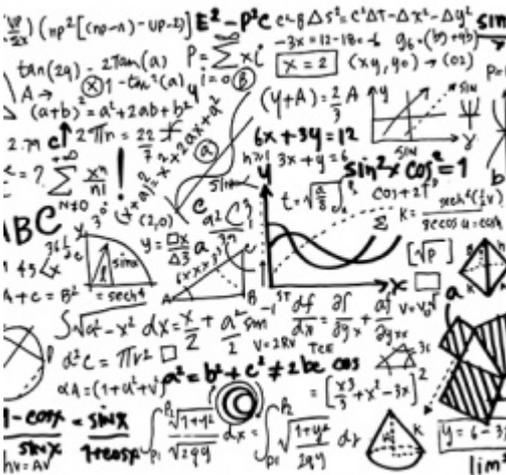


Estimate * Estimate = Health Policy



By Chuck Dinerstein, MD, MBA — June 13, 2017



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In my cyber pile of articles was this, [Reducing US cardiovascular disease burden and disparities through national and targeted dietary policies: A modeling study](#) [2] by Jonathan Pearson-Stuttard et. al, published in PLoS. The study looks at reducing cardiovascular disease using a variety of models of dietary policy. Using numbers that reflect the reduction in disease prevalence associated with various dietary changes, knowing the population at risk and a few other extrapolated estimates, the authors derived the number of lives 'saved' by dietary intervention. And importantly, this scientific information, back up by statistics and figures was offered to policy makers to make America healthy again. And to my great delight, the critical numbers linking diet and disease were from another paper, [Association between dietary factors and mortality from heart disease, stroke, and Type 2 Diabetes](#), [3] which I had already [written](#) [4] about.

Let's begin with the article that calculates the linkage between diet and disease using a meta-analysis of observational dietary studies that **estimating** their impact. Already we are getting numerically fuzzy. The accompanying [editorial](#) [5] stated that the work had the "potential for guiding policy makers in planning public health nutrition interventions," with three caveats, the most crucial, for our purposes:

Calculation of the population attributable fraction rely on a critical assumption – namely that exposure-outcome relationships are causal... clinical outcomes are rarely available and will likely never be.

Rephrasing, all of the numbers presented rest on assumptions that can never be proven, “articles of faith.’ The editorial ended by suggesting that the estimates reported should be interpreted cautiously. Not to be deterred, Pearson-Stuttard and his team did the editorial writers one better, taking those estimates and multiplied them by population statistics from the Census Bureau and more estimates of what we eat from the National Health and Nutrition Examination Survey (NHANES) [1]. At the end of their mathematical exercise, they demonstrated which food policy best lowered cardiovascular disease burden making America healthy again. Needless to say, fuzzy numbers multiplied by more fuzzy numbers results in little precision, but I want to share some of their ‘findings’ to consider how expressing results sways our thinking.

They expressed their results by age group, as we got older, the benefit of these dietary interventions seems to diminish. Here are the four interventions

- A media campaign to eat more fruit and vegetables and drink less sugary beverages
- The increasingly popular 10% tax on sugar-sweetened beverages applied nationally (10% SSB tax)
- A 10% subsidy to everyone to purchase fruits and vegetables (10%FV)
- A 30% subsidy solely to SNAP participants to purchase fruits and vegetables (Snap 30% FV)

Here is a sampling of their data for those 18-25-year-olds who had the most to gain:

Model	Reduction in cardiovascular disease	
	Media campaign	1.40%
	10% SSB tax	2.30%
	10% FV	4.20%
	SNAP 30% FV	1.30%

I am going to take these numbers as givens, even though we already know they are, at best, imprecise and at worst incorrect. But in making policy, we make tradeoffs. The tradeoff that most readily comes to mind would be, what do these models cost? Now the easiest cost to consider is how many individuals will I need to treat needlessly to make one patient better – this is called the number needed to treat (NNT), and you can consider it a measure of treatment's efficiency. [2] Statins, when taken to prevent death in someone with known heart disease, have an NNT of 83 [6]. Here are the calculated NNTs.

Model	Reduction in cardiovascular disease	NNT
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Media campaign	71		
10%SSB tax		2.30%	43
10% FV		4.20%	24
SNAP 30% FV		1.30%	77

But there is another tradeoff to consider, what do these interventions cost? Before you say it, let me remind you, the government pays these subsidies through your taxes, including that SSB tax. Here again is an opportunity to play with numbers, should the estimated 'costs' be divided up between the age groups, or by the entire population, etc.? In general, the lowest expenditures were still in that 18-25 age group except for SNAP where an older population with more SNAP participants lowered the cost. But we have given up precision long ago, let's simply consider the cost for the population between 18 and 25.

Model	Reduction in cardiovascular disease	NNT	Cost to effectively treat one person [3]	
Media campaign		1.40%	71	[4]
10%SSB tax		2.30%	43	\$185.65
10% FV		4.20%	24	\$1,738.10
SNAP 30% FV		1.30%	77	\$9,496.26

And finally, let's add a comparison to something already in use so we can judge the effectiveness of our policy changes.

Model	Reduction in cardiovascular disease	NNT	Cost to effectively treat one person	
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SNAP 30% FV		1.30%	77	\$9,496.26
Statins		1.20%	83	\$4,905.50
Hypertension Medications		0.8%	125	\$8,059.42

Vitamin Supplements	No evidence they reduce cardiovascular disease	Infinite [5]
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So, as you sit in the policy making chair, which of the numbers looks best to you?

Media? Do you believe it is, as this study reports, slightly more helpful than statins? If you do, perhaps we could stop using statins, media is apparently more effective, and the cost is trivial in comparison.

Or the sugar tax versus a fruit and vegetable subsidy, I would be torn, both effective and the cost is lower for the tax. On the other hand, a new tax, even on sinners, may not be as good as a stealth tax, hidden from all and offered to the public as a transfer of wealth from the food rich to the food poor. Fun fact! We, as a nation, are [net importers](#) [7] of sugar, fruits, and vegetables.

And finally, those vitamins, the government has already beat us to the punch, policy-wise, you [cannot buy vitamins](#) [8] with SNAP money. We spend \$21 billion on vitamins, more than even statins. Perhaps there is no better example of the placebo effect.

[1] A recollection survey discussed on this site on several occasions. It too results in fuzziness, not precise numbers.

[2] Numbers need to treat = 1/absolute risk reduction

[3] [Costs of fruits and vegetables](#) [9], population figures, [spending on SSB](#) [10]

[4] A calculation I did not attempt but the public licensing of media entitles the government to free PSA broadcasts, I would not expect the cost to be significant.

[5] NNTs were taken from <http://www.thennt.com> [11], statin [costs](#) [12], [cost](#) [13] of hypertension medications and vitamins and supplements [costs](#) [14]

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Links

- [1] <http://www.shutterstock.com>
- [2] <http://journals.plos.org/plosmedicine/article?id=10.1371/journal.pmed.1002311>
- [3] <http://jamanetwork.com/journals/jama/article-abstract/2608221>
- [4] <http://www.acsh.org/news/2017/03/08/media-think-10-dietary-magic-bullets-will-prevent-half-us-deaths-10968>
- [5] <http://jamanetwork.com/journals/jama/article-abstract/2608201>
- [6] <http://www.thennt.com/nnt/statins-for-heart-disease-prevention-with-known-heart-disease/>
- [7] <https://fas.org/sgp/crs/misc/RL34468.pdf>
- [8] <https://www.fns.usda.gov/snap/eligible-food-items>
- [9] <http://ageconsearch.umn.edu/bitstream/101280/2/EIB71.pdf>
- [10] <http://big.assets.huffingtonpost.com/soda.pdf>
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- [14] <http://www.healthline.com/health-news/americans-spend-billions-on-vitamins-and-herbs-that-dont-work-031915>