

Questions & Answers from the View-Master Public Meeting Held on January 28, 2003



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This document contains responses to questions that were gathered at the public meeting that Oregon DHS held with former View-Master workers and concerned citizens on January 28, 2003, at the Elmonica School in Beaverton.

To develop answers, these questions were referred to several different agencies, including the Office of Environmental and Occupational Epidemiology of Oregon DHS, the Office of Environmental Services and Consultation of Oregon DHS, Oregon Department of Environmental Quality, Oregon Drinking Water Program, the federal Agency for Toxic Substances and Disease Registry, the Ombudsman's Office for Injured Workers in the Department of Consumer and Business Services, as well as the Mattel Corporation.

The responses were developed to the best of our knowledge at the present time. This document may be updated in the future if we receive new information.

Section I. Effects of TCE on Health

QUESTIONS ABOUT REPRODUCTIVE AND DEVELOPMENTAL EFFECTS

There is some evidence that exposure to trichloroethylene (TCE) in drinking water may cause certain types of birth defects. However, this body of research is still far from conclusive and there is insufficient evidence to determine whether or not there is an association between exposure to TCE and developmental effects. Some studies suggest that more birth defects may occur when mothers drink water containing TCE. In a study of TCE exposure from well water, greater than expected numbers of children were reported to be born with heart defects. Data from some animal studies also show developmental effects of TCE on the heart. However, other chemicals were also in the water from this well and may have contributed to these effects. Thus, it is not possible to make firm conclusions about the exact effects of TCE from these studies, and more studies need to be done. The proposed health study will evaluate these conditions among the population of former View-Master employees and their children.

Q: All of my children have birth defects - could they have been caused by TCE?

It is impossible to determine with certainty whether any individual birth defects were caused by TCE exposure. As noted above, the most common birth defects related to TCE exposure include cardiac anomalies in children who were exposed to TCE in the fetal stage. Effects on nervous system development and cleft palate formation have also been noted among the children of mothers who drank water contaminated with TCE during pregnancy. One study reported a higher number of children with a rare defect in the respiratory system and eye defects. Children listed in the National Exposure Subregistry of persons exposed to TCE were reported to have higher rates of hearing and speech impairment. There are many questions regarding these reports.

Q: Are my daughters' endometriosis, chronic fatigue syndrome, and Irritable Bowel Syndrome caused by TCE?

No literature was found to suggest that the conditions mentioned above are related to TCE exposure.

Q: How do I know if my grandchildren have been or may be affected? (birth defects, cancer, etc.)? How can we find out about 2nd generation health concerns?

No effects from TCE would be likely to occur in grandchildren as a result of TCE exposure experienced by their grandparents. TCE does not accumulate in the body to appreciable levels. In addition, TCE does not induce genetic changes in most laboratory tests, thus making its potential to effect the second generation even more unlikely.

Q: I was pregnant with two of my children while employed at Sawyers. One of these daughters has a problem with seizures, could this be related?

TCE can induce neurological effects, but no studies were found that associated TCE exposure during pregnancy to seizures in children.

Q: My son was born through c-section and suffered from seizures while I was an employee at Hall Street. He now is unable to have children due to a low sperm count. Does this have to do with TCE?

There is no way to determine for certain whether TCE exposure has resulted in an individual's seizures and low sperm count. Some studies have associated low sperm counts and abnormal sperm production to TCE as a result of workplace exposure in adults.

Q: What is known about reproductive health outcomes? Does TCE affect female fertility? My mother had reproductive difficulties and lost pregnancies. Is this related?

Studies on female reproductive effects are few. One study did report increased menstrual disorders in female workers exposed to TCE.

Q: Could TCE stay in your system and possibly cause birth defects at a later time?

This scenario is highly unlikely, as TCE does not accumulate in the body to levels that would represent a health concern.

Q: My mother was a worker at the Hall St. plant while she was pregnant with me. I have a multitude of nervous system problems that the doctors cannot treat. Was this TCE related?

Exposure to TCE during embryonic development may result in abnormal development of the neural tube. Unfortunately, there is no way to know how much TCE exposure occurred during critical stages of neural tube development at the Hall Street Plant. Studies on rats have demonstrated changes in brain metabolism and adult behavior as a result of embryonic exposure to TCE.

QUESTIONS ABOUT CANCER

The link between oral exposure to TCE and the incidence of cancer in humans is controversial. We do not have any clear evidence that TCE alone in drinking water can cause leukemia or any other type of cancer in humans. People who used water for several years from two wells that had high levels of TCE may have had a higher incidence of childhood leukemia than other people, but these findings are not conclusive, partly because TCE was not the only contaminant present in the drinking water. The most consistent effect across epidemiological studies is an association between TCE exposure and kidney cancer (many of these studies were based on inhalation of TCE as opposed to drinking water exposure).

As part of the National Exposure Subregistry, the Agency for Toxic Substances and Disease Registry (ATSDR) compiled data on 4,280 residents of three states (Michigan, Illinois, and

Indiana) who had environmental exposure to TCE. It found no definitive evidence of an excess of cancers from TCE exposure.

A study in New Jersey found an association between leukemia in women and exposure to TCE in the drinking water. A study in Massachusetts found that TCE exposure was associated with leukemia in children. Results from other studies are inconsistent, and the links between TCE and specific cancers are not fully understood. More studies need to be done to establish the relationship between exposure to TCE and cancer.

Based on the limited data in humans regarding TCE exposure and cancer, and evidence that high doses of TCE can cause cancer in animals, the International Agency for Research on Cancer (IARC) has determined that TCE is probably carcinogenic to humans. In addition, the EPA considers TCE to be a probable human carcinogen. The proposed human health evaluation of former View-Master workers may add important information to help answer these questions about links between exposures and disease.

Q: I am under doctor's care for bladder cancer, is this related?

It is impossible to say for sure whether or not TCE is related to an individual case of cancer or not. In one study, elevated rates of bladder cancer were noted in workers exposed to TCE through inhalation and drinking water. However, the results were not significant enough to conclude that TCE was the cause of the elevated number of bladder cancers. Other studies have not observed elevated bladder cancer after workplace exposure. In the proposed View-Master health study, we will look for any links between TCE exposure at the View-Master plant and the incidence of bladder cancer among former workers, as well as other health problems.

Q: I have been stricken twice with cancer and it is expected to recur. Could TCE have contributed to my illnesses?

Some types of cancer are more likely to be associated with TCE exposure compared to other forms based on existing studies. Unfortunately, it is not possible to determine for certain whether or not TCE contributed to an individual's illness. However, by looking at the health of the View-Master worker population as a whole, we can determine whether there are patterns of illness that would not normally occur. We will be examining various types of cancers and other illnesses in the proposed health study.

Q: I know former workers who developed breast cancer. Any relation to TCE?

No association was found in the literature to suggest a link between breast cancer and TCE exposure in the workplace.

Q: I have lymphoma cancer. Was water & working in injection mold a factor? Is there a future health threat?

Some studies have found a link between TCE and lymphomas. Although it is not possible to determine whether an individual case of lymphoma was directly cause by TCE, in the proposed

health study we hope to determine whether there is an excessive incidence of lymphoma among former View-Master workers.

Q: How many years in the future does cancer show up?

Most types of cancer take several years or decades to show up after exposure to a carcinogen. However, it is impossible to predict when cancer will show up or if it will develop at all in any given individual. For example, although smoking has been shown to cause lung cancer, not all smokers will develop lung cancer.

Q: I had a hysterectomy due to cancer, is this related?

One study found an elevated form of rare ovarian cancer in women exposed to TCE. Another study found a significant increase in cervical cancer as a result of workplace exposure to inhaled TCE.

It is not possible to determine whether any individual's illness was caused directly by TCE. By conducting a complete health study, we can instead determine whether patterns of particular diseases emerge among the population of former View-Master workers as a whole.

Q: Is there any association with my brother's inoperable brain tumor and TCE?

No information could be found on brain tumors and exposure to TCE.

Q: My mother worked at the Hall Street Plant for 10 years. Last year she was diagnosed with kidney cancer. Is this related?

One of the initial findings from the DHS Public Health Consultation was that elevated rates of kidney cancer were observed in a limited number of workers from the Hall Street plant. Epidemiological evidence and toxicological studies have demonstrated an association between TCE exposure and kidney cancer. Unfortunately, it is not possible to determine for certain whether an individual case of kidney cancer was related to workplace exposure to TCE.

QUESTIONS ABOUT VARIOUS OTHER HEALTH EFFECTS

Q: What other health concerns other than cancer might be caused by TCE?

TCE has been associated with numerous effects besides cancer. Several of these effects remain controversial, due to small numbers among worker populations and mixed exposures to other chemicals. Other effects are mostly associated with high dose, short-term exposure.

Non-cancer effects that may be associated with TCE exposure according to some studies include cardiovascular, respiratory, liver, kidney, immunological, neurological, reproductive and developmental effects. Other studies have found no association between TCE exposure and the effects mentioned above.

Q: I have several medical problems for which doctors have no explanation. These include urinary, bladder and nerve problems, loss of hearing, muscle and joint problems. Could these be TCE related?

It is impossible to say for certain whether or not these effects are related to TCE exposure. Hearing problems were noted in children exposed in utero to TCE. Impaired kidney function was noted in some studies as a result of exposure to a high concentration of TCE. No information was found on musculoskeletal effects and TCE exposure.

Q: Can TCE cause Lupus (SLE), fibromyalgia, or Sjogrens syndrome? I have had numerous joint replacements, is this related?

A study of residents from Tucson, Arizona, who were exposed to TCE and other chemicals in well water drawn from the Santa Cruz aquifer found increased frequencies of systemic lupus erythematosus symptoms. No information was found on the other conditions mentioned above.

Q: Can TCE cause Crohn's disease?

No information was found on Crohn's disease and exposure to TCE.

Q: I have had intestinal problems after working 14 years at the plant, yet the screening doctors ignored them.

Some of the people exposed to TCE and other chlorinated hydrocarbons in the drinking water in Woburn, Massachusetts, complained of chronic nausea, episodic diarrhea, and constipation. Although 52% of the subjects had these complaints, these general signs could not be specifically attributed to the TCE.

Q: I drank many gallons of water. Can this have caused my migraines and sinus problems?

Headaches were reported in a study population who drank well water contaminated with TCE. In addition, respiratory difficulties due to TCE exposure have been observed in another study. However, headaches and sinus problems are also related to numerous factors that have nothing to do with TCE exposure.

Q: After 14 years at the Hall Street plant, I have some nasty allergies, asthma and thyroid problems, are these TCE related?

One study did suggest increased respiratory disorders, such as asthma, bronchitis and pneumonia in children who were chronically exposed to contaminated well water.

Q: I worked for about 12 years at the plant, in 1968 I developed tinnitus, which I have had constantly since, is this related?

There were no studies that examined an association between tinnitus and TCE exposure.

Q: Should I be worried about getting kidney & liver problems now if I worked at the plant from 1971-6?

While it is unlikely that liver and kidney problems will develop, it is important to tell your physician about your employment at the Hall Street plant and to remain proactive about screening for potential health problems.

Q: Does TCE affect the immune system? Can TCE cause multiple chemical sensitivities, food allergies, and environmental allergies by weakening your immune system?

Immunological abnormalities were reported in 23 adults in Woburn, Massachusetts, who were exposed to well water contaminated with TCE and other chemicals, and who were family members of children with leukemia. These immunological abnormalities, tested for 5 years after well closure, included persistent changes in white blood cells. The ability to apply these findings to other communities may be limited, however.

Q: Does TCE have anything to do with diabetes?

Although there have been no studies on specific endocrine effects in humans following oral exposure to TCE, in the National Exposure Subregistry for TCE, diabetes rates were higher for females in certain age groups. In the proposed View-Master health study, DHS plans to examine whether diabetes occurs excessively among former View-Master workers, to help determine whether TCE exposure may increase the risk of diabetes.

Q: Does TCE cause neurological effects? Could rapid heart rate be caused by TCE?

The epidemiological studies of the people exposed to TCE, as well as other chemicals, from well water in Woburn, Massachusetts, did not reveal neurological problems. Some of the people in this community did show residual damage to the facial and trigeminal nerves, measured by a decreased blink reflex (indicating damage to cranial nerves V and VII) six years after exposure.

Among persons in the ATSDR Exposure Subregistry for TCE, a statistically significant increase in impairment of hearing was reported in children age 9 years or younger. The study authors caution that their findings do not identify a causal relationship between TCE and effects but does suggest areas for further research.

Q: Is there testing to see if TCE is still in one's system?

Yes, there are some tests that can show if you have been recently exposed to TCE since this chemical can be measured in your breath. Also, there are tests that can be ordered by a doctor to measure TCE or a number of breakdown products of TCE in your urine or blood from recent exposure.

If the measurements are done soon after the exposure, the breath levels can indicate whether you have been exposed to a large amount of TCE or only a small amount. Urine and blood tests can

also show if you have been recently exposed to large amounts of this chemical. Because one of the breakdown products leaves your body very slowly, it can be measured in the urine for up to about 1 week after TCE exposure. However, exposure to other similar chemicals can produce the same breakdown products in your urine and blood. Therefore, these methods cannot confirm whether you have been exposed specifically to TCE.

Q: Can TCE affect you immediately? When does it usually have an impact?

Immediate effects from TCE usually happen only when very large amounts of the undiluted solvent enter the body over a short period of time. Most of the health concerns from drinking TCE-contaminated water, which is less concentrated than pure TCE solvent, would only be seen months to years after the exposure began.