Theory

Because addiction is a chronic disease, it is related to theories in health economics. The most well-known theories that serve as a basis for the empirical work that follows are Grossman’s (1972) model of the demand for health and Becker’s and Murphy’s (1988) model of rational addiction. A. The Proportionate Model: Grossman (1972) developed a model to explain an individual’s health. Grossman begins by assuming that people derive utility from health and a composite of all other goods. The utility function is: U = U (H, G) where H = the stock of Health and G = all other goods. Health is modeled as a production process. The production function of health summarizes the relationship between inputs such as medical care and lifestyle and health outcomes such as life expectancy. The model treats investment in one’s stock of health as a form of investment in human capital.

B. Rational Addiction

Behavioral factors that involve addictions to goods such as cigarettes, alcohol, and illicit drugs are inputs in the production function of health that have a negative impact on health status. However, if addictive goods change the utility function of individuals, preferences may not be time-consistent. Becker and Murphy (1988) develop a model in which individuals rationally choose to consume addictive goods. Their theory is based on the assumption that individuals incorporate all available information into their calculations of utility and that they are aware of the addictive properties that may change their future preferences. Therefore, preferences are time-consistent in their model. Current consumption increases the desire for future consumption, and, as tolerance increases, the need to consume additional quantities of the addictive good in order to achieve the same effect. Becker et al (1991) extend Becker and Murphy’s model by adding addictive capital stock to the utility function. In this model, consumption of the addictive good leads to addictive capital stock that reinforces the desire for consumption of the addictive good as it makes future consumption more pleasant.

State Level Analysis

The state-level empirical model uses state level panel data for the years 2014-2015 to examine factors related to opioid overdose deaths in the United States. Only the states that had values for all of the variables used in the empirical model were included in the analysis. The states include: Arizona, Arkansas, Colorado, Florida, Georgia, Hawaii, Iowa, Kentucky, Maine, Maryland, Massachusetts, Michigan, Minnesota, Nebraska, Nevada, New Jersey, New Mexico, New York, North Carolina, Oregon, Rhode Island, South Carolina, Texas, Vermont, Virginia, Washington, West Virginia, and Wisconsin. All of the data excluding the cannabis law data was obtained from the Health Access Data Assistance Center (SHADAC). Data for cannabis laws was gathered from a historical timeline on ProCon.org. The initial specification of the empirical model is:

\[ Y = \beta_0 + \beta_1 \text{PSD} + \beta_2 \text{PSh} + \beta_3 \text{UR} + \beta_4 \text{SU} + \beta_5 \text{PH} + \beta_6 \text{ED} + \beta_7 \text{MD} + \beta_8 \text{C} + \beta_9 \text{G} + \epsilon \]

where \( Y \) = the crude rate of accidental poisoning by and exposure to narcotics and psychotropics (hallucinogens).

An explanation of the variables and descriptive statistics is in Table 1.

Conclusions

Empirical results at the state level indicate that there is a strong significant positive association between opioid overdose deaths and average monthly physically unhealthy days (\( p < .01 \)). Opioid prescription rates were also found to have a significant positive correlation with opioid overdose deaths (\( p < .05 \)). These results imply that the physical health of the individual and prescriber behavior are important in explaining opioid overdose mortality. The results at the county level suggest a highly significant negative association between opioid overdose deaths and the unemployment rate (\( p < .01 \)). This result differs from the insignificant positive association with unemployment found in the state level analysis. However, the empirical literature on the relationship of unemployment and opioid abuse is mixed and is evident in this study. In both the state and county analysis, binge or excessive drinking is negatively correlated with opioid overdose deaths. Even though the relationship is important, this may imply that alcohol and opioids may be weak substitutes. While my empirical results were consistent with much of the previous literature, there are ways in which my study could be improved and expanded. As more data becomes available, incorporating additional variables, observations, and modeling techniques could improve the ability of the empirical models to predict opioid overdose deaths. For example, I was only able to plan the empirical models to make the impact of state laws passed to limit prescription opioids (PDMPs) on opioid overdose mortality. Despite the potential of opportunities for improvement and expansion, this study is important in developing an understanding of the factors impacting the opioid crisis on the state, county, and population levels. These results are consistent with previous ones that find opioid prescription rates to be a significant factor in determining opioid overdose deaths. Additionally, policies such as allowing legal cannabis may also be helpful in reducing opioid overdose deaths.

Bibliography


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