Full length article

Buprenorphine and methadone treatment for opioid dependence by income, ethnicity and race of neighborhoods in New York City

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ABSTRACT

Background: Geographic and demographic variation in buprenorphine and methadone treatment use in U.S. cities has not been assessed. Identifying variance in opioid maintenance is essential to improving treatment access and equity.

Purpose: To examine the differential uptake of buprenorphine treatment in comparison to methadone treatment between 2004 and 2013 in neighborhoods in New York City characterized by income, race and ethnicity.

Methods: Social area (SA) analysis of residential zip codes of methadone and buprenorphine patients in NYC, which aggregated zip codes into five social areas with similar percentages of residents below poverty, identifying as Black non-Hispanic and as Hispanic, to examine whether treatment rates differed significantly among social areas over time. For each rate, mixed model analyses of variance were run with fixed effects for social area, year and the interaction of social area by year.

Results: Buprenorphine treatment increased in all social areas over time with a significantly higher rate of increase in the social area with the highest income and the lowest percentage of Black, Hispanic, and low-income residents. Methadone treatment decreased slightly in all social areas until 2011 and then increased bringing rates back to 2004 levels. Treatment patterns varied by social area.

Conclusions: Buprenorphine treatment rates are increasing in all social areas, with slower uptake in moderate income mixed ethnicity areas. Methadone rates have remained stable over time. Targeted investments to promote public sector buprenorphine prescription may be necessary to reduce disparities in buprenorphine treatment and to realize its potential as a public health measure.

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1. Introduction

The dramatic rise in the non-medical use of prescription opioids and of heroin in the U.S. over the past decade has had major health consequences: as of 2012, drug overdose became the leading cause of injury death in the U.S., most of these from opioids (Centers for Disease Control and Prevention (CDC, 2014). At the same time, it is estimated that 80% of people dependent on heroin or prescription opioids do not receive treatment (Stancliff et al., 2012). Buprenorphine has emerged as a clinical and public health intervention; a partial opioid agonist, it has comparable effectiveness to

methadone in treating heroin and prescription opioid dependence (Mattick et al., 2013). In order to expand access to treatment, in 2002 the U.S. Food and Drug Administration approved the prescription of buprenorphine for opioid maintenance treatment by general physicians in their offices, as an alternative to regulated methadone clinics with directly observed dosing requirements (Wakhlu, 2009).

In Western European countries such as France, buprenorphine provision is seen as a public health measure and promoted by the government among low-income, ethnic minority heroin injecting patients, reducing their HIV and overdose rates (Lovell, 2006; Emmanuelli and Desenclos, 2005). In the U.S., buprenorphine patients have historically been privately insured prescription opioid users. As of 2005, buprenorphine patients were likely to be White (92% compared to 53% of methadone patients), employed (56% vs 29% of methadone patients), to have some college education (56% vs 19% of methadone patients), and to be prescription

opioid dependent (75%) rather than heroin dependent (Stanton et al., 2006). Although no nationally representative data on the socioeconomic status or ethnicity/race of buprenorphine patients has been published since the Stanton et al. study, recent city and state-level analysis have found similar racial and socioeconomic trends (Hansen et al., 2013; Stein et al., 2015a,b),

The demographic patterns of buprenorphine treatment in the U.S. may be explained by Congress' desire to address the growth in suburban and rural prescription opioid and heroin use, which was enhanced by targeted marketing of new prescription opioids in those areas beginning in the 1990s (Zee, 2009). Members of Congress passed legislation enabling office-based buprenorphine maintenance that would be more palatable to a growing population of suburban, opioid dependent people than methadone clinics (Egan et al., 2010). Additionally, the manufacturer advertised to consumers primarily over the internet, and helped the Substance Abuse and Mental Health Services Administration launch a web-based physician locator to help patients find buprenorphine certified prescribers (Hansen and Roberts, 2012), which may have favored literate and more affluent consumers. The certification requirement for eight hours of training itself contributed to a shortage of public sector buprenorphine prescribers (Barry et al., 2009).

Heroin and other opioid use remains an endemic cause of overdose death, HIV and hepatitis C infection among Blacks and Hispanics (CDC African Americans, 2015; CDC Latinos, 2015; CDC Health Disparities, 2015; Khlifi et al., 2009; Mack, 2013). Buprenorphine has been shown to improve treatment retention and health outcomes among low-income, socially marginalized populations (Hersh et al., 2011; Stancliff et al., 2012) including formerly incarcerated patients (Lee et al., 2012; Magura et al., 2009) who often express a preference for buprenorphine over methadone (Mitchell et al., 2012). Disparities in access to buprenorphine represent a missed opportunity to protect the health of these populations.

To address the uneven distribution of buprenorphine, all states now include some form of Medicaid coverage for buprenorphine (Rinaldo and Rinaldo, 2013), and certain major cities, including Baltimore and Boston, actively promote buprenorphine treatment in public clinics (Schwartz et al., 2013; Hersh et al., 2011). Beginning in 2005, New York City's public hospitals publicized buprenorphine among patients, encouraged physicians to become certified, and offered buprenorphine in outpatient and inpatient settings (personal communication with Peter Coleman, M.D., June 24, 2013). New York City is instructive with regard to buprenorphine access; while it has the greatest number of opioid dependent residents of any U.S. city, with estimates ranging from 92,000 to 200,000 (Frank, 2000), only an estimated 11–23% have initiated treatment (McNeely et al., 2012). Their untreated opioid dependence has significant consequences; injection drug use is a primary reason that New York has the highest number of new HIV cases in the U.S. (Centers for Disease Control and Prevention (CDC, 2012).

Despite New York City's promotion of buprenorphine in public clinics, as of 2007, buprenorphine patients were significantly more likely to live in high income, predominantly White areas of New York City, while methadone patients were significantly more likely to live in low-income, predominantly Black or Hispanic areas (Hansen et al., 2013). The question raised in this paper is whether these treatment patterns persist. Theories of the health impact of new health technologies in socially stratified societies predict that they increase disparities in health and health care, due to uptake among consumers that have the economic, cultural and social capital to access them. In the absence of countervailing public investments, new technologies are used by more affluent, educated patients, and the use of these technologies further increases disparities in disease detection, treatment access, and mortality based on education and income (Glied and Lleras-Muney, 2008; Tehranifar

et al., 2009). This compounds pre-existing health inequalities: Link and Phelan (1995) have argued that socioeconomic inequalities fundamentally cause health disparities by putting people "at risk of risk".

This study traces geographic changes in buprenorphine maintenance treatment (BMT) and methadone maintenance treatment (MMT) across neighborhoods with markedly different demographics and income levels, over a period of regulatory changes and increases in opioid use. In 2007, a Federal amendment raised the legal limit of buprenorphine patients per provider from 30 to 100. In 2012, a Federal regulatory change allowed methadone clinics to dispense take-home buprenorphine. By 2013, New York City reported an unprecedented rise in opioid overdose deaths (Siegler et al., 2014). In analyses in which usage rates of buprenorphine and of methadone are the dependent variables and usage is examined over constructed social areas defined by their income levels and ethnic mix, the hypotheses tested were: 1) usage of methadone has declined and of buprenorphine has increased in all social areas; 2) the variation among neighborhoods defined by income, race/ethnicity in buprenorphine and methadone usage persists over time.

2. Method

2.1. Data

The buprenorphine treatment rate was determined from data collected by the Federal Drug Enforcement Agency (DEA) on the number of buprenorphine prescriptions written from 2004 to 2013 by residential postal ZIP code of the patient treated. Data were supplied by the New York State Bureau of Narcotics Enforcement. Although independent verification of the completeness of this data is not available, it is the most complete publicly available data set on buprenorphine prescriptions because retail pharmacies are federally mandated to report the age, address and date of service for each buprenorphine prescription recipient to the DEA. MMT rates were based on data from the New York State Office of Alcoholism and Substance Abuse Services (OASAS) that accounted for all patients receiving MMT in New York City methadone clinics in 2004–2013 by patients' ZIP code. Estimates of missing data in this set are unavailable. MMT programs do not record ZIP codes for homeless individuals not in shelters. Otherwise, missing data is expected to be rare since all New York City methadone maintenance clinics are regulated by OASAS, and this data set is linked to reimbursements and is used for budgeting purposes by the state payer. Ethnic/racial data (Black non-Hispanic and/or Hispanic), and proportion of the population who are living less than two times below the poverty level, were obtained from 2010 US Census ZIP Code Tabulation area reports. Census ZIP codes were subsequently matched back to their postal ZIP equivalents (Grubesic and Matisziw, 2006). After exclusion of codes denoting water areas, non-residential areas, and areas with populations of less than 200, the sample consisted of 179 New York City ZIP codes.

2.2. Measures

Annual BMT and MMT usage rates were calculated for each ZIP code. For both BMT and MMT rates, anyone who began or ended treatment within the year was included. The buprenorphine treatment rate is the annual number of buprenorphine prescriptions written to patients residing in each ZIP code divided by the number of persons residing in the ZIP code times 10,000. Because individual prescriptions usually provide a 30 day supply of medication, prescriptions were annualized by dividing the count of 30-day prescriptions by 12. This divisor is somewhat arbitrary but does not