

Physical activity or nutrition interventions: which can improve population health the most and save the most health dollars?

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We gave a presentation to Members of Parliament last week on taxes and subsidies on food, the pros and cons (slides here). In this blogpost we go into some extra detail on how such nutritional interventions compare to physical activity ones – in terms of health gain and potential for cost savings to the health system.

This presentation arose because Diabetes New Zealand had read our recent post here at Public Health Expert on taxes and subsidies, and how challenging they are to model. The discussions also ranged more widely to other interventions (e.g. food labelling). During the discussion with the MPs, our host for the evening Louise Upston (National MP for Taupo, and Senior Government Whip) asked a good triple whammy question:

- What interventions achieve more health gain – diet or physical activity?
- What about if you combine them?
- And what about the built urban environment and physical activity?

Phew – lots of public health research required to answer this properly!

But in general terms, and for the types of interventions we usually think about in public health, you get both more health bang, and more bang for your buck, with population wide nutrition interventions. For example, things like reformulation of food (getting rid of trans fats, reducing salt) and taxes on tobacco and alcohol.

The table below, taken from a Lancet paper, is a summary of many research projects in Australia using the ACE-Prevention study approach. They are ranked from most cost-effective (actually cost-saving in the health system due to averting future (costly) diseases) to least cost-effective (e.g. \$760,000 per disability-adjusted life year (DALY) saved from a walking school bus intervention). Also shown in the table is the DALYs saved and net cost – things like food taxes and subsidies, front-of-pack labelling, reducing food marketing to children and (surprisingly to many) gastric banding save lots of DALYs and dollars. That is the nutrition interventions.

	Target population	Strength of evidence*	DALYs saved	Gross costs† (A\$ million)	Net cost per DALY saved‡ (A\$ million)
Unhealthy food and beverage tax (10%)§ ²⁷	Adults	4	559 000	18.00	Cost-saving
Front-of-pack traffic light nutrition labelling§ ²⁷	Adults	5	45 100	81.00	Cost-saving
Reduction of advertising of junk food and beverages to children¶	Children (0–14 years)	2	37 000	0.13	Cost-saving
School-based education programme to reduce television viewing¶	Primary schoolchildren (8–10 years)	3	8600	27.70	Cost-saving
Multi-faceted school-based programme including nutrition and physical activity¶	Primary schoolchildren (6 years)	3	8000	40.00	Cost-saving
School-based education programme to reduce sugar-sweetened drink consumption¶	Primary schoolchildren (7–11 years)	3	5300	3.30	Cost-saving
Family-based targeted programme for obese children¶	Obese children (10–11 years)	1	2700	11.00	Cost-saving
Multi-faceted targeted school-based programme¶	Overweight/obese primary schoolchildren (7–10 years)	3	270	0.56	Cost-saving
Gastric banding—adolescents¶ ²⁸	Severely obese adolescents (14–19 years)	1	12 300	130.00	4400
Family-based GP-mediated programme¶ ²⁹	Overweight/moderately obese children (5–9 years)	3	510	6.30	4700
Gastric banding—adults§	Adults BMI > 35 kg/m ²	1	140 000	120.00	5800
Multi-faceted school-based programme without an active physical activity component¶	Primary schoolchildren (6 years)	3	1600	51.20	21 300
Diet and exercise§	Adults BMI > 25 kg/m ²	1	3000	140.00	28 000
Low-fat diet§	Adults BMI > 25 kg/m ²	1	1900	94.00	37 000
Active After Schools Communities Program¶ ³⁰	Primary schoolchildren (5–11 years)	5	450	40.3	82 000
Weight Watchers§	Adults	1	54	5.00	84 000
Lighten up to a healthy lifestyle weight-loss programme§	Adults	4	38	4.00	94 000
TravelSMART schools¶	Primary schoolchildren (10–11 years)	4	90	13.10	117 000
Orlistat§	Adults BMI > 30 kg/m ²	1	2100	1500.00	700 000
Walking School Bus¶	Primary schoolchildren (5–7 years)	3	450	40.30	760 000

Source: Gortmaker et al, Changing the future of obesity: science, policy, and action, Lancet 2011

That is not to say that physical activity interventions are not sometimes ‘good’ value for money. For example, giving out pedometers to people is a simple and very cost-effective intervention. But as usually conceived, physical activity interventions don’t have the same massive impact on benefiting health and for saving health costs as (some) nutrition interventions.

But what about if we think big scale physical activity interventions? What about if we think about interventions to change the built environment to be more conducive to physical activity (e.g. active transport options, walkability)? Now we have scale, breadth and reach – but also few if any randomised trials, and weaker evidence.

Let’s consider one example that was published in a top journal (the BMJ) recently, a public bicycle lending scheme in Barcelona. This was an evaluation of a real intervention, a health impact assessment looking backwards in time if you like. They estimated, in line with other such studies, that the harms due to road traffic crash injuries and increased exposure to air pollution were far outweighed by the physical activity benefits on reduced mortality. Whilst we can quibble about the exact size of the association of physical activity with mortality risk, and whether bicycle lending programmes (or more radical urban redesign) increase

activity in already active people or sedentary people, it seems almost inescapable that health gains from such widespread interventions are substantial.

So, back to Louise Upston's triple whammy question. In our view, in the short to medium term ambitious and usually population wide nutrition interventions are likely to achieve large health gains rapidly, and save dollars. Physical activity interventions, if bold and done in such a way as to change our culture and way of living/commuting, have massive potential – but are generally on the long timeline plan. We firmly believe they should be tested out (and evaluated along the way), as we are not now talking principally about health gains, but also the quality of our living environments and environmental sustainability.

Regarding the joint effects of nutritional and physical activity interventions, we are going to default to time honoured academic hedging by talking about 'on the one hand....' and 'more research required'.

On the one hand, if we first undertake widespread diet interventions (say), this will greatly reduce disease rates meaning that (some) of the benefits of a next wave of physical activity interventions is less, because disease rates have already been reduced. On the other hand, if the costs of both dietary and physical interventions can be shared, or cross-subsidised (e.g. taxes on junk food paying for redesigning urban environments so that walking and cycling are easy commuting options), they can potentially be win-wins. Real fancy analyses will take into account the benefit from healthy diets on lower greenhouse gas emissions from agriculture and how active transport also reduces emissions from vehicles.

But we need not always not wait for further research – smart policy makers can do a range of things now to both start improving the foodscape and making active transport an easier option for commuting, as we are confident they will (greatly) benefit health and also save health dollars – or at least allow health resources to be allocated to the next best use.

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