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Deriving costs of service use among an urban homeless population

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ABSTRACT

The purpose of this study was to describe a novel approach to calculating service use costs across multiple domains of service for homeless populations. A randomly-selected sample of homeless persons was interviewed in St. Louis, MO and followed for 2 years. Service- and cost-related data were collected from homeless individuals and from the agencies serving them. Detailed interviews of study participants and of agency personnel in specific domains of service (medical, psychiatric, substance abuse, homeless maintenance, and homeless amelioration services) were conducted using a standardized approach. Service utilization data were obtained from agency records. Standardized service-related costs were derived and aggregated across multiple domains from agency-reported data. Housing status was not found to be significantly associated with costs. Although labor intensive, this approach to cost estimation allows costs to be accurately compared across domains. These methods could potentially be applied to other populations.

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1. Introduction

Homeless populations have broad and complex needs and thus require a wide range of services. Homeless populations utilize a variety of services that generate cost, including housing programs, psychiatric and substance abuse treatment, case management, medical care, and incarceration. Estimated treatment and other service use costs for homeless populations have ranged from as low as $7,000 to as high as $50,000 per person annually (Basu, Kee, Buchanan, & Sadowski, 2012; Gilmer, Stefancic, Ettner, Manning, & Tsemberis, 2010; Larimer et al., 2009). Compared to the general population, homeless individuals have more frequent, lengthy, and costly medical and psychiatric hospitalizations (Hwang, Weaver, Aubry, & Hoch, 2011; Martell et al., 1992; Salit, Kuhn, Hartz, Vu, & Mosso, 1998). Although requiring a large range of services with complex needs, homeless populations are largely uninsured and rely excessively on costly acute care services (Baggett, O'Connell, Singer, & Rigotti, 2010; Fleischman, 1992; Hwang et al., 2011; Kushel, Vittinghoff, & Haas, 2001; Kushel, Perry, Bangsberg, Clark, & Moss, 2002; O'Connell, 1999; Pearson, Bruggman, & Haukoos, 2007). Accurate cost estimates are needed to fully develop strategies for efficient delivery of services to homeless populations.

Inconsistent research methods and imprecise cost estimation approaches have likely contributed to the wide range of service cost estimates provided for homeless populations. Much of the literature studies subgroups, such as those with serious mental illness, substance use disorders, or HIV (Basu et al., 2012). Studies assessing costs in the context of an experimental study (Jones et al., 2003) are unlikely to coincide with costs in a natural setting. Selective inclusion of services in cost estimation promotes further variation in cost estimates. The majority of existing cost studies have based their estimates on billing and administrative systems (Basu et al., 2012; Gilmer et al., 2010; Larimer et al., 2009; Poulin, Maguire, Metraux, & Culhane, 2010). The degree to which billing or administrative data sources reflect actual resource use depends on the idiosyncrasies of the system from which the data are drawn, and resulting estimates may not be comparable across systems.

The study that estimates costs for the most comprehensive range services is perhaps by Poulin and colleagues in Philadelphia (Poulin et al., 2010). The authors estimated costs of services to a chronically homeless population in an observational study rather than as part of an intervention study. Unit costs for service types were estimated based on average costs from city-wide databases. A limitation of that study is that it omits the costs of medical services, which are relatively high in homeless populations (Culhane, Metraux, & Hadley, 2002; Culhane, Gross, Parker, Poppe, & Sykes, 2008; Kuno, Rothbard, Averyt, & Culhane, 2000; Kushel et al., 2002; Larimer et al., 2009; Martinez &

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Burt, 2006; Rosenheck, 2000; Salit et al., 1998). Although deriving unit costs at a city level represents a substantial improvement over previous research designs, these estimates did not account for variation across different agencies providing the same services. That study also did not include individuals who did not use services, because the sample was developed from service databases.

The primary aim of this article is to describe a method for deriving service cost data across multiple domains of care for homeless populations and present findings for a sample of homeless individuals in St. Louis, Missouri. A naturalistic, longitudinal population-based study of a homeless sample estimated economic service costs using an agency-level perspective by combining data on self report of service use, unit costs for services, and service utilization estimates from agency records.

2. Materials and methods

2.1. Sample

Currently homeless individuals were recruited for this study. Current homelessness was defined as having no current fixed address and having spent the previous 14 nights without a place of one's own, such as in a public shelter or in some other unsheltered location or on the streets. Those who had spent the last 14 days in inexpensive transient lodging (e.g., "flophouses") were included if they had been there for more than 30 days. Individuals who had stayed in a public shelter or unsheltered location during the last 14 days were also included but only if they had stayed less than half of those days temporarily with friends or relatives or in temporary single-room-occupancy facilities (North et al., 2004). This project was approved in advance by the Institutional Review Board of Washington University School of Medicine. Written informed consent was obtained from all participants.

This homeless sample was randomly selected from shelters and street routes, using methods previously developed (North, Eyrich, Pollio, & Spitznagel, 2004; Smith, North, & Spitznagel, 1992; Smith, North, & Spitznagel, 1993). Recruitment and baseline assessment of participants occurred between October 1999 and May 2001. The majority (80%) were selected randomly from 12 homeless shelters proportionate to shelter size using randomly-generated computerized schedules. The remaining 20% were recruited from street locations along 16 computer-randomized street routes where homeless people frequently travel; interviewers traversed these routes by foot using randomized starting points and approached all individuals they encountered for potential participation. These individuals were screened for recent housing history, and those eligible were invited to participate in the study. Of 435 eligible homeless individuals invited to participate in the study, 35 did not enroll, yielding a 92% baseline participation rate.

Participants were tracked for 2 years using methods described elsewhere (North, Black, & Pollio, 2012). Of the baseline sample of 400, 29 were classified as ineligible for re-assessment at one or both follow-up points because of death ($n = 5$), severe illness, ($n = 6$), or incarceration ($n = 18$); 288 (72%) were successfully tracked over 2 years, and of the 371 who were eligible for follow-up reassessments, 255 (68%) were reassessed in both follow-up years with complete data. No significant baseline differences were detected between those tracked and not tracked through the entire 2 years of study follow-up or between those with all three annual study assessments completed versus those missing one or more assessments in baseline characteristics (North et al., 2012).

2.2. Measures

Study measures provided both self-report and agency-report data. Self report was used to obtain data on individual characteristics, including current and past mental health problems, and services used. Provider agencies reported individual intensity of service utilization and cost information.

2.3. Baseline self-report measures

At baseline, a structured interview was administered including sociodemographic sections of the National Comorbidity Study (Kessler et al., 1994) interview, the substance abuse sections of the Composite International Diagnostic Interview-Substance Abuse Module for *DSM-III-R* (Cottler & Compton, 1993), the Diagnostic Interview Schedule for *DSM-IV* (Robins, Cottler, Bucholz, & Compton, 1995), and the Homeless Supplement to the Diagnostic Interview Schedule (North, Eyrich, Pollio, Foster, et al., 2004). These structured interviews elicited detailed information on psychiatric symptoms and diagnoses and substance use patterns, including both lifetime and past year history, as well as amount and types of services used during the previous year. After the interview, a urine sample was obtained and immediately tested using OnTrak Abuscreen rapid assays (Roche Diagnostic Systems Inc, 1991) for the presence of cocaine, opiates, amphetamine, barbiturates, and benzodiazepines.

2.4. Follow-up self-report measures

Detailed self-report information on housing status and service use was collected, as well as a urine sample for rapid drug screening, from all participants using detailed interviews at 1 and 2 years after the baseline assessments. At each assessment, participants were asked about their housing status and about the amount and types of services they used during the previous year. Participants were considered stably housed at the end of each year if they responded that they had been housed in their own place for the previous 30 days and for most of the past year.

2.5. Deriving service costs

Data were collected from four types of agencies providing services to the homeless population: substance abuse treatment agencies, mental health treatment facilities, medical centers (including inpatient, outpatient, and emergency treatment facilities), and homeless shelters. Services in the geographical area where the study was conducted are coordinated through a government-funded agency, the Homeless Services Network Board of the Homeless Service Division of the City of St. Louis Department of Human Services (Coordinated Strategy to Prevent Homelessness, 2012). The Homeless Services Network Board comprises approximately fifty social and human service agencies that meet monthly to coordinate the various types of services offered, to create a comprehensive service continuum to the homeless population in the metropolitan area. Of 29 agencies providing services to this population, 23 participated in this study and one ceased to exist shortly after the study began, yielding an 82% agency participation rate. Among the participating agencies, 12 provided substance abuse programs, 9 provided mental health programs, 6 provided general medical care, and 12 provided night/day sheltering (7 of which also offered substance abuse services and 4 specialized in mental health services) (North, Pollio, Perron, Eyrich, & Spitznagel, 2005). Two types of data were collected from participating agencies and individuals: service unit cost data and service utilization data.

2.5.1. Service unit costs

Service unit cost data were obtained and costs were derived using a methodology developed at RTI International, known as the Substance Abuse Services Cost Analysis Program (SASCAP) (Zarkin, Dunlap, & Homsi, 2004). Earlier versions of the SASCAP method have