

Cancer Trends Progress Report

Online Summary of Trends in US Cancer Control Measures

Nitrate

Data Up to Date as of:

July 2021

Background

Nitrates and nitrites are nitrogen-oxygen chemical units that naturally occur in soil, water, and some foods. When taken into the body by drinking water and through other dietary sources, nitrate and nitrite can react with amines and amides to form N-nitroso compounds (NOC), which are known to cause cancer in animals and may cause cancer in humans. Excessive nitrate or nitrite exposure can also result in acute acquired methemoglobinemia, a blood abnormality that causes blood to lose its ability to carry oxygen to tissues (anoxia). This is especially dangerous in infants younger than 4 months of age.

The biggest source of nitrate exposure is dietary consumption of certain types of vegetables which are naturally high in nitrate. However, these vegetables also contain compounds that prevent the formation of NOCs. Studies assessing connections between nitrate and cancer in humans have focused on excess exposure from drinking water or food grown in areas where use of nitrogen-based fertilizers is common. Some of the highest levels of nitrate have been measured in shallow wells and surface water supplies that are subject to runoff from nitrogen fertilizers and confined animal feedlot operations and resulting excrement and contamination from leaking septic tanks and sewage. In addition, workers who manufacture these fertilizers can have high exposures to dusts that contain nitrate. Oral tobacco also may contribute to nitrate intake, but is minor compared to diet or contaminated drinking water.

Studies have shown increased risks of colon, kidney, and stomach cancer among people with higher ingestion of water nitrate and higher meat intake compared with low intakes of both, a dietary pattern that results in increased NOC formation. Other studies have shown modest evidence that higher nitrate intake can increase the risk of thyroid cancer and ovarian cancer among women.

Measure

We present exposure data on the 95th percentile of the population, representing people with the greatest exposure. The 95th percentile level means that 95% of the population has concentrations below that level. Public health officials use such reference values to determine whether groups of people are experiencing an exposure that is unusual compared with an exposure experienced by the rest of the population. [\[Citation\]](#)

To calculate whether the differences between 95th percentiles for two different time points is statistically significant, we used a different statistical methodology than that used by the National Center for Environmental Health, who publishes the National Report on Human Exposure to Environmental Chemicals from where our data are derived. Our estimates may differ slightly from those in the original report due to differences in statistical procedures used.

[\[Methodology\]](#)

Healthy People 2030 Target

There are no Healthy People 2030 targets regarding nitrate.

[Healthy People 2030](#) is a set of goals set forth by the Department of Health and Human Services.

Data Source

Centers for Disease Control and Prevention, National Center for Health Statistics, National Health and Nutrition Examination Survey.

Trends and Most Recent Estimates

By Sex

95th percentile for urinary (creatinine corrected) concentrations (mg/g of creatinine) of nitrate among persons aged 6 years and older by sex, 2001-2016

Overview Graph	Detailed Trend Graphs	Most Recent Estimates (2015 to 2016)	
		Dependent Variable	95% Confidence Interval
	Both Sexes	137.6	119.1 - 158.1
	Male	122.1	107.4 - 154.9
	Female	147.1	121.4 - 176.9

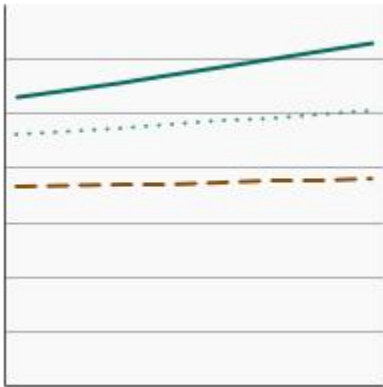
By Race/Ethnicity

95th percentile for urinary (creatinine corrected) concentrations (mg/g of creatinine) of nitrate among persons aged 6 years and older by race/ethnicity, 2001-2016

Overview Graph	Detailed Trend Graphs	Most Recent Estimates (2015 to 2016)	
		Dependent Variable	95% Confidence Interval
	All Races	137.6	119.1 - 158.1
	Non-Hispanic White	142.3	112.8 - 164.2
	Non-Hispanic Black	98.6	87.7 - 104.5
	Hispanic	120.7	107.1 - 139.9

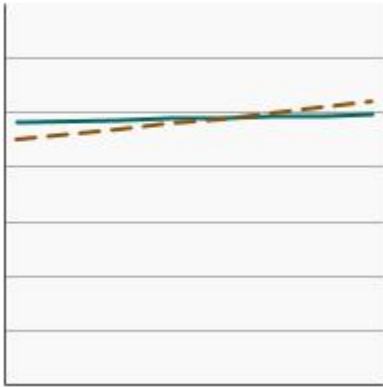
By Age

95th percentile for urinary (creatinine corrected) concentrations (mg/g of creatinine) of nitrate among persons aged 6 years and older by age, 2001-2016

Overview Graph	Detailed Trend Graphs	Most Recent Estimates (2015 to 2016)	
		Dependent Variable	95% Confidence Interval
	<u>Ages 6-11</u>	175.4	133.2 - 220.3
	<u>Ages 12-19</u>	103.0	83.5 - 117.7
	<u>Ages 20+</u>	125.7	108.0 - 151.6

By Poverty Income Level

95th percentile for urinary (creatinine corrected) concentrations (mg/g of creatinine) of nitrate among persons aged 6 years and older by poverty income level, 2001-2016

Overview Graph	Detailed Trend Graphs	Most Recent Estimates (2015 to 2016)	
		Dependent Variable	95% Confidence Interval
	<u>< 200% of the federal poverty level</u>	129.5	115.4 - 146.8
	<u>>= 200% of the federal poverty level</u>	143.4	117.5 - 164.3

By Education Level

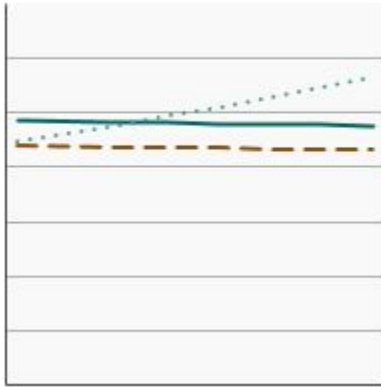
95th percentile for urinary (creatinine corrected) concentrations (mg/g of creatinine) of nitrate among persons aged 20 years and older by highest level of education obtained, 2001-2016

[Overview Graph](#)

Detailed Trend Graphs

Most Recent Estimates (2015 to 2016)

Dependent Variable 95% Confidence Interval



<u>Less than High School</u>	119.4	102.0 - 161.2
<u>High School</u>	90.4	81.2 - 152.2
<u>Greater than High School</u>	135.9	113.1 - 162.4

Additional Information on Nitrate