

Solvents, Parkinson's Disease Risk and Residence at Camp LeJeune

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**Parkinson's
Disease**

Research,
Education &
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UCSF

Weill Institute for
Neurosciences

Department of
Neurology

Trichloroethylene: Parkinsonism and Complex 1 Mitochondrial Neurotoxicity

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3 PD patients, small industry, all exposed to TCE
65/134 coworkers responded to questionnaire
21 endorsed symptoms
14 with clinical signs of parkinsonism on exam

Trichloroethylene induces dopaminergic neurodegeneration in Fisher 344 rats

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Biological plausibility: Oral TCE:

- SNpc neuron loss (dose dependent)
- Reduced rotarod performance
- Nigra: Reduced mt Complex I function, oxidative stress markers, microglial activation in SN
- α -synuclein in DM X, SN neurons

PD & Occupational Solvent Exposure in 99 Discordant Twin Pairs

Goldman, Tanner, Quinlan, et al, Ann Neurol 2012

- NAS/NRC WWI Veteran Twins
- Male twins discordant for PD
- NIH criteria by consensus of 2 movement disorder neurologists (CMT, GWR)
- Lifelong job task specific occupational history
- Exposure assigned by industrial hygienist unaware of case status

Solvent	Odds Ratio Ever/Never	95% Confidence Interval	p-value
TCE	6.1	1.2-33	0.034
PERC	10.5	0.97-113	0.053

TriChloroethylene (TCE) & Perchloroethylene/tetrachloroethylene (PERC,PCE)

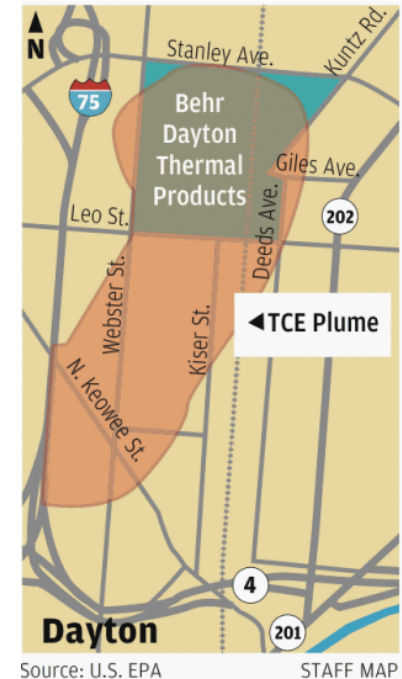
- **Environmentally persistent**
- **Common soil, ground water contaminants**

PERC

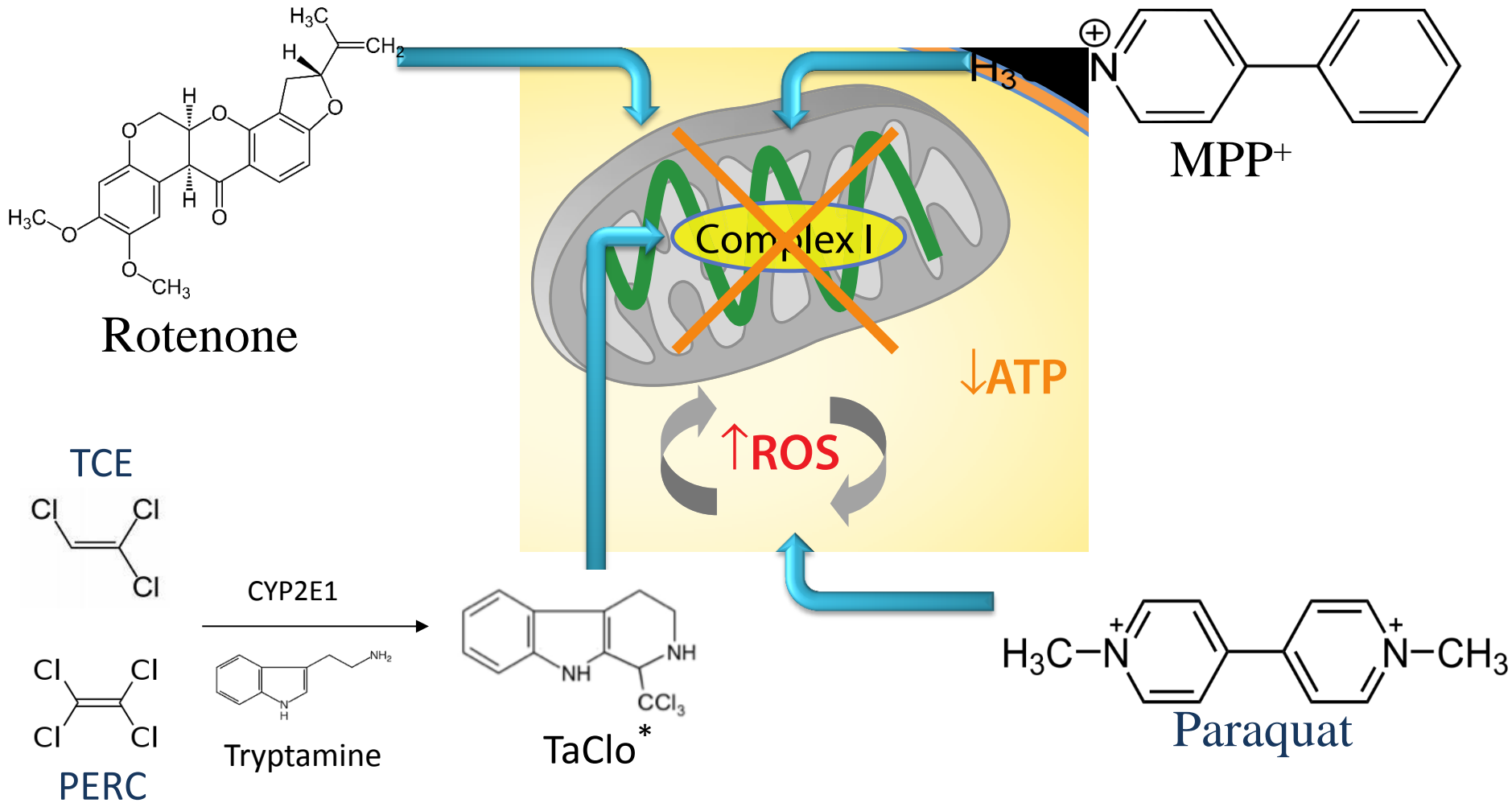
- Excellent solvent
- Nonflammable
- Popular drycleaning solvent

TCE

- Industrial degreasing agent
- Surgical anesthetic, decaffeinated coffee
- Most common organic contaminant in groundwater



Toxicants Associated with PD Risk: Mechanistic & Structural Similarity



*1-trichloromethyl-1,2,3,4-tetrahydro-β-carboline

Camp Lejeune N.C.

Figure 1. The Hadnot Point-Holcomb Boulevard Water Distribution Areas, U.S. Marine Corps Base Camp Lejeune, North Carolina



History:

1953-1985 - Water contaminated with TCE & PCE (i.e., PERC)

1980 – Contaminants discovered

1987- Wells closed

1989 - EPA Superfund

500,000 – 1 million exposed

Military: Marines, National Guard, , reservists

Civilian: Family members, employees

Sources of exposure:

Drinking water, bathing,

Inhalation, swimming, recreation

Exposure levels:

Est.monthly median (max. mean) ug/L:

PCE: 85 (158); TCE: 366 (783)

vs. US max. contaminant level: 5 ug/l

Honoring America's Veterans & Caring for Camp Lejeune Families Act of 2012

- Health benefits to veterans & family members with any of 15 conditions identified in a National Research Council report as having limited/suggestive evidence of an association with TCE, PERC or a solvent mixture :
 - Esophageal cancer
 - Lung cancer
 - Breast cancer
 - Bladder cancer
 - Kidney cancer
 - Adult leukemia
 - Multiple myeloma
 - Myelodysplastic syndromes
 - Renal toxicity
 - Hepatic steatosis
 - Female infertility
 - Miscarriage with exposure during pregnancy
 - Scleroderma
 - Neurobehavioral effects
- Benefits provided “notwithstanding that there is insufficient medical evidence to conclude that such illnesses or conditions are attributable to such service “..or “residence”



CAMP LEJEUNE: PAST WATER CONTAMINATION

From the 1950s through the 1980s, people serving or living at the U.S. Marine Corps Base Camp Lejeune, North Carolina, were potentially exposed to drinking water contaminated with industrial solvents, benzene, and other chemicals. This chemical exposure may have led to adverse health conditions.

YOU MAY BE ELIGIBLE FOR VA HEALTH BENEFITS IF YOU SERVED ON ACTIVE DUTY (VETERANS) OR RESIDED (FAMILY MEMBERS) AT CAMP LEJEUNE FOR 30 DAYS OR MORE BETWEEN AUGUST 1, 1953 AND DECEMBER 31, 1987:

- Veterans who are determined to be eligible will be able to receive VA health care. In addition, care for qualifying health conditions is provided at no cost to the Veteran (including copayments).
- Eligible family members receive reimbursement for out-of-pocket medical expenses incurred from the treatment of qualifying health conditions after all other health insurance is applied.

QUALIFYING HEALTH CONDITIONS INCLUDE:

- Bladder cancer
- Breast cancer
- Esophageal cancer
- Kidney cancer
- Leukemia
- Lung cancer
- Multiple myeloma
- Myelodysplastic syndromes
- Non-Hodgkin's lymphoma
- Female infertility
- Hepatic steatosis
- Miscarriage
- Neurobehavioral effects
- Renal toxicity
- Scleroderma

VETERANS

ENROLL IN VA HEALTH CARE

- Inform VA that you served on active duty at Camp Lejeune for at least 30 days during the covered time period.
- Already enrolled? Contact your local VA health care facility at <http://www.va.gov/directory/guide/> to sign up for the Camp Lejeune Program and receive VA care.
- Not yet enrolled? Apply online at <http://www.va.gov/healthbenefits/apply/> or call toll-free 1-877-222-8387.

FAMILY MEMBERS

GATHER DOCUMENTS

- Show your relationship to a Veteran, such as a marriage license or birth certificate.
- VA will assist you with verifying residency on Camp Lejeune during the covered timeframe.

GATHER QUALIFYING EXPENSE RECEIPTS

- By law, VA may only compensate for eligible out-of-pocket expenses after family members have received payment from all other health plans.

APPLY FOR REIMBURSEMENT

- Apply online at <https://www.clfamilymembers.fsc.va.gov> or call toll-free 1-866-372-1144.

VA



U.S. Department
of Veterans Affairs

News Release

Office of Public Affairs
Media Relations

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FOR IMMEDIATE RELEASE
August 3, 2015

VA Expands Review of Chemical Exposure in Drinking Water at Marine Corps Base Camp Lejeune

WASHINGTON – As part of VA’s ongoing commitment to provide care to Veterans and their families, the Department of Veterans Affairs today announced that it will start the process of amending its regulations to establish presumptions of service connection for certain conditions resulting from exposure to contaminated drinking water at the U.S. Marine Corps Base Camp Lejeune in North Carolina.

This process is in addition to the healthcare VA already provides for 15 conditions to eligible Veterans who were stationed at Camp Lejeune for at least 30 days between August 1, 1953 and December 31, 1987 as a result of the Honoring America’s Veterans and Caring for Camp Lejeune Families Act of 2012. VA also provides reimbursement of healthcare expenses for those 15 conditions to eligible family members who resided at Camp Lejeune during that time period.

The Secretary of Veterans Affairs recently met with Senators Isakson, Burr and Tillis and the Director of the Agency for Toxic Substances and Disease Registry (ATSDR) to discuss the creation of presumptions of service connection for diseases associated with the contaminated water at Camp Lejeune. The diseases that are currently being reviewed for potential presumptive service connection include kidney cancer, angiosarcoma of the liver, and acute myelogenous leukemia, which are known to be related to long-term exposure to the chemicals that were in the water at Lejeune from the 1950s through 1987. The chemicals are Benzene, Vinyl Chloride, Trichloroethylene and Perchloroethylene, which are known as volatile organic compounds, used in industrial solvents and components of fuels. ATSDR and VA representatives will meet at ATSDR offices on August 19 to begin discussions on establishing these presumptions.

VA will also work with ATSDR and potentially the National Academy of Sciences to evaluate the body of scientific knowledge and research related to exposure to these chemicals and the subsequent development of other diseases. VA will carefully consider all public comments received when determining the final scope of any presumptions.

Veterans with health problems they believe are related to exposure to the water at Camp Lejeune may file a claim for disability compensation online at www.ebenefits.va.gov, or call 1-800-827-1000 for assistance.

For more information, Veterans and family members should contact the nearest VA healthcare facility by calling 1-877-222-VETS (8387) or visit www.publichealth.va.gov/exposures/camp-lejeune. For further information on Camp Lejeune: VHA Office of Public Health has a Website on Camp Lejeune historical water contamination at: www.publichealth.va.gov/exposures/camp-lejeune/index.asp.

The U.S. Marine Corps encourages all those who lived or worked at Camp Lejeune before 1987 to register for notifications regarding Camp Lejeune Historic Drinking Water at <https://clnr.hqi.usmc.mil/clwater>.

ATSDR & VA Camp Lejeune Science Liaison Team → VA Technical Work Group

VA TWG → EPA, NIH’s NTP, WHO/IARC, NAS/NRC/IOM

Institute of Medicine 2015

“Parkinson’s disease is a neurobehavioral effect that may have resulted from consumption of contaminated drinking water at Camp Lejeune.”

Proposed Rules

Federal Register

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Friday, September 9, 2016

DEPARTMENT OF VETERANS AFFAIRS

38 CFR Part 3

RIN 2900-AP66

Diseases Associated With Exposure to Contaminants in the Water Supply at Camp Lejeune

AGENCY: Department of Veterans Affairs.

ACTION: Proposed rule.

SUMMARY: The Department of Veterans Affairs (VA) proposes to amend its adjudication regulations relating to presumptive service connection to add certain diseases associated with contaminants present in the base water supply at U.S. Marine Corps Base Camp

- Adds Parkinson's disease as a presumptive condition associated with exposure to contaminants in the water supply at Camp Lejeune
- All active duty, reserve, National Guard, serving no less than 30 days (may be nonconsecutive)
- Service at Camp Lejeune or Marine Corps Air Station New River, NC, 8/1/53-12/31/87

- 30 day comment to 10/11/16

Thank You

