Deaths of Despair: Prescriptive Authority of Psychologists

Agnitra Roy Choudhury[1]
Alicia Plemmons[2]

Abstract:

Limited access to mental health care has many adverse effects, especially for marginalized communities. Between 2002 and 2017, five states (NM, LA, IL, IA, and ID) passed legislation allowing psychologists to prescribe psychotropic medication when deemed necessary for patient care, popularly referred to as the RxP movement. We find that psychologists, when given prescriptive authority, have higher rates of annual income but do not work an increased number of hours. Using Vital Mortality Statistics, a restricted data set provided through the National Center for Health Statistics, we determine the effect of state-level expansions of prescriptive authority of psychologists on suicide rates. We find that, after allowing ample time for education, training, and experience requirements, that the rate of suicide reduced for both men and women, white and black, individuals who are divorced or single, and for people between the ages of 35 and 55.

Keywords: Occupational Regulation, Psychologists, Scope of Practice, RxP Movement, Prescriptive Authority, Suicide
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Disclaimer: Any analysis, interpretations, or conclusions reached are those of the authors and not of NCHS, which is responsible only for the initial data.

I. Introduction

Suicide is one of the top leading causes of death in the United States (CDC, 2020). It is the second leading cause of death among individuals between the ages of 15-34. Over the past two decades, mortality resulting from suicide increased in all fifty states and the District of Columbia. Over 44,000 lives were lost to suicide in 2016 alone[3]. While there are many factors responsible for a person taking their own life, several studies have found strong associations between mental health issues and risk of suicide, with depression being ranked as the most prevalent catalyst (Arsenault-Lapierre, 2004; Bachmann, 2018; Brådvik, 2018; Chesney, et al.,

[1] Visiting Assistant Professor, Department of Economics, Auburn University at Montgomery. Email: achoudhu@aum.edu; Office Phone: (334) 244 – 3505
[2] Assistant Professor of Economics, Department of Economics & Finance, Southern Illinois University Edwardsville. Email: aplemmo@siue.edu; Office Phone: (618) 650 – 3472
[3] https://www.cdc.gov/vitalsigns/suicide/index.html

2014; Too, et al, 2019). Improving access to mental health care might be able to mitigate the "deaths of despair" and save some lives. Access problems are further highlighted by looking at the higher rates of suicide in rural areas that are also underserved by health care providers (Bureau of Health Workforce, 2016).

In this paper, we use labor market and restricted mortality data provided through the National Center for Health Statistics to analyze how allowing psychologists to have prescriptive authority affects suicide rates. Prescriptive authority means that psychologists can prescribe mental and behavioral health medication that they deem as beneficial for the individual, after meeting training, education, and experience requirements. In economics, several studies have linked scope of practice regulations to limit in access to health care services.

The first reason as to why access problems can occur is because of higher prices of health care services due to restrictive scope of practice laws (Kleiner, et al. 2016; Kleiner, et al. 2010; Timmons et al., 2018). Access can be especially difficult for mental health services because there may be disparities in the willingness of insurance companies to cover this type of care due to parity laws. Lang (2013) finds that mental health parity laws can make it easier for people to access mental health care by structuring prices in a way that is more affordable within insurance coverage. Scope of practice regulations can also exacerbate the shortage crisis prevalent in health care today, with a shortage of over 6,000 providers for mental health services alone[4]. Most papers studying scope of practice laws focus on dental services (Kleiner and Park, 2010; Marier and Wing, 2011), primary care vs nurse practitioners (Dueker, et al., 2005; Stange, 2014; Xue, et al. 2016; Traczysnki and Udalova, 2018), and physician assistants. Our paper instead focuses on

[4] https://data.hrsa.gov/topics/health-workforce/shortage-areas

mental health care and suicide through psychologist scope of practice in terms of prescriptive authority, a market that has not been studied thoroughly in the literature.

The Prescription Privileges movement (or RxP movement hereafter) is an on-going policy debate that seeks to expand scope of practice privileges for psychologists to prescribe controlled substances. Mental health care services usually take two primary, and often complementary, forms: psychotherapy (such as talk therapy) and psychotropic medication. Allowing psychologists to prescribe psychotropic medication may increase access to treatment, particularly for disadvantaged or minority populations. Currently, there are five states where prescriptive authority exists: New Mexico (2002), Louisiana (2004), Illinois (2014), Iowa (2016), and Idaho (2017). States that allow prescriptive privilege to psychologists require them to complete additional training, education, and experience requirements in psychopharmacology. These requirements create a substantial lagged effect between when the policy was passed and when psychologists will be able to prescribe psychotropic medications to patients.

Proponents of the RxP movement argue that allowing psychologists to prescribe controlled substances will improve access to mental health care services. Opponents of the policy state that quality of care will be poor and there might be over medication of patients. Existing literature in occupational licensing and scope of practice suggest mixed results on quality metrics for reductions in regulatory barriers, with some studies recording improvements due to better access to care. Our paper contributes to this research by analyzing how mortality due to suicides is affected by mental health care access by allowing psychologists to prescribe controlled substances. We use difference-in-difference estimation strategy to determine whether prescription privileges for psychologists mitigate deaths resulting from suicide in states allowing prescriptive authority relative to others. Our results suggest that the policy change only had a

statistically significant impact following a significant amount of time has passed for the additional training, education, and experience requirements, which we observe for New Mexico and Louisiana. We find that, in the long term, states with prescriptive authority have a reduction in suicides for men, women, black, white, middle-aged, single, and divorced subpopulations.

We also investigate whether labor market outcomes for psychologists in the RxP states change as a response to prescribing privilege. We use public data from American Community Survey to investigate earnings and labor hours for psychologists in the RxP states. Using a difference-in-difference estimation technique, we find that income for psychologists increase in the treatment states relative to the control states. However, we do not find any impact of prescriptive privilege on annual hours worked, suggesting that psychologists in the treatment states do not work more hours. The findings on labor market behavior and suicide rates together suggest that psychologists are receiving a premium for their prescriptive privileges and access to mental care on average improves in the RxP states, leading to a decline in suicide rates.

The rest of the paper is organized as follows. Section II describes how our study fits with the existing literature and highlights our main contributions. Section III provides the methodology used in the paper while Section IV describes the datasets used for our analysis. We present the results from our findings in Section V and provider the conclusion in Section VI.

II. Literature Review

Scope of practice regulations refer to state level laws that dictate what types of specific procedures can or cannot be performed by health care providers. There are significant variations in scope of practice regulations across states, and across health care professions such as nurse

practitioners, physician assistants, and pharmacists (McMichael 2017, Stein et al. 2017). For instance, nurse practitioners in Alabama have to collaborate under a supervising physician before they can order a diagnostic test. However, nurse practitioners in New Mexico do not need to collaborate with physicians, can order tests, and have prescriptive authority which allows them to prescribe medication without physician oversight (AANP, 2016).

Proponents state that scope of practice regulations promotes better quality health care services and protection of physicians, who have invested more years to receive their degree. They also state that relaxing scope of practice laws might lead to over utilization of diagnostic testing (such as CT scan or MRI) and lead to higher health care costs and adverse health outcomes (Hughes, et al. 2015). Regardless of the severity of scope of practice restrictions within a state, these restrictions are designed and implemented by state-based agencies such as the board of medicine, board of pharmacy, and the board of nursing (Phillips et al., 2018). These regulatory boards often include both politicians, but also members of the currently active profession or who have a vested interested in the schools that train these individuals (Slivinski, 2020).

However, opponents state that these regulations act as strong barriers in the provision of health care services, particularly for the disadvantaged and rural residents (Federal Trade Commission 2014). They also argue that restrictive scope of practice regulations is responsible for higher health care costs by limiting the supply of health care services, which results in longer waiting times and poorer long-term health outcomes (Kandrack et al. 2019). Most of the research regarding changes in scope of practice laws have focused on the medical procedures and responsibilities of nurse practitioners, pharmacists, dental hygienists and dental assistants, physician assistants. Timmons et al. (2018) found evidence suggesting that allowing pharmacists

waivers to perform routine tests on patients without physician supervision might improve access to health care without imposing excess costs on the system.

Relaxing scope of practice regulations for nurse practitioners can reduce the dollar amount of outpatient claims of health care by nearly 11 percent and improve access to health care for Medicaid beneficiaries. However, there was no evidence suggesting that other proxies of access to care such as total claims and total care days were impacted by the changes in scope of practice regulations (Timmons, 2017). These laws also heavily impact the division of labor between types of healthcare providers, which implies the effects can extend to related care markets (Stange 2014). Furthermore, scope of practice regulations can affect labor market outcomes for people involved in complementary or substitute professions. For example, a well-child visit can be administered by both a nurse practitioner and a primary care physician. However, access to a nurse practitioner might be less expensive and easier relative to that for primary care physician (Kleiner et al. 2016. Swan et al. 2015).

Similar implications have been found in dental care market. Chen, et al (2019) find that relaxing scope of practice regulations and autonomy for dental hygienists improve utilization of dental care services. The strongest improvements in utilization rates are in areas with a bigger shortage of dental care access. Langelier, et al. (2016) find evidence suggesting that population level oral health improves following relaxation of scope of practice regulations for dental hygienists. Similar results can be found for dental hygienists and dentists where hygienists can practice independently (Kleiner, et al. 2010).

In the most similar study to our own, Alexander and Schnell (2019) find that expanding independent scope of practice for nurse practitioners to prescribe controlled substances improves aces to mental health care and reduces mental health related mortality, including suicides. This is

the only study to the best of our knowledge that looks at how expansion of scope of practice affects mental health care outcomes. Furthermore, they find that the impact is greater on areas that are underserved, such as rural or minority communities. Our paper differs from theirs in the sense that we focus on expansion of prescription authority specifically for psychologists instead of nurse practitioners, and we then determine how this expansion affects suicide related mortality. Other papers have also found that expanded scope of practice for nurse practitioners might help alleviate disparities in access to mental health care services (Bishop, et al. 2014; Hartley, et al. 2004; Traczynski and Udalova 2018).

III. Data

Our data comes from two main sources. In our psychologist labor market analysis, we use the American Community Survey (ACS) data to capture the impact of scope of practice regulations on labor market outcomes. The ACS is an annual survey that gathers labor market and work-related information from individuals. We use this data to investigate the impact of prescriptive authority on annual hours worked by psychologists and their earnings. We only look at the individuals who report working in the health care field, using the 2010 occupational codes. We collapse the individual data to develop state level aggregates for labor market outcomes, such as the average annual labor hours, annual income from wages, annual total income, and median annual wage income, in state at a given year for each occupation.

We present the descriptive statistics of the ACS data in Table 1. We use two types of income variables: wage income and total income (which includes income from sources other than labor income) for each psychologist. We weight the statistics with person-weights that are

provided by the ACS. We see that average income (both labor and total) are lower when we look at psychologists in Louisiana and New Mexico compared to the national average, the non-treatment states, or all the treatment states taken together. Though most psychologists are women, the proportion of female psychologists are lower in New Mexico and Louisiana. Psychologists are also more likely to be white. Most of the psychologists either have a master's degree or a doctorate. However, the proportion of psychologists with a doctorate is lower in New Mexico and Louisiana, while those with professional and a master's degree is higher than the national average.

To understand the ramifications of prescriptive authority on mental health outcomes, we focus on suicide rates within treated and untreated states before and after prescriptive authority for psychologists have been implemented. Though deaths resulting from suicide can have many underlying factors, it has been strongly associated as a mental and behavioral health outcome in which prescriptive medication has been shown to have substantial mitigating effects. We use multiple cause of death mortality data from the National Vital Statistics System of the National Center for Health Statistics for years 1999-2018 to analyze changes in deaths due to suicide[5]. This dataset contains information on all deaths occurring in the United States and contains categorical information on the cause(s) of death. This information is obtained from death certificates provided through vital statistics offices in all 50 states and District of Columbia.

We restrict our analysis to include only deaths due to suicide for individuals over the age of 15. We aggregate the dataset at the state, month, and year of death level to include the number of deaths due to suicide in each time period for a select state. We then include information on the

[5] We had access to the public data from 1996-2004 from NBER website. However, they discontinued posting geographic identifiers from 2005. We had to apply with NCHS to receive the restricted version of the dataset from 2005-2018. Data is aggregated to the state-level to comply with restricted data reporting requirements.

composition of the sex of individuals that died resulting from suicide in each state at a given time period. We add similar information regarding resident status, education level (high school, some college, bachelors, graduate), marital status (divorced, widowed, single, married), age group (multiple 10 years age intervals), and unemployment rate in the given state during a given month. Therefore, we have both observations of the aggregate number of deaths by suicide in a certain state at a certain time, as well as the different characteristics of people who died by suicide in a certain state at a certain time.

Tables 2 and 3 provides the summary statistics of some key variables that illustrate a snapshot of the mortality data, in the most recent year, 2018, and before any state changed their policies, 2003. Given the restrictions on data access, there are limitations in the data descriptions that we can report. We list the summary statistics of suicide rates for the nation, and then for the RxP states versus the non-treatment states, for years 2003 and 2018, the year before any policy changes and the last year in our sample, respectively. We see from the table that suicide rates increased from 2003 to 2018 for all groups. Suicide rates are also higher in the treatment states compared to the non-treatment states. This prompts the question of whether the policy implementation was endogenous or not. We also see that females only comprise a little over 20 percent of suicide deaths, which is consistent with what the literature states. Finally, according to our data, most of the suicides are of white individual which is also consistent with previous studies.

IV. Methodology

We use a difference-in-difference estimation to investigate the impact of allowing psychologists to have prescriptive authority on the access to mental health care and quality of care, as measured by labor market outcomes and suicide. Our main specification is given below:

$$y_{st} = \beta_0 + \beta_1 Treat + \boldsymbol{\beta_2 Treat} * \boldsymbol{Post} + X'C + \alpha_s + \rho_t + \varepsilon_{st}$$

y_{st} represents our outcome variables: natural log of hourly earnings, annual hours of work for psychologists, and the natural log of suicide rates. We use suicide rates to detect how expanding prescription authority to psychologists affects quality of care. If access to mental health care improves following the change in policy, we would expect suicide rates to decline or remain unchanged. Studies within the occupational licensing literature have found mixed effects on quality of care metrics after scope of practice regulations were expanded for Nurse Practitioners. However, if access to mental health care improves, we would then expect to see a significant decline in the rates of suicide. There is also the distinct, but theoretically unlikely, possibility of worse mental health outcomes because of loosening scope of practice regulations. If this is true, we might obtain increase in mortality due to suicide. Therefore, the empirical result is theoretically ambiguous.

To capture labor market impact of prescriptive authority expansions, also known as the RxP movement, we look at annual hours of work and log of hourly earnings. The implications of how the RxP movement would affect labor market outcomes for psychologists is theoretically ambiguous. Allowing psychologists to prescribe controlled substances should increase the demand for treatments that require prescriptive authority. This should increase the demand for psychologist services, increasing the quantity of services provided (captured by annual hours

worked) and the price of psychologist services (log hourly earnings). This approach corresponds to what Kleiner, et al. (2016) used in their paper when they analyzed the impact of scope of practice changes for nurse practitioners.

However, it might be possible that labor market behavior does not change for psychologists at all. The psychologists could continue seeing the same volume of patients and only change their behavior, in cases where prescription drugs are necessary, by prescribing the drugs themselves instead of having to refer them to a psychiatrist or physician who can. Stated differently, psychologists in states with the RxP movement do not only diagnose mental health issues and perform psychoanalysis, but also can prescribe controlled substances when deemed necessary. In states within our non-treatment group, where psychologists cannot prescribe, they have to refer the patient to a psychiatrist or physician who can. In this case, we will not see much of an impact on their labor market behavior. This theory would also corroborate with the idea that there is an increased access to care for patients requiring psychotropic drug treatment for their issues.

Treat is an indicator variable that equals 1 for states that allowed prescriptive authority to psychologists. In our main analysis, we use New Mexico (2002), Louisiana (2004), Illinois (2014), Iowa (2016), Idaho (2017) as our treated states. Post is an indicator variable that is equal to one when the treatment state implemented the policy allowing psychologists to be able to prescribe controlled substances. Our coefficient of interest is $\boldsymbol{\beta_2}$, which captures the impact of prescriptive authority on our three main outcome variables. The control group includes states that do not allow psychologists to prescribe medication.

We perform an additional specification to determine whether there is a lagged effect of the policy. There are various reasons to support the hypothesis that the impact of the policy

would not be immediate. Psychologists have to complete certain training, education, and experience requirements before they are allowed to prescribe controlled substances. For instance, psychologists have to undergo 450 hours of didactic instruction and 400 hours of supervised practicum in New Mexico before they can prescribe. In Louisiana, psychologists have to complete a post graduate master's degree in clinical psychopharmacology (About Prescribing Psychologists, 2014). Similar requirements are quite common in all states with prescriptive authority for psychologists. Three of our five treatment states- Illinois, Idaho, and Iowa, changed their prescriptive authority recently and therefore we believe there has not been enough time for the psychologist markets within these states to complete all the requirements for scope of practice to be fully implemented. This is why we restrict our analysis to include only New Mexico and Louisiana as the treated states in our model since these states have had ample time to see any effect of the policy change on the outcome variables, having a decade or longer to implement changes.

X represents a vector of additional controls that were added to the model, such as proportion of women that died of suicide, residential status, racial controls, education controls, marital status, age, and macroeconomic factors such as unemployment rate. We further perform a series of sub-sample analysis to see whether the expansion of prescribing authority to psychologists had an impact of certain populations more than others. We expect larger impacts on minority groups due to greater access problems present in these communities. We also expect that the policy had a bigger impact on people between the ages of 35 and 55. To test this, we conduct sub-sample analysis by the sex, marital status, age, and racial category using the variables provided in the dataset. Finally, all standard errors are clustered at the state level to adjust for unobservable confounders that are correlated to the treatment at the state level.

V. Results

Labor Market Outcomes

Tables 4 and 5 detail the impact of the *RxP* movement on labor market outcomes for psychologists. There are three dependent variables of interest pertaining to earnings: natural log of labor income, natural log of total income (labor and non-labor), natural log of hourly wages. All income variables are median values, not average values. The income variables are used to capture whether the psychologists are making more money following the policy change which allows them to prescribe controlled substance. The last column that we have contains average annual hours of work performed in the last year.

Table 4 includes all five states that permit psychologists to prescribe as treatment states. None of the coefficients are statistically significant, even though the estimates for all four outcome variables are in the expected direction. As discussed earlier, there are training, education, and experience requirements that psychologists need to complete before they can prescribe controlled substances, creating a lagged effect. To capture this, we only use New Mexico and Louisiana as our treated states in Table 5 since these states have had a sufficient amount of time elapsed since the implementation of the policy.

The income and wage variables suggest that the median income (for both labor and non-labor incomes) increases for psychologists in the treated states (New Mexico and Louisiana) after the policy implementation. According to the estimates, hourly wages increase by approximately 6 percent. The increase in labor income and total income for psychologists in treated states is between 30 and 33 percent across specifications. While psychologists have lower median income in treated states, income increases for them after they can prescribe controlled substances. The coefficient for average hours worked per year, while positive, is statistically

insignificant. This seems to suggest that while income increases for psychologists in states allowing prescriptive authority, they are not necessarily working more hours.

Mortality due to Suicides

Table 6 presents the impact of RxP movement on average suicide mortality rates in states with expanded prescriptive authority relative to the non-treatment states. The first two columns use all five states as the treated group while the columns 3 and 4 use only New Mexico and Louisiana, for the same reasoning as outlined above. The average suicide rates in the treatment states is high relative to the non-treatment states. When we only use New Mexico and Louisiana as our treatment states, we find that deaths by suicide reduced by 5 to 7 percent.

The analysis is further conducted on a series of sub samples of mortality data by sex, marital status, age group, and race. Since the evidence suggests that access to mental health care services is underprovided for certain groups, we expect to see larger magnitudes of estimated changes in suicides for some groups relative to others. Table `7' and `8' conveys that suicides for both men and women decline in New Mexico and Louisiana following the passage of prescriptive policy for psychologists. To be precise, male and female suicides in New Mexico and Louisiana decline by 9.5 percent and 39 percent, respectively. There is not a significant reduction in mortality due to suicides for men or women when all five RxP states are used as treatment. The reduction in suicide is larger for women than men, which might imply that women are more likely to seek mental and behavioral health care resources.

The sub sample analysis by marital status, found within Tables 9 and 10, reveals that the effect of expanded prescriptive authority for psychologists is almost entirely driven by reduction in suicides for divorced and never-married single people. Suicide rates decline for divorced

people by approximately 32 percent in the treatment states, relative to the control states. Suicide rates for singles in treatment states is 14 percent lower than in the control states. There is no statistically significant effect on suicides rates for married or widowed individuals. This might be because divorced people go through a substantial life change which can be both emotionally and financially taxing, and the RxP movement improves access to mental health treatment care and reduces the time from initial intake to a designated control substance regiment. Single individuals are more at risk for suicide because there is not a second person to notice changes or contact professionals during times of need.

Tables 11 and 12 categorizes the results for the sub sample analysis by age group. The data within the restricted use files is listed by 10-year intervals[6]. This table is limited to suicides people between the ages of 15 and 65, because of reporting limitations within the restricted use files on required sample sizes. This age range has also been determined to be more prone to suicidal intentions that are related to mental or behavioral health issues relating to depression and addiction.

The reduction in suicides is primarily between age groups 25-54. Deaths due to suicide in New Mexico and Louisiana decline after the policy change for people between 25-34 by approximately 22 to 35 percent. However, the estimates are statistically significant only at the 10 percent level. Suicide mortality for 45-54 age group category declines by 27 to 29 percent, statistically significant at the 5 percent level.

Subsample analysis was also conducted across racial groups. We present those results in Tables 13 and 14. The decline in suicide related mortality is statistically significant for the white

[6] We have the following categories for age group: 15-24; 25-34; 35-44; 45-54; 55-64; 65-74; 75-84; over 85

population. Specifically, suicide rates decline by 15 percentage for white suicides in the treated states. For the black population, the estimates are negative and large in magnitude, presenting a decline in suicides by 80 percent. There is no measurable impact on the Native American populations or Asian populations. Like before, none of our estimates are statistically significant when we include all five states in the treatment group. We additionally conduct a variety of additional specifications, results of which are presented in an online appendix that are available upon request from the authors. These additional tests include different forms of smoothing, such as first order autoregressive model, exponential smoothing, random walk, and the results are nearly identical in magnitude and statistical significance.

VI. Conclusion

Limited access to health care is linked to poorer health outcomes for many people. This is also true for mental health care. Economists and health care professionals argue that access to health care can be expanded by relaxing scope of practice regulations for providers. However, opponents of scope of practice expansions argue that the quality of care will be compromised, and the cost of care will increase due to over-prescribing or over testing. Our paper investigates how allowing prescriptive authority to psychologists affects suicide rates. We also analyze the labor market responses for psychologists following the policy changes, particularly by determining changes to their wages, earnings, and labor hours provided.

Using restricted mortality dataset from the National Center for Health Statistics, we test the relationship between psychologist prescriptive authority and suicide by employing a difference-in-difference estimation technique. We find that states that have passed the prescriptive authority laws for psychologists have a decrease in their suicide rates. However, our results suggest

that the impact is visible after a few years of the policy being implemented to account for lags derived by psychologists completing education, training, and experience requirements to match the new scope of practice. We find that suicide for whites, men and women, blacks, individuals who are divorced or single, and people between the ages of 35 and 55 see a significant decline due to the policy expansion. Our results suggest an average reduction in suicide rates of 7 percent in the overall population. Our results are similar to those by Alexander and Schnell (2019), who find that independent prescribing by nurse practitioners reduce suicide related mortality. Earnings have also increased for psychologists in states with prescriptive authority. However, we do not see any evidence suggesting any effect on the annual hours of work.

Our paper suggests that allowing health care providers to prescribe controlled substances can improve access to mental health care services. The demand for mental health care services has increased more than the supply of psychiatrists. This is particularly true right now when we are going through a global pandemic. Given recent CDC reports that suicide ideation has increased in young adults during COVID-19, we expect to see a rise in the demand for mental health services[7]. Restrictive scope of practice regulations reduces access to efficient mental health care, which is becoming a more prevalent concern as we get ourselves out of the current pandemic. Our paper suggests that by allowing psychologists to prescribe psychotropic substances there are reductions in suicide rates, and increased access for people to receiving sufficient treatment.

[7] https://www.cdc.gov/mmwr/volumes/69/wr/mm6932a1.htm

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Appendix

Table 1. Summary Statistics from the American Community Survey 2000 – 2017

	National Average	LA and NM Treatment States	Treatment States	Non-Treatment States
Income wage*	$29,010.00	$22,050.00	$33,792.00	$28,910.00
Total Income*	$44,460.00	$37,640.00	$44,100.00	$44,482.00
Annual Labor hours	1763.6	1476.5	1775.9	1762.31
Age	49.5	50	47.3	49.6
		Education		
College only	0.80%	0.00%	0.70%	0.80%
Masters	50.10%	59.00%	53.10%	49.90%
Professional Degree	7.70%	20.20%	9.30%	7.60%
Doctorate	41.40%	20.80%	36.90%	41.60%
Proportion Immigrant	9.10%	1.70%	5.50%	9.30%
		Race		
White	90%	82%	90.40%	90%
Black	4.60%	1.70%	4.20%	4.60%
		Sex		
Female	68.20%	50%	64%	68.40%

Note: * represents the use of median values instead of averages.

Table 2. Summary Statistics for Suicide from the Vital Mortality Statistics Sample in 2018

	National Average	**LA and NM Treatment States**	**Treatment States**	**Non-Treatment States**
Suicide Rate	14.8 per 100,000	18.6 per 100,000	15.0 per 100,000	14.6 per 100,000
		Sex		
Female	22%	23%	22%	22%
		Marial Status		
Single	39%	41%	41%	38%
Divorced	21%	19%	20%	21%
Married	33%	33%	33%	33%
		Race		
White	89%	83%	89%	89%
Black	7%	9%	7%	7%
		Age		
15 – 24	13%	14%	13%	13%
25 – 34	17%	19%	18%	16%
35 – 44	16%	15%	16%	16%
45 – 54	17%	15%	17%	17%
55 – 64	18%	16%	17%	18%

+/- 1.5% for rounding and missing data values. Summary statistics are provided for some select categories. Inclusion or exclusion of variables was determined by the limitations within the Data Usage Agreement for the Restricted Vital Mortality Statistics. Source: National Center for Health Statistics (1999-2018)

Table 3. Summary Statistics for Suicide within the Vital Mortality Statistics Sample in 2003

	National Average	LA and NM Treatment States	All Treatment States	Non-Treatment States
Suicide Rate	10.9 per 100,000	12.5 per 100,000	10.3 per 100,000	11.0 per 100,000
		Sex		
Female	20%	19%	18%	20%
		Marial Status		
Single	32%	36%	34%	32%
Divorced	22%	22%	22%	22%
Married	37%	33%	35%	38%
		Race		
White	90%	87%	91%	90%
Black	6%	7%	6%	6%
		Age		
15 – 24	13%	16%	14%	12%
25 – 34	16%	18%	17%	16%
35 – 44	21%	21%	22%	20%
45 – 54	21%	17%	20%	21%
55 – 64	12%	11%	11%	12%

+/- 1.5% for rounding and missing data values. Summary statistics are provided for some select categories. Inclusion or exclusion of variables was determined by the limitations within the Data Usage Agreement for the Restricted Vital Mortality Statistics. Source: National Center for Health Statistics (1999-2018)

Table 4. Time-Series Panel Estimate for Full Sample with All Treatment States

	ln(Hourly Wage)	*ln(Income Wage)*	*ln(Total Income)*	*Annual Hours Worked*
Treated	-0.0241	0.1934*	-0.2186**	-267.8***
	(0.0199)	(0.1102)	(0.1024)	(78.2)
Treated * Post	0.0326	-0.1549	0.1606	97.3
	(0.0223)	(0.1107)	(0.1085)	(77.8)
Standard Error Clustering	State	State	State	State
R^2	0.26	0.45	0.37	0.22
Observations	899	899	899	899

Note: We have additional controls in our regression model. The additional controls include sex, racial composition, age, age_squared, and age_cubed. We also have state and year fixed effects. We report the median values for hourly wage, income wage, and total income.

Table 5. Time-Series Panel Estimate for Full Sample with Treatment States of New Mexico and Louisiana

	ln(Hourly Wage)	*ln(Income Wage)*	*ln(Total Income)*	*Annual Hours Worked*
Treated	-0.0466**	-0.2687**	-0.3348***	-309.07***
	(0.0191)	(0.1179)	(0.0961)	(104.54)
Treated * Post	0.0592***	0.3276***	0.2974***	147.11
	(0.0204)	(0.1180)	(0.0982)	(111.54)
Standard Error Clustering	State	State	State	State
R^2	0.26	0.45	0.37	0.22
Observations	899	899	899	899

Note: We have additional controls in our regression model. The additional controls include sex, racial composition, age, age_squared, and age_cubed. We also have state and year fixed effects. We report the median values for hourly wage, income wage, and total income.

Table 6: Effect of RxP on Mortality Due to Suicides

	(1)	(2)	(3)	(4)
Treatment	1.0329***	0.9523***	1.0698***	0.9816***
	(0.0293)	(0.0346)	(0.0147)	(0.0230)
Treatment * Post Period	-0.0254	-0.0109	-0.0731***	-0.0483**
	(0.0345)	(0.0375)	(0.0184)	(0.0214)
Additional Controls	State Time	State, Time, Residency, Education, Marital Status, Age Group, Unemployment, Race, Gender	State Time	State, Time, Residency, Education, Marital Status, Age Group, Unemployment, Race, Gender
Standard Error Clustering	State	State	State	State
R^2	0.95	0.96	0.95	0.96
Observations	12,227	12,227	12,227	12,227

Note: Columns (1) and (2) use all 5 treatment states while columns (3) and (4) only use LA and NM. The treatment variable is the natural log of mortality resulting from suicide within each individual state, in each individual time-period. Source: National Center for Health Statistics (1999-2018)

Table 7. Sub Sample Analysis on Mortality due to Suicides for Males Only

	(1)	(2)	(3)	(6)
Treatment	1.0397***	0.9719***	1.0829***	1.0241***
	(0.03453)	(0.0631)	(0.0267)	(0.0575)
Treatment *	-0.0408	-0.0278	-0.0973***	-0.0950***
Post Period	(0.0406)	(0.0402)	(0.0268)	(0.0311)
Additional State-Level Controls	State Time	State, Time, Residency, Education, Marital Status, Age Group, Unemployment, Race, Gender	State Time	State, Time, Residency, Education, Marital Status, Age Group, Unemployment, Race, Gender
Standard Error Clustering	State	State	State	State
R^2	0.75	0.75	0.74	0.85
Observations	12,227	12,227	12,227	12,227

Note: Columns (1) and (2) use all 5 treatment states while columns (3) and (4) only use LA and NM. The treatment variable is the natural log of mortality resulting from suicide within each individual state, in each individual time-period. Source: National Center for Health Statistics (1999-2018)

Table 8. Sub Sample Analysis on Mortality Due to Suicide for Females Only

	(1)	(2)	(3)	(4)
Treatment	2.0617***	1.3071***	2.2013***	1.4214***
	(0.1139)	(0.2221)	(0.0742)	(0.1677)
Treatment *	-0.1996	-0.1358	-0.3865***	-0.2875**
Post Period	(0.01340)	(0.1751)	(0.0928)	(0.1249)
Additional Controls	State Time	State, Time, Residency, Education, Marital Status, Age Group, Unemployment, Race, Gender	State Time	State, Time, Residency, Education, Marital Status, Age Group, Unemployment, Race, Gender
Standard Error Clustering	State	State	State	State
R^2	0.41	0.42	0.41	0.42
Observations	12,227	12,227	12,227	12,227

Note: Columns (1) and (2) use all 5 treatment states while columns (3) and (4) only use LA and NM. The treatment variable is the natural log of mortality resulting from suicide within each individual state, in each individual time-period. Source: National Center for Health Statistics (1999-2018)

Table 9. Sub-Sample Analysis on Mortality Due to suicide by Marital Status using All Treated States

	Married	Divorce	Single	Widowed
Treatment	1.2307***	2.2736***	1.3784***	6.2829***
	(0.1806)	(0.2668)	(0.1733)	(0.2520)
Treatment * Post Period	-0.0179	-0.2190*	-0.0827	0.1928
	(0.0773)	(0.1113)	(0.0557)	(0.1856)
Additional Controls	State, Time, Residency, Education, Marital Status, Age Group, Unemployment, Race, Gender	State, Time, Residency, Education, Marital Status, Age Group, Unemployment, Race, Gender	State, Time, Residency, Education, Marital Status, Age Group, Unemployment, Race, Gender	State, Time, Residency, Education, Marital Status, Age Group, Unemployment, Race, Gender
Standard Error Clustering	State	State	State	State
R^2	0.66	0.65	0.61	0.73
Observations	12,227	12,227	12,227	12,227

Note: The treatment variable is the natural log of mortality resulting from suicide within each individual state, in each individual time-period; Source: National Center for Health Statistics (1999-2018)

Table 10. Sub-Sample Analysis on Mortality Due to Suicide by Marital Status using New Mexico and Louisiana as Treatment States

	Divorced	Married	Single	Widowed
Treatment	2.3367***	1.2751***	1.4212***	6.2194***
	(0.2575)	(0.1853)	(0.1677)	(0.3165)
Treatment * Post Period	-0.3116***	-0.0440	-0.1415***	0.2843
	(0.0873)	(0.0653)	(0.0458)	(0.2768)
Additional Controls	State, Time, Residency, Education, Marital Status, Age Group, Unemployment, Race, Gender	State, Time, Residency, Education, Marital Status, Age Group, Unemployment, Race, Gender	State, Time, Residency, Education, Marital Status, Age Group, Unemployment, Race, Gender	State, Time, Residency, Education, Marital Status, Age Group, Unemployment, Race, Gender
Standard Error Clustering	State	State	State	State
R^2	0.64	0.66	0.60	0.73
Observations	12,227	12,227	12,227	12,227

Note: The treatment variable is the natural log of mortality resulting from suicide within each individual state, in each individual time-period. Source: National Center for Health Statistics (1999-2018)

Table 11. Sub-Sample Analysis by Age Group for All Treatment States

	15-24	25-34	35-44	45-54	55-64
Treatment	3.3768***	2.7060***	2.2570***	1.6848***	3.6363***
	(0.3263)	(0.2012)	(0.2638)	(0.2638)	(0.2683)
Treatment * Post Period	-0.1010	-0.2218*	-0.1463	-0.2705***	-0.2724
	(0.1386)	(0.1144)	(0.1318)	(0.1008)	(0.2653)
Additional Controls	State, Time, Residency, Education, Marital Status, Age Group, Unemployment, Race, Gender	State, Time, Residency, Education, Marital Status, Age Group, Unemployment, Race, Gender	State, Time, Residency, Education, Marital Status, Age Group, Unemployment, Race, Gender	State, Time, Residency, Education, Marital Status, Age Group, Unemployment, Race, Gender	State, Time, Residency, Education, Marital Status, Age Group, Unemployment, Race, Gender
Standard Error Clustering	State	State	State	State	State
R^2	0.65	0.63	0.62	0.64	0.65
Observations	12,227	12,227	12,227	12,227	12,227

Note: The treatment variable is the natural log of mortality resulting from suicide within each individual state, in each individual time-period. Source: National Center for Health Statistics (1999-2018)

Table 12. Sub Sample Analysis for Mortality Due to Suicides by Age Group using New Mexico and Louisiana as Treatment States

	15-24	25-34	35-44	45-54	55-64
Treatment	3.4134***	2.8009***	2.2937***	1.6853***	3.6611***
	(0.3246)	(0.2378)	(0.2607)	(0.2725)	(0.2538)
Treatment * Post Period	-0.1531	-0.3545*	-0.2013	-0.2876**	-0.3202
	(0.1792)	(0.1805)	(0.1292)	(0.1337)	(0.2665)
Additional Controls	State, Time, Residency, Education, Marital Status, Age Group, Unemployment, Race, Gender	State, Time, Residency, Education, Marital Status, Age Group, Unemployment, Race, Gender	State, Time, Residency, Education, Marital Status, Age Group, Unemployment, Race, Gender	State, Time, Residency, Education, Marital Status, Age Group, Unemployment, Race, Gender	State, Time, Residency, Education, Marital Status, Age Group, Unemployment, Race, Gender
Standard Error Clustering	State	State	State	State	State
R^2	0.65	0.62	0.62	0.64	0.65
Observations	12,227	12,227	12,227	12,227	12,227

Note: The treatment variable is the natural log of mortality resulting from suicide within each individual state, in each individual time-period. Source: National Center for Health Statistics (1999-2018)

Table 13. Sub Sample Analysis for Mortality Due to Suicides by Race for All Treatment States

	White	Black	Native American	Asian/Pacific Islander
Treatment	0.8086***	1.7595***	10.4761***	0.7819
	(0.0987)	(0.2576)	(3.2539)	(0.6165)
Treatment * Post Period	-0.1054	-0.0677	0.2297	-0.2164
	(0.0659)	(0.2731)	(0.5382)	(0.4753)
Additional Controls	State, Time, Residency, Education, Marital Status, Age Group, Unemployment, Race, Gender	State, Time, Residency, Education, Marital Status, Age Group, Unemployment, Race, Gender	State, Time, Residency, Education, Marital Status, Age Group, Unemployment, Race, Gender	State, Time, Residency, Education, Marital Status, Age Group, Unemployment, Race, Gender
Standard Error Clustering	State	State	State	State
R^2	0.80	0.71	0.57	0.60
Observations	12,227	12,227	12,227	12,227

Note: The treatment variable is the natural log of mortality resulting from suicide within each individual state, in each individual time-period. Source: National Center for Health Statistics (1999-2018)

Table 14. Sub Sample Analysis for Mortality Due to Suicides by Race using New Mexico and Louisiana as Treatment States

	White	Black	Native American	Asian/Pacific Islander
Treatment	0.8403***	2.3395***	10.4496***	1.2976*
	(0.0952)	(0.3272)	(3.2633)	(0.6549)
Treatment * Post Period	-0.1515***	-0.7998**	0.2763	-0.8970
	(0.0503)	(0.3754)	(0.3865)	(0.6578)
Additional Controls	State, Time, Residency, Education, Marital Status, Age Group, Unemployment, Race, Gender	State, Time, Residency, Education, Marital Status, Age Group, Unemployment, Race, Gender	State, Time, Residency, Education, Marital Status, Age Group, Unemployment, Race, Gender	State, Time, Residency, Education, Marital Status, Age Group, Unemployment, Race, Gender
Standard Error Clustering	State	State	State	State
R^2	0.80	0.71	0.57	0.60
Observations	12,227	12,227	12,227	12,227

Note: The treatment variable is the natural log of mortality resulting from suicide within each individual state, in each individual time-period. Source: National Center for Health Statistics (1999-2018)