Nitrates/Nitrites

Description/Chemical Forms:	Sources/Routes of Exposure:	Health Effects:
NO_3^- (Nitrate): Naturally occurring inorganic ion found in soil, water, and some foods; common ingredient in nitrogen-based fertilizers, including ammonium or potassium nitrate NO_2^- (Nitrite): Naturally occurring inorganic ion found in soil, water, and some foods; can easily oxidize into nitrate • Both NO_3^- and NO_2^- are part of the nitrogen cycle and a product of anaerobic digestion, in which microbes breakdown organic matter to produce ammonia gas (NH_3)	Sources: foods (especially vegetables), compounds dissolved in soil or water Main Route of Exposure: Ingestion-dissolved compounds in both public and private wells from run-off or waste processing failures, residue left on produce, contaminated medication Inhalation-nitrite fumes can be released from some types of inhalants, such as "poppers"- volatiles that include cyclohexyl, butyl, and amyl nitrites used for sexual enhancement	Acute Acquired Methemoglobinemia: Excessive nitrates in the blood can alter iron levels from Fe^{2+} to Fe^{3+}, causing the abnormal hemoglobin, methemoglobin, to form and restrict oxygen from reaching vital tissues • Early stages: bluish hue (cyanosis) to the skin, increased heart rate, fatigue • Advanced stages: CNS depression, lethargy, convulsions • Death can occur at blood methemoglobin levels $\geq$50%

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Diagnosis/Treatment Options:	Prevention Strategies:	Links for Additional Information:
No routine medical test to determine nitrite or nitrate levels in the blood currently exists. Methemoglobin can be detected in blood, yet causative factors, such as exposure to nitrite/nitrate, cannot be identified. These compounds have not officially been classified as carcinogenic to humans by the Department of Health and Human Services (DHH), the International Agency for Research on Cancer (IARC), or the Environmental Protection Agency (EPA), yet additional research will likely be necessary in the future.	Advise patients to: • Avoid direct contact with nitrogen-containing fertilizers. • Regularly test private well water sources for nitrate levels; EPA current standard is 10mg/L or 10ppm Sensitive Population (Fetal Methemoglobinemia): Infants under 4 months are especially sensitive to nitrate exposure since their GI tracts are highly alkaline and conducive to growth of nitrate-producing bacteria. Filtered water for formula is advisable for homes with high nitrogen content in private/domestic wells	More information concerning nitrate/nitrite exposure and health effects can be found at the following sites: http://www.atsdr.cdc.gov/toxfaqs/tf.asp?id=1186&tid=258 http://water.epa.gov/drink/contaminants/basicinformation/nitrate.cfm http://www.drugabuse.gov/publications/drugfacts/inhalants