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Submission to House of Representatives Standing Committee on Health and Ageing

Inquiry into Obesity in Australia

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1 Background

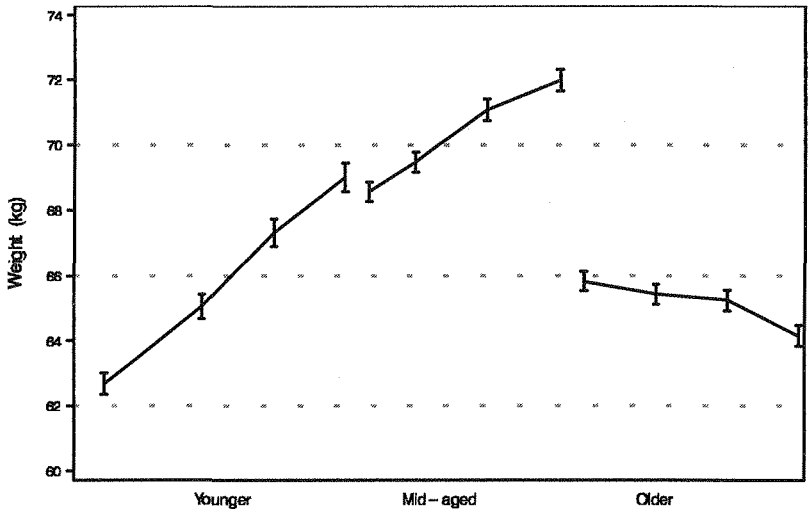
The Australian Longitudinal Study of Women's Health (ALSWH) has been monitoring the health of three large cohorts of Australian women for 12 years. Although the data are self-reported, they provide an important source of information on which to base new initiatives to prevent overweight and obesity in Australian adults. The schedule of surveys for this study is shown below (shading indicates completed surveys):

	Survey 1	**Survey 2**	**Survey 3**	**Survey 4**	**Survey 5**	**Survey 6**	**Survey 7**
Young (N=14,765 in 1996)	(1996) 18-23 yrs	(2000) 22-27 yrs	(2003) 25-30 yrs	(2006) 28-33 yrs	(2009) 31-36 yrs	(2012) 34-39 yrs	(2015) 37-42 yrs
Mid-aged (N=14,702 in 1996)	(1996) 45-50 yrs	(1998) 47-52 yrs	(2001) 50-55 yrs	(2004) 53-58 yrs	(2007) 56-61 yrs	(2010) 59-64 yrs	(2013) 62-67 yrs
Older (N=12,787 in 1996)	(1996) 70-75 yrs	(1999) 73-78 yrs	(2002) 76-81 yrs	(2005) 79-84 yrs	(2008) 82-87 yrs	(2011) 85-90 yrs	(2014) 88-93 yrs

2 Trends in weight gain

Over the period of the study there has been an overall increase in the women's weight, as shown in the figure below, and as detailed in a 2007 report to the Department of Health and Ageing.[1] Although the *young cohort* had the lowest mean weight and BMI at the start of the study, women in this group had the *highest rate of weight gain*, gaining an average of *6.32 kg over ten years* between Survey 1 in 1996 and Survey 4 in 2006. Their mean weight in 2006, at age 28-33, was higher than that of the mid-age cohort in 1996, when they were age 45-50 years. In contrast, the mid-aged women gained 3.43 kg in the 8 years between Survey 1 in 1996 and Survey 4 in 2004. In the nine years from 1996 to 2005, the older women lost an average of 1.67 kg. These data are from the women in each cohort who answered questions on weight in all four surveys, and may be an underestimate of weight gain, as women who answered every survey were more likely to be categorised as 'healthy weight' at Survey 1 than women who did not.

[1] Women's Weight: findings from the Australian Longitudinal Study of Women's Health. Report for DoHA, December 2007.



The young cohort

In 1996, *almost seven in ten of the younger cohort (then aged 18-22) were in the healthy weight range*, a testament to the effects of childhood physical activity and nutrition patterns. Only one in ten was underweight and only two in ten were overweight or obese. Ten years later, almost all the underweight women had gained weight and the proportion of women in the obese BMI category more than doubled, from 6.0% in 1996 to 15.8% by 2006. In this ten year period average BMI increased from 22.8 (well within the healthy weight range) to 25.03 (just into the overweight range).

The mid-age cohort

Women in the mid-age cohort had the highest average weight and BMI in 1996, with almost four in ten mid-aged women classified as overweight or obese. *This prevalence increased to almost six in ten by 2004.* The rate of weight gain in the mid-aged women was not as rapid as observed among the younger cohort, but there was a steady increase in the proportions of women classified as overweight or obese at each survey, and a corresponding decrease in the proportions in the healthy weight range.

The older cohort

The older women showed an average decrease in weight over the nine years form 1996 to 2005. However, they also showed a decrease in height (around 1.85 cm), so that the average BMI in this group did not change greatly from 1996 to 2002, although there was a reduction in average BMI in 2005. Between 1996 and 2005, the main changes in BMI categories for women in the older cohort were a slight increase in the proportion classified as obese (from 12.4% to 13.4%), a reduction in the proportion classified as healthy weight (from 51.1% to 49.2%) and an increase in the proportion classified as underweight (from 2.2% to 4.3%).

3 Predictors of weight change

Energy balance, the net effect of energy intake (through diet) and energy expenditure (through physical activity), is the key factor affecting weight and weight change. As these behaviours vary with other sociodemographic, lifestyle

and personal factors, it is clear that strategies which aim to change eating behaviours and physical activity should be age-group specific and related to other lifestyle factors.

Energy intake and diet

Energy intake is one of the major predictors of weight and weight change. In the Younger and Mid-aged cohorts, women with lowest energy intake had lowest weight and women with highest energy intake had highest weights throughout the study period. Among younger women, those with greater energy intake gained more weight from Survey 1 to Survey 4 (7.4 kg), than did women with lower energy intake (5.7 kg). Diet and energy intake were not assessed among women in the older cohort. Intakes of food and nutrients varied significantly across socio-demographic groups, with unmarried women, and women in 'labouring occupations' e.g. cleaner, factory worker, kitchen hand) having poorer nutrition intake.

Physical activity

Throughout the study period, physical activity levels have declined among the young women, particularly among those who were already overweight in 1996. In contrast, physical activity levels have increased among the mid-aged women, and particularly among those who were overweight in 1996. Physical activity levels have declined in the older women. *Compared with women in the 'high' physical activity group, mid-aged women who reported doing less than recommended levels of ('moderate') physical activity were about 1.5 times more likely to gain weight at twice the average rate.* High physical activity did not appear to carry additional advantage when compared with moderate activity.

Sitting time is used as an indicator of physical inactivity, and is strongly associated with weight. *The difference in average weight of women who reported sitting less than three hours per day and those who reported sitting for more than eight hours a day at survey 3 was 2.61kg in the younger women, 5.36kg in the mid-aged women, and 6.64kg in the older women.* Younger and mid-aged women who increased their sitting time gained most weight and those who decreased their sitting time by more than three hours per day gained weight at the slowest rate.

Other personal and lifestyle factors associated with weight and weight change

A number of other lifestyle factors were associated with weight and weight change:

- In the younger cohort, both weight in 1996 and weight change over subsequent surveys were associated with having a partner and a baby Those who had children gained 2-3kg in addition to the 4kg weight gained by women who had not had children up to Survey 3.
- Younger and mid-aged women showed greater weight gain in the period around quitting smoking than women who did not change their smoking habits during the study period.
- Mid-aged women who had a hysterectomy before 1996 had higher BMI than those who have not had a hysterectomy. However, there is no evidence that having had a hysterectomy leads to increased weight gain.

Sociodemographic factors associated with weight and weight change

In the younger and mid-aged cohorts, women in rural areas showed higher weight gain than women in urban areas. However, in the older cohort there was very little difference in BMI or weight according to area of residence.

In all three cohorts, women with a university degree had lowest weights and BMI throughout the study period compared to women with no formal qualifications, who had highest weights and BMI. However, there is no evidence of differences in weight change over time between women with different qualifications.

4 Weight, weight change, and health care use

There are clear associations between weight and health care use (total charges, number of Medicare claims, number of GP visits). In the younger cohort, these associations are less strong than among the other cohorts, but young women in the obese group made more Medicare claims for GP visits than those in the healthy weight group. Among mid-aged women, those in the obese group also had higher total charges, higher total Medicare claims, and more GP visits at each survey than women in the healthy and overweight BMI categories. *In 2004, total charges for women in the obese group were around $130 higher per woman (on average) than charges for women in the overweight group.* Mid-aged women who maintained a stable weight across all surveys tended to have lower charges, fewer GP visits and fewer total Medicare claims.

There were also associations between physical activity and health care use, and there was some evidence that these associations varied according to BMI category. Young sedentary women had higher total charges than women in the 'moderate' and 'high' physical activity categories (around $200 per woman for 2003).

Total charges for the mid-aged cohort were higher at all surveys for sedentary women than for women in the 'high' physical activity group. Sedentary women also had more GP visits and more total Medicare claims at all surveys than all other physical activity groups. Costs were higher for active overweight women than for sedentary healthy weight women.[2]

5 BMI and the onset of chronic disease

Data from the mid-age cohort have been used to model the incidence of hypertension and diabetes over the first five years of the study[3]. The figure below shows the distribution of BMI in 13,716 women aged 45-50 years in 1996. The lines show the incidence of hypertension (-□-) and diabetes (-△-) between 1996 and 2004. The dark bars show the actual BMI and the light bars show the projected BMI distribution if BMI could by reduced by 2 units in all women with a BMI greater than 24. *Modelling showed that this level of weight loss would result*

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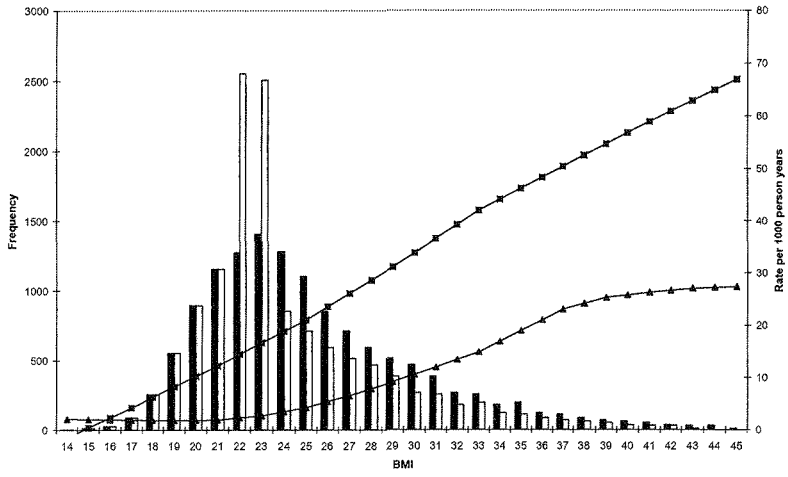
[2] Brown WJ, Hockey R, Dobson AJ. (2008). Relationships between body mass index, physical activity and health care costs in mid-age and older Australian women. *Australian and New Zealand Journal of Public Health* **32** 150-155

[3] Brown, WJ, Hockey R, Dobson, A. (2007). - Rose revisited: A 'middle road' prevention strategy for reducing risk of non-communicable chronic disease risk. *Bulletin of the World Health Organization,* **85**(11), 886-7.

in a decrease of 12.3% in the incidence of hypertension and 23% in the incidence of diabetes, over a five year period. This is greater than the 'whole population' approach of aiming to have the BMI of the entire population reduced by 1 unit (in which case the incidence of hypertension and diabetes would be reduced by 10.3% and 13.4% respectively).



Assuming that each kg of stored fat is equivalent to 7000 kcals (29,400 kJ), and that this energy is converted with an efficiency of 50%, then closing the 'energy gap' by 200 kcals per day through an additional 20 minutes or 2000 steps of brisk walking and reducing energy intake by 100 kcal (the equivalent of one chocolate biscuit) every day for one year would substantially contribute to achieving this goal.

6 Recommendations

- This submission emphasises the growing problem of obesity among adult women. The longitudinal data provided by the ASLWH show a rapid increase in weight among younger women which is not being addressed by any national or state weight gain prevention strategies. Unless there is a significant reduction in the rate of weight increase in this younger cohort, they will have a much higher prevalence of obesity and overweight than the current generation of 45-50 year old women, when they reach this age.
- Exploration of the factors contributing to overweight and obesity suggests that while energy balance is crucial through attention to diet and physical activity, other contextual factors must also be taken into account. Women may be more susceptible to weight gain at specific life-stages such as just after getting married (or starting to live with someone) and following childbirth. Health promotion efforts may need to emphasise the particular importance of healthy eating and adequate physical activity following these

events. Quitting smoking is also another key event when women seem to gain weight. Strategies are needed to help women quit smoking, and receive the benefits of this healthy change, without trading the risks of smoking for risks associated with increasing weight.

- The data also demonstrate the relationship between overweight and obesity higher health care costs. These conditions contribute significantly to poor health among women in Australia and there is potential for considerable cost savings, at a population level, if trends in overweight and obesity could be reversed. Importantly, the data suggest that there could be considerable health care cost savings if overweight and obese women could become more active, even without change in BMI.
- The ALSWH data suggest that almost one quarter of incident cases of diabetes in mid-age women could be avoided if all women with a BMI above the healthy weight range could reduce their BMI by 2 units. As suggested in the WHO Global Strategy on Diet, Physical Activity and Health (resolution WHA57.17, May 2004), small changes in energy intake and expenditure could result in significant reductions in risk of chronic non-communicable diseases across populations. This level of change is however likely to require considerable social, cultural and environmental support to encourage more active living among today's time-pressured women.

Professor Wendy Brown and Professor Annette Dobson (for the ALSWH researchers)