

## ATSDR Timeline of Public Health Activities at Camp Lejeune, North Carolina

### 1989 – Camp Lejeune and ABC One-Hour Cleaners – Superfund Sites

The US Environmental Protection Agency lists US Marine Corps Base Camp Lejeune and ABC One-Hour Cleaners as Superfund sites and adds both sites to the [National Priorities List](#).

### 1990 – ABC One-Hour Cleaners Public Health Assessment

[ATSDR finds that PCE is the main contaminant of concern detected in the Tarawa Terrace drinking water system](#). Although contaminated wells have been removed from the Tarawa Terrace water system, on- and off-site groundwater is contaminated. Groundwater and subsurface soils remain a public health concern.

### 1997 – Camp Lejeune Public Health Assessment

ATSDR identifies a past health hazard from exposures to contaminated water in Tarawa Terrace and Hadnot Point water systems. ATSDR scientists also identify a short time frame when the Holcomb Boulevard system was contaminated. ATSDR recommends a health study to assess risk to children from maternal exposure during pregnancy.

### 1998 – Reproductive Health Study

ATSDR completes its [first study on health of children born from 1968-1985](#) whose mothers were exposed to contaminated drinking water during pregnancy. This study is published in 2001 in the *American Journal of Epidemiology*. In 2007, ATSDR reports an error in the exposure assessment and declares its intention to re-evaluate the results.

### 1999-2002 – ATSDR Parent Phone Survey

ATSDR conducts a [telephone survey](#) of 12,598 parents of children born to women who were pregnant while living at Camp Lejeune from 1968-1985. Survey is designed to identify and confirm all reported cases of selected birth defects and childhood cancers in children exposed in utero to VOC-contaminated drinking water.

### 2003 – Telephone Survey Results

ATSDR's 2002 [telephone survey](#) finds 106 children with specific birth defects and some types of childhood cancer. ATSDR begins confirming cases with medical records.

### 2004-2005 – Water Contamination Reconstruction

Past Camp Lejeune water-quality sampling data are very limited. ATSDR begins historical reconstruction of Tarawa Terrace and Hadnot Point water treatment plant service areas to determine where and when certain areas at Camp Lejeune received VOC-contaminated drinking water.

### 2005 – Panels review health studies, water modeling

In February, ATSDR convenes an expert panel to explore the need for and feasibility of conducting additional health studies of people exposed to contaminated drinking water at Camp Lejeune. [In March, an expert panel evaluates the agency's field data gathering activities at Camp Lejeune and water modeling approach](#). ATSDR technical staff considers the panel recommendations and implements them as appropriate.

### **2005 – Birth Defects/Childhood Cancer Parent Interviews**

ATSDR begins [Exposure to Volatile Organic Compounds in Drinking Water and Specific Birth Defects and Childhood Cancers study](#), which evaluates groups of children with and without health effects. Telephone interviews gather information about residence, other health factors, and amount of water mothers drank during pregnancy. Study includes use of water modeling data to determine which mothers received contaminated water.

### **2006 – Camp Lejeune Community Assistance Panel (CAP)**

ATSDR holds the first CAP meeting with community members and non-government scientific experts. The CAP will help identify feasible studies for the future and prioritize them.

### **2007 – Tarawa Terrace Water Analysis**

ATSDR's analysis of Tarawa Terrace water treatment plant service area reveals that from November 1957 through February 1987, residents of Tarawa Terrace family housing and other facilities received PCE-contaminated drinking water above EPA's maximum contaminant level.

### **2007-2008 – Feasibility of Conducting Further Camp Lejeune Studies**

ATSDR determines that additional studies of mortality and cancer incidence among persons living and working at Camp Lejeune are feasible and would be scientifically useful and helpful to people exposed to contaminated water.

### **2008 – National Defense Authorization Act**

In January, President George W. Bush signs the 2008 National Defense Authorization Act. This act includes a requirement that the Department of the Navy, working with ATSDR, conduct a [health survey](#) of persons possibly exposed to contaminated drinking water at Camp Lejeune.

### **2009 – Expert panel reviews water modeling**

ATSDR convenes an expert panel to assess water-modeling and data analyses for Hadnot Point-Holcomb Boulevard study area. ATSDR agrees to evaluate the applicability of simplified approaches for determining historical concentrations at water-supply wells. The panel also encourages the Department of the Navy to ensure that ATSDR has all data and documentation necessary to complete water-modeling activities.

### **2009 – Reevaluation of VOC Exposure**

ATSDR discovers additional information about VOCs in finished water at Camp Lejeune. ATSDR learns that people serviced by the Holcomb Boulevard water-distribution system occasionally have been exposed to contaminated water. ATSDR also recognizes that benzene present in the water-supply wells before 1985 should be moved from the appendix to the body of its public health assessment. Consequently, ATSDR removes the [1997 Public Health Assessment](#) from its web site.

### **2010-2012 – DON/ATSDR work together to complete data gathering**

From 2010-2012, the [DON/ATSDR Camp Lejeune Data Mining Technical Workgroup](#) (DON, USMC, and ATSDR) conducted nine meetings to complete data gathering for water modeling and the epidemiologic studies.

**2010 – ATSDR begins mortality study**

ATSDR begins a [mortality study](#) looking at all causes of death for military and civilian personnel who lived/worked at Camp Lejeune between specific dates in the 1970s and 1980s. The study seeks to determine if these deaths are linked to exposure to contaminated water at Camp Lejeune. The study includes an unexposed sample from Camp Pendleton.

**2010 – [ATSDR releases Hadnot Point-Holcomb Boulevard Chapter C Report](#)**

The report describes the occurrence of PCE, TCE, benzene, and vinyl chloride in groundwater at Navy Installation Restoration Program (CERCLA) sites. The sites are located within the Hadnot Point and Holcomb Boulevard water treatment plants service areas and vicinities at Camp Lejeune.

**2011 – [ATSDR expert panel considers health survey issues](#)**

ATSDR expert panel reviews process of confirming self-reported disease and survey evaluation bias and agrees to move forward with confirmation.

**2011 – ATSDR mails health surveys**

ATSDR mails [ATSDR Health Survey of Former Marine Corps Personnel and Civilians](#) to persons who lived or worked at Camp Lejeune when drinking water was contaminated and to persons living or working at Camp Pendleton during the same time period. The survey asks about more than 20 different cancers and diseases and provides opportunity to report diseases not mentioned.

**2011 – [ATSDR Public Information Forum](#)**

ATSDR holds a public information forum for Camp Lejeune at the University of North Carolina Wilmington. The forum includes an update on ATSDR's health survey and other activities, an open house, one-on-one question and answer sessions, and an update from the CAP.

**2012 – Geohydrologic Framework Report**

ATSDR releases [Hadnot Point-Holcomb Boulevard Chapter B](#). The report includes information and data on the layers of sediment and groundwater beneath Camp Lejeune. This information provides a foundation for understanding groundwater flow and conducting water modeling.

**2012 – [ATSDR/DON Data Mining Workgroup Final Report](#)**

The Data Mining Workgroup, established in 2010, assures that ATSDR has a complete accounting of DON document locations that contain potentially relevant data and information for water modeling. The documents identified by the workgroup provide more information on how the Camp Lejeune Drinking Water Systems were operated.

**2012 – Contamination at RCRA Areas Report**

ATSDR releases [Hadnot Point-Holcomb Boulevard Chapter D](#). This report summarizes investigations at 64 [Resource Conservation and Recovery Act \(RCRA\)](#) study areas. The report emphasizes the occurrence and distribution of refined petroleum products such as benzene, toluene, ethylbenzene, xylene, and chlorinated solvents of PCE and TCE within areas served by the Hadnot Point and Holcomb Boulevard water treatment plants.

**2012-2014 – [DON/ATSDR work together to complete data gathering](#)**

From 2012-2014, the DON, USMC Camp Lejeune, and ATSDR conducted and completed data gathering for the soil vapor intrusion project.

**2013 – [Hadnot Point-Holcomb Boulevard Reconstruction Report](#)**

ATSDR releases [Hadnot Point-Holcomb Boulevard Chapter A and supplements](#). This report summarizes previous analyses and investigations—Chapters B, C, and D—and results of detailed water modeling analyses.

**2013 – [Birth Defects and Childhood Cancers Study](#)**

The purpose of this study was to determine if maternal exposures to the drinking water contaminants at Camp Lejeune increased the risk of neural tube defects, oral clefts, and childhood hematopoietic cancers. This study also examined whether children exposed to contaminated drinking water during the first year of life had an increased risk of childhood cancers.

**2014 – [Mortality Study of Marine and Naval Personnel](#)**

The purpose of this study was to determine whether residential exposures of Marines and Navy personnel to contaminated drinking water at Camp Lejeune increased risk of mortality from cancers and other chronic diseases.

**2014 – [Mortality Study of Civilian Employees](#)**

The purpose of the study was to determine whether potential exposures to the drinking water contaminants at Camp Lejeune are associated with increased risk of death from specific cancers and other chronic diseases among those who were employed at the base.

**2014 – [Adverse Birth Outcomes Study](#)**

ATSDR publishes study to determine if maternal exposures to contaminants in drinking water at Camp Lejeune were associated with preterm birth and fetal growth retardation. This study is a reanalysis of a previous study, which incorrectly categorized as “unexposed” some maternal exposures before June 1972 based on information available at the time.

**2015 – [Male Breast Cancer Study](#)**

The purpose of this study was to determine if Marines who were exposed to contaminated drinking water at Camp Lejeune were more likely to have male breast cancer.

**2016 – [Cancer Incidence Study](#)**

ATSDR begins the Cancer Incidence Study. The purpose of the study is to determine whether residential or workplace exposures to the drinking water contaminants at Camp Lejeune are associated with increased risks of specific cancers in Marines/Navy personnel and civilian employees.

**2016 – [Camp Lejeune Drinking Water Public Health Assessment \(Public Comment Version\)](#)**

ATSDR released preliminary findings from the revised public health assessment (PHA) of the health effects of exposure to volatile organic compounds (VOCs) found in the drinking water at

U.S. Marine Corps Base Camp Lejeune in North Carolina for public comment on May 3, 2016. The public was invited to review the PHA online and to submit comments before July 5, 2016.

**2017 – [Camp Lejeune Drinking Water Public Health Assessment](#)**

ATSDR released on January 20, 2017, the final public health assessment (PHA) of the health effects of exposure to volatile organic compounds (VOCs) found in the drinking water at U.S. Marine Corps Base Camp Lejeune in North Carolina.