

## WRITTEN TESTIMONY

### In Support of Legislation to Ban Paraquat in Vermont

Submitted to the House Committee on Agriculture, Food Resiliency, and Forestry  
Vermont General Assembly

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*Submitted by:*

**Jason Kirchick, MPH, MSN, RN, CNL, MEDSURG-BC**

Staff Nurse II, Hematology/Oncology

University of Vermont Medical Center

Legislative Liaison, Northern Vermont Chapter, Oncology Nursing Society

Regional Coordinator, Sigma Theta Tau International

North America Region 15

Resident of South Burlington; Justice of the Peace, City of South Burlington

Dear Chair Durfee and Members of the Committee:

Thank you for the opportunity to submit testimony in support of legislation to ban paraquat in Vermont. I write to you as an oncology nurse who witnesses the devastating toll of preventable illness, as a public health professional trained to evaluate evidence, and as a Vermonter who believes our state should lead in protecting its residents from unnecessary harm.

#### **What is Paraquat?**

Paraquat dichloride is one of the most widely used herbicides in the United States. According to the Centers for Disease Control and Prevention, it is so acutely toxic that the EPA classifies it as "restricted use"—available only to licensed applicators. The U.S. requires that paraquat sold domestically contain blue dye, a sharp warning odor, and a vomiting agent because accidental ingestion is frequently fatal. The CDC states plainly: *"No proven antidote or cure exists for paraquat poisoning"* and *"People who swallowed large amounts of paraquat are not likely to survive."*

The acute toxicity of paraquat has been documented for over half a century. A 1970 case series from Liverpool described four children poisoned by paraquat—two fatally. An 8-year-old girl who swallowed paraquat from an unlabeled bottle died after 24 days despite intensive medical intervention. A 4-year-old who drank purple fluid from a bottle found in a field died on day 13. The estimated fatal dose is just 4 mg per kilogram of body weight—for a 40-pound child, that could be less than a teaspoon of concentrate.

#### **The Parkinson's Disease Connection: Evidence Has Reached a Tipping Point**

Beyond acute poisoning, a growing body of evidence links paraquat exposure to Parkinson's disease, a progressive neurodegenerative condition affecting approximately one million

Americans. Parkinson's disease has the fastest rising prevalence among neurological diseases worldwide.

### **The biological mechanisms are well-characterized:**

- Paraquat is structurally similar to MPP+, the toxic metabolite known to cause Parkinsonism in humans
- Paraquat crosses the blood-brain barrier and accumulates in dopaminergic neurons
- It directly causes and exacerbates alpha-synuclein pathology—the hallmark of Parkinson's disease
- It generates massive oxidative stress, with studies showing 3.7-fold increases in superoxide radicals in brain tissue
- It causes permanent loss of tyrosine hydroxylase-positive neurons that persists for months after exposure ends

A landmark 2024 study from UCLA, published in the *International Journal of Epidemiology*, addressed the methodological limitations that had previously made causal conclusions difficult. Using California's mandatory pesticide reporting system rather than self-reported exposure, and confirming all Parkinson's diagnoses through movement disorder specialists, the researchers studied 829 patients and 824 controls in California's Central Valley.

### **The findings were striking:**

- Working near paraquat applications increased Parkinson's risk by 115% (OR = 2.15)
- Living near paraquat applications increased risk by 91% (OR = 1.91)
- For individuals diagnosed before age 60, living near applications increased risk by 278% (OR = 3.78)

In response to this study, leading Parkinson's disease researchers from Radboud University Medical Center in the Netherlands published a commentary in the same journal titled "*Paraquat and Parkinson's disease: has the burden of proof shifted?*" Their conclusion: "***The latest work, combined with earlier experimental animal work and many observational studies, in our view is now tipping the balance, shifting the burden of proof from the need to prove that paraquat 'is' a cause of PD to the need to prove that paraquat 'is not' a cause of PD.***"

These researchers explicitly called for invoking the **precautionary principle**—prioritizing human safety over agricultural and economic interests.

### **The Human Cost: Stories from Those Affected**

Behind the statistics are real people whose lives have been devastated:

**Lori Phillips** of New York grew up on a small family farm in Franklinville. She recalls the smell of crops being sprayed outside her bedroom window in the early 1960s when paraquat first came to market. She now lives with Parkinson's disease and spends \$1,900 for a 90-day supply of just one of her medications.

**Clayton Tucholke**, a 76-year-old farmer from South Dakota, used Gramoxone (paraquat) throughout the 1970s and 1980s. He was forced to give up his farm and move closer to medical professionals. His wife Denise says: "This man was so independent. And his independence has been taken from him, which is unfair."

**Frank Garcia**, a retired farmer from Arizona whose wife Maria was also diagnosed with Parkinson's after family exposure, stated: "They should've told us the consequences of this, and they didn't. That just burns me to a crisp."

## **The European Union Banned Paraquat in 2007**

The European Union banned paraquat nearly two decades ago based on the same converging evidence of harm. Over 60 countries have now banned or restricted paraquat. The United States remains one of the largest users worldwide.

Importantly, research demonstrates that agriculture without paraquat is feasible without loss of productivity. A 2023 study published in *Environmental Science and Pollution Research International* found that over 1.25 million farmers in low- and middle-income countries already successfully produce crops under standards that prohibit paraquat use. Empirical studies evaluating paraquat bans have consistently failed to show negative effects on agricultural productivity.

## **Why Vermont Should Act Now**

Vermont has a proud history of leading on environmental health policy. We were among the first states to ban neonicotinoid pesticides that harm pollinators. Banning paraquat would continue that legacy.

The U.S. Environmental Protection Agency's preliminary determination that evidence is "insufficient" to link paraquat to Parkinson's disease is based only on studies through 2018 and has not yet incorporated the landmark 2024 California research. The EPA's final determination is expected in 2025. Vermont need not wait for federal action that may be delayed, weakened, or reversed.

As a nurse, I was taught that the first principle of medicine is *primum non nocere*—first, do no harm. When evidence of serious harm accumulates and safer alternatives exist, the ethical path forward is clear. We do not need to wait for absolute certainty when the stakes are irreversible neurological damage and preventable deaths.

## **Conclusion**

I urge this committee to support legislation banning paraquat in Vermont. In doing so, you would protect farmworkers who handle this chemical, rural communities near agricultural operations, and all Vermonters from an unnecessary toxic exposure that has been linked to fatal acute poisoning and progressive neurological disease.

I am prepared to provide oral testimony and to answer any questions the committee may have. I can also facilitate connections with nursing organizations across Vermont and New England who support this legislation.

Thank you for your consideration and for your commitment to protecting the health of Vermonters.

Respectfully submitted,

**Jason Kirchick, MPH, MSN, RN, CNL, MEDSURG-BC**

Staff Nurse II, Hematology/Oncology, University of Vermont Medical Center  
Regional Coordinator, Sigma Theta Tau International, North America Region 15  
Legislative Liaison, Northern Vermont Chapter, Oncology Nursing Society  
Justice of the Peace, City of South Burlington  
South Burlington, Vermont

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