NSW Regional HEALTH PARTNERS

Addressing overweight and obesity in NSWRHP: Programs, research projects and services

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NSW GOVERNMENT

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Central Coast Local Health District | Hunter New England Local Health District | Mid North Coast Local Health District

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Foreword

The number of Australians living in our region who experience overweight or obesity continues to rise. This increase in the prevalence of excess body weight is the key factor driving the increase in chronic conditions of type 2 diabetes, heart disease and some cancers in our region. Despite the rise in prevalence, there has been no regional co-ordinated approach to the prevention or treatment of excess body weight or weight-related health. In contrast, Australians are advised to improve their lifestyle behaviours, such as dietary intake and physical activity levels, in order to better manage their weight.

While there are many ways that Australians could choose to modify their diet and physical activity, these decisions are influenced in part by socio-economic status, educational and health literacy levels and the region in which they live. Consequently, this means that for some living in our region, the opportunities to access services to help promote health and wellbeing in order to reduce risk of chronic disease is limited.

This report maps regional prevalence of overweight and obesity and related health care costs. It also maps a cross-section of programs, research projects and services that target prevention and/or treatment of overweight and obesity, albeit it is not exhaustive. It also highlights areas in which the region needs new programs, projects and services to address current gaps in evidence or service delivery.

This report is a snapshot of current activity across NSWRHP and may not have captured all activity, but does highlight areas in which further action is required in order to improve the health and well-being of those living in the catchment area. This report will help NSW Regional Health Partners and regional policy makers to make informed decisions, based on local evidence and it will form the basis for bridging the research evidence to practice gaps.

Improving the lifestyle behaviours of those living in the umbrella region that NSWRHP spans, while being both complex and a practical challenge, is imperative to improving weight-related health for those living in this region and to reduce healthcare costs associated with excess body weight. We trust that this report provides a basis upon which decisions can be made in terms of informing policies and decisions about programs, projects and services targeting improved weight-related health for those living in this region.

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1. EXECUTIVE SUMMARY

Understanding the problem

Overweight and obesity prevalence

Over recent decades, the prevalence of overweight and obesity has risen dramatically. On a global scale, the World Health Organization estimated the prevalence of obesity to have nearly tripled from 1975 to 2016, with more than 650 million adults aged 18 years or older impacted by obesity, and a total of 1.9 billion adults with overweight (World Health Organization, 2019). The same increase in prevalence of overweight and obesity has occurred in Australia, with 10% more adults classified as having obesity today compared to 1995 (Huse et al., 2018). The most recent data from 2014 to 2015 estimates that 63.4% of Australian adults and 27.6% of children now have overweight or obesity (AIHW, 2017c; Huse et al., 2018). Furthermore, age-standardised prevalence of overweight and obesity is disproportionately higher for Aboriginal and Torres Strait Islander adults (at 69.6%) and children (data not shown) compared to their non-Indigenous peers (Huse et al., 2018). The prevalence of overweight and obesity has a significant impact on the Australian economy with an estimated cost of $8.6 billion in 2011-12 (AIHW, 2017a).

Health consequences of overweight and obesity

Having overweight or obesity increases one's risk of developing a range of chronic illnesses, including heart disease, stroke, diabetes, osteoarthritis and cancers of the endometrium, breast, ovaries, prostate, liver, gallbladder, kidney and colon (Finkelstein, Ruhm, & Kosa, 2005; NHMRC, 2013a; Swinburn et al., 2011; World Health Organization, 2019). For children with obesity, there is an increased risk of breathing difficulties, fractures, hypertension, early signs of cardiovascular disease, insulin resistance and adverse psychological impacts (Bleich, Segal, Wu, Wilson, & Wang, 2013; Showell et al., 2013; World Health Organization, 2019). Of great concern, childhood obesity also follows a trajectory and is closely associated with obesity, disability and premature death in adulthood (Bleich et al., 2013; Showell et al., 2013; World Health Organization, 2019). In 2015, it was estimated that 8.4% of the total burden of disease in Australia was due to overweight and obesity (AIHW, 2019). On a global scale, overweight and obesity made up 4.9% of disability-adjusted life years from any cause amongst adults in 2015 (Afshin et al., 2017).

Causes of overweight and obesity

In a simplistic model, overweight and obesity is caused by a sustained energy imbalance, meaning that the number of kilojoules consumed is in excess of the kilojoules required (AIHW, 2017c; Finkelstein et al., 2005; NHMRC, 2013a; World Health Organization, 2019; Wright & Aronne, 2012). In the last few decades, access to and consumption of larger portions of energy-dense, nutrient-poor foods and beverages has increased, while physical activity levels have declined. Work is increasingly sedentary in nature, modes of transport are more passive, and urbanisation has increased. This has led to the development of what is termed an 'obesogenic environment,' that is, an environment that promotes overweight and obesity among individuals and populations (Finkelstein et al., 2005; NHMRC, 2013a; Swinburn et al., 2011; WHO, 2000). It is estimated that in 2015, dietary risk factors accounted for 7.3% and physical inactivity 2.5% of the total burden of disease in Australia (AIHW, 2019).

While overweight and obesity is caused by a sustained energy imbalance, the development of overweight and obesity is both directly and indirectly influenced by a range of biological, social, individual, life stage and environmental factors. These include (but are not limited to) inherited biological factors and epigenetic changes in utero; socioeconomic disadvantage; living in regional and remote locations; and identifying as Aboriginal and Torres Strait Islander. Individual factors and life stages can also strongly influence eating and physical activity patterns, and therefore weight

(NHMRC, 2013a). It is now clear that the development of overweight and obesity is not simply caused by overeating and inactivity, but is influenced by a complex interplay of risk factors that differs for each individual (NHMRC, 2013a; WHO, 2000).

Preventing overweight and obesity

The reasons why preventing overweight and obesity is preferable to treatment in developed countries have been documented (Gill, 1997; Institute of Medicine, 2000; WHO, 2000). Overweight and obesity develop over time, are challenging and costly to treat, while the health consequences are cumulative and not fully reversible by weight loss (WHO, 2000). In addition, the proportion of the population affected by overweight or obesity is now so large in Australia (63.4% of adults and 27.6% of children) that there are insufficient health care resources to provide treatment to all (AIHW, 2017a).

To halt the increasing overweight and obesity rates and reduce the number of new cases within the population, the World Health Organization recommends two types of public health intervention strategies: 1) Improving the knowledge and skills of individuals in relation to diet and physical activity; and 2) Limiting exposure to environmental factors that promote overweight and obesity (Gill, 1997; Institute of Medicine, 2000; WHO, 2000). In addition to preventing weight gain in people of a healthy weight, interventions must be delivered to populations who carry a greater risk of developing overweight and obesity due to biological, sociodemographic, individual or life stage factors (Gill, 1997; WHO, 2000). Individuals who are already affected by overweight or obesity must also be a focus of intervention with the aim of preventing further weight gain, promoting weight maintenance, managing associated co-morbidities and promoting weight loss (Gill, 1997; Institute of Medicine, 2000; WHO, 2000). Further information about the theoretical underpinnings of overweight and obesity prevention and treatment are included in Addressing Overweight and Obesity Framework.

Treating overweight and obesity

While prevention is the most effective approach in the longer term, more intensive interventions are needed to address the immediate weight and health problems for the large numbers of people who have overweight or obesity currently (NHMRC, 2013a; WHO, 2000). Lifestyle interventions seek to reduce energy intake, increase physical activity and support behavioural change. While lifestyle interventions alone tend to be associated with small absolute initial weight loss (7-8%) (NHMRC, 2013b), maintenance of 5% for two years or more has consistently been shown globally to reduce the risk of type 2 diabetes by up to 58% (Leblanc et al., 2018; Raynor et al., 2017; Taylor, Valabhji, Aveyard, & Paul, 2018).

NHMRC guidelines indicate that intensive interventions may be considered when an adult has a BMI greater than 30 kg/m2 (or a BMI greater than 27 kg/m2 with risk factors and/or comorbidities) and has been unsuccessful in previous weight loss attempts using lifestyle approaches (NHMRC, 2013a). Intensive interventions include use of a very low-energy diet, weight loss medications and bariatric surgery. Bariatric surgery with maintained lifestyle change is currently the most effective weight loss intervention, with consistently greater than 10% weight loss across studies with weight loss likely to be maintained after five years (NHMRC, 2013b).

The Addressing Overweight and Obesity Project

The Addressing Overweight and Obesity Project is a local initiative of NSW Regional Health Partners and has been funded by the Hunter Medical Research Institute (HMRI). NSW Regional Health Partners is a new centre for research translation in healthcare. Over the past two years, local health services and academic institutions have enhanced an existing collaboration to become accredited as

an NHMRC Centre for Innovation in Rural Health. The Centre supports new ways of working by researchers, clinicians and managers within its eight partner organisations. By bringing the partners together to share information, reduce duplication and share resources, the Centre leverages existing activities to accelerate change within each organisation. The Addressing Overweight and Obesity Project has been commissioned in recognition that there are significant investments in healthy weight initiatives across the NSWRHP organisations, and there is value in collating and analysing information about them to assist the partners in future planning and decision-making.

The goal of the Addressing Overweight and Obesity Project was to collect and analyse information about current rates of overweight and obesity, associated costs, and the programs, research projects and services that have been delivered by the NSWRHP organisations designed to prevent and treat overweight and obesity over the past 10 years. This information was collected with a view to identifying opportunities for collaboration amongst partners, uncovering any gaps that may benefit from further investment, and highlighting areas in which additional research can guide future intervention. The project was undertaken in five stages: 1) Engage, plan and consult; 2) Review evidence; 3) Scope programs, research projects, services and data; 4) Develop framework and analyse data; and 5) Compile final report. More information, including study inclusion and exclusion criteria, can be found in The Addressing Overweight and Obesity Project section of this report.

Measuring overweight and obesity in our local area

In order to characterise overweight and obesity and their influences within the NSWRHP population, the Clinical Research Design, IT and Statistical Support (CReDITSS) team from HMRI was commissioned to undertake an observational study to describe overweight and obesity rates in both adults and children in Central Coast, Mid North Coast and Hunter New England LHDs. Data related to diet and exercise were also explored. Data for inclusion was located from a range of sources, including the Australian Bureau of Statistics Census, the Public Health Information Development Unit social health atlases and Heart Foundation Heart Maps.

Determining local rates of overweight and obesity

Age-standardised overweight/obesity rates (ASRs) were evaluated across the 28 local government areas (LGAs) that comprise the NSWRHP geographical area. It was determined that the mean ASR for overweight/obesity was higher for men (76.78, SD 3.157) compared to women (64.54, SD 3.184), and higher for boys (26.03, SD 1.583) than for girls (22.34, SD 1.568). It was also apparent that the mean ASR of overweight/obesity for adults (70.86, SD 3.164) was significantly greater than that of children (23.99, SD 1.485). All LGAs included in this study exhibited rates *higher* than the national averages for men, women and adults (with overall reported means of 76.78 vs 70.75, p<.0001; 64.54 vs 56.4, p<.0001; and 70.8 vs 63.47, p<.0001, respectively).

In contrast, when comparing ASRs for overweight and obesity in children to the rest of Australia, all local government areas included in this study exhibited rates significantly *lower* than the national averages for boys (26.03 vs 26.99, p<.0001), girls (22.34 vs 24.57, p<.0001) and children overall (23.99 vs 25.8, p<.0001). Unfortunately these promising results were not sustained upon modelling of children with obesity only (i.e. not overweight), where all local government areas exhibited rates *higher* than the national averages for boys (7.25 vs 6.7, p=.0070), girls (9.88 vs 8.4, p<.0001) and children overall (8.18 vs 7.5, p=.0017).

Assessing predictors of overweight and obesity in the NSWRHP population

A range of variables relating to primary health determinants and risk factors for overweight and obesity, as identified by the literature, was also collected. Linear regression was then used to model overweight/obesity ASRs with LGA the unit of analysis. Variables that were significant on univariate

analysis that remained significant when added to the adult multivariate models included gender proportion, low education, low physical activity, marriage, rurality and smoking. Socioeconomic disadvantage (measured by the Index of Relative Socio-economic Disadvantage) was highly significant for adults, men and women on univariate analysis, and remained significant for men in multivariate analysis, however the variable was excluded from the final models for adults overall and women due to multicollinearity. Variables that remained significant when added to the child multivariate models included Indigenous status proportion, socioeconomic disadvantage, median age, rurality, adequate fruit intake and local health district.

Further information is available in the Measuring overweight and obesity in our local area section of the report and in Appendices 2 and 3.

Calculating the cost of overweight and obesity to our communities

To understand more about overweight and obesity and their cost to NSWRHP organisations, the Health Economics Team from HMRI was commissioned to calculate the current and projected costs associated with overweight and obesity across the NSWRHP geographical area.

From a healthcare perspective, incremental per capita direct healthcare cost for overweight was 18.7% greater, and for obesity 54% greater, than the cost of normal weight individuals per year. The annual excess cost, including direct healthcare, direct non-healthcare and government subsidies, was 25.5% for overweight and 43.7% for obesity. Based on the prevalence of overweight and obesity in the NSWRHP population, and the cost estimates calculated by the Australian Diabetes, Obesity and Lifestyle Study (Lee et al., 2018), the annual total direct healthcare costs attributable to overweight and obesity in the NSWRHP geographical area are $486,593,812. With expected population increases and current obesity trends, this cost will increase by 3% each year to a total direct healthcare cost of $565,743,290 (adjusted for inflation) in 2023.

More details of these costings are available in the Calculating the cost of overweight and obesity to our communities section of the report and in Appendix 4.

Scoping overweight and obesity prevention and treatment activity

A scoping of the programs, research projects and services designed to prevent and treat overweight and obesity amongst the eight NSWRHP organisations was the third component of work to be undertaken as part of the Addressing Overweight and Obesity Project. The scoping method for each partner organisation was decided in consultation with the Healthy Weight Advisory Group representative, in recognition of the diversity of the eight partner organisations, the varied populations they serve and the organisation's role in health research and service provision. In summary, there were 99 programs, research projects and services identified in the Addressing Overweight and Obesity scoping. These are grouped into:

- *Child-focused programs and projects* - Over half the reported programs and research projects identified in the scoping target children (n=50 of 97). Thirteen of those programs operate in the early childhood education and care context and 26 target primary schools. All programs have/had a focus on improving nutrition, increasing physical activity and/or reducing inactivity.
- *Adolescent-focused programs and projects* - Since 2009, there have been at least 11 programs and research projects with a focus on adolescents amongst the NSWRHP organisations. Two programs specifically targeted adolescent boys with the findings of one

informing the development of the other. One program targeted adolescent girls. Almost all the programs were run in the school setting (n=10/11).

- *Adult-focused programs and projects* - Amongst the eight NSWRHP organisations, there were 24 programs and research projects identified by the scoping that target adults. Six are specifically for women and five are for men. Fourteen of the programs are home-based interventions with half of those delivered online (n=7). Two target workplaces and four occur in the outpatient setting. One program funded by HNECC PHN is run in the community. One program was delivered in community health, one in primary care and another in an inpatient setting.

- *Family-focused programs and research projects* - Eight programs or research projects for families have been identified by the scoping study. Three are for fathers and their children; one is for mothers and daughters, and the other four are for the family as a whole. These programs are being delivered in a community, after-school and community health setting.

- *Community-focused programs and research projects* - On scoping the prevention and treatment activities of the eight NSWRHP organisations, five programs were identified that target communities as a whole. Four are run in the community and one occurs in all NSW health facilities within the NSWRHP geographical area.

- *Services with a focus on treating obesity* - Over the past 10 years, two services have been reported to provide care specifically for people who are affected by overweight or obesity. The Children's Weight Management Service is located at John Hunter Children's Hospital. In addition to this, bariatric surgery has either been performed on an ad hoc basis, or from 2016-2018, as part of a metabolic clinic (see the Sweet Dreams program for more information).

Further details of the programs, projects and services included in the scoping can be found the Scoping overweight and obesity prevention and treatment activity section of the report and in Appendix 1.

Identifying opportunities for future intervention

Programs, research projects and services by framework domain

In considering how best to analyse the findings of the Addressing Overweight and Obesity Project, it was determined that a population-based framework would be useful. The four types of obesity prevention and treatment represented by the Addressing Overweight and Obesity Framework include: 1) Universal prevention - Intervention is directed at everyone in a community to prevent overweight and obesity; 2) Selective prevention - Intervention focuses on high-risk individuals and groups to prevent overweight and obesity; 3) Targeted prevention - Intervention targets those with overweight to lose weight and prevent weight gain; and 4) Treatment - Intervention assists people with obesity to lose weight and manage their co-morbidities. Distributing programs, projects and services by framework domain facilitated the identification of opportunities for collaboration amongst partners, as well as opportunities for further investigation for possible future investment. Details of the framework are presented in the Addressing Overweight and Obesity Framework section of the report.

Universal prevention

Two-thirds of the programs/projects identified by the Addressing Overweight and Obesity Project can be allocated to universal prevention (n=59 of 97). They focus on promoting healthy eating,

increasing physical activity and/or decreasing inactivity; behavioural determinants that have been identified as key to preventing obesity (Gill, 1997; WHO, 2000). The majority are run in either schools (n=30) or childcare settings (n=13). Details of these programs and projects are available in the Universal prevention section of the report.

Selective prevention

There were 14 selective prevention programs and projects identified by the Addressing Overweight and Obesity scoping that focused on factors associated with obesity, such as socioeconomic disadvantage and Aboriginal and Torres Strait Islander status. There remain a number of influential factors related to obesity for which no programs, research projects or services amongst NSWRHP organisations were identified. There are also a number of obesity-related factors for which there are several programs, projects and services that focus on prevention, however, there is scope to add more. For further information, see the section of the report entitled Selective prevention.

Targeted prevention

Targeted prevention programs are those that focus on children or adults who already have overweight with the aim of preventing further weight gain (i.e. developing obesity). There are 20 programs, research projects and services identified on scoping that can be categorised as targeted prevention initiatives, details of which are provided in the Targeted prevention section of the report.

Treatment

Twenty-seven treatment programs were identified across the eight NSWRHP organisations (for details, see the section entitled Treatment). To be considered a treatment program or service, the intervention must assist people with obesity to lose weight. Of the 27 programs, projects and services, only two were intensive, the Sweet Dreams program and the provision of bariatric surgery at John Hunter Hospital. The other 25 programs, projects and services were lifestyle interventions. From those identified, only two catered specifically for patients with Class III obesity. None of the intensive programs or services are currently being delivered due to a lack of funding and/or resources.

Research

In total, there were 99 programs, research projects and services identified for inclusion in the Addressing Overweight and Obesity scoping. Eighty-one of these are/were undergoing some type of evaluation (82%). Among those being evaluated, 62 were randomised controlled trials (77%), a study design that provides the highest level of evidence, second only to systematic reviews of RCTs. These findings demonstrate a strong relationship between research and practice in obesity prevention and treatment amongst the NSW Regional Health Partner organisations. Additional information is located in the Research section of the report.

Opportunities for collaboration

There is substantial commonality in the delivery of universal prevention programs for children by Central Coast, Hunter New England and Mid North Coast LHDs. This is to be expected, as all three deliver mandated State Government funded initiatives in childhood obesity prevention to local populations. In addition, some partner organisations have undertaken iterative program innovations in order to determine cost-effective models of program delivery. Further details are provided in Opportunities for collaboration.

Opportunities for investment

It has been established by the Addressing Overweight and Obesity Project that age-standardised obesity rates for children, and overweight and obesity rates for adults in the NSWRHP geographical

area are significantly higher than the national average, and confer an estimated $487 million in direct healthcare costs per year for the three NSWRHP LHDs. With projected population growth and the current trends in obesity, this cost is set to increase by 3% each year to $566 million in 2023. These figures provide compelling evidence for continued and enhanced investment in overweight and obesity prevention within NSWRHP organisations.

This includes intervention to prevent overweight and obesity within the population as a whole, as well as groups at higher risk of developing overweight and obesity, such as those who live in regional areas, come from culturally and linguistically diverse backgrounds and those who have a physical impairment due to illness or disability. Interventions that target those who already have overweight with the aim of preventing further weight gain, as well as lifestyle interventions to treat obesity should also be considered for investment, particularly for children and young people.

One of the main findings of The Addressing Overweight and Obesity Project has been a substantial gap in the treatment of severe complex obesity amongst the NSWRHP organisations. Of the programs and services being delivered within NSWRHP organisations for adults with obesity, the vast majority are lifestyle interventions. A metabolic clinic providing intensive treatment with very low energy diet and bariatric surgery as options existed within HNELHD but has been closed due to a lack of funding. Presently, bariatric surgery is only being performed in HNELHD within the context of gastric reflux. This means that the recommended treatment for the majority of patients with severe complex obesity is not available in the public system, and given the increased prevalence of obesity amongst socioeconomically disadvantaged populations, this raises an issue of equity for the NSWRHP population. Future investment in intensive treatment interventions must be considered in any future planning and decision-making about obesity.

More information on opportunities for investment can found in the Opportunities for investment section of the report.

Opportunities for research

All participants of the Addressing Overweight and Obesity Project were invited to identify opportunities for future research. Some common themes in their responses included how best to:

- Develop new models of care that create and sustain long-term behavioural change in childhood/adolescent obesity;
- Develop and evaluate programs for specific population groups, in particular, those impacted by socioeconomic disadvantage;
- Improve access to treatment for all patients (in rural areas, as well as those made housebound by obesity);
- Treat obesity within the context of other chronic diseases, e.g. COPD, diabetes and CVD;
- Integrate obesity prevention and management into other routine aspects of care and across the continuum of services offered across all NSWRHPs; and
- Support community organisations to implement and sustain effective programs at scale.

Healthy Weight Advisory Group recommendations

Subsequent to the finalisation of the Addressing Overweight and Obesity report, the Healthy Weight Advisory Group prepared recommendations for the Governing Board to consider in future planning. The recommendations are based both on the contents of the report and expert contributions from the Healthy Weight Advisory Group. These recommendations are provided in Appendix 7: Healthy Weight Advisory Group recommendations.

Limitations of scoping

One the main imitations of the Addressing Overweight and Obesity scoping study related to its exclusion criteria. Programs, research projects and services were excluded if their principal goal was not to prevent or treat overweight or obesity. This meant that programs, projects and services with related goals (e.g. preventing chronic disease, improving nutrition, reducing stroke risk factors or improving pain), or included overweight and obesity prevention and/or treatment, plus other chronic disease risk behaviours (e.g. smoking, alcohol), were excluded even though they undoubtedly contribute to the prevention and treatment of overweight and obesity.

In addition, the scoping method predominantly relied on asking people to recall all the programs, research projects and services that occurred in their team, unit or organisation over the past 10 years. It is inevitable that some will be omitted as a result of publication prior to 2009, poor corporate memory, staff turnover and the disinclination to mention programs or studies that have been unsuccessful.

Lastly, the Project Team was based in Newcastle. This enabled more face-to-face communication with researchers and service providers from Hunter New England LHD and the University of Newcastle. In comparison, the ability of the Project Team to meet face-to-face with researchers and service providers from MNCLHD and UNE was limited as a result of distance. More information on the limitations of the project is available in the Limitations of scoping section of the report.