

This is an official **CDC HEALTH UPDATE**

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Statement on Health Effects of Shuttle Debris

CDC and ATSDR are providing these fact sheets, web links, and information on personal protective equipment (PPE) and medical toxicology for use in state responses to the Space Shuttle Columbia disaster. This information has also been shared with poison control centers.

On February 01, 2003, the shuttle "Columbia" broke apart over eastern Texas. Debris from the shuttle has been found in a wide area underneath its path, principally in eastern Texas and Louisiana. Questions have been raised about possible human health effects related to substances released during the shuttle break-up. What follows is an interim assessment by experts in the Department of Health and Human Services. This guidance will be updated as necessary as further information becomes available.

NASA has indicated that two toxic liquid fuel components, monomethyl hydrazine and nitrogen tetroxide, could have been present at the end of a shuttle voyage. Nevertheless, based principally on the physical characteristics of both liquids (nitrogen tetroxide boiling point 21 degrees C; methylhydrazine BP 88 degrees C), we conclude that neither is likely to have survived the descent of almost 40 miles in a concentrated liquid or solid state. Accordingly, we consider that the general population in the area of falling debris and with no close contact with the debris is not at risk from either chemical. NASA data indicate that no other toxic or radioactive substances were present in quantities likely to pose a danger to health.

More caution should be exercised by those who must be exposed to shuttle debris in the course of search and recovery operations. Although unlikely, it is conceivable that the toxic fuel components or other reagents used in shuttle experiments could have remained concentrated and sequestered in specific components of shuttle debris. Personal protective equipment (see below) should be used by those who must necessarily be in close contact with shuttle debris. Those inadvertently exposed to smoke or particulate emissions or who have had physical contact with any liquid or solid components of the debris should seek medical attention for any symptoms that may develop. Physicians treating patients with such a history should provide symptomatic and supportive treatment. If there is a strong suspicion of contact with substantial amounts of methylhydrazine, treatment with pyridoxine may be considered. Consultation with the regional poison center may be helpful in determining the dose of pyridoxine and the need for such treatment in specific cases. Although it is unlikely to be relevant to the evaluation or treatment of patients without close exposure to the debris, for more highly exposed individuals' physicians should be mindful of the fact that methylhydrazine exposure has been associated with delayed pulmonary edema and with hemolytic anemia.

As with any mechanical event involving solids and high energies, airborne particulates can be produced. The health effects of particulates are well known to medical personnel and include respiratory irritation, cough, and (in high concentrations) difficulty breathing. In addition, persons with chronic bronchitis, asthma, or hyperreactive

airways may develop bronchospasm and respiratory failure. Such effects would be expected only in those with particularly close exposure to shuttle debris and not in the general population in the area of falling debris. Oxygen, bronchodilators, and other supportive respiratory care can be given to those exposed and symptomatic.

NOTE: Attachments were removed due to broken links. Contact the Health Alert Network for further information.

General information about the health effects of a variety of hazardous materials, including fuel propellants, is available at <http://www.atsdr.cdc.gov/toxfaq.html>

ATSDR Ammonia ToxFAQ sheet :<http://www.atsdr.cdc.gov/tfacts126.pdf>

ATSDR Hydrazine ToxFAQ sheet :<http://www.atsdr.cdc.gov/tfacts100.pdf>

ATSDR Nitrogen Oxides ToxFAQ sheet :<http://www.atsdr.cdc.gov/tfactsx6.pdf>

ATSDR Ammonia Medical Management Guideline:
<http://www.atsdr.cdc.gov/MHMI/mmg126.pdf>

ATSDR Nitrogen Oxides Medical Management Guidelines:
<http://www.atsdr.cdc.gov/MHMI/mmgx6.pdf>

ATSDR Unknown Chemical Medical Management Guideline
:<http://www.atsdr.cdc.gov/mmgx6.pdf>

NIOSH Ammonia Worker Health & Safety card:
<http://www.cdc.gov/niosh/ipcsneng/neng0414.html>

NIOSH Hydrazine Worker Health & Safety card:
<http://www.cdc.gov/niosh/ipcsneng/neng0281.html>

NIOSH Nitrogen Dioxide (Tetraoxide) Worker Health & Safety card
:<http://www.cdc.gov/niosh/ipcsneng/neng0930.html>

NLM HSDB Emergency Medical Treatment for Methyl Hydrazine :<http://toxnet.nlm.nih.gov/cgi-bin/sis/search/f?/.temp/~BAAm.aGvs:3>

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DEPARTMENT OF HEALTH AND HUMAN SERVICES