Appendix A: Data sources used to estimate 2010-11 total disease burdens and direct healthcare expenditures in Australia.

**Burden of disease**

Wherever possible, estimates of disease burden in disability-adjusted life years (DALY) were taken from the Australian Institute of Health and Welfare (AIHW). When AIHW estimates were unavailable or were found to be inappropriate for economic analysis, the peer-reviewed literature and government reports were searched for other Australian estimates. Estimates were then updated to Australian fiscal year 2010-11 values using projections of disease incidence or prevalence that were provided either by Voss et al. (1) or by Access Economics (2-4).

The AIHW estimates for the burden of high body mass index and high blood pressure considered these only as risk factors for other diseases, without any directly attributable loss in quality or length of life. As the estimates did not include any burden associated with the treatment of these risk factors, or with social stigma that may be attached to them, they are likely to be conservative. The AIHW report considered osteoporosis as a disease rather than a risk factor which meant that the osteoporosis-attributable portions of several other diseases and injuries (e.g. kyphosis and some bone fractures) were excluded, also resulting in an underestimate (2), so an alternative and more comprehensive estimate of the burden of osteoporosis (2) was used.

The AIHW estimated burden of high Body Mass Index (BMI) as a continuous variable (5). This was apportioned into estimates of burden attributable to obesity (BMI > 30) and overweight (25 < BMI < 30) according to the relative sizes of the direct healthcare costs attributable to overweight and obesity in Australia. These were calculated using estimates from Colagiuri et al. to be 20.1% and 79.9%, respectively (6). No excess health care costs were attributed to BMI < 25).

**Direct healthcare expenditure**

As with burden of disease, estimates of the direct healthcare costs for individual diseases were sought from the AIHW. When AIHW estimates were unavailable, as was the case for obesity and hypertension, they were obtained from the peer-reviewed literature, from other government reports, or from primary analysis of publicly available databases and government reports. Estimates of healthcare costs were updated to Australian fiscal year 2010-11 values using projections of direct expenditure by Voss et al. (1), adjusted for inflation using the Australian Total Health Price Index (7).

An estimate for the healthcare costs of obesity was obtained from a recently published analysis by Colagiuri et al. (6). This estimate was derived from a comparison of the healthcare costs over five years in a nationally representative cohort of 6140 Australians aged 25 and over, stratified according to weight status. The direct healthcare costs reported by Colagiuri et al. were adjusted for overlap by subtracting AIHW estimates of the obesity-attributable fractions of type 2 diabetes mellitus (T2DM), ischemic heart disease (IHD) and stroke (5), as well as 30% of the cost of hypertension (Wilson et al. reported a PAR of 26% for overweight and obesity combined in the Framingham study (8)).

Expenditure on the management of hypertension was estimated for the current study from publicly available data sources. The estimate included the following components: i) antihypertensive use by class, predicted using best fit (quadratic) regressions of data from Australian Statistics on Medicines—an annual report published by the Department of Health and Ageing (9-11); ii) general practice expenditure on treatment of hypertension based on the relative frequency of management of hypertension in general practice, using data from the
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Medicare Australia online database (12), the AIHW (7) and Britt et al. (13); iii) hospitalizations for hypertension predicted using a best fit (reducing power) regression of data from the National Hospitals Morbidity Database (NHMD) (14) and the National Hospital Cost Data Collection (NHCDC) (15,16); iv) hypertension outpatient clinics based on data from the NHCDC (16), presuming the same proportional allocation to hypertension as for hospitalizations.

For the reasons noted above for burden of disease, the AIHW estimate of expenditure on osteoporosis (17) was considered to be an under-estimate and an alternative, more comprehensive estimate by Access Economics (2) was incorporated into the base case analysis.

We expanded the estimates of expenditure on hypertension and T2DM to include attributable fractions of IHD and stroke. This provided unadjusted estimates that can be interpreted individually without summing across conditions. In the base case analysis, these were deducted again in order to adjust for overlapping causal pathways.

Supplemental Literature Cited