

## Seasonal Allergy Blues: Is Mental Health Worse on High Pollen Days?

Joelle Abramowitz  
Institute for Social Research  
University of Michigan

Shooshan Danagoulian  
Department of Economics  
Wayne State University

### Abstract:

More than 47,000 individuals died by suicide and more than 312,000 received care in the emergency department for self-harm injuries in 2018, part of a decade-long rising trend. Though air pollution is a known risk factor of deaths by suicide, lack of seasonal pollen data has prevented any consistent national evaluation of its impact on mental health and death by suicide. This paper fills this knowledge gap by using newly-available, high-frequency data to quantify the impact of seasonal pollen on mental health and death by suicide in the United States. We examine effects of local pollen conditions on mental health and death by suicide by combining three national datasets from 2006 to 2017 obtained through exclusive agreement: (1) National Allergy Bureau daily pollen measurements from 33 localities across the US; (2) National Violent Death Reporting System records on violent deaths; and (3) OptumInsight health insurance claims of 18 million individuals insured by UnitedHealthcare. While pollen is only one of the many factors that affect mental health and suicide, we isolate its impact by using two-way fixed-effects econometric methods, allowing for causal interpretation of the estimated effects. We find a 1.1 percentage point rise in the probability of death by suicide and up to a 20% increase in the number deaths by suicide in a county in the days that follow a very high pollen measurement. We also find suggestive evidence of a 23.3% decline in visits on the day of high pollen, followed by a 13.2% increase on the following day consistent with a pattern of initial avoidance behavior followed by a subsequent increase in mental distress and stress from exposure. These results suggest that very high pollen levels do lead to an increase in deaths by suicide and point to the importance of understanding the effect of pollen on mental health and deaths by suicide to inform potentially mitigating policies that can save lives and improve individuals' mental health and quality of life.