FAQ

Health effects of dietary risks in 195 countries, 1990–2017:
a systematic analysis for the Global Burden of Disease Study 2017

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Q.   Where can I find the study?

A.   The study can be found on The Lancet website at:
http://www.thelancet.com/journals/lancet/article/PIIS0140-6736(19)30041-8/fulltext

Q.   What dietary components were analyzed in this study?

A.   Study authors analyzed 15 dietary components, including foods and nutrients.

The diet components were quantified as risks based on daily consumption that was "suboptimal," i.e., intake was too low or too high.

The 15 dietary components include:

Diet low in:

1. fruits
2. vegetables
3. legumes
4. whole grains
5. nuts and seeds
6. milk
7. fiber
8. calcium
9. seafood omega-3 fatty acids
10. polyunsaturated fatty acids

Diet high in:

11. red meat
12. processed meat
13. sugar-sweetened beverages
14. trans fatty acids
15. sodium

Q. Where can I find the definitions for each of the dietary components?

A. See the table on page 3 of the manuscript for full definitions for each dietary risk factor.

Please note the following:

- <u>Fruits</u> – this category excludes *all* fruit juices (100% or otherwise)

- <u>Vegetables</u> – this category excludes pickled vegetables and starchy vegetables (e.g., potatoes, corn); legumes (e.g., peas) were also excluded as they were analyzed in a separate "diet low in legumes" category; tomatoes were considered vegetables for this analysis

- <u>Milk</u> – this category includes non-fat, low-fat, and full-fat milk (cow, goat, etc.); however, soy milk, almond milk, and other plant derivatives were excluded

- <u>Calcium</u> – this category includes calcium from all sources, both dairy products (milk, yogurt, and cheese) and non-dairy products (e.g., broccoli, cabbage); however, dietary calcium from supplements was excluded

- <u>Red meat</u> – this category excludes poultry, fish, eggs, and *all* processed meats

- <u>Processed meat</u> – this category includes any type of meat (not just red meat) preserved by smoking, curing, or salting, or meat to which chemical preservatives have been added

- <u>Sugar-sweetened beverages</u> – "sugar-sweetened" beverages are defined as beverages having 50 calories per 8-ounce serving; this category excludes 100% fruit and vegetable juices but includes fruit and vegetable juices which are less than 100%

- <u>Fiber</u> – this category includes fruits, vegetables, grains, legumes, and pulses (e.g., lentils, chickpeas)

- <u>Seafood omega-3 fatty acids</u> – includes EPA (eicosapentaenoic acid) and DHA (docosahexaenoic acid); EPA and DHA are polyunsaturated fatty acids found in the flesh of cold-water fish (tuna, salmon, mackerel, herring, halibut, cod liver, whale and seal blubber).

Q. What is "optimal" dietary intake?

A. "Optimal" dietary intake is the level of consumption associated with the lowest risk of mortality from each related disease. For example, for fruits, the optimal dietary intake is 250 grams or more of fruit per day. This amount is associated with the lowest risk of mortality from each disease related to low fruit intake.

Therefore, intake of *less* than 250 grams of fruit per day is considered suboptimal intake and considered a "diet low in fruits." It places one at an increased risk of mortality and morbidity from a number of diseases.

Below is suboptimal consumption for each dietary component:

Dietary risk	Suboptimal intake (average consumption per day)
Diet low in fruits	Less than 250 grams
Diet low in vegetables	Less than 360 grams
Diet low in legumes	Less than 60 grams
Diet low in whole grains	Less than 125 grams
Diet low in nuts and seeds	Less than 20.5 grams
Diet low in milk	Less than 435 grams (12.3 oz.)

Diet low in fiber	Less than 23.5 grams
Diet low in calcium	Less than 1.25 grams
Diet low in seafood omega-3 fatty acids	Less than 250 milligrams
Diet low in polyunsaturated fatty acids	Varies based on an individual's caloric intake (e.g., 2000 calories); suboptimal intake is measured in terms of daily energy intake, where energy from polyunsaturated fatty acids is less than 11% of total calories consumed
Diet high in red meat	More than 22.5 grams
Diet high in processed meat	More than 2 grams
Diet high in sugar-sweetened beverages	More than 2.5 grams
Diet high in trans fatty acids	Varies based on an individual's caloric intake (e.g., 2000 calories); suboptimal intake is measured in terms of daily energy intake, where energy from trans fatty acids is more than 0.5% of total calories consumed
Diet high in sodium	Excessive intake is measured in terms of urinary sodium, where the 24-hour urinary sodium is more than 3 grams

Q.   What diseases were evaluated in this analysis?

A.   Researchers evaluated evidence showing a causal relationship between dietary habits and chronic non-communicable diseases.

Here is a list of the diseases analyzed in relation to each dietary component:

Cardiovascular diseases
Cancers
Other non-communicable diseases

	Ischemic heart disease	Ischemic stroke	Hemorrhaghic stroke	Lip and oral cavity cancer	Nasopharynx cancer	Other pharynx cancer	Esophageal cancer	Larynx cancer	Tracheal, bronchus, & lung cancer	Colon and rectum cancer	Stomach cancer	Diabetes type II	Chronic kidney disease
Low dietary intake													
Diet low in fruits	X	X		X	X	X	X	X	X			X	
Diet low in vegetables	X	X	X				X						
Diet low in legumes	X												
Diet low in whole grains	X	X	X									X	
Diet low in nuts and seeds	X											X	
Diet low in milk										X			
Diet low in fiber	X									X			
Diet low in calcium										X			
Diet low in seafood omega-3 fatty acids	X												
Diet low in polyunsaturated fatty acids	X												
High dietary intake													
Diet high in red meat										X		X	
Diet high in processed meat	X									X		X	
Diet high in sugar-sweetened beverages	X											X	
Diet high in trans fatty acids	X												
Diet high in sodium	X	X	X								X		X

*Note: For sodium, researchers analyzed the relationship between sodium and stomach cancer, which is independent of changes in systolic blood pressure. They also analyzed the relationship between urinary

sodium and changes in systolic blood pressure that resulted in chronic kidney disease and the following cardiovascular diseases:

- Rheumatic heart disease; ischemic heart disease; ischemic stroke; hemorrhagic stroke; hypertensive heart disease; non-rheumatic valvular heart disease; cardiomyopathy and myocarditis; atrial fibrillation and flutter; aortic aneurysm; peripheral artery disease; endocarditis; other cardiovascular and circulatory diseases

Q. **How are adults defined in this analysis?**

A.   For the purpose of this analysis, adults were defined as persons aged 25 years or older.

Q. **Milk is a source of calcium, but milk and calcium were measured as two separate risks, i.e., "diet low in milk" and "diet low in calcium." How did researchers prevent double-counting when totaling all diet-related deaths and DALYs?**

A.   Study authors first assessed the burden of deaths/DALYs attributable to each dietary risk *independent* of all other dietary risks. That is, they determined the deaths attributable to a diet low in milk only (i.e., non-fat, low-fat, and full-fat milk from cows, goats, etc., but not including soy milk, almond milk, and other plant derivatives). They also determined the deaths attributable to a diet low in calcium only. This included calcium from both dairy products (including milk, yogurt, cheese) and non-dairy products such as broccoli or cabbage, etc.

Then, in order to prevent double-counting of milk across both risks, when totaling aggregate deaths from all dietary risks combined, researchers excluded deaths related to low milk intake only.

Note: A similar arrangement exists for "diet low in fiber" as it is a category that includes fruits, vegetables, grains, and legumes. To prevent double-counting at the aggregate level for all dietary risks combined, researchers excluded deaths related to low fiber intake only.

Q. **Where can I find the underlying data sources by country?**

A.   A listing of data sources used in the analysis can be found in the online source tool (http://ghdx.healthdata.org/gbd-2017/data-input-sources) on the Global Health Data Exchange website.

Q. **Where can I find estimates by country?**

A.   Estimates for 195 countries and territories can be found in Supplemental Tables 7 and 8.