditions.[128] Made by the German engineering company Bosch, Health Buddy asks patients questions about their symptoms each day and transmits the data to the program coordinators at the hospital. Over 10 clinical trials in chronic disease management using the Health Buddy system have demonstrated positive outcomes and cost savings across variable settings and disease stages.[129,130,131]

Notwithstanding all these valuable options and opportunities, improving our nation's public health remains an enormous challenge. Changing norms in our society are, to a great extent, antithetical to health. Thus the fact that larger numbers of women are in the work force is a good thing, in general, but this often does not serve the goal of improving family nutrition. Likewise workforce flexibility is essential in the modern economy but, as the Finns have found, those who work irregular hours and in the service or trade industries (growing sectors in Canada) are more likely to eat packed meals (which, in Finland, are typically less healthy).

Disease management programs at a national level have had a good degree of success in improving health outcomes for chronically ill patients, but many of the programs that have been most effective have been community-based initiatives.

This raises more questions than it answers about the federal role in addressing public health. These are questions that Canada 2020 will be at pains to address in our event on May 28, 2013.

Editor's note

For those of you reading this after the event, please do see how we did by watching the video which will be available on our event home page at: http://canada2020.ca/event/the-canada-we-want-in-2020-public-health/

Appendix

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