

Written Submission to the Joint Committee on Children and Youth Affairs: Tackling Childhood Obesity

The Extent of the Problem

Obesity is considered to have reached epidemic proportions in both adult and child populations. The rapid rise in the prevalence of childhood obesity represents a major public health concern¹ and has prompted calls for national Governments to do more to stem the rising tide.² According to a recent report the global prevalence of obesity in the pre-school aged population increased from 4.5% in 1990 to 6.7% (45 million) in 2010, and is projected to rise to 9.1% (60 million) by 2020.³ Ireland has not been immune to these trends.

According to figures published by Growing Up in Ireland, 19% of children aged 3 years are overweight and 6% are obese.⁴ These figures are extremely concerning from a population health perspective because obesity tends to track and children who are overweight / obese in childhood are more likely to maintain this status into adolescence and adulthood. Fifty-five percent of obese children will become obese adolescents, and 80% of obese adolescents will become obese adults⁵. Childhood adiposity has downstream consequences for disease risk in later life including risk for type 2 non-insulin dependent diabetes mellitus (NIDDM), hypertension, and cardiovascular disease. Psychological sequelae of childhood overweight/obesity include, peer-group victimisation, lower self-esteem, and depression⁶.

According to a recent report commissioned by Safefood⁷ and led by Professor Ivan Perry of UCC, the total lifetime cost of childhood overweight and obesity in the Republic of Ireland is in the region of 4.6 billion euros. Direct healthcare costs account for about 21% of the total which equates to almost 1 billion euros. If current trends are sustained, these figures point to enormous pressure on the Irish health care system in future years.

Factors Contributing to the Problem

Factors contributing to increased obesity among children are multitudinous and complex. Genetic factors are almost certainly implicated, but the rapid escalation in the numbers of obese children within a relatively stable population, suggests that genetic factors are not the primary reason for change. The mismatch between Energy Intake (EI) and Energy Expenditure (EE) has been proffered as a major explanatory variable. However, at present it is not clear whether obesity develops because of an excessive intake (EI) relative to expenditure (EE), a reduced EE relative to EI, or a combination of both⁸. This imbalance may result from the increased consumption of high-fat, energy-dense foods that promote passive over-consumption of energy, or increased sedentary behaviour among children. Research in the Irish context indicates that children are consuming large amounts of energy-

dense foods both inside and outside the home. A study by the Irish Universities Nutrition Association estimated that children were receiving as much as 18 per cent of their calorific intake and 21 per cent of their total fat intake from cakes, biscuits and confectionary⁹. Carbonated and sugar-sweetened drinks have also been implicated.¹⁰ Research has shown that total energy intake was about 10 per cent higher in school-aged children who consumed soft drinks relative to those who do not¹¹; and each additional can of soft drink consumed daily is estimated to increase chances of obesity by 60 per cent.¹² Changing activity and lifestyle patterns have exacerbated the problems associated with worsening dietary habits⁸. Obesity has been linked to a number of sedentary leisure pursuits such as television viewing and computer game use^{13, 14}. Hussey and collaborators¹⁵ reported that among 7- to 9-year-old Dublin schoolchildren, 14 per cent of boys and 24 per cent of girls were doing less than the optimal amount of exercise required to benefit the cardiovascular system. Furthermore, physical activity levels decrease with age and there is normally a significant change after adolescence, especially among girls¹⁶ which may contribute to increased risk.

Parental overweight is one of the strongest predictors of childhood overweight¹⁷ reflecting the contribution of shared genes and shared environment. We have previously shown that a child is 3.2 times more likely to be obese if one parent is overweight/obese, and 9.5 times more likely to be obese if both parents are overweight or obese¹⁸. Moreover, overweight parents are less likely to spot overweight in their children. Worryingly, our research shows that 54% of parents of overweight children and 20% of parents of obese children in the Growing Up in Ireland childhood cohort reported that they are 'about the right' weight for their height.¹⁹ Health promotion literature suggests that behaviour change and weight reduction can only come about once the individual recognises the need for change, yet it is clear that many parents have a poor understanding of appropriate body weight.

Parents shape their children's eating behaviour not only through the foods they make accessible to their children, but also through parental modelling, parenting practices and reinforcement.²⁰ Research shows that children tend to eat those foods which are most accessible to them in the home environment, and the foods to which children are most routinely exposed help shape preferences and consumption patterns.²¹ Similarly, children's and parents' intakes are correlated for most nutrients²² so intervention efforts should be designed to target parents and family units.

Socio-Economic Inequalities

One of the most concerning findings from our research on childhood obesity with the Growing Up in Ireland cohorts is the stark socio-economic inequalities that are evident at a very early age. Indeed, studies have consistently shown that childhood overweight and obesity is more heavily concentrated in lower socio-economic status (SES) households. Although there is some tentative evidence that rates of childhood overweight and obesity may have stabilized in recent years in some high income countries²³⁻²⁵, this trend has not occurred at an equal pace across all socio-economic groups and may have exacerbated socio-economic inequalities²⁶. Data from the Growing Up in Ireland infant cohort shows that 9 percent of children from lower secondary educated maternal backgrounds are obese at 3 years of age compared with 4 percent of children from degree educated maternal backgrounds²⁷. This means that by the time they arrive at the door of the pre-school to avail of the Government's Early Childhood Care and Education (ECCE) scheme, children from lower SES backgrounds are already 2.3 times more likely to be obese compared with their higher SES peers. Moreover, the data tells us that these socio-economic inequalities continue to widen thereafter. By 13 years of age, shortly after they have made the transition to secondary school, children from lower SES backgrounds are 56% more likely to be overweight and 3.5 times more likely to be obese (Figure 1). They weigh approximately 1kg per metre squared heavier by 13 years of age compared with their higher SES counterparts (Figure 2).

Our analysis of longitudinal patterns indicates that children from lower SES backgrounds are more likely to be overweight/obese at any age for which figures are available, are more likely to become overweight or obese if previously non-overweight, and are more likely to maintain overweight/obese status over time.²⁷ This means that children from lower SES backgrounds are quite literally carrying around a heavier burden of disease from much earlier in the life course. Recent research suggests excess adiposity represents a major pathway through which social inequality gets 'underneath the skin' to precipitate earlier morbidity and mortality among more disadvantaged groups. These findings reinforce the necessity of challenging the childhood obesity epidemic at early ages because previous research has shown that these patterns are difficult to change once they become entrenched.

We need to urgently address the material (e.g. low income), structural (e.g. green spaces), and cultural (e.g. low breastfeeding rates) factors that contribute to the emergence of these

inequalities in early life. International research (including our own) suggests that the period from infancy extending through early childhood is a critical one for growth and development. Our research with the GUI infant cohort shows that children from semi/unskilled social class backgrounds weigh 135 grams less on average at time of birth compared with children from professional social class backgrounds, but experience more rapid weight gain thereafter, to the extent that they weigh 250 grams more on average by 3 years of age.²⁸ Factors contributing to this pattern of rapid weight in the first 9 months of life include, earlier transition to solid foods (before 6 months of age), lower rates of breastfeeding (which has been shown to be protective against the development of obesity), and prenatal tobacco smoke exposure. Factors associated with rapid weight gain between 9 months and 3 years of age include lower dietary quality, higher maternal BMI, and higher levels of television watching, all of which are socio-economically patterned. Statistical adjustment for this constellation of risk factors (early infant nutrition, maternal prenatal behaviours, and child diet and lifestyle) fully explained the class differentials that exist in relation to childhood obesity at 3 years of age. Importantly, these risk factors are all modifiable and so represent an opportunity to intervene and reduce the riskier body mass trajectories of lower SES groups.

Dietary Quality and Obesity

Studies of household food purchases generally report a positive association between household SES and the quality and variety of purchased foods.²⁹ These patterns have also been found to hold in the Irish context. The Growing Up in Ireland study reported lower levels of fruit and vegetable consumption, and higher consumption of energy dense foods such as crisps, sweets, and non-diet fizzy drinks among children from lower SES backgrounds⁴ (Figure 3). International evidence suggests that high quality diets are more expensive than low quality diets³⁰ and that those on low incomes are more sensitive to the cost of food. For example, a recent study from the UK found that higher occupational social class was associated with greater food expenditure, which was in turn associated with healthier purchasing. Mediation analysis showed that 63% of the socio-economic differences in choices of less healthy foods/beverages were mediated by expenditure and 36% for fruit and vegetables³¹. A recent editorial in the *Lancet*³² concluded that: *“Unfortunately, fruit and vegetables remain out of budget and inaccessible to many low income families, and low cost processed food might seem an easy option for busy parents. However, plans to address the affordability and accessibility of healthy foods remain insufficient, and parents and caregivers often lack the nutritional knowledge, parenting advice and support to make*

healthy meal times a priority.” (p.79). The introduction of the recent Sugar Tax may lead to a reduction in unhealthy food consumption, but strategies are also needed to encourage consumption of nutritive dense foods on the other side.

Feeding Style and Obesity

Breastfeeding has been shown to be protective against the development of obesity. A recent meta-analysis of 25 studies involving 226,508 participants across 12 countries found that breastfeeding was associated with reduced risk of obesity and that the effect was dose-dependent.³³ We have previously shown that being breastfed for a period of 6 months or more was associated with a 49% reduction in the risk of obesity at 3 years of age²⁸ and a 51% reduction in the risk of obesity at 9 years of age.¹⁸ Ireland has the lowest breastfeeding rate in Europe with initiation rates just above 50%. Figure 4 shows that even amongst those who initiate breastfeeding, the proportion still doing so falls to 70 per cent at one month (30 days) and to 50 per cent by around three months.³⁴ By six months or 180 days, the proportion still providing any breastfeeding falls to just over a quarter (26 per cent) of those who had initiated it. Of those who decided not to breastfeed, 49% said it was because ‘formula feeding was preferable’. There is wide variation in the propensity to breastfeed by maternal socio-economic status. Women with higher levels of income, education and social class are much more likely to breastfeed, and breastfeed for a longer duration. Measures to increase rates of breastfeeding should be a national priority, and resources allocated to increase breastfeeding rates among more disadvantaged groups. This will involve a commitment to substantially increase the level and provision of support for breastfeeding in Ireland, in addition to providing a sufficient level of central funding to help achieve this goal.

Prenatal Maternal Smoking and Obesity

There is good evidence that maternal smoking during pregnancy has a direct intrauterine effect on childhood obesity risk with the results of a recent meta-analysis showing higher risks for maternal smoking during pregnancy compared with paternal smoking.³⁵ We have documented significantly higher rates of smoking among lower SES women during their pregnancy. The reasons for this patterning by SES are complex, but there is increasing evidence that it reflects the level of social deprivation among lower socio-economic women and its effect on their mental health as well as use of smoking as a coping mechanism³⁶. The policy implication of this is that reducing the number of risk factors among lower socio-economic groups will be dependent on improvement in their general living conditions. This

would require substantial changes in policy over the long term across a number of departments of government. Detailed studies of the required changes are available.³⁷⁻³⁸

Summary and recommendations

The foregoing review has established that the factors contributing to the increase in childhood overweight and obesity are multitudinous and complex. In short, there is no simple solution to this problem. Tackling it will require co-ordinated action across a number of Government departments, and the involvement of stakeholders, including parents, schools, community based-organisations, healthcare providers, and the private and public sectors. Nevertheless, there are a number of things that can be done in the immediate to short-term that would be useful to begin to address the scale of the problem:

Short-term Priorities

1. The Government should give a political commitment to tackling childhood obesity and develop an action plan
2. The Government should implement a national screening program for BMI and waist circumference in school-age children on an annual basis.
3. The Government should set national targets for the reduction of childhood obesity, and an evaluation programme for monitoring success of this goal.
4. The Government should establish clear targets for reducing socio-economic inequalities in childhood obesity.
5. The Government should consider the use of targeted intervention for high-risk groups (e.g. low SES)

References

1. Han JC, Lawlor DA, Kimm SY. Childhood obesity. *The Lancet*. 2010;375(9727):1737-1748.
2. World Health Organisation. Consideration of the evidence on childhood obesity for the Commission on Ending Childhood Obesity: report of the ad hoc Working Group on Science and Evidence for Ending Childhood Obesity, Geneva, Switzerland. *Consideration of the evidence on childhood obesity for the Commission on Ending Childhood Obesity: report of the ad hoc Working Group on Science and Evidence for Ending Childhood Obesity, Geneva, Switzerland*. 2016.
3. De Onis M, Blössner M, Borghi E. Global prevalence and trends of overweight and obesity among preschool children. *The American journal of clinical nutrition*. 2010;92(5):1257-1264.
4. Williams, J., Murray, A. McCrory, C. & McNally, S. (2013). *Growing Up in Ireland. Development from birth to 3 years*. Dublin, Government Publications.
5. Simmonds M, Llewellyn A, Owen C, Woolacott N. Predicting adult obesity from childhood obesity: a systematic review and meta- analysis. *Obesity reviews*. 2016;17(2):95-107.
6. Sahoo K, Sahoo B, Choudhury AK, Sofi NY, Kumar R, Bhadoria AS. Childhood obesity: causes and consequences. *Journal of Family Medicine and Primary Care*. 2015;4(2):187-92.
7. Safefood (2017). The cost of overweight and obesity on the island of Ireland (2017).
8. Livingstone, M.B E. (2001). Childhood Obesity in Europe: a growing concern. *Public Health Nutrition*, 4, 109-116.
9. McCarthy, S., O'Neill, J., & O'Brien, D. (2005). *Obesity and physical activity in Irish Children*. In Dublin: Presented at National Children's Food Survey RELAY Workshop, 19/5/05, St. James Hospital, Dublin 8
10. Gill, T. P., Rangan, A. M., & Webb, K. L. (2006). The weight of evidence suggests that soft drinks are a major issue in childhood and adolescent obesity. *The Medical Journal of Australia*, 184, 263-264.
11. Harnack, L., Stang, J., & Story, M. (1999). Soft drink consumption among US children and adolescents: nutritional consequences. *Journal of the American Dietetic Association*, 99, 436-441.
12. Mattes, R. D. (1996). Dietary compensation by humans for supplemental energy provided as ethanol or carbohydrate in fluids. *Physiology & Behaviour*, 53, 1133-1144.
13. Robinson, T. N. (1999). Reducing Children's Television Viewing to Prevent Obesity: A Randomized Controlled Trial. *The Journal of the American Medical Association*, 282, 1561-1567.
14. Gortmaker, S. L., Must, A., Sobol, A. M., Peterson, K., Colditz, G. A., & Dietz, W. H. (1996). Television viewing as a cause of increasing obesity among children in the United States, 1986-1990. *Archives of Pediatric and Adolescent Medicine*, 150, 356-362.
15. Hussey, J., Gormley, J., & Bell, C. (2001). Physical activity in Dublin children aged 7–9 years. *The British Journal of Sports Medicine*, 35, 268-272.
16. Clerkin, P., Walsh, K., & NicGabhainn, S. (2004a). *Exercise among Irish schoolchildren. Health Behaviour in School-aged Children Survey* [On-line]. Available: <http://www.nuigalway.ie/hbsc/factsheets.html>
17. Danielzik, S., Langnase, K., Mast, M., Spethmann, C., & Muller, M. J. (2002). Impact of parental BMI on the manifestation of overweight 5e7 year old children. *European Journal of Nutrition*, 41, 132e138.

18. McCrory, C. & Layte, R. (2012). Breastfeeding and Risk of Overweight and Obesity at Nine Years of Age. *Social Science and Medicine*, 75(2), 323-330.
19. Layte, R. & McCrory, C. (2011). *Overweight and obesity among 9 Year Olds*. Dublin: Government Publications
20. Scaglioni, S., Salvioni, M. & Galimberti, C. (2008). Influence of parental attitudes in the development of children eating behaviour, *British Journal of Nutrition*, 99, supplement 1, S22-S25
21. Patrick, H. & Nicklas, T.A. (2005). A review of family and social determinants of children's eating patterns and diet quality, *Journal of the American College of Nutrition*, 24(2), 83-92.
22. Taylor, J. P., Evers, S., & McKenna, M. (2005). Determinants of healthy eating in children and youth. *Canadian Journal of Public Health*, 96(Suppl. 3), S20eS26
23. Wabitsch M, Moss A, Kromeyer-Hauschild K. Unexpected plateauing of childhood obesity rates in developed countries. *BMC medicine*. 2014;12(1):17.
24. Olds T, Maher C, Zumin S, Péneau S, Lioret S, Castetbon K, et al. Evidence that the prevalence of childhood overweight is plateauing: data from nine countries. *International Journal of Pediatric Obesity*. 2011;6(5-6):342-60.
25. Rokholm B, Baker JL, Sørensen TIA. The levelling off of the obesity epidemic since the year 1999—a review of evidence and perspectives. *Obesity reviews*. 2010;11(12):835-46.
26. Stamatakis E, Wardle J, Cole TJ. Childhood obesity and overweight prevalence trends in England: evidence for growing socioeconomic disparities. *International Journal of Obesity*. 2010;34(1):41-7.
27. McCrory, C. et al (in preparation). Socio-economic inequalities in measured body mass index trajectories in 41,399 children in three European countries.
28. Layte R, Bennett A, McCrory C, Kearney J. Social class variation in the predictors of rapid growth in infancy and obesity at age 3 years. *International Journal of Obesity*. 2014;38(1):82-90.
29. Darmon, N., & Drewnowski, A. (2008). Does social class predict diet quality? *American Journal of Clinical Nutrition*, 87(5), 1107e1117
30. Wiggins, S. et al (2015). The rising cost of a healthy diet: Changing relative prices of foods in high-income and emerging economies. Overseas Development Institute.
31. Pechey, R, & Monsivais, P. (2016). Socioeconomic inequalities in the healthiness of food choices: Exploring the contributions of food expenditures. *Preventive Medicine*, 88, 203-209.
32. No one is exempt in the fight against childhood obesity. *The Lancet Child & Adolescent Health* , 1(2), 79.
33. Yan J, Liu L, Zhu Y, Huang G, Wang PP (2014). The association between breastfeeding and childhood obesity: a meta-analysis. *BMC Public Health*.14(1):1267.
34. Layte, R. & McCrory, C. (2015). *Maternal Health Behaviours and Child Growth in Infancy*. Dublin: Government Publications.
35. Riedel, C. et al. (2014). Parental smoking and childhood obesity: higher effect estimates for maternal smoking in pregnancy compared with paternal smoking--a meta-analysis. *International Journal of Epidemiology*, 43(5):1593-1606.
36. Layte, R. and Whelan, C.T. 2009. Explaining Social Class Inequalities in Smoking: The Role of Education, Self-Efficacy and Deprivation. *European Sociological Review* 25:399-410.
37. Acheson, D., Barker, D., Chambers, J., Graham, H., Marmot, M.G. and Whitehead, M. 1998. *Independent Inquiry into Inequalities in Health*. London, The Stationery Office

38. Marmot, M.G. and Wadsworth, M.E.J. 1997. Fetal and Early Childhood Environment: Long Term Implications. Churchill Livingstone