



executive summary

Background

Overweight among children and adolescents is recognised in Australia (as in most developed economies) as one of the most significant threats to the health of young people. Overweight and obesity among young people are associated with psychological distress, poorer social well-being and poorer physical health. There is substantially increased risk of both acute health problems and the chronic diseases that account for much of the illness, disability and death in Australia. Obesity has a serious negative effect on almost every organ system of the body, and what most people might consider a modest degree of overweight can also increase the risk of heart disease, type 2 diabetes and liver disease. Not only will diseases associated with overweight and obesity result in decreased quality and length of life, but they will greatly increase demands on the health care system.

Australian epidemiological studies have shown that the prevalence of overweight and obesity has been rising rapidly among young Australians since the mid-1980s. In 1997, the prevalence of overweight and obesity among young people in NSW was 19-23%.

In response to this threat, the NSW Government conducted the NSW Child Obesity Summit in 2002. One of the subsequent policy recommendations and program initiatives was a commitment from NSW Health to fund the establishment and operation of the NSW Centre for Overweight and Obesity (COO). As its first major task, COO was charged with conducting a representative population survey among school-aged young people in NSW

to identify the prevalence and population distribution of overweight, of key behaviours that are likely to affect or be associated with adiposity (ie physical activity and sedentariness, travel behaviours, cardiovascular fitness, fundamental movement skills, food habits and eating patterns) and the chronic disease outcomes associated with overweight (ie risk factors for cardiovascular disease, type 2 diabetes and fatty liver disease).

Methods of the survey

The NSW Schools Physical Activity and Nutrition Survey (SPANS) 2004 was a representative population survey of NSW school students in Years K, 2, 4, 6, 8 and 10, conducted in the first half of 2004. Students from Government, Catholic and Independent schools in urban and rural areas were invited to participate. Height, weight and waist girth were measured among all students. Fundamental movement skill proficiency was assessed among Year 2 and older students and cardio-respiratory fitness was also assessed among Year 4 and older students.

Year 6, 8 and 10 students completed comprehensive self-report questionnaires, providing information on:

- > participation in organised and non-organised physical activity
- > modes of travel to and from school
- > the time usually spent in sedentary behaviours
- > food habits and eating patterns.

Five sub-studies were also conducted:

- 1 The **physical activity sub-study** involved administration of a physical activity questionnaire that was used in a national survey of student health in 1985 to a separate sample of Year 8 and 10 students. The data were used to identify secular trends in physical activity participation over the last 20 years (1985-2004).
- 2 The **biomarker sub-study** involved the collection of blood samples and the measurement of blood pressure among 500 Year 10 students. Tests were conducted to determine the proportions of students with liver damage, at risk of developing type 2 diabetes and at risk of developing cardiovascular disease.
- 3 The **school environment sub-study** involved administration of a questionnaire to school staff regarding the characteristics of the school environment, equipment, policies, practices, barriers and supports relevant to student participation in physical activity.
- 4 The **school canteen sub-study** involved administration of a questionnaire that assessed what was sold in school canteens and vending machines, school policies and procedures, and the factors that helped or hindered canteens from offering more healthy choices.
- 5 The **response bias study** used an innovative approach to determine if overweight students were more likely to exclude themselves from the survey, potentially leading to an underestimate of the proportion of young people who were overweight or obese.

Findings

The response rates to the survey were good by international standards and the sample had much the same demographic characteristics as the NSW population of primary and secondary school students.

The response bias study confirmed that the sample was not significantly biased, and that the prevalence estimates of overweight and obesity are accurate. That is, the results of the survey can be taken to be a reliable reflection of the NSW population.

OVERWEIGHT AND OBESITY

The prevalence of overweight and obesity combined ranged from 15% among Year K boys to 32% among Year 6 boys and 27% among secondary school boys. The prevalence of obesity rose from 6.6% among Year K boys, peaking at 9.4% among Year 6 boys.

Among girls, the prevalence of overweight and obesity combined was generally in the range 20-25%, but was 30% among Year 4 students. The prevalence of obesity rose from 4.6% among Year K girls to a peak of 7.7% among Year 4 and 6 girls, then declined to 4.2% among Year 10 girls. Although only statistically significant in a few cases, there was a clear association between overweight and obesity and socioeconomic status, such that the prevalence of overweight declined as socioeconomic status increased. The prevalence of overweight and obesity was markedly higher among boys from Middle-Eastern cultural backgrounds in all Years and among girls from Middle-Eastern backgrounds in Years 4, 6 and 10.

The prevalence of overweight and obesity rose by 9-10% between 1985 and 1997, among boys. Over the period 1997-2004 the changes among Year 2 and 4 boys were small, but the prevalence of overweight and obesity increased by 6-10% among Year 6, 8 and 10 boys. Among all boys, and particularly among the older boys, the rate of increase in the prevalence of overweight and obesity was higher for the period 1997-2004 than for the period 1985-1997. That is, the prevalence of overweight and obesity is not only increasing among boys, the rate of change is accelerating. Of equal concern is the fact that the prevalence of obesity increased at the same or a faster rate than the prevalence of overweight. Because of the much greater health risk associated with obesity, this means that the negative impact on boys' health is increasing at an even faster rate than is the overall prevalence of overweight and obesity.

A different pattern occurred among girls. Despite consistent increases in the prevalence of overweight and obesity between 1985 and 1997, the prevalence did not increase among Year 2, 6 and 10 girls over the period 1997-2004. The rate

of increase in the prevalence of overweight and obesity accelerated only among Year 4 girls during this period. Among all others, it fell or was about the same for both periods. That is, overall, the rate of increase slowed among girls over the period 1997-2004 compared with 1985-1997.

Nevertheless, the overall prevalence of overweight and obesity among young people in NSW has increased. Among girls it increased from 20.5% to 23.7% and among boys it increased from 20.2% to 26.1%. Including all young people, the prevalence of overweight and obesity increased from about 20% to 25% between 1997 and 2004 in NSW; this is a very large increase.

PHYSICAL ACTIVITY

During summer school terms, 80-90% of Year 6, 8 and 10 students participated in at least an hour of moderate-to-vigorous physical activity per day, with the exception of Year 10 girls (60% met this criterion). The prevalence of being active declined with increasing age. Girls, but not boys, living in rural areas were more physically active. There was no association between socioeconomic status and physical activity participation. Boys (and to some extent girls) from Asian cultural backgrounds and girls from Middle-Eastern cultural backgrounds were less active.

During winter school terms, the same proportion of boys were active as during summer, but markedly fewer girls were. Smaller proportions of boys and girls from Middle-Eastern and Asian cultural backgrounds were active during winter. Only slightly fewer overweight and obese students, compared with healthy weight students, reported being active during both summer and winter school terms.

With regard to trends over time, the prevalence of physical activity participation increased markedly between 1997 and 2004, particularly among Year 8 students, and particularly during summer school terms, but the increases were far more modest during winter school terms. These findings were supported by the results of the physical activity sub-study, which found that, between 1985 and 2004, the prevalence of physical activity participation increased by 15-25% among secondary school boys and girls.

SEDENTARY BEHAVIOURS

Year 6, 8 and 10 students spent 25, 34 and 37 hours per week engaged in sedentary behaviours, respectively, with little difference between boys and girls. Boys spent 18-22 hours per week and girls spent 13-18 hours per week engaged in small screen recreation (SSR), mostly watching TV; this is half of all sedentary time outside of school. Secondary school students also spent six to seven hours per week (15-20%) in educational activities outside of school, three hours per week (8%) travelling, three to four hours per week (12%) engaged in cultural activities and three to four hours (10%) in social activities. The hours spent in sedentary behaviours increased with age, particularly between the primary and secondary school Years. Girls generally spent more time than boys in each of the sedentary behaviours, except SSR.

Urban students were significantly more sedentary than rural students and there was a small rise in sedentary hours with rising socioeconomic status. Boys from an Asian cultural background spent significantly more hours engaged in sedentary behaviours than other boys, but there were no clear differences between girls. Overweight and obese students spent more time in sedentary behaviours than did healthy-weight students.

Close to 50% of Year 6 students spent more than two hours per day engaged in SSR, rising to two-thirds of secondary school girls and three-quarters of secondary school boys. There were no clear associations between SSR and the demographic variables other than that the behaviour was significantly more prevalent among girls from Middle-Eastern cultural backgrounds.

TRAVEL TO AND FROM SCHOOL

About 30% of Year 6 students walked to school every day and the same proportion travelled by car. Twenty per cent used public transport. Among secondary school students, over 50% used public transport, 20% walked and 20% travelled by car. Public transport use tended to be more common among rural students and travelling by car less common. Among secondary school students, the prevalence of public transport use was higher and car use was lower among overweight students

compared with healthy-weight students. Overall, the median daily time spent walking to school for all those who did not travel by car was about five minutes. Patterns of travel home from school were very similar to patterns of travel to school, except that car use fell from about 20% to 10%, with concomitant increases in walking and public transport use.

CARDIORESPIRATORY FITNESS

About 60% of boys and 70-80% of girls (except for Year 10) were adequately fit. Greater proportions of rural boys and girls were adequately fit, but the differences between urban and rural students were generally quite small. A greater proportion of students in the highest tertile of socioeconomic status were fit than in the low and middle tertiles. Boys and girls from Middle-Eastern cultural backgrounds were generally less likely to be fit, compared with students from other cultural backgrounds, as was the case for Year 8 and 10 girls from Asian cultural backgrounds. Much smaller proportions of overweight students were fit than were healthy-weight students.

Among boys and girls in Years 4, 6, 8 and 10, the proportion who were adequately fit increased over the period 1997 to 2004 for most of the sex/Year groups. These findings are consistent with the finding of increased self-reported physical activity over the same period.

FUNDAMENTAL MOVEMENT SKILLS

Proficiency at fundamental movement skills (vertical jump, side gallop and leap, catch, kick and throw) showed very substantial improvements for boys and girls and across all Years, between 1997 and 2004. These findings provide clear support for the success of the professional development programs of the NSW Department of Education and Training (NSW DET) and for the efforts of the Catholic and Independent education sectors. Despite the gains, there still remains room for further improvement and reducing the disparities between population sub-groups. The prevalence of skill mastery and near-mastery was lower among students, particularly girls, of lower socioeconomic status. Skill proficiency also remains markedly lower among students from Middle-Eastern cultural backgrounds, particularly girls.

FOOD HABITS

While the majority of school students consume the recommended amounts of fruit each day, there is scope to encourage greater consumption among other food groups. In contrast, the prevalence of the consumption of four serves or more of vegetables every day was approximately 20% – and this low prevalence is of considerable concern. Fruit and vegetable consumption were inversely associated with socioeconomic status. Approximately 60% of young people drink full fat rather than reduced fat milk. Only about one-quarter of young people eat fish at least once per week.

Twenty-five per cent to 30% of young people consume at least 400ml per week of soft drinks. Boys were more likely to consume soft drink, and consumption was higher among students from lower socioeconomic backgrounds, among boys and girls from Middle-Eastern cultural backgrounds and among overweight and obese young people. Significant proportions of young people reported consuming 'extra' foods (chips and other fried potato, confectionery):

- > 25-30% reported eating confectionery at least four times per week
- > almost one-half of boys and over one-third of girls reported eating hot chips or other fried potato products at least once per week
- > and 20% of young people also eat potato crisps or other salty snacks at least four times per week.

EATING PATTERNS

A substantial number of young people reported not eating breakfast every day (30-40% of secondary school students), not eating lunch every day (30% of secondary school girls and Year 10 boys) or not eating dinner (10-15%). Overweight and obese students were less likely to consume meals regularly. Although approximately 80% of young people reported eating dinner with most of their family every night, one-third of boys and one-quarter to one-third of girls ate dinner in front of television at least four nights per week. In several cases, poorer eating patterns became more prevalent with declining socioeconomic status.

The reported consumption of food from fast food outlets was low, with less than 20% of all students reporting that they ate food from a fast food outlet once or more times per week. Although there was an inverse association between socioeconomic status and the prevalence of fast food consumption, there did not appear to be any association between the frequency of fast food consumption and overweight or obesity.

INFLUENCES OVER FOOD AND DRINK CHOICES

Although the majority of young people reported that vegetables made them feel healthy and that vegetables were usually served with dinner, only about half reported that they liked the taste of most vegetables. In contrast, most reported that they liked the taste of fruit, that it was always available at home and that it was a convenient snack.

Approximately 25% of boys and 10% of girls reported that drinking soft drinks made them feel good and about 45% reported that soft drinks were regularly available at home. About two-thirds of boys and half of the girls believed that most young people liked soft drinks. It is notable that these proportions were much larger than the proportion of young people who actually reported that soft drink made them feel good.

Slightly more than half of the students reported that they went to fast food outlets because they liked the taste of the food, although only 10-20% stated that they preferred to eat at a fast food outlet compared with eating at home and only 10-15% of students felt that fast food was good value for money. Less than 25% reported that they chose a fast food outlet based on the value of the meals, but larger proportions stated that they were influenced by the convenience of the outlet.

FOOD AND DRINK PURCHASING PATTERNS

Only small proportions of students purchased food on the way to school on a regular basis. Somewhat larger proportions of students purchased food on the way home from school, particularly boys. At least 20% of boys regularly purchased food on the way home from school, but only half that percentage of girls did so.

A small but significant proportion of Year 6 boys (10%) frequently obtained their breakfast from the school canteen, but only small proportions of other students did so. About half of all students never purchased food from the school canteen for recess, about one-quarter did so infrequently and a further quarter did so twice a week or more. The great majority of students took their lunch from home, but up to 20% of secondary school students usually purchased their lunch from the school canteen.

With regard to buying drinks from the school canteen, primary school students most commonly purchased milk drinks. Among secondary school students, boys most commonly purchased soft drinks while girls purchased soft drinks and water with about equal frequency. Approximately 75% of secondary school students reported either that their school did not have a drinks vending machine or that they did not purchase drinks from it. Of those who did buy drinks from school vending machines, soft drinks were the most commonly purchased product.

MARKERS OF CHRONIC DISEASE

Almost 20% of Year 10 boys and girls had elevated concentrations of insulin, using as a criterion the concentrations of insulin associated with the development of heart disease. Using as an alternative criterion the concentration at which clinicians would undertake further investigations and consider treatment, 16% were found to have elevated insulin. At both of these concentrations, there is an increased risk of developing type 2 diabetes. Nine per cent of Year 10 boys also had elevated ALT concentrations (indicating liver damage), 10% had low concentrations of HDL cholesterol and 5% had elevated concentrations of LDL cholesterol (indicating increased risk of cardiovascular disease). Ten per cent had elevated C-reactive protein (indicating vascular inflammation).

Except for insulin and LDL cholesterol, all of the biomarkers were less prevalent among girls: the prevalence of elevated ALT was more than 5%, the prevalence of low HDL was less than 4% and the prevalence of elevated LDL cholesterol was 6% among girls. The prevalence of high blood pressure was also about four times higher among boys than

girls. If the prevalence values found in this study are the same for 16-19-year-olds, then among all 15-19-year olds in NSW: 77,000 have elevated concentrations of insulin: over 20,000 males and 13,600 females have elevated ALT, indicating that they have sustained damage to their livers: approximately 23,000 males and 8,000 females have low concentrations of HDL cholesterol and 10,000 males and 13,000 females had elevated LDL cholesterol, with these last two being important risk factors for the development of cardiovascular disease.

While BMI category was clearly associated with elevated biomarker concentrations, the patterns were different between boys and girls. Most noticeably, the biomarkers were generally elevated among overweight, as well as obese, boys, suggesting greater susceptibility to health risks among boys in the same BMI category as girls. Generally, there was an inverse association between socioeconomic status and the biomarkers for both boys and girls. Although there was no apparent association between cultural background and the biomarkers among boys, the prevalence of most of the biomarkers was surprisingly high among girls from Asian cultural backgrounds, particularly considering they also had a low prevalence of overweight and obesity.

Recommendations

The following recommendations are also presented in Chapter 16, together with their rationales.

- 1 All sectors should continue to address the increasing prevalence of overweight and obesity among children and young people as a matter of urgency.
- 2 Efforts to promote greater fundamental movement skill proficiency among children and young people should be continued and expanded. Any curricula reform and implementation should retain a strong emphasis on fundamental movement skills, and should ensure that adequate time is made available for sport and physical education.
- 3 Efforts to increase participation in all forms of physical activity in school and in the community should be continued and increased.
- 4 Children and young people should limit the time they spend watching television and playing computer games to less than two hours a day.
- 5 Schools should offer at least two hours of planned physical activity each week for all students. This time should include moderate to vigorous activity.
- 6 All sectors should implement specific strategies to ensure that physical activity and nutritional initiatives are inclusive and reach all population groups.
- 7 All sectors should work with community organisations to develop and implement strategies that specifically target at-risk groups.
- 8 All responsible should implement the National Health and Medical Research Council Clinical Practice Guidelines for the Management of Overweight and Obesity in Children and Adolescents, particularly regular clinical monitoring of weight status.
- 9 Children and young people should consume only small quantities of soft drinks, confectionery, chips and other 'extra' foods. Parents should consider these foods to be infrequent treats, and the promotion of these foods and drinks should be limited.

- 10 Children, young people and their parents should be educated about the kinds of foods and eating patterns that help maintain a healthy weight, and about how to develop and maintain healthy eating habits.
- 11 All sectors should implement a more systematic approach to monitoring physical activity, food habits, weight status and the health consequences of overweight among children and young people. Consideration should be given to integrating these data collections with current systematic data collections.
- 12 Researchers should conduct intervention studies to try to reduce overweight and obesity, and to promote physical activity and good nutrition.
- 13 More research into the factors surrounding food and eating that contribute to the development and maintenance of overweight and obesity should be undertaken.