Prescription Opioid Abuse: Gleaning insights from hospital and vital records data

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Objective

In this paper we used hospital charges to assess costs incurred due to prescription drug/opioid hospitalizations

Introduction

There is a resurgence in the need to evaluate the economic burden of prescription drug hospitalizations in the United States. We used the Wisconsin 2014 Hospital Discharge data to examine opioid related hospitalization incidence and costs. Fentanyl, a powerful synthetic opioid, is frequently being used for as an intraoperative agent in anesthesia, and post-operative recovery in hospitals. According to a 2013 study, synthetic Fentanyl is 40 times more potent than heroin and other prescription opioids; the strength of Fentanyl leads to substantial hospitalizations risks. Since, 1990 it has been available with a prescription in various forms such as transdermal patches or lollipops for treatment of serious chronic pain, most often prescribed for late stage cancer patients. There have been reported fatal overdoses associated with misuse of prescription fentanyl. In Wisconsin number of total opioid related deaths increased by 51% from 2010 to 2014 with the number of deaths involving prescription opioids specifically increased by 23% and number of deaths involving heroin increased by 192%. We hypothesized that opioids prescription drugs, as a proxy of Fentanyl use, result in excessive health care costs.

Methods

Opioid hospitalizations was defined as any mention of the ICD9 codes (304,305) in any diagnostic field or the mention of (:E935.09) on the first listed E-code. Our analysis used the Heckman 2-stage model, a method often used by Economists in absence of randomized control trials. In presence of unobserved choice, for example opioid related hospitalizations, there usually is a correlation between error in an underlying function (fentanyl prescription) and an estimated function (hospital charges) that introduces a selection bias. Heckman treats this correlation between errors as an omitted variable bias. Therefore, we estimate a Heckman two step model using hospitalization: where the selection function is the probability of being hospitalized for synthetic opioid via logistic regression. Finally, we estimate the hospital charges realized if the patient was given opioids.

Results

Male patients are significantly more likely to be hospitalized for opioids than are female patients; while white patients are significantly more likely to be admitted for opioid usage than other racial groups. We also find that comorbid factors, such as mental health, significantly impact hospital charges associated with opioid use. We find that persons with private health insurance are associated with higher rates of opioid use.

Conclusions

Using a Heckman two step approach we show that comorbid conditions such as mental health, Hepatitis C, injuries, etc significantly affect hospital charges associated with hospitalization. We use these findings to explore the impact of the 2013 rule mandating doctors share opioid prescription information on the incidence of opioid related death and hospital charges associated with opioid prescriptions. This work is policy relevant because alternatives to opioid prescription such as meditation, pain management therapies may be relevant.

Estimates for Opioid Hospital Charge using 2 Stage Heckman

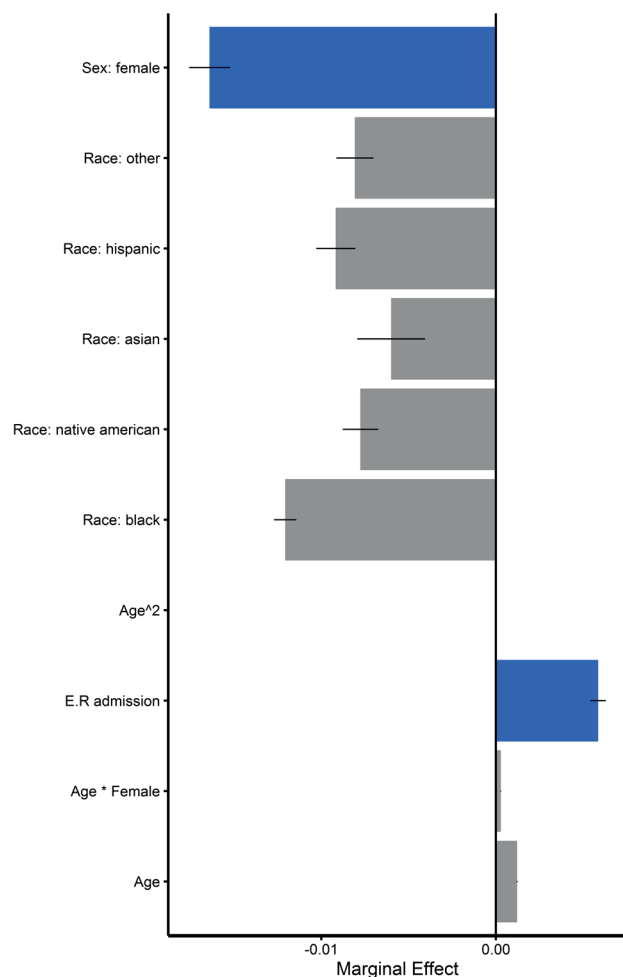| Estimates	Opioid Overdose	Hospital Charge
Intercept	-2.205	3.05
	(0.082)***	(0.25)***
Age	0.034	0.01
	(0.002)***	(0.00)***
Sex	-0.423	0.047
	(0.047)***	
E.D. Admission		0.13
		(0.02)***
Black	-0.37	
	(0.12)***	
American Indian	-0.23	
	(0.08)**	
Alcohol		-0.065
		(0.025)*
Mental		-0.14
		(0.03)***
Injuries		0.08
		(0.02)***
Muscoskeletal		0.08
		(0.02)***
Private Insurance		0.08
		(0.03)***
Medicare		0.08
		(0.03)*
Medicaid		0.06

Significance levels ***99%, **95%, *90%

Figure 3. Marginal Effects of Heckman 2-Step Opioid Use

Keywords

Opioid overdose; Heckman 2-step; Hospital discharge data

References

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