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Policing cannabis and drug related hospital admissions: Evidence from administrative records ☆

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ABSTRACT

We evaluate the impact of a policing experiment that depenalized the possession of small quantities of cannabis in the London borough of Lambeth, on hospital admissions related to illicit drug use. To do so, we exploit administrative records on individual hospital admissions classified by ICD-10 diagnosis codes. These records allow the construction of a quarterly panel data set for London boroughs running from 1997 to 2009 to estimate the short and long run impacts of the depenalization policy unilaterally introduced in Lambeth between 2001 and 2002. We find that the depenalization of cannabis had significant longer term impacts on hospital admissions related to the use of hard drugs, raising hospital admission rates for men by between 40 and 100% of their pre-policy baseline levels. The impacts are concentrated among men in younger age cohorts. The dynamic impacts across cohorts vary in profile with some cohorts experiencing hospitalization rates remaining above pre-intervention levels three to four years after the depenalization policy is introduced. We combine these estimated impacts on hospitalization rates with estimates on how the policy impacted the severity of hospital admissions to provide a lower bound estimate of the public health cost of the depenalization policy.

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1. Introduction

Illicit drug use generates substantial economic costs including those related to crime, ill-health, and diminished labor productivity. In 2002, the Office for National Drug Control Policy estimated that illicit drugs cost the US economy $181 billion (ONDCS, 2004). For the UK, Gordon et al. (2006) estimated the cost of drug-related crime and health service use to be £15.4 billion in 2003/4. It is these social costs, coupled with the risks posed to drug users themselves, that have led governments throughout the world to try and regulate illicit drug markets. All such policies aim to curb both drug use and its negative consequences, but there is ongoing debate among policy-makers as to relative weight that should be given to policies related to prevention, enforcement, and treatment (Grossman et al., 2002).

The current trend in policy circles is to suggest regimes built *solely* around strong enforcement and punitive punishment might be both costly and ineffective. For example, after forty-years of the US 'war on drugs', the Obama administration has adopted a strategy that focuses more on prevention and treatment, and less on incarceration (ONDCS, 2011), although the two primary enforcement and policy agencies of the Drug Enforcement Agency and the Office for National Drug Control Policy remain more focused on traditional supply-side approaches. Other countries such as the Netherlands, Australia and Portugal, have long adopted more liberal approaches that have depenalized or decriminalized the possession of some illicit drugs, most commonly cannabis, with many countries in Latin America currently debating similar moves.[1] While such policies might well help free up resources from the criminal justice system and stop large numbers of individuals being criminalized (Adda et al., 2013), these more liberalized policies also carry their own risks. If such policies signal the health and legal risks from consumption have been reduced, then this should reduce prices (Becker and Murphy, 1988). This can potentially increase the number of users as well as increasing use among existing users, all of which could have deleterious consequences for user's health. The use of certain

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[1] A recent policy announcement by the US Attorney General Eric Holder in August 2013, signaled that a "fundamentally new approach" would be tried in which federal prosecutors will no longer seek mandatory sentences for some non-violent drug offenders. Uruguay now appears set to be the first country to legalize the sale and production of cannabis.

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drugs might also provide a causal 'gateway' to more harmful and addictive substances (van Ours, 2003; Melberg et al., 2010).

This paper considers the impact of a localized policing experiment that reduced the enforcement of punishments against the use of one illicit drug-cannabis-on a major cost associated with the consumption of illegal drugs: the use of health services by consumers of illicit drugs. The policing experiment we study took place unilaterally in the London Borough of Lambeth and ran from July 2001 to July 2002, during which time all other London boroughs had no change in policing policy towards cannabis or any other illicit drug. The experiment-known as the Lambeth Cannabis Warning Scheme (LCWS)-meant that the possession of small quantities of cannabis was temporarily depenalized, so that this was no longer a prosecutable offense.[2] We evaluate the short and long run consequences of this policy on healthcare usage as measured by detailed and comprehensive administrative records on drug-related admissions to all London hospitals. Such hospital admissions represent 60% of drug-related healthcare costs (Gordon et al., 2006). To do so we use a difference-in-difference research design that compares pre- and post-policy changes in hospitalization rates between Lambeth and other London boroughs. Our analysis aims to shed light on the broad question of whether policing strategies towards the market for cannabis impact upon public health, through changes in the use of illicit drugs and subsequent health of drug users.

Our primary data comes from a novel source that has not been much used by economists: the Inpatient Hospital Episode Statistics (HES). These administrative records document every admission to a public hospital in England, with detailed ICD-10 codes for classifying the primary and secondary causes of each individual hospital admission.[3] This is the most comprehensive health related data available for England, in which it is possible to track the admissions history of the same individual over time. We aggregate the individual HES records to construct a panel data set of hospital admissions rates by London borough and quarter. We do so for various cohorts defined along the lines of gender, age at the time of the implementation of the depenalization policy, and previous hospital admission history. As such these administrative records allow us to provide detailed evidence on the aggregate impact of the depenalization policy on hospitalization rates, and to provide novel evidence on how these health impacts vary across cohorts. To reiterate, these administrative records cover the most serious health events. Patients with less serious conditions receive treatment elsewhere, including outpatient appointments, accident and emergency departments, or primary care services. If such health events are also impacted by drug policing strategies, our estimates based solely on inpatient records provide a strict *lower* bound impact of the depenalization of cannabis on public health.

The balanced panel data we construct covers all 32 London boroughs between April 1997 and December 2009. This data series starts four years before the initiation of the depenalization policy in the borough of Lambeth, allowing us to estimate policy impacts accounting for underlying trends in hospital admissions. The series runs to seven years after the policy ended, allowing us to assess the long term impacts of a short-lived formal change in policing strategy related to cannabis.

Given the detailed ICD-10 codes available for each admission, the administrative records allow us to specifically measure admission rates for drug-related hospitalizations for *each* type of illicit drug: although the depenalization policy would most likely impact cannabis consumption more directly than other illicit drugs, this has to be weighed against the fact that hospitalizations related to cannabis usage are extremely rare and so policy impacts are statistically difficult to measure along this margin. Our main outcome variable therefore focuses on hospital admissions related to hard drugs, known as 'Class-A' drugs in England. This includes all hospital admissions where the principal diagnosis relates to cocaine, crack, crystal-meth, heroin, LSD, MDMA or methadone.[4] The administrative records also contain information on the length of hospital stays (in days) associated with each patient admission, and we use this to explore whether the depenalization policy impacted the *severity* of hospital admissions (not just their incidence), where the primary diagnosis relates to hospitalizations for Class-A drug use. Ultimately, we then combine the estimated policy impacts on hospitalization rates and the severity of hospital admissions for Class-A drug use, to provide a conservative estimate of the public health costs of the depenalization policy that arises solely through the increased demand on hospital bed services.

We present four main results. First, relative to other London boroughs, the depenalization policy had significant long term impacts on hospital admissions in Lambeth related to the use of Class-A drugs, with the impacts being concentrated among men. Exploring the heterogeneous impacts across male cohorts, we find the direct impacts on Lambeth residents to be larger among cohorts that were younger at the start of the policy. The magnitudes of the impacts are large: the increases in hospitalization rates correspond to rises of between 40 and 100% of their pre-policy baseline levels in Lambeth, for those aged 15–24 and aged 25–34 on the eve of the policy. To underpin the credibility of the difference-in-difference research design, we also probe the data to: (i) check for pre-existing divergent trends in hospitalization rates between Lambeth and other London boroughs; (ii) evaluate the robustness of the results to alternative control boroughs to compare Lambeth to; (iii) examine whether differential changes over time in health care provision between Lambeth and other locations, or other policies impacting hospitalizations for Class-A drug use, could confound the results, and; (iv) shed light on whether individuals changed borough of residence in response to the policy.

Second, the dynamic impacts across cohorts vary in profile with some cohorts experiencing hospitalization rates remaining above pre-intervention levels three to four years after the depenalization of cannabis was first introduced.

Third, we explore the impacts of the policy on hospitalizations related to alcohol use among Lambeth residents. There is a body of work examining the relationship between cannabis and alcohol use: this has generated mixed results with some research finding evidence of the two being complements (Pacula, 1998; Williams et al., 2004), and other studies suggesting that the two are substitutes (DiNardo

[2] Donohue et al. (2011) categorize illicit drug policies into three types: (1) legalization — a system in which possession and sale are lawful but subject to regulation and taxation; (ii) criminalization — a system of proscriptions on possession and sale backed by criminal punishment, potentially including incarceration; (iii) depenalization — a hybrid system, in which sale and possession are proscribed, but the prohibition on possession is backed only by such sanctions as fines or mandatory substance abuse treatment, not incarceration. The LCWS policing experiment we evaluate is a policy of depenalization. The practical way in which it was implemented is very much in line with policy changes in other countries that have changed enforcement strategies in illicit drug markets and as such we expect our results to have external validity to those settings, including for the current debate on the potential decriminalization of cannabis in California (Kilmer et al., 2010). As discussed in Chu (2012), medical marijuana legislation represents a major change in US policy in recent years, where 17 states have now passed laws that allow individuals with specific symptoms to use marijuana for medical purposes.

[3] Private healthcare constitutes less than 10% of the healthcare market in England, with most admissions for elective procedures. Focusing on admissions to public hospitals is therefore unlikely to produce a biased evaluation of the policing policy on drug-related hospitalizations. The HES contains an inpatient and an outpatient data set. We only use the inpatient data. The inpatient data includes all those admitted to hospital (under the order of a doctor) who are expected to stay at least one night, and contains ICD-10 diagnosis classifications. The outpatient data covers those in which a patient is seen but does not require a hospital bed for recovery purposes (except for a short recovery after a specific procedure). We do not use the HES outpatients data because it is only reliable from 2006/7 onwards (and so not before the LCWS is initiated) and does not have information on diagnosis codes.

[4] The UK has a three tiered drug classification system, with assignment from Class-C to Class-A intended to indicate increasing potential harm to users. Class-A drugs include cocaine, crack, crystal-meth, heroin, LSD, MDMA and methadone. Much of the ongoing policy debate on the decriminalization or depenalization of cannabis, reclassifying it from Class-B to Class-C, stems from the fact that legal drugs such as alcohol and tobacco, are thought to have higher levels of dependency and cause more physical harm to users than some illicit drugs including cannabis (Nutt et al., 2007).

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