

Early-life exposure to chemical in drinking water may affect vision, study finds

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Prenatal and early childhood exposure to the chemical solvent tetrachloroethylene (PCE) found in drinking water may be associated with long-term visual impairments, particularly in the area of color discrimination, a new study led by Boston University School of Public Health (BUSPH) researchers has found.

The study by epidemiologists and biostatisticians at BUSPH, working with an ophthalmologist from the BU School of Medicine, found that people exposed to higher levels of PCE from gestation through age 5 exhibited poorer color-discrimination abilities than unexposed people. The study, published July 11 in the journal [Environmental Health Perspectives](#), recommends further investigation into the [visual impairments](#) associated with PCE exposure.

The research team assessed visual functioning among a group of people born between 1969 and 1983 to parents residing in eight towns in the Cape Cod region of Massachusetts. The towns all had PCE in their drinking water because of pipes outfitted with a vinyl liner that was improperly cured. Previous studies led by Ann Aschengrau, professor of epidemiology at BUSPH, have found associations between PCE exposure and cancer, as well as reproductive and [developmental outcomes](#). Increases in the risks of [breast cancer](#) and certain birth defects were seen in the team's prior studies.

PCE is a known [neurotoxin](#) that was used to apply the vinyl liner of some drinking [water pipes](#). Surveys have estimated that more than 600

miles of such pipes were installed in nearly 100 cities and towns in Massachusetts, mainly during the 1970s. Exposure to PCE from drinking water occurs by direct ingestion, dermal exposure during bathing, and by inhalation during showering, bathing and other household uses.

The pipes no longer leach PCE, but the chemical is still widely used in dry cleaning and metal degreasing solutions and is a common drinking water contaminant.

In testing vision, Aschengrau and colleagues found that people exposed to PCE made more major errors in color discrimination than those not exposed. The levels of color confusion were greatest among people with high exposure levels. PCE previously has been implicated in deficiencies in color discrimination, mainly among adults with occupational exposures. The new study is the first to assess "the associations between prenatal and early childhood exposure to PCE and adult vision," Aschengrau said. The findings suggest that "the effects of early life PCE-exposure on color discrimination may be irreversible."

Provided by Boston University Medical Center

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