Rates of Parkinson’s disease are exploding because of trichloroethylene (TCE)

Adrienne Matei
Researchers believe a factor is a chemical used in drycleaning and household products such as shoe polishes and carpet cleaners

‘The EPA estimates that 250 million pounds of TCE are used annually in the US.’ Photograph: Justin Kase/Alamy Stock Photo

Asked about the future of Parkinson’s disease in the US, Dr Ray Dorsey says, “We’re on the tip of a very, very large iceberg.”

Dorsey, a neurologist at the University of Rochester Medical Center and author of Ending Parkinson’s Disease, believes a Parkinson’s epidemic is on the horizon. Parkinson’s is already the fastest-growing neurological disorder in the world; in the US, the number of people with Parkinson’s has increased 35% the last 10 years, says Dorsey, and “We think over the next 25 years it will double again.”

Most cases of Parkinson’s disease are considered idiopathic – they lack a clear cause. Yet researchers increasingly believe that one factor is environmental
exposure to trichloroethylene (TCE), a chemical compound used in industrial degreasing, dry-cleaning and household products such as some shoe polishes and carpet cleaners.

To date, the clearest evidence around the risk of TCE to human health is derived from workers who are exposed to the chemical in the workplace. A 2008 peer-reviewed study in the Annals of Neurology, for example, found that TCE is “a risk factor for parkinsonism.” And a 2011 study echoed those results, finding “a six-fold increase in the risk of developing Parkinson’s in individuals exposed in the workplace to trichloroethylene (TCE).”

Dr Samuel Goldman of The Parkinson’s Institute in Sunnyvale, California, who co-led the study, which appeared in the Annals of Neurology journal, wrote: “Our study confirms that common environmental contaminants may increase the risk of developing Parkinson’s, which has considerable public health implications.” It was off the back of studies like these that the US Department of Labor issued a guidance on TCE, saying: “The Board recommends [...] exposures to carbon disulfide (CS2) and trichloroethylene (TCE) be presumed to cause, contribute, or aggravate Parkinsonism.”

TCE is a carcinogen linked to renal cell carcinoma, cancers of the cervix, liver, biliary passages, lymphatic system and male breast tissue, and fetal cardiac defects, among other effects. Its known relationship to Parkinson’s may often be overlooked due to the fact that exposure to TCE can predate the disease’s onset by decades. While some people exposed may sicken quickly, others may unknowingly work or live on contaminated sites for most of their lives before developing symptoms of Parkinson’s.

Those near National Priorities List Superfund sites (sites known to be contaminated with hazardous substances such as TCE) are at especially high risk of exposure. Santa Clara county, California, for example, is home not only to Silicon Valley, but 23 superfund sites – the highest concentration in the country. Google Quad Campus sits atop one such site; for several months in 2012 and 2013, the Environmental Protection Agency (EPA) found employees of the company were inhaling unsafe levels of TCE in the form of toxic vapor rising up from the ground beneath their offices.

While some countries heavily regulate TCE (its use is banned in the EU without special authorization) the EPA estimates that 250m lb of the chemical are still used annually in the US, and that in 2017, more than 2m lb of it was released into the environment from industrial sites, contaminating air, soil and water. TCE is currently estimated to be present in about 30% of US groundwater (the non-profit Environmental Working Group created its own map of TCE-contaminated water sites nationwide), though researcher Briana de Miranda, a toxicologist who studies TCE at the University of Alabama at Birmingham
School of Medicine, says: “We are under-sampling how many people are exposed to TCE. It’s probably a lot more than we guess.”

Under EPA regulations, it’s considered “safe” for TCE to be present in drinking water at a maximum concentration of five parts per billion. In severe cases of contamination, such as that which occurred at Camp Lejeune, a North Carolina marine corps, between the 1950s and late 1980s, people are believed to have been exposed to up to 3,400 times the level of contaminants permitted by safety standards. A memorial site known as “Babyland” honors the children of military personnel who died after they or their pregnant mothers were exposed to TCE-tainted water while living on the base.

While De Miranda says researchers do not believe low concentrations of TCE in drinking water specifically are enough to cause illness, Dorsey doesn’t think it’s an overstatement to say US groundwater could be giving people Parkinson’s disease. “Numerous studies have linked well water to Parkinson’s disease, and it’s not just TCE in those cases, it can be pesticides like paraquat, too,” he says, referencing a lethal weedkiller the US still uses despite it being phased out in the EU, Brazil and China.

Using activated carbon filtration devices (like Brita filters) can help reduce TCE in drinking water, yet bathing in contaminated water, as well as inhaling vapours from toxic groundwater and soil, can be far more difficult to avoid.

De Miranda says policy and effective government intervention are crucial when it comes to testing, monitoring and remediating TCE contaminated sites, and that it’s important to raise awareness of TCE’s role in surging rates of Parkinson’s. Failure to address the issue will not only continue to negatively affect people’s health, but will exacerbate the adult home care crisis that has already left 50 million Americans responsible for providing care to sick loved ones, as Parkinson’s is characterized by slow, progressive degeneration and has no cure.

In May 2020, Minnesota became the first state to ban TCE; New York followed suit last December, as should more states, especially as federal action on the issue has lagged. Given the negative health effects of TCE have been documented in the Journal of the American Medical Association since 1932, it’s well past time for the US to stop using it, and to better protect its civilians from in the last year. And you’re not alone; through these turbulent and challenging times, millions rely on the Guardian for independent journalism that stands for truth and integrity. Readers chose to support us financially more than 1.5 million times in 2020, joining existing supporters in 180 countries.

With your help, we will continue to provide high-impact reporting that can counter misinformation and offer an authoritative, trustworthy source of news for everyone. With no shareholders or billionaire owner, we set our own
agenda and provide truth-seeking journalism that’s free from commercial and political influence. When it’s never mattered more, we can investigate and challenge without fear or favour.

Unlike many others, we have maintained our choice: to keep Guardian journalism open for all readers, regardless of where they live or what they can afford to pay. We do this because we believe in information equality, where everyone deserves to read accurate news and thoughtful analysis. Greater numbers of people are staying well-informed on world events, and being inspired to take meaningful action.

We aim to offer readers a comprehensive, international perspective on critical events shaping our world – from the Black Lives Matter movement, to the new American administration, Brexit, and the world’s slow emergence from a global pandemic. We are committed to upholding our reputation for urgent, powerful reporting on the climate emergency, and made the decision to reject advertising from fossil fuel companies, divest from the oil and gas industries, and set a course to achieve net zero emissions by 2030.