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International policies to reduce childhood obesity - a Health Action Campaign review

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Executive Summary

Childhood obesity has become a serious public health issue globally – as the number of obese children has grown, particularly in more deprived areas, and the health risks of obesity have become more evident. Governments are therefore increasingly seeking to tackle the problem. This includes obesity plans from countries such as Denmark, England, France, Mexico, New Zealand, Ireland and Scotland, as well as reports and recommendations from countries including Australia and Canada.

Some governments have also launched initiatives to tackle specific factors believed to increase the risk of obesity, such as taxing:

- The advertising budgets of food companies not encouraging healthy eating (France)
- Pre-packaged food high in sugar and salt (Hungary)
- Sugary drinks (England and Mexico)

These national obesity plans and initiatives have begun to address some of the factors which fuel childhood obesity. They may have helped encourage healthier diets or more physical activity (with all the attendant health benefits) and have probably also helped slow the rise in childhood obesity. However, only Scotland saw a national reduction in children at risk of obesity (at least among boys, between 2012 and 2017).

Reducing childhood obesity in an obesogenic world is clearly a major challenge. Fortunately, governments can now learn from a range of more local, regional or targeted initiatives which have begun to reduce rates of childhood obesity. These include:

- Ensemble Prevenons L'Obesite Des Enfants (EPODE) in France
- Health Exercise Nutrition for the Really Young (HENRY) in Leeds (UK)
- Jongeren op Gezond Gewicht (JOGG) in the Netherlands
- The Overcoming Obesity Programme in the Finnish city of Seinajoki
- The Children's Obesity Clinic Treatment (TCOCT) in several towns in Denmark
- The Obesity Prevention and Lifestyle (OPAL) programme in South Australia
- The Women, Infants and Children's programme (WIC) for some 7 million low income pregnant women and new mothers in the USA

One question for national governments is how to scale up initiatives like these, where success may have depended, at least in part, on local factors and specific individuals and organisations. Fortunately, EPODE provides a positive example of scaling up. Its approach has now been applied in many French towns and has influenced and inspired successful initiatives in the Netherlands (JOGG), South Australia (OPAL) and Scotland (Healthy Weight Healthy Communities).

Governments can also apply guidance from the World Health Organisation, which has identified the importance of promoting the intake of healthy foods and physical activity at three key stages in life: preconception and pregnancy; early childhood; and the school years – as well as weight management.

Introduction

Globally, childhood obesity has become a serious public health concern. Prevalence of childhood obesity has risen from 4% to 18% over the last four decades, with a current estimation of over 340 million children aged 5-19 years overweight or obese. (1) The primary cause of the childhood obesity epidemic has been the increased availability, accessibility and affordability of energy-dense, high fat, salt and sugary foods. Coupled with decreasing physical activity, this results in excess energy intake, leading to weight gain. Obesity poses many significant physical health risks, including cardiovascular disease, Type 2 diabetes and is linked to 12 types of cancer. (2) Overweight and obese children are five times more likely to become obese in adulthood. Alongside poorer quality of life and premature death from associated conditions, overweight children are likely to experience poorer mental health from bullying, low self-esteem, depression and social isolation.

High income countries are among those at risk. (3) One in six children are overweight or obese in the Organisation for Economic Cooperation and Development (OECD) countries. (3) Figure 1 displays international overweight and obesity prevalence in children aged 2-19 years by OECD country. (4) Socioeconomic disparities are widely evident, with children from the most disadvantaged areas more likely to be overweight than children from less deprived areas. However, due to urbanisation and nutrition transition, childhood obesity is also on the rise in low-middle income countries. (5)

In 2004, the World Health Organisation (WHO) developed a prevention-based Global Strategy on Diet, Physical Activity and Health. The strategy aims to reduce the prevalence and risk factors of non-communicable diseases, (such as cardiovascular disease, diabetes and cancer) through focus on global diet and physical activity patterns. (6) With slow and inconsistent progress in childhood obesity, the WHO director-general established the Commission on Ending Childhood Obesity, with six key areas of action identified to help meet the global target of halting childhood obesity: (7)

1. Promote intake of healthy foods
2. Promote physical activity
3. Preconception and pregnancy care
4. Early childhood and physical activity
5. Health, nutrition and physical activity for school-age children
6. Weight management

The WHO population-based approaches to childhood obesity prevention identifies environments supportive of healthy diets and physical activity as essential in childhood obesity prevention strategies. (8) This involves fiscal policies, policy changes in food marketing, labelling, urban planning, transport and agriculture. Policy instruments often include taxes and subsidies, laws and regulations and social marketing campaigns affecting whole populations. Some countries, such as Mexico, Finland and Hungary, have implemented policies to increase the price of unhealthy food and drinks, with the aim of encouraging healthier diets. The

intended outcome of such policies is to create environments that reinforce educational and behavioural interventions, whilst also improving outcomes across the socio-economic spectrum.

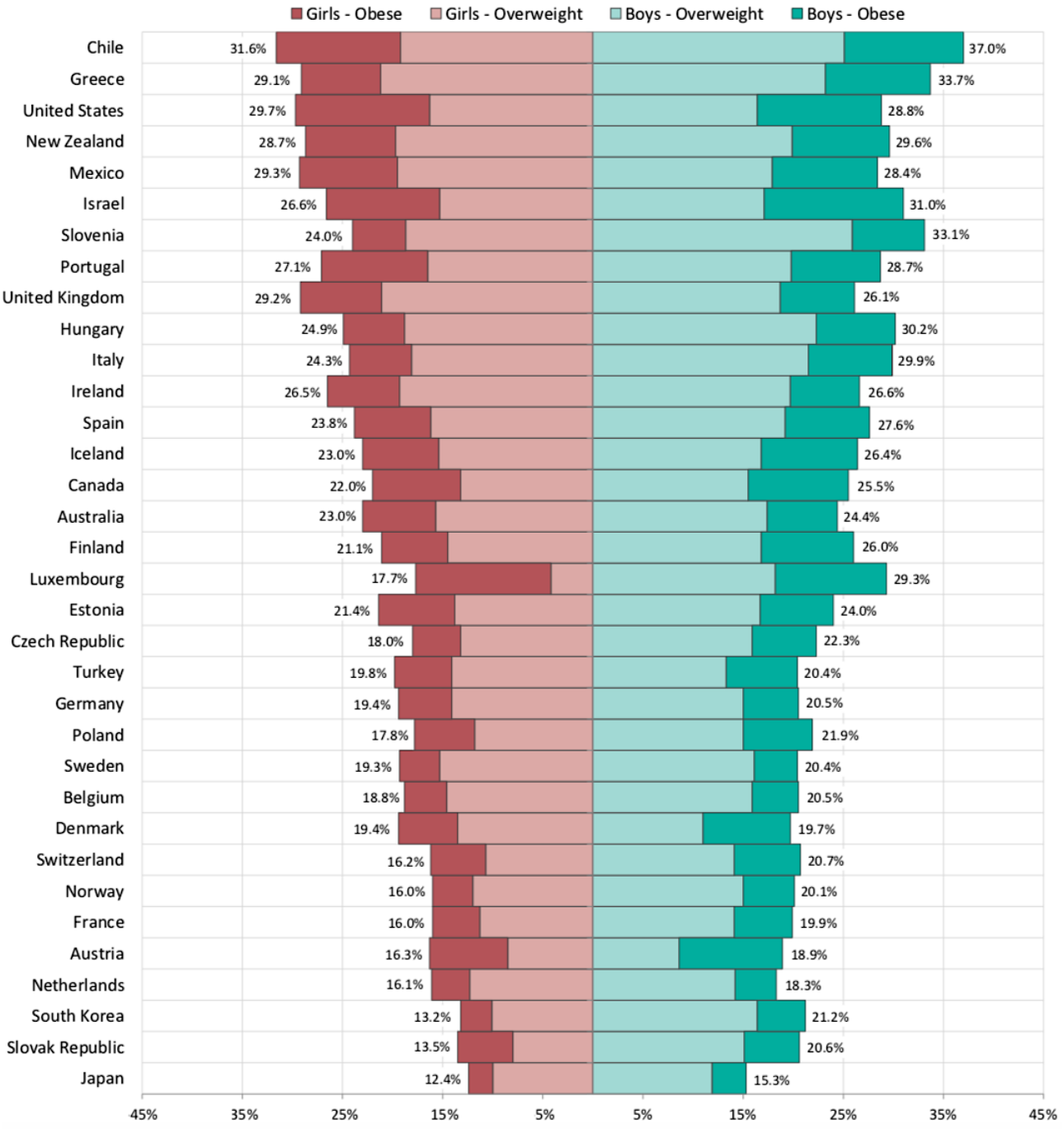

Figure 1: Global prevalence of overweight and obesity in children aged 2-19 years old by OECD country using the International Obesity Taskforce cut-offs. (4)

National policies promoting safe physical environments supportive of active travel are also important, including travel to and from schools, recreation and leisure facilities and adequate safe space for active play. Such policies can include urban planning, transport, sport and education to engage children from all areas. (9)

This report reviews current international childhood obesity policies, including evidence of what has worked and what can be learnt from these policies in preventing or reducing obesity.

United States

Out of the OECD countries, the United States (US) has the highest obesity rates globally. The latest National Health and Nutrition Examination Survey (NHANES) reports 13.9% of children aged 2-5 years,18.4% of children aged 6-11 years and 20.6% of children 12-19 years are obese. (10) Childhood obesity has more than tripled since 1976, from 5.5% to 18.5% (see Figure 2). (11) In adults, obesity affected 39.6% of US adults, a significant increase since 1999-2000. (9,10) Obesity is most prevalent among Hispanics (25.5%) compared to non-Hispanics (22.0%), non-Hispanic whites (14.1%) and non-Hispanic Asians (11%). In 1999, the Centre for Disease Control and Prevention (CDC) established the Division of Nutrition, Physical Activity, and Obesity (DNPAO) to address growing obesity and chronic disease rates. CDC-DPAO programmes are based on the 5-level socioecological model, which proposes the interconnected interactions that influence obesity, including intrapersonal, interpersonal, organizational, community and societal factors. Since then, the CDC have published recommended strategies to improve nutrition and physical activity in America, alongside 24 community-based obesity prevention strategies focusing on environmental and policy level change. (11,12)

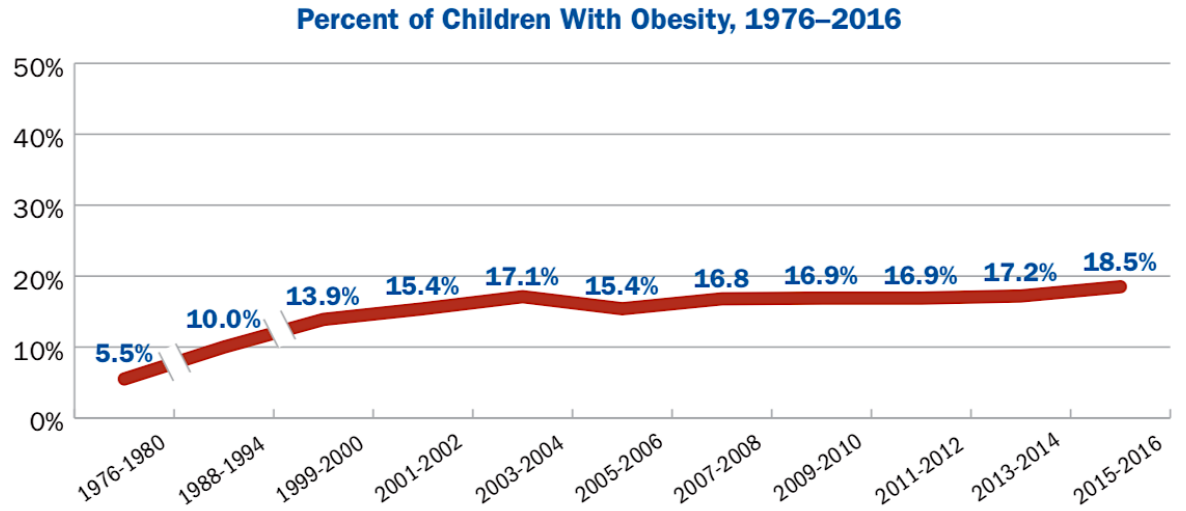

Figure 2: Age-adjusted national obesity rates for children between 1976-2016 in the United States. (11)

The following are the current national policies to address the obesity epidemic in America: (14)

Nutrition Assistance Policies

1. Supplemental Nutrition Assistance Program (SNAP) - the nation's largest nutrition assistance program for families not gaining equitable access to affordable food. The program feeds more than 40 million Americans, of which two thirds are children, older adults and people with disabilities.
2. Women, Infants and Children (WIC) Program - this program aids almost 7.3 million low income pregnant, postpartum and breastfeeding women, infants and children up to 5 years of age by providing access to healthy food, nutrition education, breastfeeding promotion, support for nursing mothers and provision of health and social service referrals.

3. Child and Adult Care Food Program - provides state reimbursement to providers supplying nutritious meals and snacks (meeting minimum nutrition standards) to children and adults in their care
4. Health Food Financing Initiative - a public-private partnership providing grants and loans to finance construction and development of grocery stores and other healthy food retailers in 'food desert' areas (with no access to grocery stores, supermarkets or farmers markets).

Consumer Information Policies

1. Menu labelling - chain restaurants with more than 20 locations are to provide calorie and nutrition information on menus and menu boards. Retailers with less than 20 location may voluntarily do so
2. Dietary guidelines - the current 2015-2020 dietary guidelines emphasize a combination of nutrient dense foods within meals and moderate saturated fats, added sugar and sodium. The 2020-2025 guidelines will include standards for pregnant women, infants and toddlers
3. Nutrition facts - from 2020, nutrition labels with a larger font, stating the number of servings, amount and percentage daily value of added sugars, will become mandatory from manufactures with more than $10 billion total sales (from 2021 for all other manufacturers).

School and Early Childhood Policies

1. Head Start - a childhood education program helping to prepare over one million low-income children under 5 to prepare for school by providing education, health and social services. New revised standards require programs to engage in obesity prevention in classrooms and through family partnerships
2. School Meals and Snacks - with over 30 million children participating in the National School Lunch Programme and School Breakfast Programme, nutrition standards for school meal programs have been updated
3. School based physical education - the Comprehensive School Physical Activity Program to encourage children to get the recommended 60 minutes of physical activity daily
4. Safe Routes to School - promotes walking and cycling to and from school by providing communities with resources to build sidewalks, cycle paths, adding crosswalks and improving lighting and signage to ensure safe conditions

Health Coverage and Prevention Policies

1. Medicare, Medicaid and Children's Health Insurance Program (CHIP)
    - Medicare is a government program for the over 65 years, covering BMI screening and behavioral counselling for patients with obesity, as well as bariatric surgery.
    - Medicaid is a government program aiding more than 67 million low-income Americans and those with disability. 8.2% of Medicaid dollars are spent treating obesity and related conditions, with some states spending more than 20%. For children on Medicaid, states have to cover all medically necessary screenings, diagnostic and treatment services. For adult participants, most states cover at least one obesity-related service such as screening.
    - CHIP covers children from low-income families, increasing access to obesity screening, counselling services and referrals to local pediatric weight management programs.

2. Diabetes Prevention Programme- a public-private partnership supporting evidence-based diabetes prevention interventions in communities around the country. The program works to prevent or delay a diagnosis of diabetes and provides participants with practical training on nutrition, physical activity, and weight-control strategies.
3. Prevention and Public Health Fund – a mandatory funding stream to improve public health. Administered by the CDC, the fund supports health initiatives run by states, counties, cities, non-profit organisations and tribal organisations.

Reductions in childhood obesity

Women, Infants and Children Programme

A recent study found that states implementing the CDC-funded nutrition and physical activity programmes between 2000-2010 had 2.4-3.8% reduction in the odds of obesity among adults compared to states without the programmes. (14) However, the effect of programmes varied by state and duration/length of implementation. From 2010 to 2014, there was a statistically significant decrease in obesity among children 2-4 years participating in WIC, with rates declining from 15.9% to 14.5% nationally and across all racial and ethnic subgroups. (15,16) These reductions were statistically significant in 31 states. The programme has a focus on improving preconception nutrition for women and nutrition for infants, highlighting the importance of this window of opportunity for healthy child growth. The CDC reported the decrease in obesity among the WIC program to have been a result of USDA's revision of the WIC food package in 2009 (leading to healthier food environments in low-income neighbourhoods), CDC's Early Childhood Education (ECE) and State Public Health Actions. (17) To further encourage the declining trends, state public health leaders are encouraged to enroll families eligible for WIC. ECE centres serving low-income children are also encouraged to enrol in the Child and Adult Care Food Program to better ensure access and affordability of healthier food and snacks for children.

MEND programme in Texas

A small-scale intensive, multi-sector project in Texas with a clinical focus was found successful at reducing the weight of overweight/obese children in low-income communities compared to a primary care-centered programme. (18,19) The community-centred Mind, Exercise, Nutrition, Do it (MEND) programme was combined with a Coordinated Approach to Child Health (CATCH) programme, and compared to the primary health care-centred programme Next Steps. MEND/CATCH for children aged 6-12 was more effective at reducing BMI after 3 months (the intensive phase) but and not after 12 months (the transition phase) compared to Next Steps. Intervention compliance was inversely associated with change in BMI during the intensive phase. (19) The need for long-term, continued support for low-income families in lifestyle interventions was highlighted for sustained improvements in children's weight.

New York City initiatives

New York City (NYC) had some success in reducing overweight and obesity among school children. Interventions including NYC food standards, nutrition standards for school meals, daycare regulations and Health Bucks ($2 coupons that can be used to purchase fresh fruits and vegetables at all NYC farmers markets for every $5 spent using SNAP) were implemented between 2006-2010, and continued as part of the New York State Prevention Agenda 2012-2018. (20) There were statistically significant reductions in obesity among elementary school children between 2006-2007 (5.5% reduction) and 2010-2011 (20.7% reduction). (21) These changes were found amongst children across all age and socioeconomic groups. The decline in obesity was smaller among black children (1.9%) and Hispanic children (3.4%) compared to Asian (7.6%) and white (12.5%) children. Health Bucks has increased the availability and accessibility of fresh fruit and vegetables in low-income areas throughout the city. All policies were reinforced at state and local level, helping to ensure the strategies were implemented across all areas of the city and the harder-to-reach children also exposed.

Other initiatives

Shape Up Somerville was a 3-year, CDC-funded randomized control trial from 2003-2005 with 30 elementary schools in Massachusetts. (22) The study aimed to prevent obesity in first and third grade children through community-based, participatory environmental change. The intervention consisted of updating quality of school lunches, enhancing food options from over 40 restaurants, training local clinicians and school nurses on addressing nutrition and obesity, addition of cycle lanes, renovation of 17 parks plus addition of 4 new parks. In the first year of the intervention, there was a modest statistically significant one-pound decrease in weight and after 2 years, a -0.06 decrease in BMI z-scores among children in the intervention group compared to children in control communities (whose weight actually increased by one pound.) There were also spill over improvements in parents BMI. (23) Following the study, Shape up Somerville has now been expanded and continued by the city of Somerville.

An observational study, The Healthy Communities Study, was designed to assess the impact of community policies and programmes on adiposity, diet and physical activity in children. The study included over 5000 children from 130 communities. Children living in communities which did more to encourage physical activity and healthy diets had lower BMI and waist circumference. (24)

In 2014, Berkeley, California became the first state to enforce a $0.34/litre tax (up to 25% tax) on sugar-sweetened beverages, fruit-flavoured drinks, sweetened water, coffee and tea. Evaluation in 2016 showed a 21% reduction in consumption of sweetened beverages in Berkeley, whilst intake increased by 4% in the comparison cities in Oakland and San Francisco. (25) Water consumption increased by 63% in Berkeley, whilst in comparison cities consumption of water increased by 19%. The tax has been a success so far, with consumption of taxed beverages decreasing in low-income neighbourhoods, with no impact on grocery bills or revenue for retailers. Between 2014-2016, six other US cities introduced city-level soda taxes, including Oakland and San Francisco.

Canada

Between 1978 and 2004, overweight and obesity among children aged 2-17 years increased from 15% to 26%. (26) The latest data now shows 30% of Canadian children 6-17 years are overweight or obese, with trends stabilizing over the last decade (see Figure 3). (27) Among adults over 18 years, 64% are overweight and obese. (28)

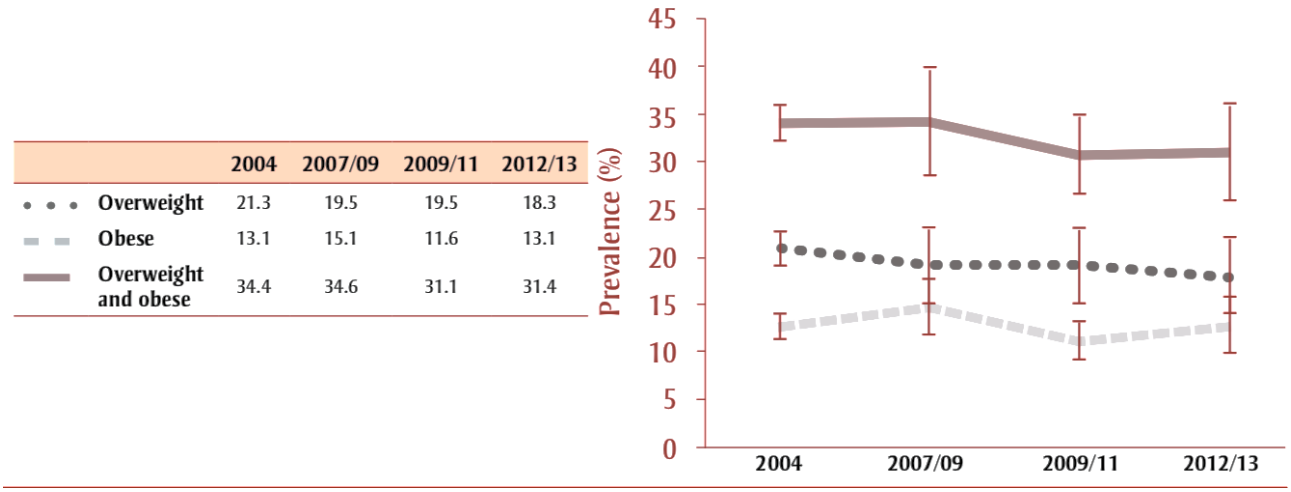

Figure 3: Prevalence (%) of overweight and obesity in children aged 6-17 years in Canada, 2004-2012/13.(27)

A Federal, Provincial and Territorial Framework for action was developed to promote healthy weights among children under 18 years in Canada (26), based on three main strategies:

1. making childhood overweight and obesity a collective priority for action
2. coordinating three policy priorities
   a. supportive social and physical environments for physical activity and healthy eating
   b. early identification and action for overweight/obese children
   c. increasing availability of nutritious foods
3. measuring and reporting the collective progress

In 2016, Canada published *Obesity in Canada: A Whole-of-Society Approach for a Healthier Canada.* The report provides a list of 21 recommendations, including:

- a ban on advertising food and drink to children
- a potential tax on sugar-sweetened beverages
- a ban on partially hydrogenated oils to minimize trans-fat content in food
- a review of nutrition food labelling
- nutrition labelling on menus
- a public awareness campaign on healthy eating
- a plan for making healthy food more affordable
- promotion of the Canadian Physical Activity Guidelines
- increased funding to ParticipACTION (a non-profit organisation promoting healthy living)
- a public awareness campaign on healthy active lifestyles.

Mexico

Mexico is currently the second most obese country in the world, with predictions that over 39% of the population will be obese by 2030. In 1995, 31.2% of girls and 29.8% of boys aged 12-19 years were overweight and obese. (29) The most recent data now shows over 39.2% of girls, 33.5% of boys and 70% of adults are classified overweight and obese. (29,30)

The National Agreement for Nutritional Health - Strategy to Control Overweight and Obesity was signed by 15 government agencies in 2010 to reduce the prevalence of overweight and obesity among children 2-5 years. The agreement also pledged to stop overweight and obesity growing in the 5-19-year age group and to slow the increase of obesity and overweigh in adults. (31) Priority objectives were to:

1. Promote physical activity in all settings (school, work, community, recreational).
2. Increase availability, accessibility and consumption of water.
3. Reduce sugar and fat in drinks.
4. Increase consumption of vegetables and fruits, legumes, whole grains and fiber.
5. Improve decision-making capacity through labelling and promotion of health and nutrition literacy.
6. Promote exclusive breastfeeding during the first 6 months of life.
7. Reduce the amount of sugar added in food.
8. Decrease consumption of saturated fats and eliminate trans fats in processed food.
9. Encourage elaboration of smaller servings in restaurants and food outlets, and diminish the portion size of processed food.
10. Limit the amount of sodium added to foods and reduce sodium intake (because of its importance for chronic diseases prevention, especially hypertension and cardiovascular diseases).

In 2012, Mexico had the highest intake of sugar-sweetened beverages globally, at 160 litres per person. With evidence showing 70% of sugar intake coming from sugar-sweetened beverages and 23% from non-essential energy dense foods, the government launched two taxes: a $1 peso (4p) per litre excise tax (10% pre-tax price) on non-dairy and non-alcohol drinks with added sugar and an 8% tax on non-essential foods with more than 275 calories per 100 grams, including snacks, sweets, nut butters and cereal-based prepared products. The sugar-sweetened beverage tax showed immediate positive benefit by the end of 2014, with a 5.5% reduction in the total amount of taxed drinks purchased and a 9.7% reduction by the second year. (32) The tax has had the largest impact on lower socio-economic households, with a 9% reduction and a reduced purchase of 18.8ml per person per day during 2014 and up to a 17% decrease by the end of the year. Purchases of untaxed drinks increased by 2% over 2014-15, with production of still bottled water increasing. (32,33)

14% of Mexican kilocalories were estimated to come from the unessential energy-dense foods. In the first year of the 8% ad valorem tax, there was a 5.1% reduction in purchase of the targeted foods relative to pre-tax trends, rising to 7% in the second year. Reduced purchases were predominantly found among low income households who purchased an average of 10.2% less taxed foods. Medium-income households bought on average 5.8% less taxed foods. The fiscal policies in Mexico illustrate that such measures can help to reduce excess energy intake among the population, particularly those at the lowest socioeconomic level.

Australia

According to the Australian Institute of Health and Welfare, 25% of children aged 5-17 years were overweight or obese in 2017-18 (17% overweight, 8.1% obese) and 67% of Australian adults were overweight or obese. (34) Childhood obesity rates rose from 1995 to 2007/08. They have become relatively stable since, although overweight rates have continued to rise (see Figure 4). (35) In 2008, the Australian government announced the National Preventative Health Taskforce to drive preventative health initiatives and research for chronic diseases caused by alcohol, tobacco and obesity. The task-force released the report *Australia: The Healthiest Country by 2020 - National Preventative Health Taskforce Strategy, The Roadmap for Action*, of which a total of 27 actions were recommended to prevent and reduce obesity. (36) However, in 2014, the National Preventative Health Agency was abolished and the Commonwealth funding provided across different states to deliver lifestyle interventions under the National Preventative Health Agreement were also stopped. The government's priory for obesity action was criticized at the time as being too low, although there have since been more positive developments, as reported below .

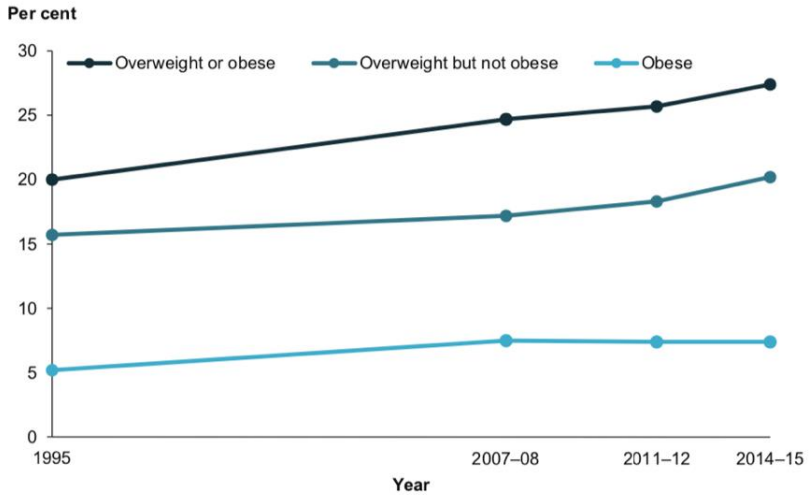

Figure 4: The prevalence (%) of overweight and obesity among children aged 5-17 years between 1995-2014/15. (35)

Reduction in childhood obesity

Obesity Prevention and Lifestyle Programme (OPAL)

The South Australian government launched the Obesity Prevention and Lifestyle (OPAL) 2009-2017 programme in response to a high prevalence of childhood obesity. (37) OPAL was developed on the basis of EPODE, a French program designed to prevent obesity at community level (see page 22). Programme aims were to increase the proportion of 0-18 years olds in the healthy weight range by improving eating and physical activity habits across 20 metropolitan and regional communities for 5 years. Behaviour change was to be influenced by availability of healthier food choices from food outlets, healthy meals produced at home, access and distribution of local healthy food, active travel, active leisure participation and use of open spaces. Evaluation of the programme found a 12.2% reduction in the extent to which

overweight and obesity would have been expected to rise among children aged 4-5 years within the time frame. The greatest reductions were observed 2 years after the programme's conclusion. (38) Greater programme response and impact was seen among higher socioeconomic status areas.

Other Australian initiatives

A number of initiatives have been developed by the Department of Health to encourage healthy food, nutrition and physical activity amongst the Australian population. These include the Australian dietary guidelines, the National School Canteen's project, physical activity guidelines, the Healthy Workers project, the Healthy Weight Guide, the Healthy Star Rating and the Girls Make Your Move campaign aiming to empower young women to be more active. (39,40) Australian ministers recently agreed on the development of a National Obesity Strategy, beginning with a national obesity summit held early in 2019. (41) Key messages from the summit were: the need for a whole systems perspective to prevent, manage and treat obesity; reframing the conversation around weight and weight management; collaboration with other organizations working on obesity and targeted interventions for the early years and adolescents. As of now, the government are acting on the recommendations of the Select Committee into the obesity epidemic (2018). (42) The committee have proposed key strategies to improve provision of healthier food choices and evidence-based measures to prevent childhood obesity, including:

- food labelling - making the Healthy Star Rating mandatory, which enables consumers to make better informed decisions by comparing nutritional value of food items. The aim is for the rating system to drive reformulation by the food industry
- food reformulation - acceleration of reformulation to increase access to healthier food
- tax on sugary drinks - the main purpose of this would be to again encourage reformulation of high sugar products
- advertisement of discretionary foods - a review for restrictions on advertising for discretionary food (i.e. confectionary, savory biscuits, salty snacks) and drinks on free-to-air television until 9.00pm
- education campaigns - a need for publicly funded education campaigns to seek to change attitudes and behaviors around health eating and physical activity
- health care interventions - recognising obesity as a chronic disease and a medical condition liable for the Chronic Disease Management Scheme; and consideration of campaigns educating the medical profession on the cost effectiveness and health benefits of bariatric surgery
- community- based multi-strategy interventions - to drive systemic change, involving all sectors of the community to address the structural causes of obesity.

New Zealand

The most recent New Zealand Health Survey 2017/18 found 34.8% of girls (21.7% overweight, 13.1% obese) and 29.2% of boys (17.5% overweight, 11.7% obese) aged 2-14 years were overweight and obese, both increasing by 3.1% since 2002. (43) 32% of adults (aged 15 and over) are obese, increasing by 5% in 10 years. Children and adults living in the most deprived areas were at higher risk than the least deprived areas (2.1 and 1.6 times, respectively). In 2015, the Ministry of Health launched a package of 22 initiatives as part of its **childhood obesity plan** (Figure 5). (44) These include targeted interventions for children who are obese and increased support for those at high risk of becoming obese, plus broader approaches to make healthier choices easier for the general population. The initiatives have multi-sectoral engagement and place importance on food, the environment and keeping active across the life course.

In the targeted initiatives, children identified obese in the Before School Check (B4SC) program will be offered referral to a health professional and family-based nutrition and lifestyle interventions. For children with low sport participation and at higher risk of obesity, more sport opportunities are provided.

Other measures to increase support for children at high risk for obesity include clinical guidance for weight management, guidance for healthy weight gain in pregnancy, guidelines for gestational diabetes and prescriptions for lifestyle improvement for pregnant women at high risk of gestational diabetes.

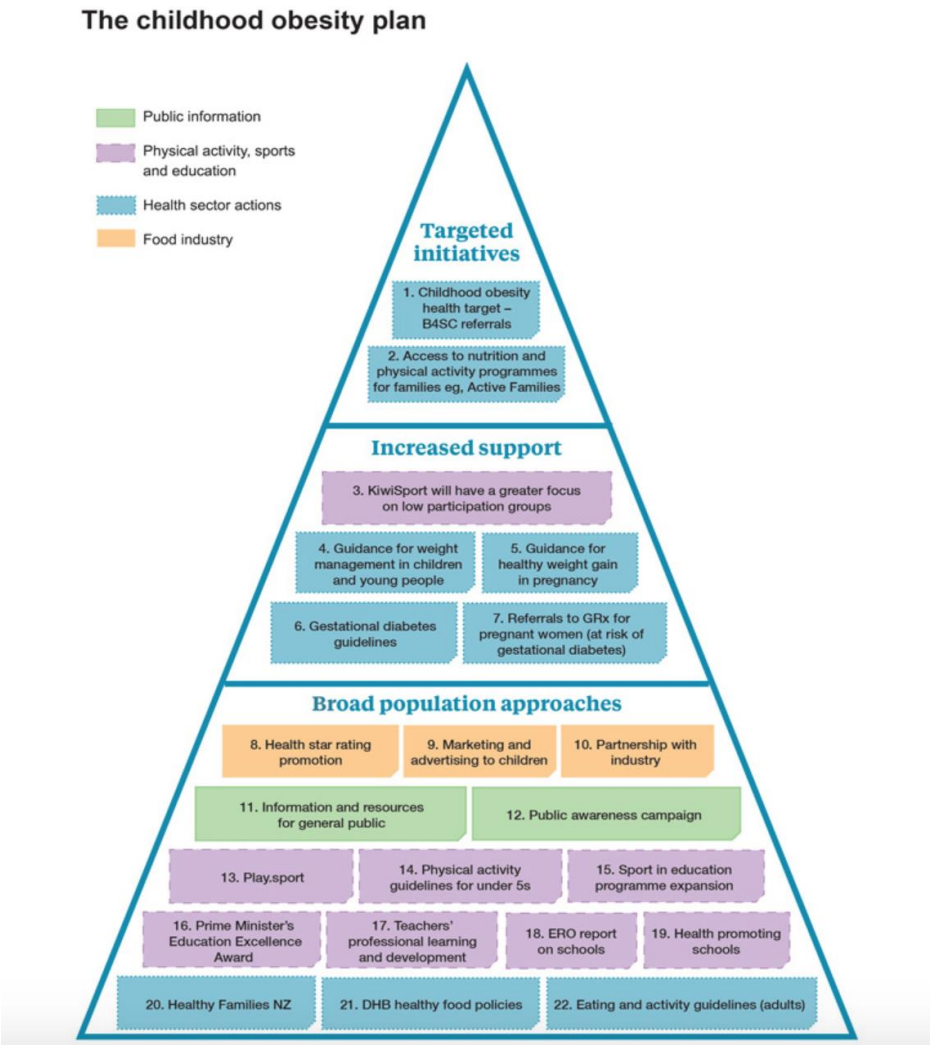

Figure 5: New Zealand Childhood Obesity Plan. (44)

Broader initiatives to improve the population's diet are: a voluntary Healthy Star Rating for front-of-pack nutrition labels to help consumers make healthier choices, review of a new Children and Young People's Advertising Code which include restrictions for advertising occasional food and drinks to children under 18 and engaging with the food industry to help reduce childhood obesity, providing access to nutrition and physical activity information for the public.

United Kingdom

Across the UK, a number of policies and initiatives have been implemented over the years in efforts to reduce childhood obesity:

- UK Code of Broadcast Advertising (BCAP Code) – statutory rules on advertisements for high fat, salt and sugary foods (HFSS) on TV channels targeted at children. Advertising of HFSS products, classified by the nutrient profiling model, is banned during television programmes that appeal to children under 16 years of age, also applying to social media and advertisers' own websites.
- School Food Regulations - in effect from 2015, these regulations are mandatory nutrition standards for school lunches and food provided to children/students on school premises.
- Soft Drinks Industry Levy- launched in 2018 to encourage reformulation by manufacturers to reduce added sugar in drinks, market low sugar alternatives and reduce portion sizes. Drinks with sugar content 5-8g/100ml are subject to a 18p/litre tax, and drinks with more than 8g/100ml are subject to a 24p/litre tax. The tax has achieved a 28.8% sugar reduction per 100ml in beverages from retailers and manufacturers' own-brand products and a 27.2% reduction per 100ml in drinks from the out of home sector.
- The School Fruit and Vegetable Scheme is a government scheme launched in 2004 and entitles children aged 4-6 years in fully state-funded schools to a piece of fruit or vegetable each school day.
- Change4Life – a social marketing campaign to encourage improvements in diet, activity level and alcohol consumption, targeted at parents of children 1-4 years (Early Years), new parents with babies (Start4Life) and children aged 5-11 years.
- Healthy Start Scheme – fee vouchers for milk, fruit, vegetables and vitamins for pregnant women, pregnant girls under 18 and women with a child under 4 receiving income support.
- Physical activity guidelines set by the UK Chief Medical Officers, with recent guidelines published for babies, infants and children.

England

Obesity among children aged 4-5 years has remained stable over the last decade but for 10-11 year olds has been increasing (Figure 6). (45) The inequality gap in obesity between children from the least deprived and most deprived areas has also been widening over the years.

Public Health Responsibility Deal

Launched in 2011 this was a public-private partnership to improve public health through food, physical activity, alcohol and health at work. The food industry made voluntary commitments to reformulate products high in salt, saturated fats, trans-fats and calories. There was some success in reducing salt in mass produced food such as bread, however criticism arose due to the voluntary nature of the deal, i.e. not all companies had to participate and there was no independent assessment of claims made by companies. The Responsibility Deal has since been discontinued.

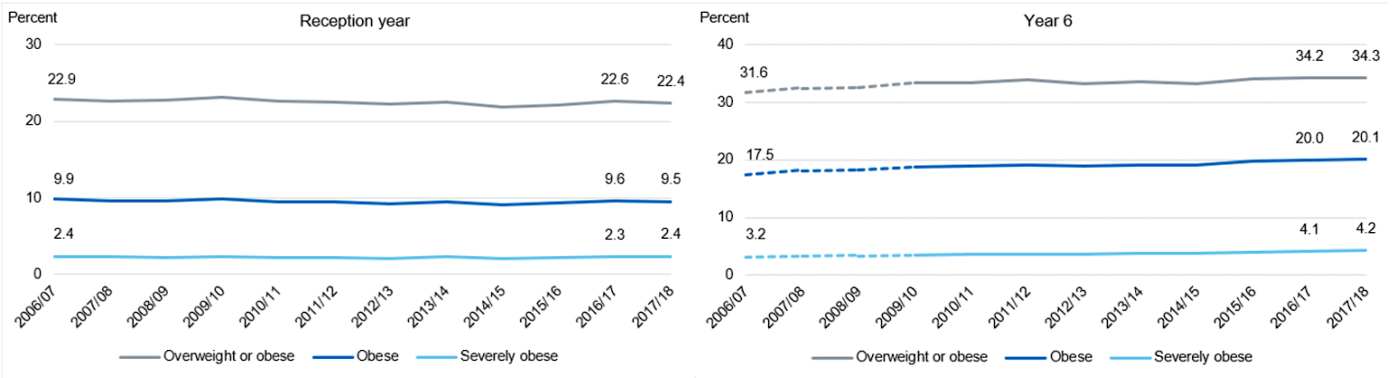

Figure 6: Trends in prevalence (%) of obesity in children 4-5 years (Reception year) and 10-11 years (Year 6) in England from 2007/07 to 2017/18. (45)

Childhood Obesity Plan

The government launched its first Childhood Obesity plan in 2016, and a Chapter 2 in 2018, with the bold ambition to halve childhood obesity by 2030 and significantly reduce the gap in obesity between children from the most and least deprived areas. The plan includes proposals for the food industry to make a 20% reduction in sugar and calories in popular children's products by 2020 and 2024, respectively. (46) The plan also proposes to introduce a 9pm watershed on HFSS food advertising, ban price promotions for HFSS foods, ban promotion of unhealthy food and drink by location and strengthen nutrition standards in the Government Buying Standards for Food and Catering Services.

There has been some progress so far, including modest progress towards the sugar reduction targets and recent legislation on the sale of energy drinks to children. However, there is currently still no response from consultations which were planned to end in 2018, in particular the 9pm watershed on HFSS food marketing on television programmes and the ban of multibuy offers. This is leading health campaigners to claim progress on tackling obesity has stalled.

London Child Obesity Taskforce

With London having one of the highest childhood obesity rates in Europe, the London Mayor established the London Child Obesity Taskforce in 2018. The taskforce has recently set 10 ambitions, including to: end child poverty; support women to breastfeed for longer; skill up early years professionals; use child measurement to better support parents; ensure nurseries and schools are enabling health for life; make free water available everywhere; create more active, playful streets and public spaces; stop unhealthy marketing influencing what children eat; transform fast-food businesses and harness the power of investment to create good food.

Reduction in childhood obesity

Health, Exercise, Nutrition for the Really Young (HENRY), Leeds

HENRY is an evidence-based intervention to support young children from an early stage to help prevent obesity. The early years are considered the key window of opportunity as children develop food and lifestyle habits which can track into later childhood and adulthood. On this

basis, HENRY supports families, early years practitioners, communities and local authorities to make positive lifestyle changes which can have positive impact on children. These include improved nutrition, parenting skills, breastfeeding support and physical activity. HENRY has been credited with helping successfully reduce obesity among children aged 4-5 years in Leeds, where the programme has been running across the city for over 8 years. The proportion of children who are obese fell from 9.4% in 2009/10 to 8.8% in 2016/17, with this reduction predominantly among the most deprived children. (47) In children aged 10-11 years, prevalence of obesity increased in other cities during this time but remained unchanged in Leeds. There have been no other similar reductions seen in other cities across England as a whole. In 2008, Leeds made the early years their priority approach in their long-term child obesity strategy, embedding HENRY at the core of family support and workforce development. The delivery of the programme through community-based children's centres in the most deprived communities is also likely to have had positive impact on the improvements seen.

Scotland

The 2017 Scottish Health Survey estimated that 26% of children aged 2-15 years were at risk of being overweight, and 13% at risk of obesity. Since 2008, the proportion of children at risk of overweight and obesity has been fluctuating in a downward trend (see Figure 7). (48) This is largely due to a decrease in obesity amongst boys, from 20% in 2012 to 12% in 2017 (Figure 8). (48) As there have been fluctuations over this time (as well as an upturn in boys at risk of obesity in 2018) it will be important to see whether this overall trend continues. There have been many policies in place in Scotland with potential to prevent increase in obesity.

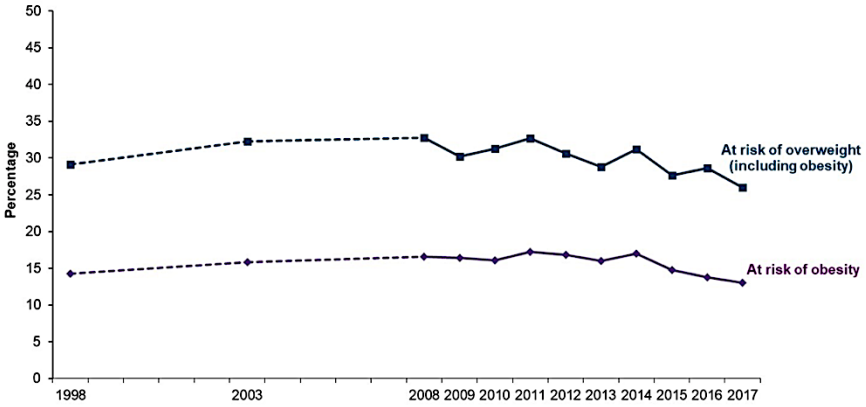

Figure 7: The proportion (%) of children (aged 2-15 years) at risk of overweight and obesity in Scotland, 1998-2017. (48)

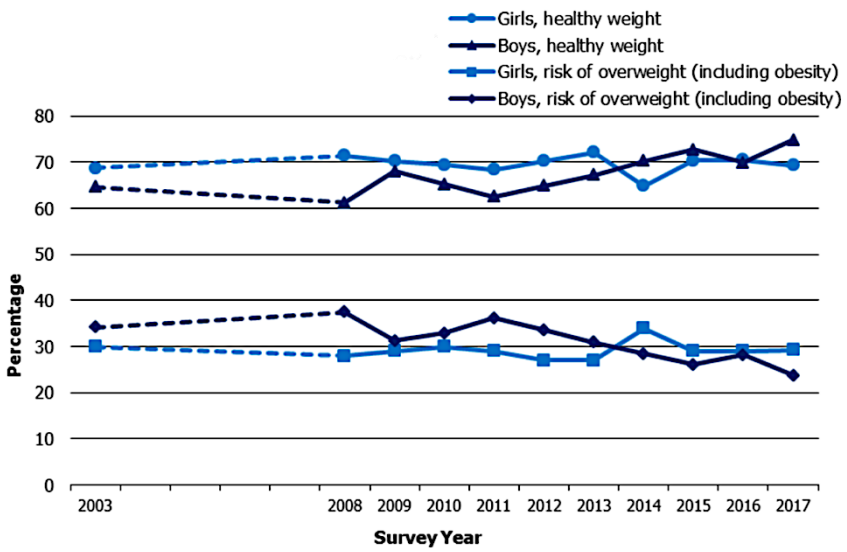

Figure 8: Prevalence (%) of healthy weight and at risk of overweight (including obesity) in children 2-15 years in Scotland, 2003-2017. (48)

Healthy Weight Communities

As part of the Scottish Government's Healthy Eating, Active Living action plan 2008-2011, eight local areas were invited in 2009 to be pathfinders for Healthy Weight Communities (HWC) programmes. HWC were programmes in which local communities, families and young people were engaged in healthy eating, physical activity and healthy weight initiatives from a range of delivery partners. Funding was extended to 2012. The programmes took inspiration from the French EPODE programme with a focus on towns/communities, emphasis on local leadership and community engagement, a strong element of social marketing and a partnership approach drawing together all services which can contribute to influence healthy weight. It was recognised at the start of the HWC that it was not realistic to expect to see immediate changes in BMI. The expectations for change therefore focused on partnership working and joining up services for greater reach and impact. According to feedback from stakeholders, services and clients, the main areas where the programme made a difference at service delivery level were: enhanced partnership and joint working; developing shared understanding; developing relationships with client groups and building capacity. (49)

The Route Map for Preventing Overweight and Obesity

The Route Map was launched by the Scottish government in 2010 with a 20-year commitment to reduce overweight and obesity in children. (50) The Route Map had a national aim to increase the proportion of children with a BMI within the healthy range by 2018. This included provision of child healthy weight programmes integrating diet and physical activity and behaviour change components, involving children and their parents. Over 6,317 child healthy weight programmes were delivered between 2008-2011, and a further 14,910 by 2014. Health Boards delivered these programmes through school-based, group-based or one-to-one interventions, with most interventions being weekly sessions lasting 45-90 minutes for 6-8 weeks. Evaluation of the child healthy weight programmes found the interventions increased

perceived knowledge of healthy lifestyles, improved healthier dietary choices and increased physical activity levels. (51)

From 2011-2014, there was a slight decrease in the average BMI standard deviation scores of children receiving the child healthy weight interventions, with the greatest decrease among children attending group interventions (-0.08, 95% CI -0.111, -0.048) and the smallest decrease from school-based interventions (-0.031, 95% CI -0.034, -0.027). (51) However, there were no control groups and it was not possible to attribute these results unambiguously to children's involvement in the healthy weight programmes. It was concluded that if the aim is to further reduce obesity in Scotland, a higher number of interventions will need to be delivered via group and one-to-one interventions. These need to contain all elements identified that appear to maximise the likelihood of achievement of positive outcomes, including highly motivated delivery staff capable of building good rapport with children and families; interventions that take place on a regular basis (i.e. weekly) and where families can stay involved longer term to help maintain changes; supported access to facilities and activities in the local area as part of the interventions; high engagement from parents and children; and active parental motivation and engagement.

A Healthier Future - Scotland's Diet and Healthy Weight Delivery Plan

The Route Map has now been overtaken by the latest national obesity strategy, a Healthier Future – Scotland's Diet and Weight Delivery Plan. With over 60 actions, the plan takes a primary prevention approach, aiming to halve childhood obesity by 2030 and significantly reduce health inequalities with five key focus areas:

- Tackling weight-related issues from an early stage by helping ensure children have the best start in life
- A food environment supportive of healthier food choices
- Access to effective weight management services
- Leaders across all sectors promote healthy weight and diet
- Reduction of diet-related health inequalities

A More Active Scotland: Scotland's Physical Activity Delivery Plan was also published to coincide with the diet and healthy weight plan. The Scottish government has developed a monitoring and evaluation framework to report the plan's key measures of performance, with plans to publish regular report on progress.

Wales

The levels of severe obesity in Wales (3.3%) are substantially higher than those in England (2.4%) or in Scotland (2.6%). According to the latest Child Measurement Programme for 2017/18, 26.4% of children aged 4-5 years were overweight or obese, with 3.3% of children severely obese compared to 2.7% in 2012-2013. (52)

The All Wales Obesity Pathway

This was established in 2010 as a tool for Health Boards working jointly with Local Authorities and other key stakeholders to map local policies, services and activity for both children and adults against four tiers of intervention. The four-level approach consists of:

1. Level 1: community-based prevention to ensure opportunities are available for people to achieve and help maintain a healthy body weight
2. Level 2: early intervention services for people who wish to lose weight and have been identified at an increased risk by a doctor.
3. Level 3: specialist weight management services for people who are obese and have tried several methods of losing weight without success.
4. Level 4: bariatric surgery, specialist medical and surgical services for those people who have not managed to lose weight through conventional methods

All health boards are providing level one and two services, with other boards developing their level three specifications. Not all areas of Wales have access to a range of services for children and adults at each level. The pathway is currently being reviewed, with plans to establish minimum standards and a common dataset enabling outcomes of the services to be more clearly demonstrated.

Every Child

This was launched in 2017 to improve the health and well-being of children. The programme includes 10 Steps to a Healthy Weight, which outline the key factors that increase the likelihood of a child being a healthy weight when they start school. The advice focuses on three age ranges: pre conception and pregnancy, 0-2 years and 2-5 years. Wales also has mandatory nutrition standards, with regulations setting out the types of food and drink that can/cannot be provided during the school day and define the nutrient content of school lunches.

Healthy Weight Healthy Wales

A Healthier Wales: Our Plan for Health and Social Care 2018 has a vision that "the people of Wales should have longer, healthier and happier lives, able to remain active and independent, in their own homes for as long as possible". The plan aims to shift the focus to early interventions and the prevention of obesity, with the ultimate goal of reversing current trends. Public Health Wales is supporting the Welsh government in developing its first national obesity prevention and reduction strategy. A consultation, Healthy Weight: Healthy Wales, was developed outlining actions to be taken to help the population achieve a healthy weight. The consultation addressed four key themes designed to drive behaviour change: leadership and enabling change; healthy environments; healthy settings and healthy people.

Northern Ireland

The Health Survey Northern Ireland 2010/11 reported that 19% of children aged 2-15 years were overweight and 8% obese. Amongst adults aged over 16 years, 36% were overweight and 23% obese. The Department for Health, Social Services and Public Safety (DHSSPS) has therefore developed a coordinated, integrated and cross-sectoral framework aiming to prevent overweight and obesity in Northern Ireland over 10 years.

The Framework for Preventing and Addressing Overweight and Obesity in Northern Ireland 2012-2022: A Fitter Future for All

The Framework aims to address all inter-connected and related factors involved in the obesogenic environment, creating environments that promote a healthy diet and active lifestyle. The targets are:

- A 4% reduction in obesity and 3% reduction in overweight and obesity in adults by 2022
- A 3% reduction in obesity and 2% reduction in overweight and obesity in children by 2022

The framework's long-term objectives are to increase the percentage of people eating a healthy, nutritionally balanced diet and increase the percentage of the population meeting the Chief Medical Officer's guidelines on physical activity. There has been some useful progress from the framework, including the launch of a breastfeeding strategy, piloting of a weight management programme for pregnant women, the launch of a new food labelling scheme in 2013 by the Food Standards Agency, catering menus showing calories and updates on early years resources. (53)

Alongside the national plan, other policies in Northern Ireland to help reduce childhood obesity include nutritional standards for schools and Food in Schools Policy, a policy advocating a 'whole school approach' to all food provided in schools and to the development of the necessary knowledge and skills in relation to healthy eating and lifestyles.

Ireland

In Ireland, one in four children are overweight or obese. The latest National Children's Food Survey (NCFS II), published in September 2019, suggests a possible decline in overweight and obesity among children aged 5-12 years from 2003/04-2017/18 (Figure 9). (54) Though these results are positive, the sample size of 600 school children may not be representative, hence it is unclear whether there has been a reduction in overweight and obesity nationwide.

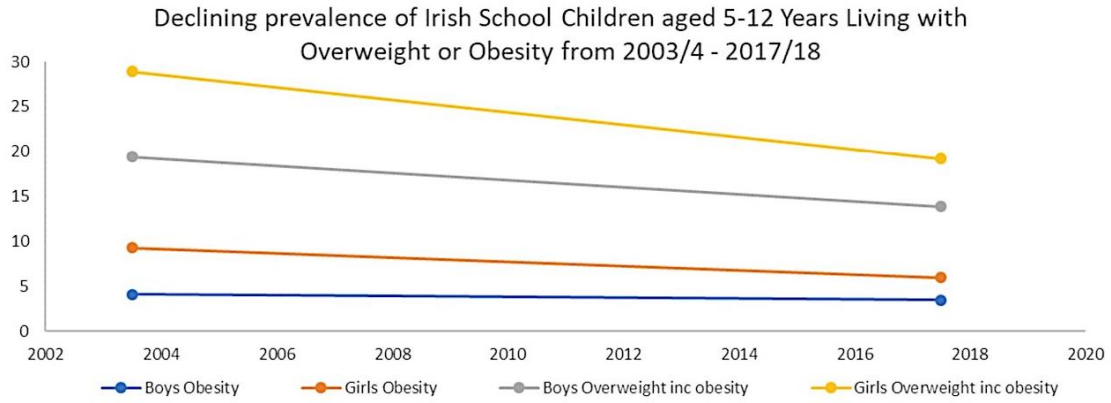

Figure 9: Prevalence of overweight or obesity in Irish school children 5-12 years from 2003/4-2017/18. (54)

The Healthy Child Programme 5-19 years follows on from the Healthy Child Programme for pregnancy to 5 years. It makes recommendations for optimal health, education and wellbeing for all children and young people, with guidance for health practitioners, children's service practitioners, education providers and others working with children and young people. Overall it sets out the good practice framework for prevention and early intervention and is designed to help local children's services planners effectively use their resources.

A Healthy Weight for Ireland: Obesity Policy and Action Plan 2016-2025 was launched to help reduce childhood obesity. The plan emphasizes the need for multi-sectoral contributions to help reduce the burden of childhood overweight and obesity, whilst also acknowledging the importance of empowering individuals, families and communities to make healthier food choices and improve physical activity to attain a healthy weight.

The overall aim of the plan is to increase the number of children and adults with a healthy weight, making healthy weight the norm and removing the stigma associated with obesity, particularly among children. 10 action plans are proposed, ranging from short-term and intermediate to long-term sustainable solutions, recognising the complexity of behaviour change. Using international evidence, the plan aims to combine upstream and downstream interventions in order to achieve multilevel change and impact on the nation's weight. The two main approaches are:

- Top down measures - sectors playing a role in creating an obesity prevention environment
- Bottom up approaches - empowering individuals, families and communities to make healthier choices and/or to inform sectors of future strategies

France

In 1994, 16.2% of girls and 11.9% of boys in France aged 7-9 years were overweight or obese. In 2006/7, 14.9% of girls and 13.1% of boys were overweight or obese. In more recent years, trends have increased in both genders, with 18.7% of girls and 14.4% of boys overweight or obese in 2016. (55)

National Health and Nutrition Program (Programme National Nutrition Santé, PNNS)

The French Ministry of Health launched the programme in 2001 as a multi-sectorial attempt to reduce obesity, increase physical activity, improve eating habits and reduce the prevalence of nutritional disorders. The program was intended for 2001-2006, but extended to 2010. To target children's diets, the Ministry of Education published guidelines on school meal nutrition standards, fresh water fountains were installed in schools and vending machines selling unhealthy snacks were also banned in schools. A 1.5% tax was also imposed on the advertising budgets of food companies not encouraging healthy eating. (56) TV and radio adverts for sugar-sweetened beverages, added salt, artificial sweeteners and manufactured food products had to contain health messages such as: "for the sake of your health, do not eat foods that contain too much fat, sugar or salt". (57)

Whilst some initial goals were achieved as regards reducing overweight and obesity among children, reducing sodium and sugar consumption and increasing the consumption of fruit; the improvements did not affect all population groups equally and actually heightened health inequalities. (58)

Reduction in Childhood Obesity

Ensemble Prevenons l'Obesite Des Enfants (EPODE)

In 2004, ten French communities launched a community-based approach, implementing strategies to promote healthier lifestyles and prevent childhood obesity. Ensemble Prevenons l'Obesite Des Enfants (Together Let's Prevent Childhood Obesity) targeted children aged 0-12 with the aim of reducing obesity through a whole-community approach - whereby children's settings, local environments and family norms encouraged the adoption of healthier lifestyles in line with French guidelines on diet and physical activity. The design of EPODE was based on results from a 1992 study in two French towns, Fleurbaix and Laventie (FLVS), which found school-based interventions were ineffective on their own in significantly reducing childhood overweight and obesity. (59) Improvements in weight outcomes were best achieved from the subsequent community-based intervention within the study. Based on the FLVS study findings, a range of stakeholders are involved in EPODE at two levels: bottom-up (local community stakeholders who determine the social, cultural and physical adaption of actions in the local context) and top-down stakeholders, providing resources and support at a central level. (60)

The EPODE program has been successful at reducing obesity rates, with a reduction of up to 25% in some communities. EPODE for Promotion of Health Equity (EPHE) was launched in

2012 with the aim of evaluating the impact and sustainability of EPODE-based community programmes in reducing inequalities in diet and physical activity. An evaluation study observed 1,062 children aged 6-8 years and their families across 7 European communities over 2 years. (61) The study found that following the EPODE interventions, children from lower socioeconomic groups improved fruit and vegetable consumption and reduced sugar-sweetened beverage consumption and screen exposure compared to other socioeconomic groups. (61) EPODE has not only had the capacity to reduce childhood obesity but also to reduce health inequalities. Initiatives are adapted to socioeconomic groups, increasing community acceptance. A critique of the programme is the partial funding from industry, but some argue this has contributed to the programme's success. More than 5 years after initial implementation, EPODE was still active in over 90% of the original pilot communities and active in over 500 communities globally.

Fiscal measures

France has also implemented fiscal measures to help reduce overconsumption of sugar-sweetened beverages, linked to overweight and obesity. Introduced in 2011, the French soda tax was set at €0.07 per litre (corresponding to a 6% price increase) for all non-alcoholic, sweetened drinks. The tax applies to manufacturers, processors and importers. The tax has had a positive effect on soda consumption, with a 6.7% decline in demand for regular soda in the first 2 years, with the greatest reduction among young people, households with adolescents and low-income groups. (62)

The Netherlands

Since 1980, there had been a large increase in childhood obesity in the Netherlands (see Figure 10). (63) The Netherlands now employ a preventative approach to reduce overweight and obesity, focusing on healthy environments and support for children and families where obesity rates are highest. The Ministry of Health, Welfare and Sport finances programmes to support local authorities and organisations working to reduce overweight and obesity. The Netherlands approaches have had success, with more than 18 municipalities reducing childhood obesity.

The main programmes in the Netherlands targeting childhood obesity are Jongeren op Gezond Gewicht (JOGG); healthy school; healthy day-care and care for obesity.

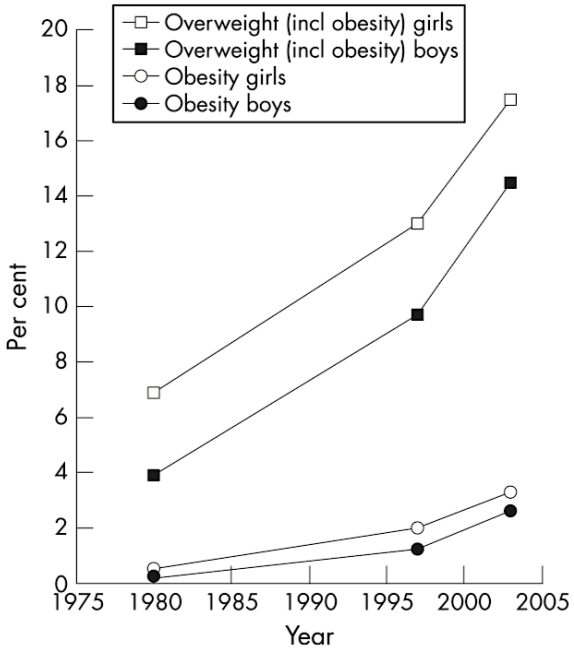

Figure 10: Secular trends in the prevalence (%) of overweight and obesity in 4-15-year-old children living in the Netherlands between 1980-2003. (63)

Reductions in childhood obesity

Jongeren op Gezond Gewicht (JOGG - Young People at a Healthy Weight)

JOGG is a programme coordinated at national level targeting maintenance of healthy weight for children and adolescents aged 0-19. (64) JOGG encourages healthy eating and exercise within cities, town and neighbourhoods. The local approach targets health professionals, shopkeepers, schools, companies and local authorities to help children and families attain and maintain a healthy weight. Over 84 municipalities in the Netherlands are now using JOGG. The programme is based on the French EPODE programme, with five main pillars which each town and city plans activities around:

- Political and governmental support
- Public-private partnership
- Social marketing
- Scientific coaching and evaluation
- Linking prevention and health care

The five pillars aim to enable intersectoral collaboration and capacity building within communities, leading to an increase in nutrition and physical activity initiatives within local environments. The objectives for 2010-2014 were to halt the rise in overweight and obesity among children aged 0-19 and for JOGG to be implemented in 75 municipalities. Between 2010-2014, JOGG's progress was monitored in 5 municipalities, which all achieved a decrease in overweight and obesity in primary school children: from 12.1% to 10.6% in Zwolle, 25% to

22% in Utrecht, 35.2% to 34.2% in Dordrecht, 41.5% to 37.4% in Amsterdam and stabilization in the percentage of children overweight in Rotterdam. (64)

Amsterdam Healthy Weight Programme (AAGG)

With Amsterdam having higher childhood obesity rates than the national average (21% and 15%, respectively), the Amsterdam Healthy Weight Programme (AAGG) was established in 2013 by the Amsterdam Municipality. The objective of AAGG is to "give every child a healthy childhood and future, regardless of their start in life". (65) Socioeconomic disparities were widely evident, with 21.8% of children from very low socioeconomic status overweight or obese, in contrast to 9.6% of children from very high socioeconomic status. Tackling these inequalities was the basis for AAGG. Interventions enabling healthier food choices, increasing physical activity and attaining better quality sleep were targeted in neighbourhoods, schools and children of non-Dutch origin with the highest prevalence of overweight and obesity. AAGG was designed as an urban-level policy, managed by the city's authority. Five, ten and twenty-year targets were set, with recognition that time and patience is needed to assess change and impact:

- 2018: a healthy weight for all 0-5 year-olds in Amsterdam
- 2023: a healthy weight for all 0-10 year-olds in Amsterdam
- 2033: a healthy weight for all young people in Amsterdam

The Rainbow model (see Figure 11) inspired AAGG's guidelines, drawing on Dahlgren and Whitehead's social determinants of health model. (66) The Rainbow model outlines the numerous factors influential to children's health and development, and thus the need to engage all sectors to achieve healthy weight children.

Figure 11: The Amsterdam Rainbow Model on Childhood Obesity 2018. (66)

To achieve the 2015-18 targets, less focus was placed on the outer ring of the model as these macro-economic factors were deemed more difficult to influence. The programme emphasized prevention efforts, overlapping with two other clusters, on curative care and facilitation.

Prevention

1. The first 1000 days approach
2. Schools approach
3. Neighbourhood and community approach
4. Healthy environment approach (healthy urban design, healthy food environment)
5. Focus on teens
6. Focus on children with special needs

Curative

7. Efforts to combat overweight and obesity in children, helping children regain a healthier weight

Facilitative

8. Learning approach
9. Digital facilities
10. Use of communications and methods for behavioural insights

Between 2012 and 2015, the programme reported a decrease in obesity from 8% to 6% among all children 0-18 years, with an 11% decline among low and 9% very low socioeconomic groups (Figure 12). (67,68) The combined prevalence of overweight and obesity fell from 21% to 18.5%. Alongside Dutch children, there were significant reductions in obesity among children from other ethnic groups, including Turkish and Moroccan. Of the 11 heaviest neighbourhoods, 9 are now lighter. Sugar sweetened beverage consumption among children decreased and the proportion of children exercising increased. Exclusive breastfeeding rates also increased by 4% at 3 months and 5% at 6 months. Though there have been improvements amongst most age groups, there have been mixed results in younger children 2-4 years, with no clear reason as to why. Much can be learnt from this multi-level intervention, in particular as regards the focus and impact on lower socioeconomic groups.

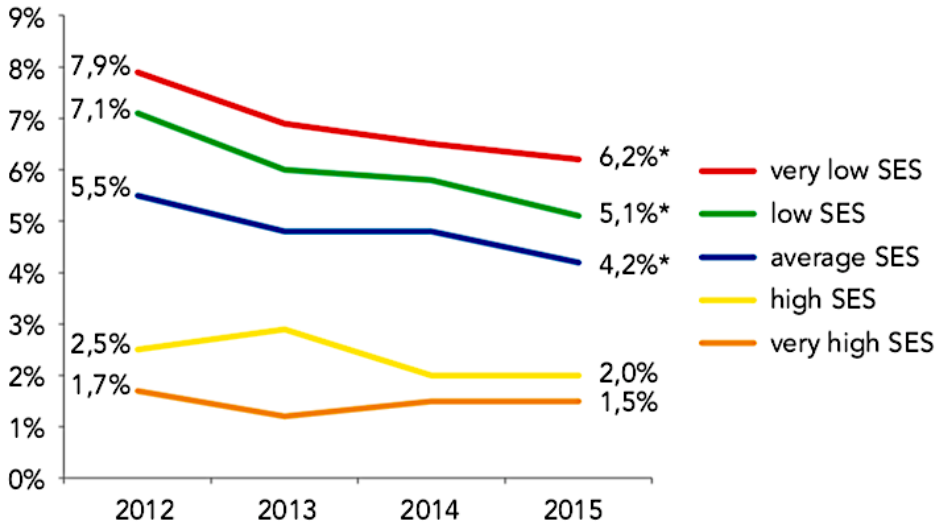

Figure 12: Trends in the prevalence of obesity, by socioeconomic status, for 5- and 10-year olds in Amsterdam between 2012-2015. (68)

Denmark

Though Denmark has one of the lowest childhood obesity rates in Europe, trends have still been increasing nationally across the years. In 1996/97, 15.2% girls and 14.1% boys aged 5-16 years were overweight or obese. In 2007/9, 21.1% girls and 29.3% boys were overweight or obese. (55)

National Action Plan against Obesity

In 2014, the Danish Ministry of Health launched national guidelines for the population's health, which included goals to reduce social inequalities and the number of overweight children. These guidelines follow on from the National Action Plan against Obesity which included 66 recommendations for the prevention and treatment of obesity. (69) Denmark also has a set of policies to help increase physical activity across the nation, from the City of Cyclists environmental intervention to Get2sport, an ongoing project promoting participation in sports among children from the most deprived areas.

Fat tax experiment

Few countries have introduced an explicit tax on fat. In 2011, Denmark introduced a fat tax, DKr 16/kg (USD $2.15) on products containing more than 2.3% saturated fat, plus an additional 25% VAT. This included meat, full-fat dairy, animal fats and edible oils. Although consumption of these products decreased by 10-15% in the first 9 months the tax was ineffective and repealed due to the ease of obtaining untaxed products from neighbouring countries. Reports of the government gaining the income rather than initiatives to improve the nation's health also undermined confidence.

Reduction in childhood obesity

The Children's Obesity Clinic Treatment (TCOCT)

This has been one of the first clinical interventions found to be effective in reducing childhood obesity. TCOCT, developed by Danish paediatrician Dr Jens Christian Holm, is a protocol aimed at helping clinically obese children achieve weight loss through personalised behaviour change techniques targeted at the child and their family. (70) Children are initially admitted to hospital for 24 hours, having a series of tests and body composition measures. A detailed questionnaire on diet and lifestyle is also completed with the aid of parents. A tailored protocol including a set of rules aimed at improving diet, increasing exercise levels and reducing sedentary time is then provided to the child. From 2008, over 2,300 children and adolescents were enrolled and results published in 2011 found significant reductions in BMI standard deviation scores after 1.5 years, including reduction of several comorbidities. (70)

Adoption of the protocol in another Danish clinic also found a significant reduction in BMI standard deviation scores among children aged 5-18 after one year and even greater reduction after two years. (71) Retention rates were acceptable, at 0.57 after two years of treatment. Similar improvements in BMI were found when the TCOCT protocol was transferred to a community healthcare setting, suggesting that the protocol can be feasible and effective when implemented more widely. (72) These results have led to the Danish clinical guidelines, set in 2014, for examining and treating overweight and obese children and adolescents in paediatric settings. (73)

Hungary

The last nationally representative survey of Hungarian school children aged 7-14 in 2005 found 25.9% of girls and 25.5% of boys overweight or obese. (74)

Public health product tax

In 2011, Hungary introduced a public health product tax on non-staple, pre-packaged foods with high levels of sugar, salt and other ingredients with proven health risks. This included confectionary, salty snacks, fruit jams, soft drinks and energy drinks. (75) The first impact assessment found a 26-32% reduction in intake of the products subject to the tax, with price increase driving the shift amongst consumers. Interestingly, 22-38% of consumers did however reduce their intake due to increased health consciousness, with those having higher perceived health status less likely to decrease consumption of products subject to the tax than those with perceived poorer health status. (62) Food manufacturers also begun reformulation efforts. 40% reformulated their products, of which 70% reduced the quantity of targeted ingredients in their products and 30% completely removed them. (76) The second impact assessment showed 7-16% of consumers chose cheaper, healthier products, 5-16% of consumers consumed less of the unhealthy products and 5-11% changed to alternative brands or substituted with other food products (often healthier). (77) Consumption of unhealthier food has been sustained, with 59-73% consuming less of the taxed products in 2014 than in the initial years.

There is some data showing a slower rise in obesity following the tax introduction in 2011. Two population surveys each with over 40,000 Hungarian adults showed a 0.5% reduction in the proportion of men overweight between 2013-15, no change in the proportion on men obese and a 0.5% rise in women overweight and obese. (78) Though these results were promising, the effects are likely to have also been from a combination of other nutrition and physical activity initiatives across the country. Overall, the Hungarian approach has been supported by WHO, as the tax has not only reduced public consumption of taxed items and impacted manufacturers, but also increased health literacy across the population.

Finland

In 2016-2017, 26% of boys and 16% of girls aged 2-16 years were overweight, with 7% of boys and 3% of girls classified as obese. In pre-school age children, 10% of boys and 15% of girls were reportedly overweight. (79) Among adults aged 30+ years in Finland, 71.9% of men are overweight and 26.1% are obese, whilst 63.2% and 27.5% of women are overweight and obese, respectively.

National Obesity Program 2012-2018

To help reduce the incidence of obesity across the nation, The National Institute of Health and Welfare developed the National Obesity Program 2012-2018 . (80) The program was developed with multi-stakeholder engagement to promote the population's health, with key actors including childcare settings, health settings, sports organisations, employers, trade unions, the food industry, catering service providers, research institutions, public health organisations, defence forces, community planning and municipalities. The targets of the program are:

1. to support the healthy growth of children to reduce the risk of obesity into adulthood
2. to ensure reduction in weight gain during adulthood
3. to reduce inequalities in obesity prevalence among population groups
4. to provide support for people at high risk of obesity

The key themes of the program between 2016-2018 were to prevent childhood obesity, increase stakeholder collaboration and increase health equality.

Finland introduced a sweets and soft drink tax in 2011 and 2014 respectively, with the tax levied at €0.95/kg on sweets and ice cream and a €0.11/L on soft drinks. The sweets tax raised the price of confectionary by about 10%, however consumption of taxed sweets remained the same following this price increase. The soft drinks tax has been successful in reducing consumption by 4.2% in comparison to control products unaffected by the tax.

Reduction in childhood obesity

Seinajoki Overcoming Obesity Programme

The City of Seinajoki have been the first to see improvements in childhood obesity. Seinajoki launched the Overcoming Obesity Programme in 2013-2020, based on the National Obesity Programme. (81,82) The programme involves collaboration with childcare settings, education, nutrition, recreation and urban planning departments to promote healthier environments, access to healthy dietary choices and information and encourage physical activity among children 0-12 years of age. Key actions taken have included:

- improvement in school playgrounds by the urban planning department
- the recreation department implementing more physical activity in schools
- sugary snacks eliminated and healthier lunches provided by the nutrition department working within day care centres

- the health department introducing annual health checks in schools, including parent education on healthy eating

Among children aged 5 years in Seinajoki, overweight and obesity reduced from 17% in 2009 to 10% in 2015. Similar reductions in overweight and obesity were also observed among primary school children, with a 5.3% reduction in first graders and 7.9% reduction in fifth graders. Whilst the overall proportion of children overweight and obese aged one and five years has decreased since 2009, there was a small increase between 2012-2015 among these age groups (see Figure 13). (81) The programme illustrates the potential success possible through high-quality delivery of a multi-scale intervention in a city, integrating all sectors involved in influencing children's health from an early age. It is also important to note that health education, nutrition and cooking lessons are mandatory in all schools in Finland. Data collection on obesity rates throughout the duration of programme has been through routine surveys and evaluations are yet to be published in peer reviewed literature.

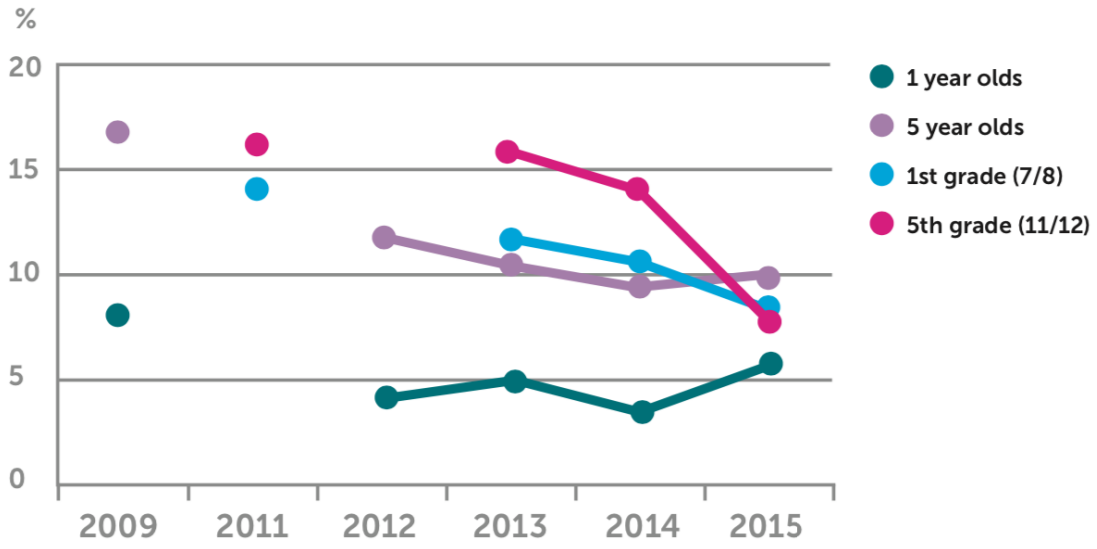

Figure 13: The proportion (%) of overweight and obese children monitored in Seinajoki

Conclusion

When seeking to reduce childhood obesity, national governments have often adopted similar approaches. The permutations include:

- Higher taxes on HFSS food and beverage – to seek to reduce consumption and/or encourage food companies to reformulate.
- Restrictions on the marketing of HFSS food and beverage to children.
- Improved food and menu labelling to help consumers make informed choices.
- School food regulations, to improve nutrition.
- National dietary and physical activity guidelines.
- Social marketing campaigns to encourage healthier eating and physical activity.

These top down initiatives often appear to produce health benefits by encouraging healthier diets or more physical activity (particularly beneficial when this occurs in more deprived areas) and may also have helped slow the rise in childhood obesity. However, following sustained government action, only Scotland has seen a national reduction in children at risk of obesity (at least among boys, between 2012 and 2017).

There are a number of possible explanations for government action not yet achieving a reduction in childhood obesity in most countries. Not enough action may have been taken (a criticism of England's Childhood Obesity Plans, for instance). This includes not enough approaches being taken; seeking to discourage HFSS consumption but not taking enough action to make healthier food affordable, accessible and attractive; and action being taken at too low a level (for instance, relying on voluntary approaches rather than regulation or setting tax levels on HFSS products too low to achieve significant behaviour change). There may also be a time lag between actions being taken and results being achieved.

This review suggests a further explanation i.e. to have optimum effect, top down policies from governments need to combine with bottom up, community-based approaches. These help create a holistic, 'whole systems' response on the scale needed to begin to combat the otherwise pervasive effects of modern obesogenic environments and often prove particularly effective when targeting more deprived areas, which are otherwise usually at greatest risk of obesity.

Successful examples include local/community-based initiatives in parts of France, the Netherlands, the USA, Finland and South Australia. Key features of these programmes include:

- addressing the wider influences on children's diets and physical activity by incorporating initiatives throughout school, home and community environments.
- support for parents, families and early years professionals as children's food preferences and lifestyle choices are established in the early years.
- engagement of influential stakeholders from central to local level, such as businesses, local government, schools, early years centres, communities, families and parents.
- empowering and enabling the capacity-building of local communities to help improve environments for children.

One challenge for national governments is how to scale up initiatives like these, where success may have depended, at least in part, on local factors and specific individuals and organisations. Fortunately, EPODE provides a positive example of scaling up. Its approach has now been applied in over two hundred French towns and has influenced and inspired successful initiatives in the Netherlands (JOGG), South Australia (OPAL) and Scotland (Healthy Weight Healthy Communities).

This report supports global evidence that multiple approaches are required to reduce childhood obesity, achieving more health gains and greater cost-effectiveness than individual interventions. (83)

Government action is important to help tackle obesogenic environments: for instance, by influencing the types of food available and affordable; by restricting the advertising of HFSS products to children; by encouraging and enabling more physical activity; and by providing the information and support to help parents make healthy choices for themselves and their children. Compulsory national policies on school-based health education can also support action on obesity prevention. We see this, for instance, in Finland, where health education, nutrition and cooking lessons are mandatory in all schools. This focus on health is not at the expense of academic achievement, as Finland routinely appears near the top of international league tables for pupil performance.

The most successful interventions are usually adapted to local contexts, taking account of existing social, environmental and cultural factors. Engaging with and empowering local stakeholders and children/families within communities can help ensure sustainable, inclusive and equitable lifestyle and behaviour change. Building on existing national/regional frameworks and policies, developing community ownership and influencing social norms can help support the sustainability of community programmes.

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