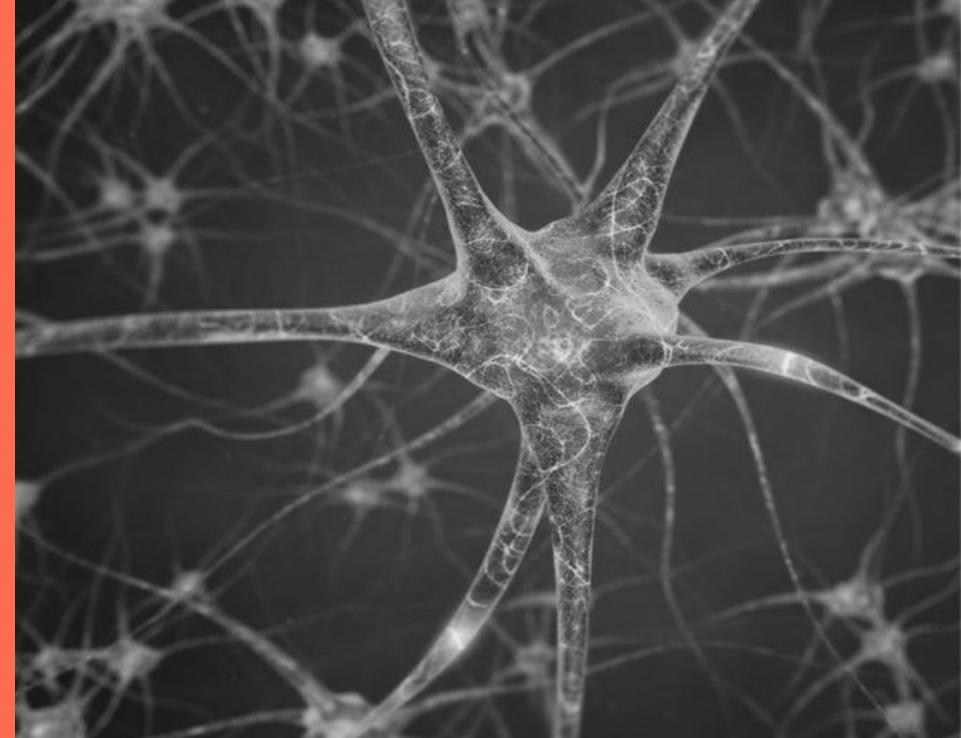

Why do I have Parkinson's?

March 21, 2023

info@endingPD.org



Outline

Parkinson's is rising

Parkinson's is largely man-made

Parkinson's is preventable

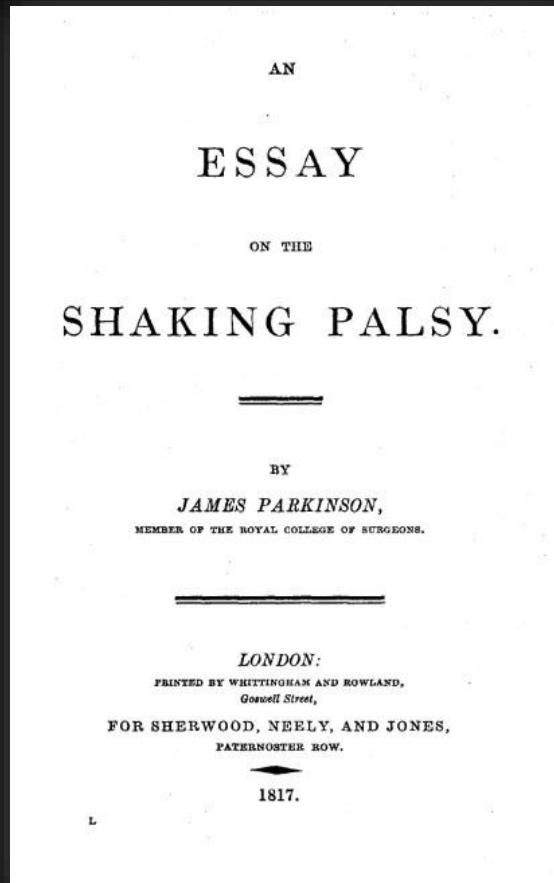
Outline

Parkinson's is rising

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Parkinson's is preventable

Parkinson's disease was once rare ...



First page of *An Essay on the Shaking Palsy*, 1817

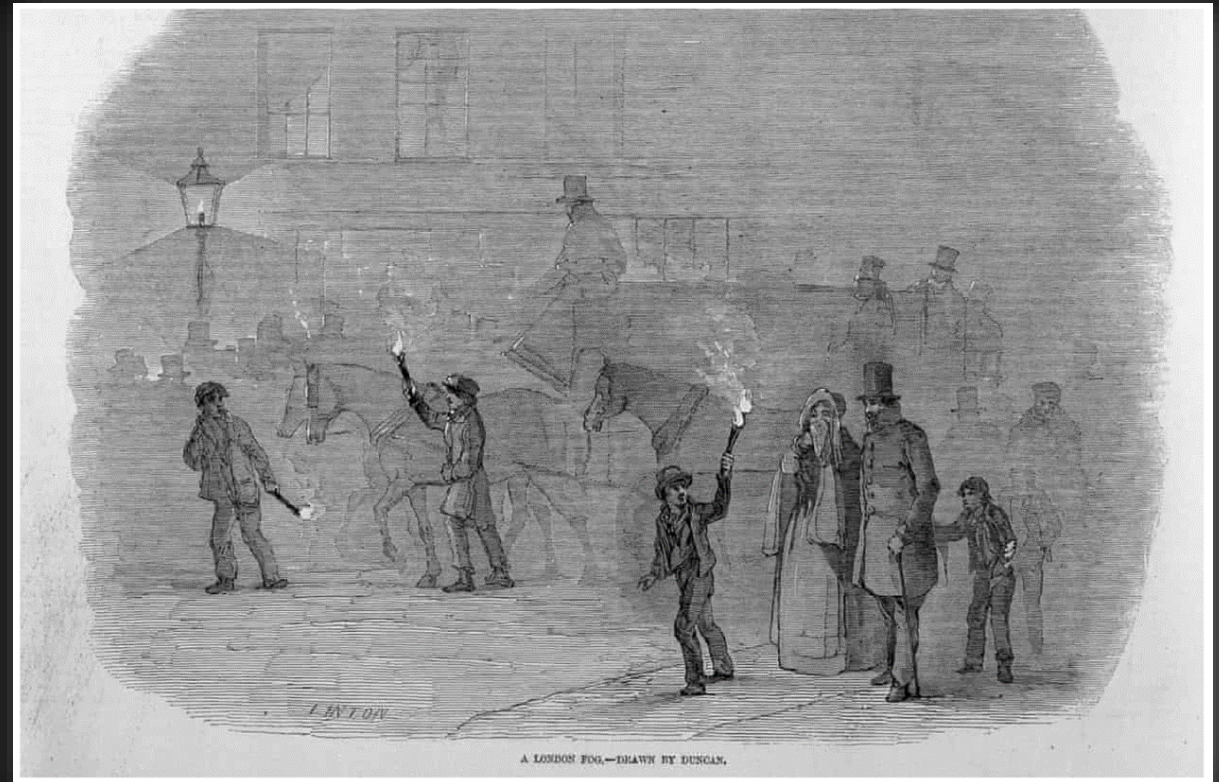
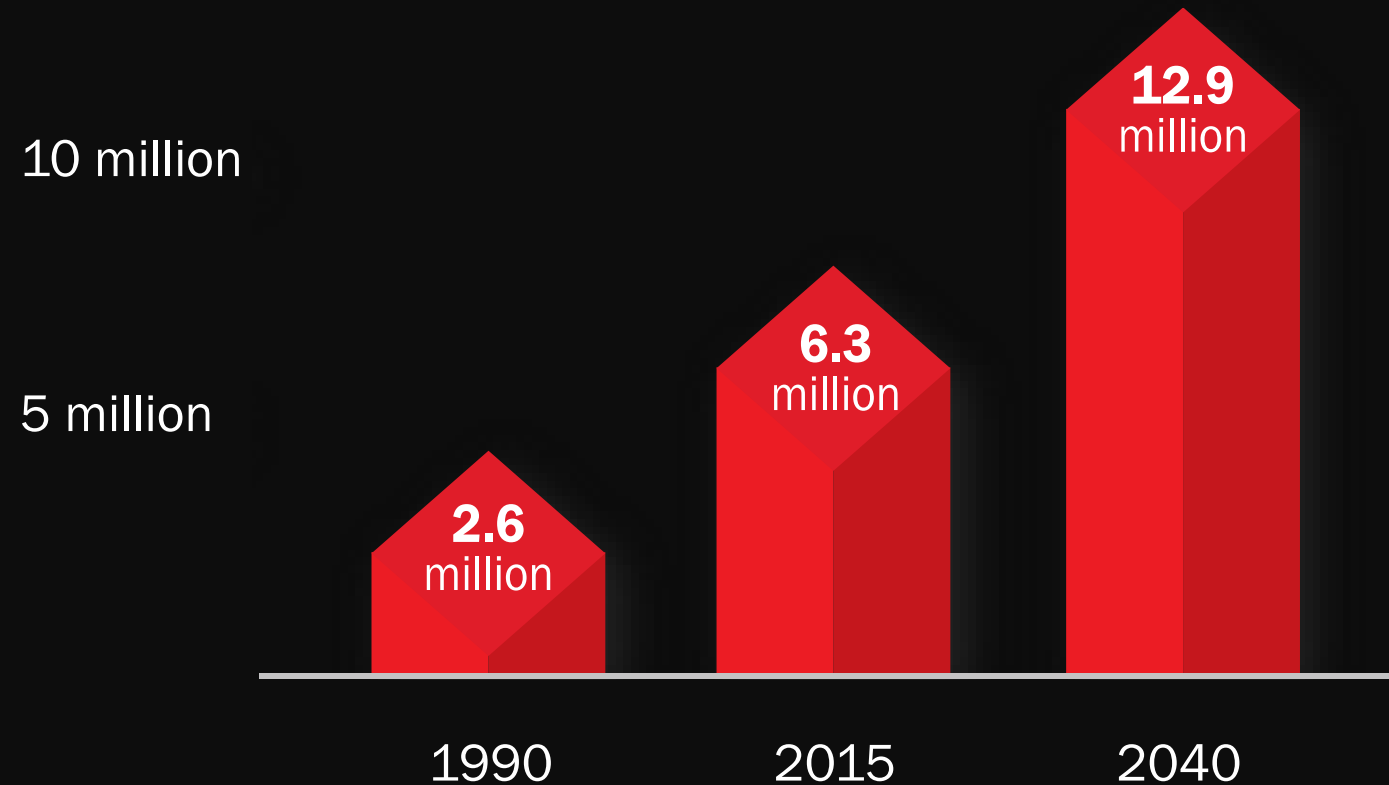
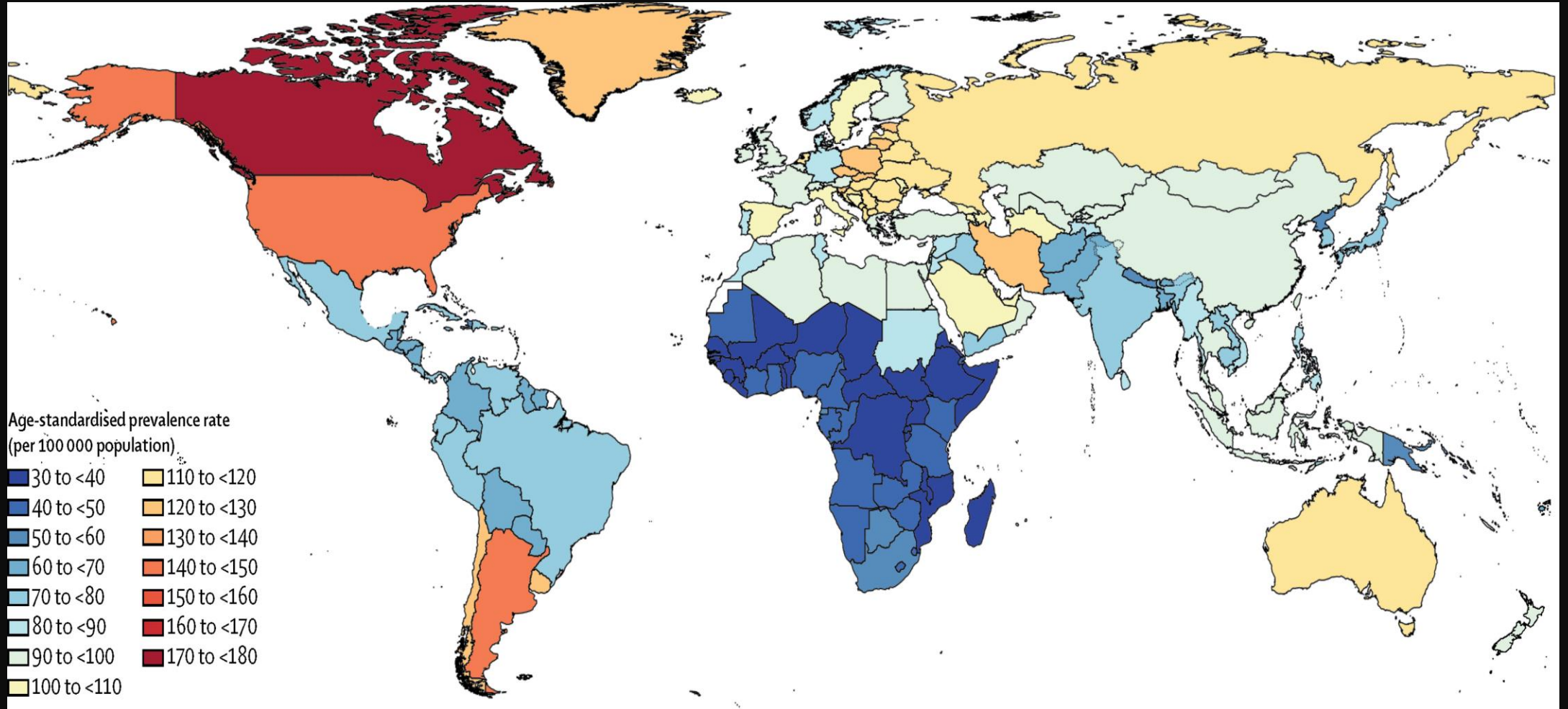


Illustration of London Fog, 1847

...but is now the fastest growing brain disease ...



...in the world



Outline

Parkinson's is rising

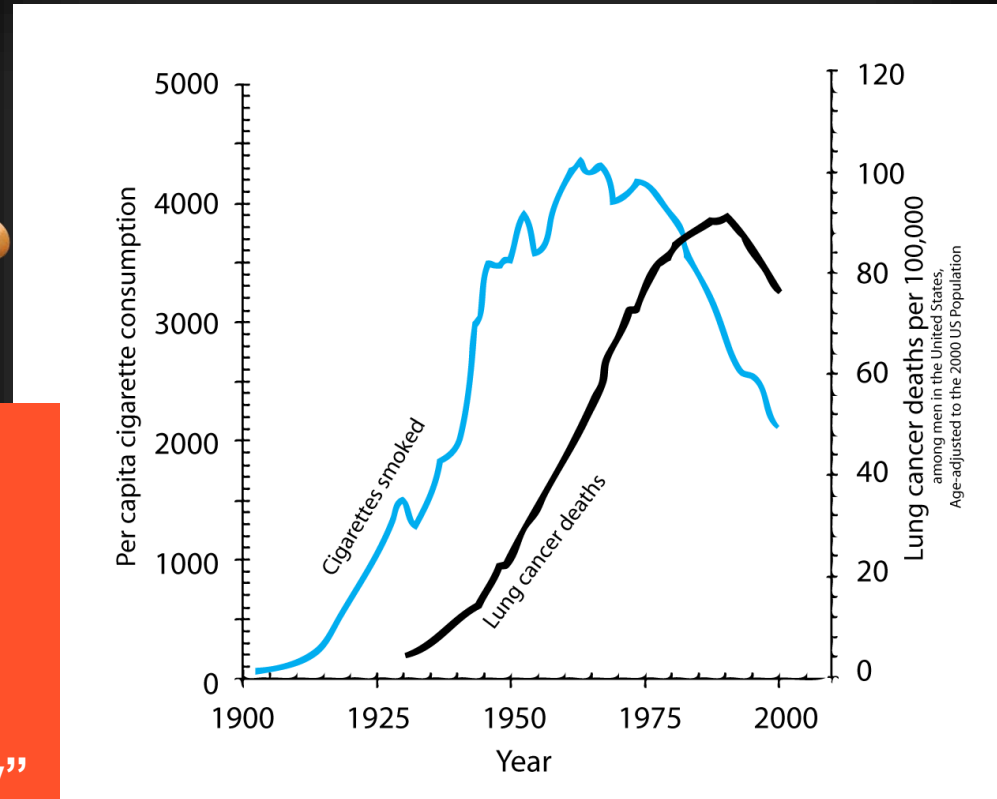
Parkinson's is largely man-made

Parkinson's is preventable

Some common diseases are clearly man-made



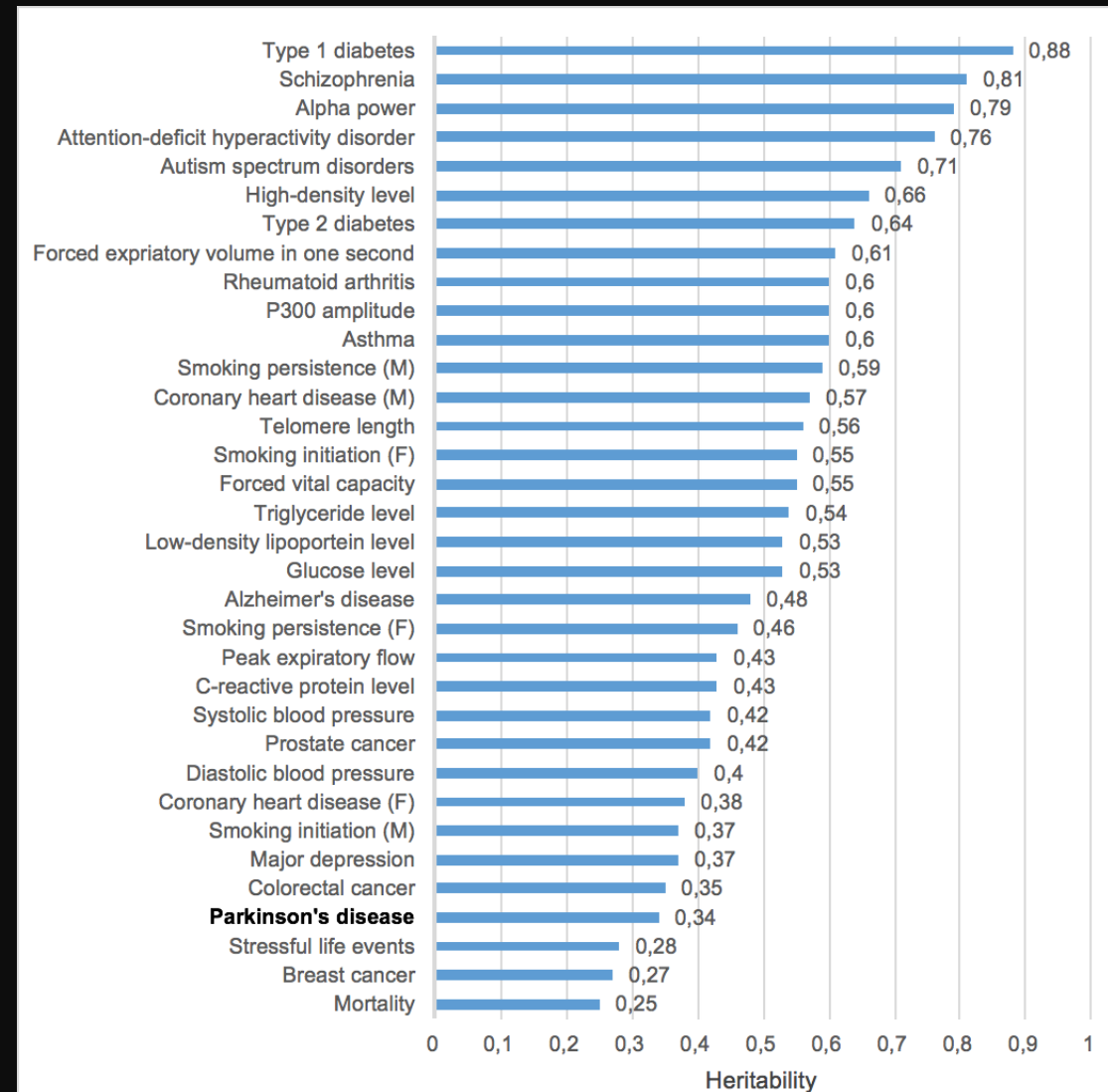
Before the advent of cigarettes, “doctors took special notice when confronted with a case, thinking it a **once-in-a-lifetime oddity**”



Sources: Chart showing correlation between increased cigarette consumption and incidence of lung cancer, with a lag time.

https://en.wikipedia.org/wiki/File:Smoking_lung_cancer.png#/media/File:Smoking_lung_cancer.png; Proctor RN. The history of the discovery of the cigarette–lung cancer link: evidentiary traditions, corporate denial, global toll *Tobacco Control* 2012;21:87-91.

The heritability of Parkinson's is low

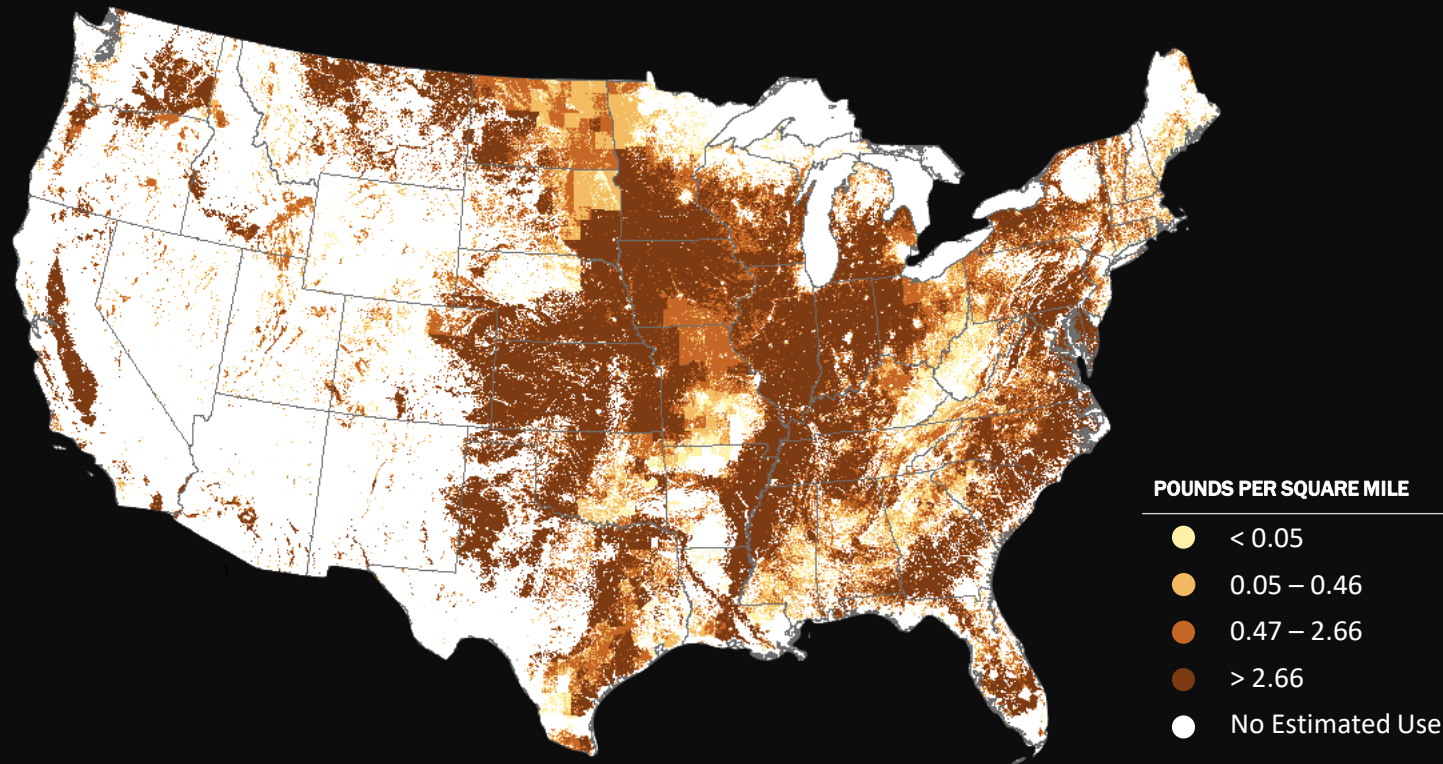


Less than 15% of people with Parkinson's have identifiable genetic risk factor

	GENES LINKED TO PARKINSON'S	FREQUENCY IN PARKINSON'S	ENVIRONMENTAL INTERACTIONS
AUTOSOMAL DOMINANT	<i>SNCA</i>	<<1%	Paraquat Rotenone
	<i>LRRK2</i>	~2-3%	Paraquat
	<i>VPS35</i>	<1%	Rotenone
AUTOSOMAL RECESSIVE	<i>Parkin</i>	~1%	Paraquat Rotenone
	<i>PINK1</i>	<1%	Manganese
	<i>DJ-1</i>	<<1%	Rotenone
	<i>ATP13A2, PLA2G6, PARK9, FBX07</i>	<<1%	Manganese
GENETIC RISK FACTOR	<i>GBA</i>	5-14%	MPTP

We can stop fueling the rise of Parkinson's by banning paraquat

Estimated use of paraquat on U.S. Agricultural land, 2016



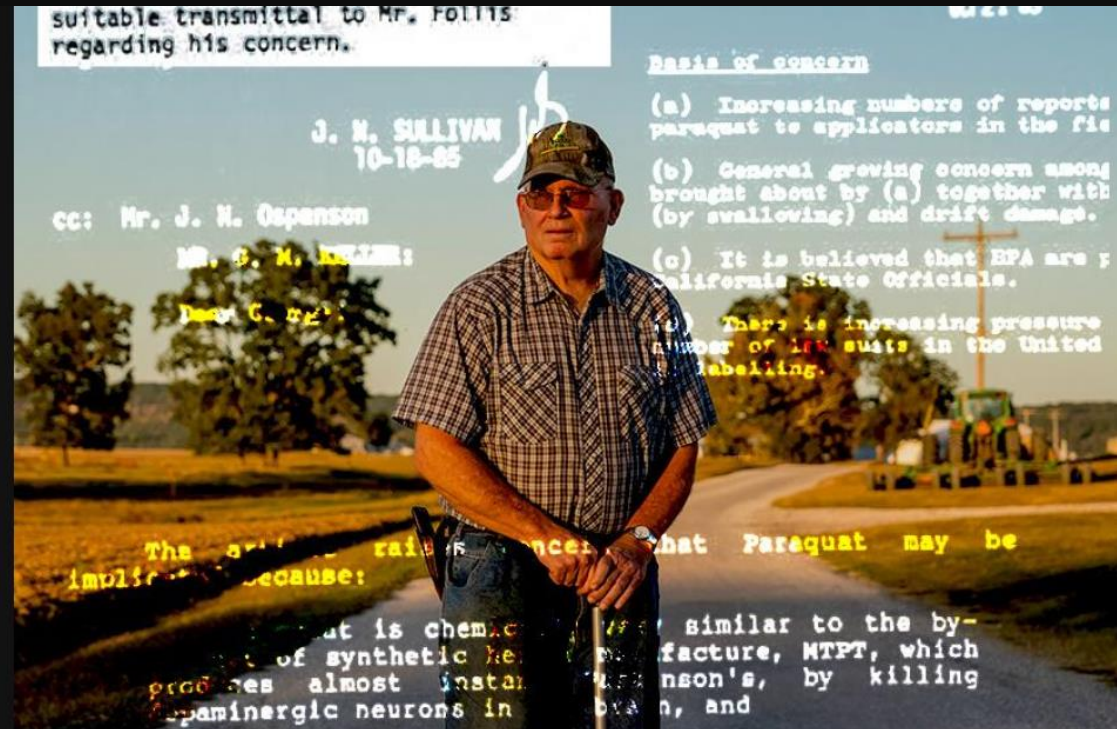
Sources: U.S. Geological Survey; Sadie Costello, Myles Cockburn, Jeff Bronstein, Xinbo Zhang, Beate Ritz, Parkinson's Disease and Residential Exposure to Maneb and Paraquat From Agricultural Applications in the Central Valley of California, *American Journal of Epidemiology*, Volume 169, Issue 8, 15 April 2009, Pages 919–926, <https://doi.org/10.1093/aje/kwp006>

In October, the *Guardian* released an exposé on paraquat, Parkinson's disease, and the companies that produce it

Secret files suggest chemical giant feared weedkiller's link to Parkinson's disease

Documents seen by Guardian detail effort to refute scientific research into paraquat and derail nomination of key EPA adviser

by Carey Gillam and Aliya Uteuova



The makers of paraquat have known about its health risks for 50+ years

Year	Event
1955	Imperial Chemical Industries identifies paraquat as a potent weed killer
1962	Company introduces paraquat (brand name Gramoxone) into UK and later the U.S.
1964	Company finds skin exposure to paraquat in rabbits in very high doses causes “weakness and incoordination”
1966	Company scientists find that some rats and mice given large doses of paraquat display a stiff gait or tremors
1968	Poisoning deaths and suicides due to paraquat start to rise
1974	State regulators express concerns about workers “who might inadvertently lick small quantities of paraquat residue off lips, or inhale paraquat mist;” rumors circulate that some in EPA are in favor of banning paraquat
1975	Meeting between Imperial Chemical Industries and Chevron reports that long-term spraying could injure the brain and spinal cord
1976	Autopsy of farmworker shows “degenerative changes” in the “cells of substantia nigra”
1985	Chevron memo reports scientific article showing “ <u>extraordinarily</u> high correlation of .967 was found between levels of pesticide use and Parkinson’s cases.” Memo warns that paraquat could become a huge legal liability like asbestos and says, “Parkinson’s can go on for decades”

These industry actions are designed to foster ignorance

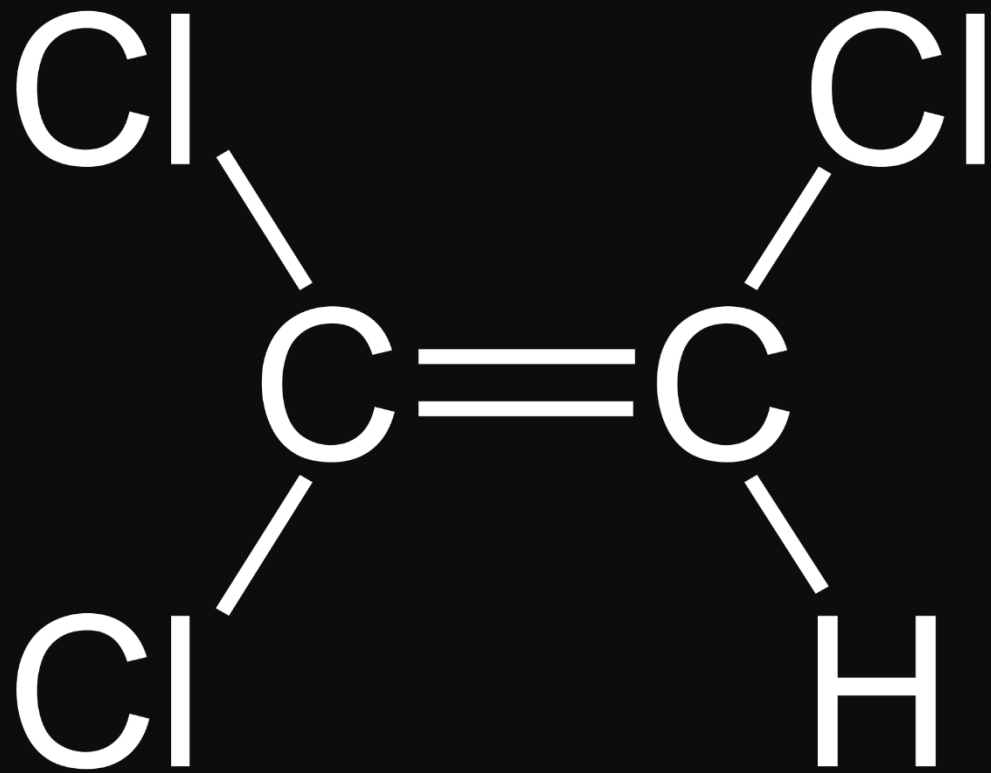


Iain Boal

Agnotology

- Intentional production of ignorance or doubt, often for commercial gain
- Used by tobacco companies (“Doubt is our product”) to conceal health risks of smoking
- Later applied to climate change
- And for over 50 years to chemicals linked to Parkinson’s disease

Trichloroethylene may be
another cause of Parkinson's



Trichloroethylene (TCE)



TCE is associated with a 500% increased risk of Parkinson's, ...

Solvent Exposures and Parkinson's Disease Risk in Twins

Objective: Several case reports have linked solvent exposure to Parkinson disease (PD), but few studies have assessed associations with specific agents using an analytic epidemiologic design. We tested the hypothesis that exposure to specific solvents is associated with PD risk using a discordant twin pair design.

Methods: Ninety-nine twin pairs discordant for PD ascertained from the National Academy of Sciences/National Research Council World War II Veteran Twins Cohort were interviewed regarding lifetime occupations and hobbies using detailed job task-specific questionnaires. Exposures to 6 specific solvents selected a priori were estimated by expert raters unaware of case status.

Results: Ever exposure to trichloroethylene (TCE) was associated with significantly increased risk of PD (odds ratio [OR], 6.1; 95% confidence interval [CI] 1.2–33; $p = 0.034$), and exposure to perchloroethylene (PERC) and carbon tetrachloride (CCl_4) tended toward significance (respectively: OR, 10.5; 95% CI, 0.97–113; $p = 0.053$; OR, 2.3; 95% CI, 0.9–6.1; $p = 0.088$). Results were similar for estimates of exposure duration and cumulative lifetime exposure.

Interpretation: Exposure to specific solvents may increase risk of PD. TCE is the most common organic contaminant in groundwater, and PERC and CCl_4 are also ubiquitous in the environment. Our findings require replication in other populations with well-characterized exposures, but the potential public health implications are substantial.

ANN NEUROL 2012;71:776–784

Time lag between exposure and diagnosis of Parkinson's can be 10-40 years

... and causes cancer



TCE is “carcinogenic to humans”



TCE is “known to be a human carcinogen”



TCE is a “carcinogenic in humans by all routes of exposure”



"Exposure to TCE was associated with excess incidences of liver cancer, kidney cancer, non-Hodgkin's lymphoma, prostate cancer, and multiple myeloma."

In the 1970s, TCE was ubiquitous

Example occupations where trichloroethylene exposure may occur
[85, 86, 90]

Aircraft maintenance workers
Automotive factory workers
Communications equipment repairers
Computer specialists
Corrosive control technicians
Distillery workers
Dry cleaners
Electronic component manufacturers
Embalmers
Food manufacturers
Insecticide manufacturers
Jet engine mechanics
Leather manufacturers
Machinery installation & assembly workers
Mechanics
Metal treatment workers
Missile technicians
Nautical equipment workers
Oil processors
Painters
Pesticide manufacturers
Pharmaceutical manufacturing factory workers
Printers
Radar technicians
Refrigerant manufacturers
Resin workers
Rubber cementers
Sewerage workers
Silk screeners
Shoe makers
Systems technicians
Taxidermists
Textile manufacturers
Textile and fabric cleaners
Tobacco denicotinizers
Waste treatment workers
Weapons specialists
Varnish workers

Historical usage of trichloroethylene [19, 72, 73, 85–88]

Commercial & Consumer Products

Adhesives*
Aerosol cleaning products*
Carpet cleaner*
Cleaners and solvent degreasers*
Cleaning wipes*
Cosmetic glues
Decaffeinated coffee
Film cleaners
Glue
Gun cleaner
Fumigant
Hoof polishes
Inks
Lubricants
Mold release
Paint and paint removers*
Pepper spray
Pesticides
Refrigerant*
Sealants
Stain removers*
Tap and die fluid
Toner aid
Tool cleaners
Typewriter correction fluids*
Wood finishes*

Industry Usage

Automotive care
Dry cleaning*
Degreasing*
Furniture care
Manufacturing
 Computer and electronics
 Disinfectants
 Dyes
 Fat and oil extraction
 Flavor extracts (spices, hops)
 Jewelry
 Machinery*
 Paint and coating*
 Paper
 Perfumes
 Plastics
 Refrigerant*
 Soaps

Even doctors used it to anesthetize patients



“Trilene (trichloroethylene) is a potent analgesic drug. Its margin of safety and ease of administration will ultimately make it a standard agent on all delivery floors. Trilene's wide variety of uses will probably allow almost every obstetrician to find a place for it in his obstetrical practice”

— Dr. Charles Flowers, Jr., *American Journal of Obstetrics and Gynecology*, 1956

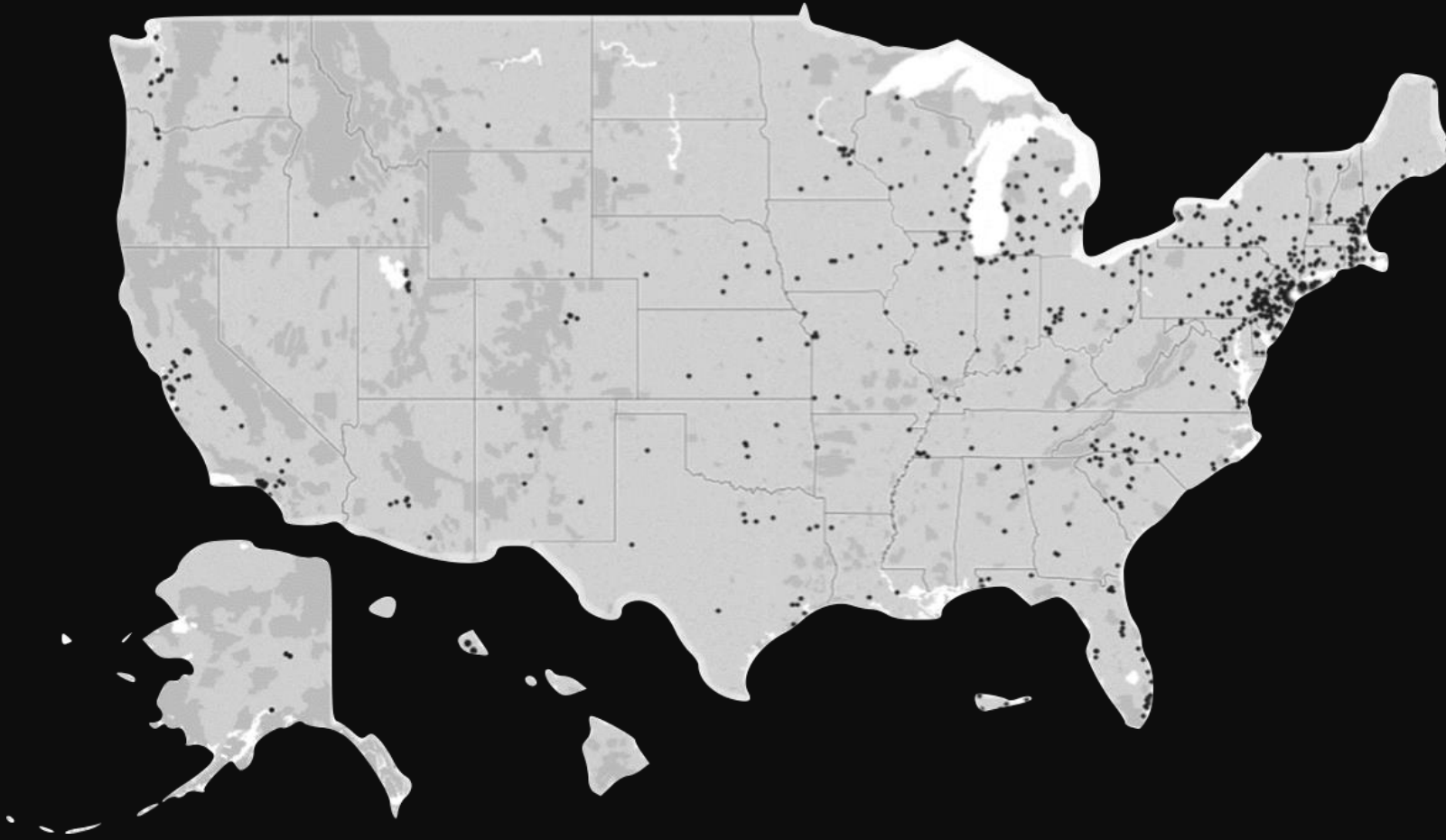


Courtesy of Dr. Victor Poleshuck, Clinical Professor, Emeritus, Department of Obstetrics and Gynecology, University of Rochester

Sources: <https://anesthesiamuseum.wordpress.com/cyprane-trilene-inhaler/>; <https://www.sciencedirect.com/science/article/abs/pii/0002937853906279>

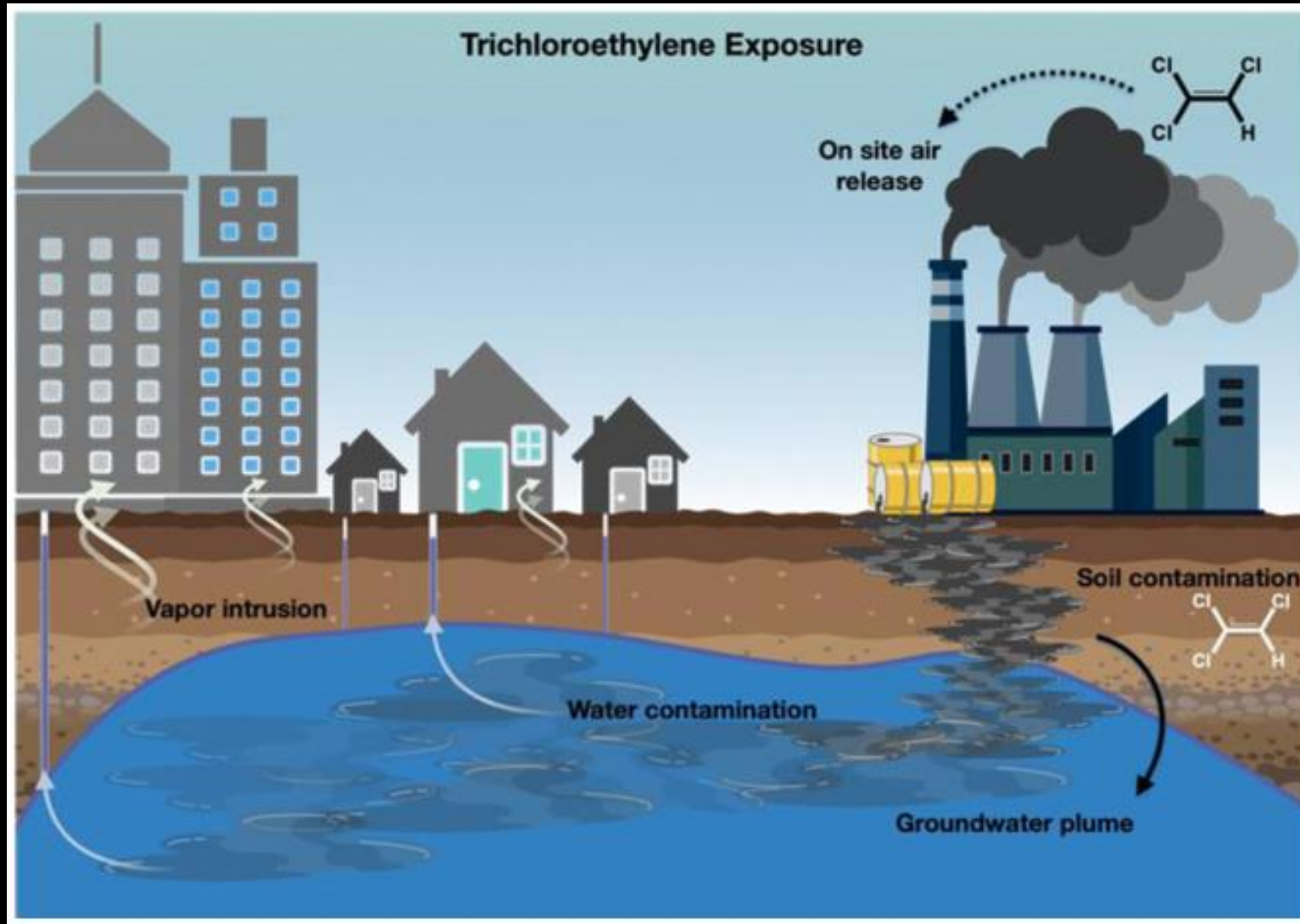
It is still with us today

Map of U.S. Superfund sites contaminated with trichloroethylene, 2018

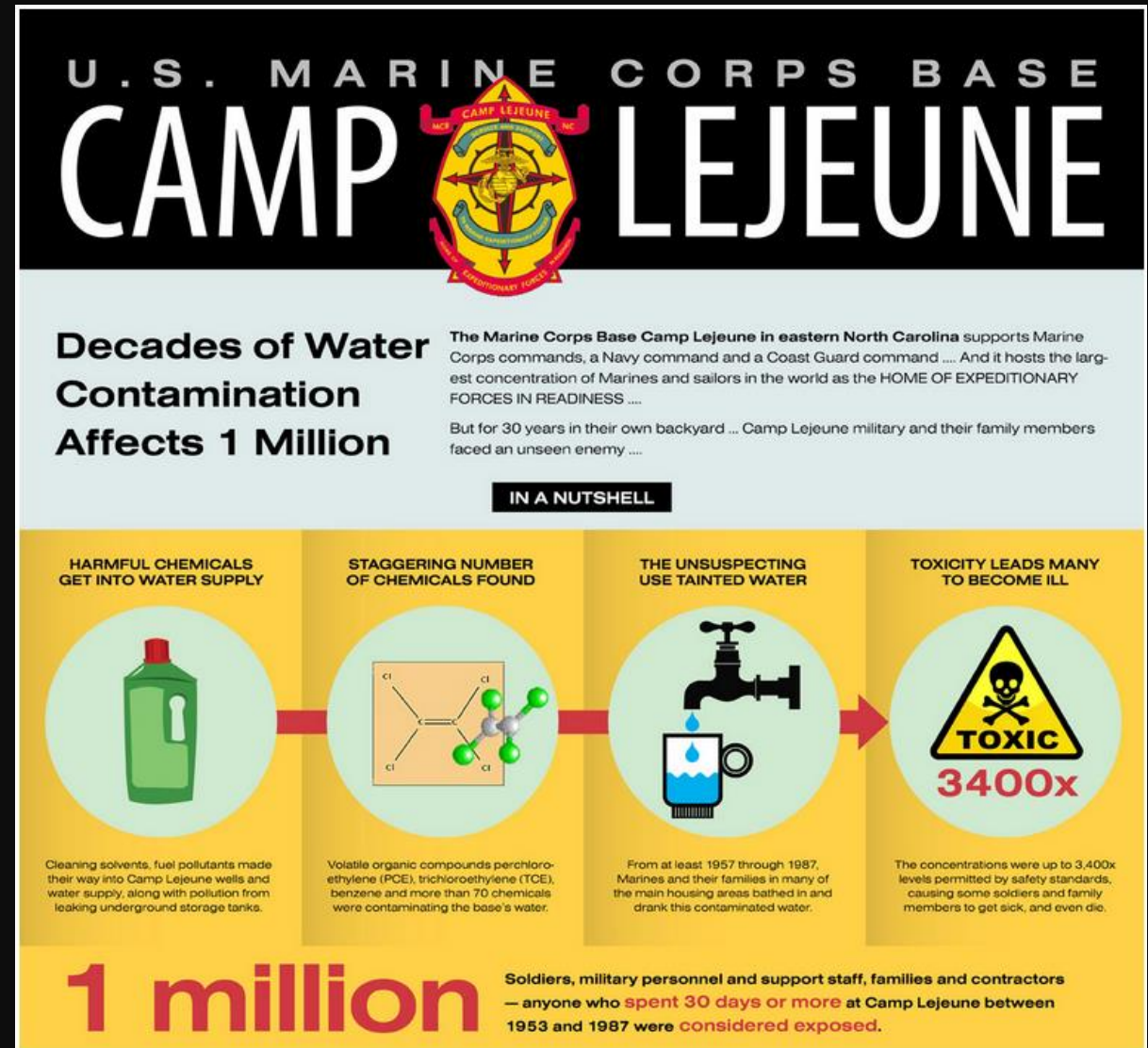
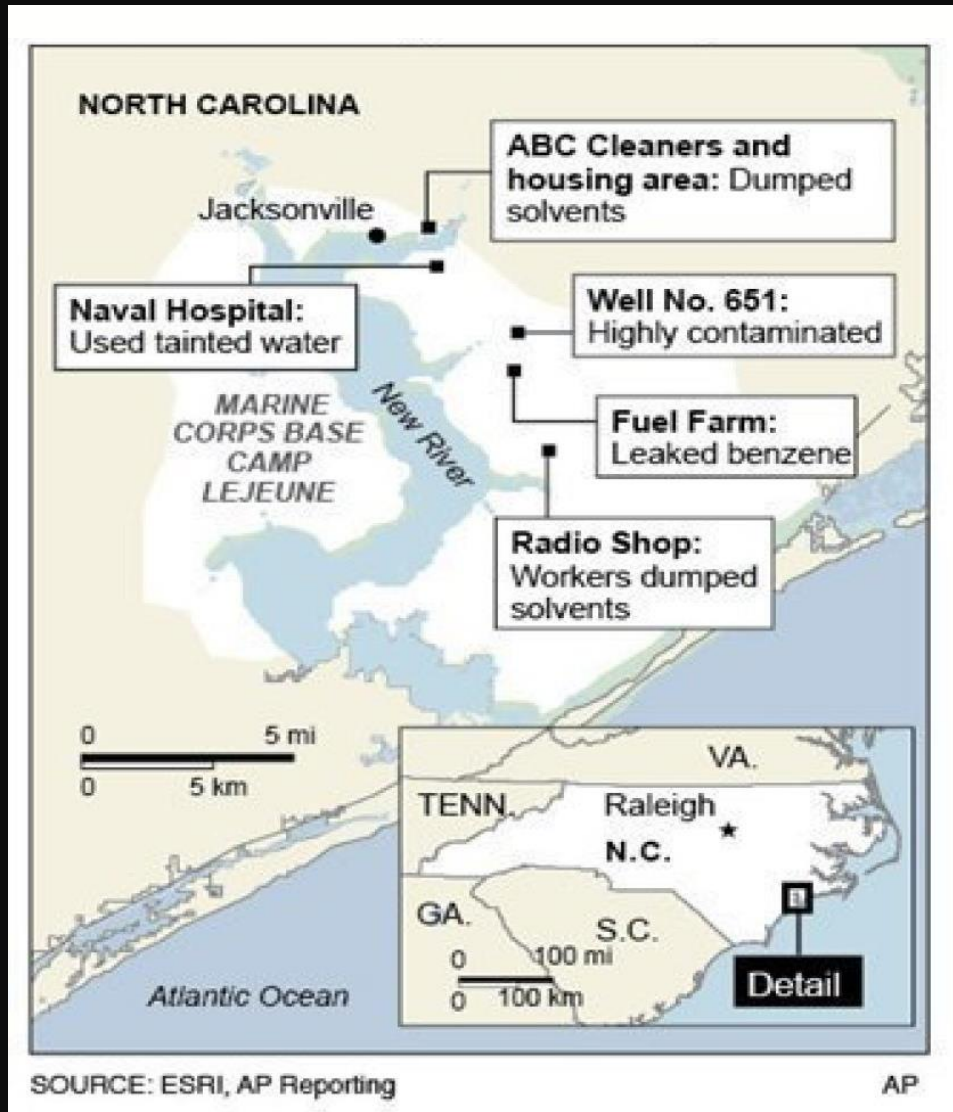


Sources: EPA; Barringer F. E.P.A. Charts Risks of a Ubiquitous Chemical. The New York Times. September 30, 2011.; Gash D., Rutland K., Hudson N. et al Trichloroethylene: Parkinsonism and complex 1 mitochondrial neurotoxicity. Annals of Neurology 2008; 63(2): 184-192 <https://doi.org/10.1002/ana.21288>

TCE can contaminate the air, ground water, and homes

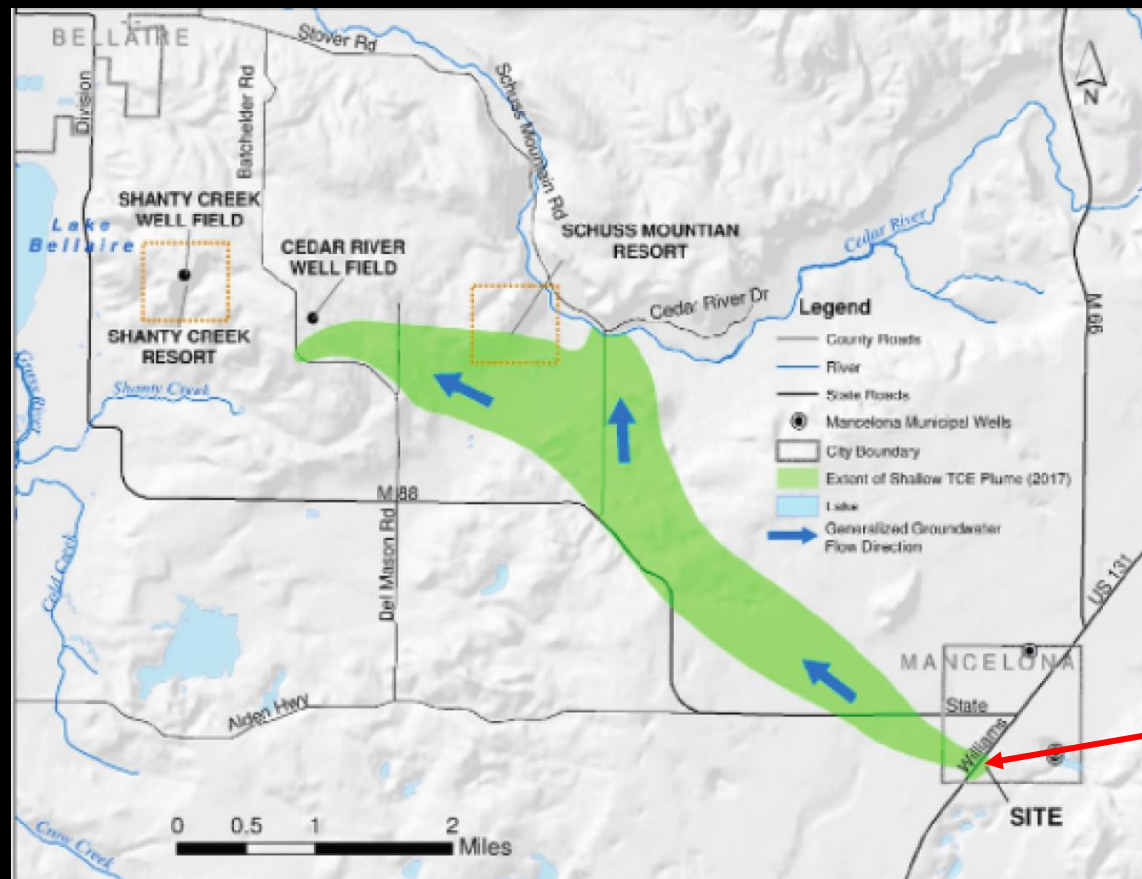


TCE contaminated the Marine base Camp Lejeune



Contaminated sites are everywhere ...

Michigan has 7,300 toxic sites. Money for cleanups is almost gone.



TCE from an automobile manufacturer dissolved into the groundwater and formed an underground plume

... including in Silicon Valley

Map of Superfund sites in Silicon Valley contaminated with trichloroethylene



Fortunately, vapor intrusion is addressable

Jane Horton outside her home in Mountain View, CA with her TCE-remediation system



New York state has hundreds of contaminated sites



Nassau, NY

... including at a dozen dry cleaners in
Rochester, NY



Source: New York State Department of Environmental Conservation

Knowledge of TCE's dangers is not new

TOXICITY OF TRICHLOROETHYLENE

Promotional activities, seeking the extension of industrial uses of trichloroethylene, frequently fail to disclose the toxic nature of this chemical and the practical dangers that may attend its use. Trichloroethylene (C_2HCl_3) is a chlorinated hydrocarbon, similar in qualities to chloroform, carbon tetrachloride, and ethylene dichloride. It is recommended for use as a dry cleaning agent, as a cleanser of metal parts, as a fumigant, as a solvent for insecticides, as a general degreasing agent, and as a solvent for many oils, fats, greases, gums, tars, waxes and rubber. The product has been standardized.

Any manufacturer contemplating the use of trichloroethylene may find in it many desirable qualities. Too, in the absence of closed systems of operation, he may find in this solvent the source of disaster for exposed workmen.

CAREY P. McCORD, M.D., Cincinnati.

Outline

Parkinson's is rising

Parkinson's is largely man-made

Parkinson's is preventable

To the extent Parkinson's is man-made, it can be human-ended



Air Pollution

Nationwide emissions of common air pollutants decreased by >50% between 1990 and 2012



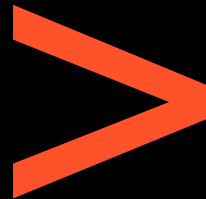
Pesticides

Between 1968 and 1986, when tested in patient adipose tissue, levels of Dieldrin, DDT, and their metabolites dropped between 75 and 90%



Trichloroethylene

In 1981, levels of airborne TCE levels were among the lowest in Europe



Substantial decrease in the incidence of Parkinson's disease in the Netherlands, 1990-2000



We can end Parkinson's disease

PACT

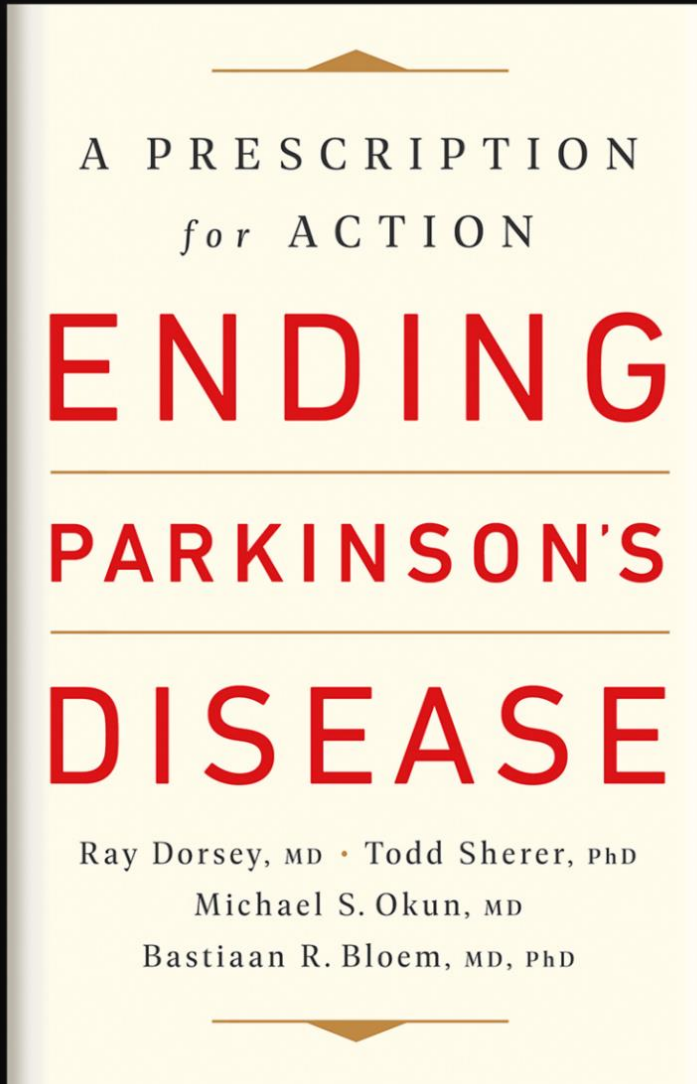
- Prevent
- Advocate
- Care
- Treat

- Ban paraquat and trichloroethylene
- Exercise, eat well, and enjoy your coffee
- Take care of your brain

- Push for greater funding
- Support research efforts
- Share your story
- Receive the care you want
- Expand telemedicine reimbursement
- Learn more about Parkinson's

- Join a clinical study
- Know your ancestry
- Participate in research from your home

But we must act



1. **Hold** wrongdoers accountable
 - Ask questions
 - Demand action
2. **Ban** paraquat, trichloroethylene (TCE), and perchloroethylene (PCE) at the federal level
3. **Read** *Ending Parkinson's Disease*
 - Available on Amazon (authors are devoting their proceeds to stop Parkinson's)
 - If you cannot afford a copy, email us (info@endingPD.org), and we will send you one
4. **Join** PD Avengers: www.pdavengers.com
5. **Tell** us your story: info@endingPD.org