Assessing the Effectiveness of New York’s 911 Good Samaritan Policy –

A Natural Experiment

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Objectives. To evaluate the effectiveness of New York State’s 911 Good Samaritan Law.

Methods. We exploit a difference in state law between New York State, where the policy was adopted in 2011, and New Jersey, where the policy was not adopted until 2013, to provide a reasonable comparison condition. We examine variation in hospital admissions across 270 hospitals in New York and New Jersey at the quarterly level controlling for state and hospital fixed effects and time trends using State Emergency Department Databases (SEDD) and State Inpatient Databases (SID), Healthcare Cost and Utilization Project (HCUP), Agency for Healthcare Research and Quality.

Results. There was an overall increase in hospital admissions in the incidence of heroin related accidental overdose cases after the enactment of New York’s 911 Good Samaritan Laws, but not for non-heroin accidental overdoses. While hospital admissions in the neighboring state of New Jersey did not experience significant increases.

Conclusions. Findings support both of our hypotheses and provide preliminary support for the effectiveness of 911 Good Samaritan Laws in increasing heroin related hospital admissions. Results suggest that either heroin users and/or those around them were impacted by the policy change.
Introduction

Drug overdose is the leading cause of accidental death in the United States, even exceeding motor vehicle deaths. Since 2000, the rate of deaths from accidental overdoses has increased by 137%, and the rate of opioid overdoses has increased by 200% (Centers for Disease Control and Prevention 2015). While prescription drugs are largely responsible for the rise and account for more overdose deaths than all illegal drugs combined, heroin overdose deaths have also risen rapidly in recent years. Nationally, opioids, heroin and prescription pain relievers are the primary drugs associated with accidental overdoses (Rudd et al. 2016). In response to increasing overdose deaths, in 2007, New Mexico was the first state to pass a Good Samaritan Law. As of September 2016, 37 states and the District of Columbia have enacted similar legislation. Generally, these policies attempt to encourage witnesses or those experiencing an overdose to call 911 by providing immunity from charge or prosecution of possession of narcotics. Advocates argue that enacting the law can potentially save lives by encouraging individuals to seek medical help in the event of an overdose (Drug Policy Alliance 2016). Given the rapid adoption of 911 Good Samaritan policies among states across the nation and recommendations for the adoption and evaluation of such policies (Davis, Webb, and Burris 2013; Haegerich et al. 2014; Johnson 2010), it is surprising that little research has been conducted to examine the effectiveness of 911 Good Samaritan policies at the population level at reducing deaths from accidental overdoses. We evaluate New York’s 911 Good Samaritan Law by assessing hospital admissions for accidental overdoses before and after the enactment of the policy.

It is important to examine the effectiveness of 911 Good Samaritan Laws for several reasons. First, overdoses bring significant financial and health care utilization burden on the
United States health care system (Yokell et al., 2014). As such, strategies to reduce morbidity and mortality resulting from overdose are urgently needed. Yet, strategies that are adopted should be evidence based and objectively evaluated. Second, passage of Good Samaritan Laws can be a costly investment. For example, Washington State’s law took five years to pass and experienced a number of legislative hurdles (Banta-Green et al. 2011; 2014). One of the primary objectives of 911 Good Samaritan Laws is to “saves lives”. As such, advocates routinely argue that adoption of these policies will impact overdose deaths in the US (Drug Policy Alliance 2016). Finally, due to the alarming increase in accidental opioid overdoses, federal and state agencies have been aggressive in implementing new strategies to help fight the opioid overdose epidemic, including harm reduction policies such as needle exchanges, heroin distribution and access to Naloxone, an opioid overdose reversal drug (Kounang 2016). 911 Good Samaritan Laws are decidedly part of the array of harm reduction policies. As such, evidence based evaluations can potentially tip the scale in terms of informing legislators which policies can impact overdose death rates.

We evaluate the impact of the 911 Good Samaritan Law using data from the State Emergency Department Databases (SEDD) and State Inpatient Databases (SID), Healthcare Cost and Utilization Project HCUP, Agency for Healthcare Research and Quality to compare emergency department and inpatient hospital admissions before and after the adoption of the policy. Specifically, we exploit a difference in state law between New York State, where the policy was adopted in 2011, and New Jersey, where the policy was not adopted until 2013, to provide a reasonable comparison condition. We examine variation in hospital admissions across 270 hospitals in New York and New Jersey at the quarterly level controlling for state and hospital fixed effects and time trends.
Overview of Good Samaritan

According to Darke and Farrell (2014), three factors can theoretically influence the number of fatal opioid overdoses seen in a population: (i) the size of the population exposed to opioids, (ii) the risk of overdose when exposed to an opioid and (iii) the risk of dying when an overdose is experienced. Good Samaritan laws theoretically impact the third factor. Because overdose deaths generally do not occur instantaneously upon ingestion or injection, the likelihood of surviving an overdose is largely dependent on how quickly one receives medical attention. Importantly, most overdose deaths are preventable because those experiencing an overdose are rarely alone, meaning that in most overdose cases there is a bystander that can either render aid or call 911 (Darke and Zador 1996; Darke and Hall 2003). However, given harsh penalties for drug use and possession, fear of punishment regarding illicit drug use may prevent bystanders’ efforts to obtain emergency treatment for people experiencing a heroin or other opioid overdose. In fact, studies in multiple sites and on various subgroups of users demonstrate that fear of police involvement is a salient concern and a correlate of drug users’ reluctance to call 911 (see Banta-Green 2014; Tobin, Davey, and Latkin 2005; Tracy et al. 2005). Key to the success of Good Samaritan policies is buy-in from both bystanders and law enforcement. If both bystanders and law enforcement buy-in to the policy, fears about punishment should decrease and in turn we should observe an increase in both 911 calls and hospital admissions for overdose related injuries.

Initial evaluations of Good Samaritan Laws are promising but nuanced. In interviews with opiate users, law enforcement officers, and paramedics in Seattle, Washington, Banta-Green and colleagues (2011; 2014) found that 88% of opiate users indicated that they would be more willing to call 911 in the event of an overdose upon passage of the law. Notably, few officers
(16%) and paramedics (7%) were aware of the law at the time of the interviews (Banta-Green et al. 2014). After being informed of the law, 62% of police said they would not change their behavior because they would not have made an arrest anyway, 14% said they would be less likely to make an arrest, 20% of officers were unsure of what they would do, and 4% indicated that they would continue to make arrests. Banta-Green et al. (2011: 4) argue, “The 911 Good Samaritan overdose law essentially makes the existing law on the streets formally the law on the books” (see also Banta-Green et al. 2014), which may suggest little practical utility to law enforcement officers’ behavior. Banta-Green et al. (2014:1109) acknowledge that passing Good Samaritan laws is “decidedly inefficient” without proper implementation, but such laws have the potential to work with buy-in from both bystanders and law enforcement.

Studies from Rhode Island somewhat mirror those in Washington in that knowledge of Good Samaritan laws is not widespread among users (Evans et al. 2016). However, in Rhode Island knowledge of the law was not associated with user’s willingness to call 911. Moreover, knowledge of Rhode Island’s Good Samaritan Law was not universal among law enforcement, though proper training on overdose protocol increased awareness among officers (Saucier et al. 2016). To date, we know of no official evaluations of the effectiveness of Good Samaritan laws at the population level.

The Current Study

The current study is among the first to examine the effectiveness of 911 Good Samaritan Laws. Specifically, we focus on whether the enactment of New York State’s 911 Good Samaritan Law is associated with a higher rate of hospital admissions for accidental opioid and heroin overdoses. On September 18, 2011, New York State’s Good Samaritan Law went into effect. The bill essentially provides immunity protections from charge and prosecution for
possession of up to 8 ounces of a controlled substance, alcohol (for underage drinkers); any amount of marijuana, paraphernalia offenses; and sharing of drugs, which in New York State sharing constitutes a “sales” offense (§ 220.00(1)). It also protects against arrest for misdemeanor amounts of controlled substances (very small and residual amounts), but not misdemeanor amounts of marijuana. The legislation received unusual bi-partisan support across New York passing unanimously in the senate and with only two “no” votes in the assembly. Despite apprehension from law enforcement, the Governor of New York, Andrew Cuomo outlined why a health-based approach was needed and argued, “The benefit to be gained by the bill – saving lives – must be paramount.” Thus, the Division of Criminal Justice Services was instructed to conduct training so law enforcement officials understand the new law.

In contrast to New York State, New Jersey State legislators were reluctant to adopt harm reduction policies, including 911 Good Samaritan Laws. Despite several attempts by advocates, the New Jersey Governor Chris Christie vetoed the bill until there was a change in perspective and the bill was eventually signed into law on May 2, 2013. The gap during the period of adoption of the 911 Good Samaritan Laws between the two neighboring states, New York and New Jersey, provides a unique opportunity for us to examine the changes in accidental heroin and opioid overdoses before and after the adoption of the policy in New York in years 2010, 2011 and 2012. We can also leverage the fact that New Jersey did not have a similar law during those years and use the changes in the rates of heroin and opioid overdoses in New Jersey as a point of comparison.

**Data and Methods**

We use 2010-2012 New York State and New Jersey state-specific hospital admissions data from the State Emergency Department Databases (SEDD) and State Inpatient Databases
SID, Healthcare Cost and Utilization Project (HCUP), Agency for Healthcare Research and Quality. The SEDD include emergency department visits that do not result in hospitalization, while the SID include hospital inpatient stay records, as such emergency department visits that result in hospitalization only appear in the SID. We define opioid-related overdoses using International Classification of Diseases, Ninth Revisions, Clinical Modification (ICD-9-CM) codes 965.00, 965.01, 965.02, 965.09, E850.0, E850.1, or E850.2, and heroin-related overdoses using ICD-9-CM codes 965.01 and E850.0. Because the 911 Good Samaritan Law should only influence accidental overdose rates, we exclude intentional injury cases.  

The data were restructured from incident level to hospital level, such that each hospital has quarterly observations up to 12 quarters over the 3 year study period. The quarters are a count of each of the outcomes of interest (i.e. opioid and related narcotics, heroin, non-heroin admissions) within each hospital. There were 277 hospitals that contained at least one incident of opioid or related narcotics admissions over the study period. Because our fixed effects estimator requires at least 2 periods per unit, 7 hospitals excluded from analysis, which made our analytic sample 2,870 observations across 270 hospitals across New York State (n=196) and New Jersey (n=74). Our outcomes for heroin and non-heroin accidental overdoses resulted in a slightly smaller sample given that some hospitals were further dropped because of having only one observation in the hospital. In the end, our sample for the heroin only cases consisted of 1,780 observations across 228 hospitals and our non-heroin cases consisted of 1,776 observations across 226 hospitals.

Analytic Plan

1 Intentional Ecodes excluded: E950.0, E950.1, E950.2, E950.3, E950.4, E950.5, E950.6, E950.7, E950.8, E950.9 E951.0, E951.1, E951.8, E952.0, E952.1, E952.8, E952.9, E953.0, E953.1, E953.8, E953.9, E954, E955.0, E955.1, E955.2, E955.3, E955.4, E955.5, E955.6, E955.7, E955.9, E956, E957.0, E957.1, E957.2, E957.9, E958.0, E958.1, E958.2, E958.3, E958.4, E958.5, E958.6, E958.7, E958.8, E958.9, E959, E950.0.
The analysis proceeds in several steps. First, we examine the monthly rates of hospital and emergency room admissions for opiate related narcotics admissions in New York and New Jersey across the study period, separated by gender.

Second, to examine the effect of the 911 Good Samaritan Act in New York, we estimate the following model:

\[
y_{it} = \beta_0 + \beta_1 A_{it} + \beta_2 N_{Yi} + \gamma A_{it} * N_{Yi} + a_i + p_t + \epsilon_{it}
\]

Where \( A_{it} \) is an indicator of time before vs. after the policy, \( N_{Yi} \) represents the indicator for the state of New York, and \( a_i \) and \( p_t \) represent hospital and time fixed effects, respectively. The parameter of interest is \( \gamma \) which is the coefficient on the interaction between time and treatment. In addition we include a dummy variable for each quarter to control for the shifts in the dependent variable which are not explained by other variables. Finally, given that the dependent variable in each case is a count, we employ a Poisson regression model to estimate the parameters of the model.\(^2\)

We hypothesize that for the 911 Good Samaritan Act to have an overall increase in hospital admissions:

\[
H1: \gamma > 0
\]

Finally, we conduct the above analysis with heroin incidents only and non-heroin incidents. We expect that given the 911 Good Samaritan provides immunity from charge or prosecution of possession of narcotics, its effect would be driven by heroin overdoses. Therefore we hypothesize:

\[
H2: \text{ (heroin)} > \gamma \text{ (non-heroin)}
\]

\(^2\) We recognize that overdispersion might be an issue so as sensitivity analysis we used a negative binomial regression model. Results were consistent with the Poisson models.
Results

Figures 1 and 2 illustrate the monthly rate of opioid and related narcotics hospital admissions per 10,000 persons in the population for males and females in New York and New Jersey, respectively. There are several noteworthy points regarding Figures 1 and 2. First, there is an upward trend in the rate of opioid and related narcotics hospital admissions in both states, for both males and females. At the beginning of the study period the monthly rate for males was .2 per 10,000 in New York and .24 per 10,000 in New Jersey. At the end of the study period, the monthly rate for males was .36 per 10,000 in New York and .42 per 10,000 in New Jersey. Opioid and related narcotics hospital admissions for females also increased in both New York and New Jersey. Second, in general the rate of opioid and related narcotics hospital admissions for males in New Jersey was slightly higher than in New York across the study period. However, the trend in New Jersey’s hospital admissions appears considerably less stable compared with the trend in New York admissions, for both genders.

Table 1 provides a description of the distribution of our three outcome measures: opiates and related narcotics, heroin, and non-heroin admissions. On average, New York hospitals had 7.54 opioid and related narcotics admissions per quarter and New Jersey hospitals had 6.16 opioid and related narcotics admissions per quarter. When we separate out the overdoses that were associated with heroin, New York hospitals in our sample had on average 3.16 per quarter whereas New Jersey hospitals 4.01 per quarter. In terms of overdoses that are not associated with heroin, New York’s average was about double (7.14) New Jersey’s average (3.5). Table 1 also shows that New Jersey’s rates have considerable variation, especially for heroin admissions (SD=10.22).
Table 2 presents the results of our hospital fixed effects models on the three outcomes. For each of the three outcomes we estimate hospital fixed effects models with and without time fixed effects. The first two columns show the results for opioid and related narcotics admissions. In both columns one and two, the indicator for time is negative and significant; suggesting that on average, post intervention is associated with a decrease in hospital admissions across the study period. Our parameter of interest, the interaction between treatment and time is positive and significant. It shows that in the hospitals in New York, after the 911 Good Samaritan Policy was enacted, the logs of expected admission counts would increase by 0.19. Alternatively, after the 911 Good Samaritan Policy was enacted there was a 20.9% increase in opioid and related narcotics admissions in New York hospitals. The coefficient for the interaction between treatment and time is not impacted by the inclusion of time-fixed effects. This supports Hypothesis 1, and we reject the null hypothesis and conclude that the 911 Good Samaritan Policy significantly increased opioid and related narcotics admissions in New York State.

Columns 3 and 4 in Table 2 displays the results for our Poisson model with hospital and time fixed effects on overdoses involving heroin. The results are similar to the opioid and related narcotics admissions such that the indicator for post treatment is negative and significant; suggesting that on average, post intervention is associated with a decrease in heroin hospital admissions over the study period. The parameter of interest, the interaction between treatment and time is also positive and significant. In fact, it is a stronger effect than in model 1 showing that in the hospitals in New York, after the 911 Good Samaritan Policy was enacted, the logs of expected heroin admission counts would increase by 0.30. Stated differently, all else equal, the expected number of heroin admissions is about 35% higher after the policy was implemented in
New York hospitals. The coefficient for the interaction between treatment and time is not impacted by the inclusion of time-fixed effects.

Finally, columns 5 and 6 considers the incidents that are opioid and narcotics related, but exclude the heroin cases. In hypothesis 2 we expected that the 911 Good Samaritan Policy should have a bigger effect on cases involving heroin than cases that did not include heroin since the threat of charge and conviction is not as salient with non-heroin accidental overdoses. In column 5, our post treatment indicator is negatively (p<.01) related to non-heroin overdoses however when we incorporate the time fixed effects, there is no relationship between our post treatment indicator and non-heroin hospital overdose admissions. The interaction between treatment and time also suggests a null relationship between the 911 Good Samaritan Policy and non-heroin hospital overdose admissions. In fact, the co-efficient is very close to zero and is almost identical with or without time fixed effects. Thus our second hypothesis is also supported, and we observe a stronger relationship between the 911 Good Samaritan Policy and heroin overdose hospital admissions compared to non-heroin overdoses.

**Discussion**

It is estimated that 1.9 million people in the United States suffer from substance use disorders related to prescription opioid pain relievers in 2014 and an estimated 586,000 are addicted to heroin (Center for Behavioral Health Statistics and Quality 2015). One of the most detrimental consequences is the soaring number of unintentional overdose deaths from prescription opioids and heroin. In response to increasing overdose deaths, over half of the states in the US have passed 911 Good Samaritan Laws, providing immunity from charge or prosecution of possession of narcotics. The current study is among the first to examine the effectiveness of 911 Good Samaritan Laws at the population level. We leverage data on hospital
admissions for opioid and related narcotics accidental overdose cases in New York and New Jersey.

We highlight two main findings from our analyses. First, even after controlling for unobserved heterogeneity across hospitals and accounting for time shifts, we found an overall increase in hospital admissions in the incidence of opioid and related narcotics accidental overdose cases after the enactment of New York’s 911 Good Samaritan Laws. While hospital admissions in the neighboring state of New Jersey did not experience significant increases. Second, when we separated our sample into two subsamples - heroin related overdoses only and non-heroin related overdoses - we found that the increase in admissions in New York was significant for heroin related overdoses but not non-heroin related admissions. In fact, the effect for non-heroin related admissions was almost zero, which suggests that the opiate and related narcotics finding was driven by heroin admissions. These findings support both of our hypotheses and provide preliminary support for the effectiveness of 911 Good Samaritan Laws in increasing heroin related hospital admissions. Our results suggest that either heroin users and/or those around them were impacted by the policy change.

It is important to acknowledge that there are a number of limitations in our study. Perhaps most salient is that the intention of 911 Good Samaritan Laws is to increase the probability that individuals call 911. Thus, the most direct way to measure the effect of the policy is to examine the variation in 911 calls for service or emergency services data. Unfortunately, to our knowledge no systematic data collection of emergency services exists, and certainly not for New York and New Jersey during the study time period. Relatedly, we are not able to account for cases in which a call to 911 was placed but the person who experienced the overdose refused to be transported to the hospital. We included time fixed effects to account for any exogenous shifts
not accounted for in our hospital fixed effects; however, we should note that there were no major shifts in Naloxone, an overdose reversal drug, access or distribution in New York during the study period.

Another limitation of the current study is that we do not have much information on the hospitals themselves. We have unique identifiers for each hospital, which allowed us to use a hospital fixed effects approach, but gaining detailed hospital level data would be another important step in assessing time varying covariates associated with hospital admissions. Having hospital level characteristics would also allow us to link geographical covariates to changes in hospital admissions. Despite some of these limitations, we see our study as a valuable first step in systematically testing the effectiveness of policies enacted to contend with the rise in accidental opioid overdoses.
Figure 1. Opioids and Related Narcotics Hospital Admissions 2010-2012, Males

Figure 2. Opioids and Related Narcotics Hospital Admissions 2010-2012, Females
Table 1. Sample Description

<table>
<thead>
<tr>
<th></th>
<th>New York N=202</th>
<th>New Jersey N=75</th>
</tr>
</thead>
<tbody>
<tr>
<td></td>
<td>Mean (SD)</td>
<td>Mean (SD)</td>
</tr>
<tr>
<td>Opioids and Related Admissions</td>
<td>7.54 (7.54)</td>
<td>6.16 (9.96)</td>
</tr>
<tr>
<td>Heroin Admissions</td>
<td>3.16 (3.51)</td>
<td>4.01 (10.22)</td>
</tr>
<tr>
<td>Non-Heroin Admissions</td>
<td>7.14 (5.87)</td>
<td>3.50 (3.13)</td>
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</tbody>
</table>
Table 2. Poisson Regression Predicting Accidental Overdose Hospital Admissions

<table>
<thead>
<tr>
<th>Predictor</th>
<th>Opioids and Related Narcotics</th>
<th>Heroin</th>
<th>Non-Heroin</th>
</tr>
</thead>
<tbody>
<tr>
<td></td>
<td>N=270; 2870 observations</td>
<td>N=228; 1780 observations</td>
<td>N=226; 1776 observations</td>
</tr>
<tr>
<td>Coefficient (S.E.)</td>
<td>Coefficient (S.E.)</td>
<td>Coefficient (S.E.)</td>
<td>Coefficient (S.E.)</td>
</tr>
<tr>
<td>Pre-Post Treatment</td>
<td>-.37 (.03)***</td>
<td>-.28 (.04)***</td>
<td>-.65 (.04)</td>
</tr>
<tr>
<td>State * Time</td>
<td>.19 (.03)***</td>
<td>.19 (.03)***</td>
<td>.31 (.05)</td>
</tr>
<tr>
<td>Hospital Fixed Effects</td>
<td>Yes</td>
<td>Yes</td>
<td>Yes</td>
</tr>
<tr>
<td>Time Fixed Effects</td>
<td>No</td>
<td>Yes</td>
<td>No</td>
</tr>
</tbody>
</table>

*p<.05 **p<.01 ***p<.001
References


New York Penal Law § 220.00(1)


