The Treated Prevalence of Mental Health and Substance Use Disorders among Adults Admitted to the Philadelphia Shelter System: Results from the Integration of Longitudinal Data on Shelter and Mental Health Services Utilization

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Running head: HOMELESSNESS AND MENTAL DISORDERS

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Abstract

This paper reports results from a study of the treated prevalence of mental health and substance use disorders among adults admitted to Philadelphia public shelters between 1990 and 1992 (N=27,638). Identifiers and service records from longitudinal databases on shelter and mental health services were merged, finding that 49% of single homeless adults and 33.2% of homeless adults with children had a treatment for a mental health or substance use disorder between 1985 and 1993. The rate of treatment for serious mental illness [SMI] was 10.7% (by most frequently occurring diagnosis). Single women (18.6%) had twice the rate of SMI as single men (9.9%), and single adults (12.1%) had twice the rate of SMI of adults with children (6.2%). The treated rate of substance use disorders (25.2%) was higher than the rate of mental health disorders (20%), and was twice as high for single adults (28.6%) as for adults with children (14.6%). An additional 20% of adult shelter users were identified through shelter records as having untreated substance use problems. Veterans had comparable rates of disorders as nonveterans. Overall, 65% of adult shelter users were identified as *ever* having some mental health or substance use problem, treated or untreated. People with SMI were less represented among shelter users on two single day censuses than over three years, suggesting a higher rate of turnover among people with SMI, while people with substance use disorders were overrepresented by a third on the two single day censuses, suggesting a lower rate of turnover among people treated for substance abuse. Of the treated Medicaid population, 6.8% became homeless in the three year study period, representing 7.8% of the treated population with SMI, 9.5% of the treated schizophrenia population, and 20.1% of the population receiving inpatient substance abuse services. Approximately 3,000 people with SMI became homeless in the 3-year study period, with an average of 73 people with SMI entering shelter for the first time each month. An analysis of inpatient usage found that 25.7% of the SMI and 34.2% of the treated substance abuse population were hospitalized within 120 days of their first shelter admission (before or after). Fourteen percent (14%) of the SMI were also seen in an emergency room within 120 days of shelter admission (before or after).

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Introduction

Previous research on homelessness has found significantly higher rates of mental health and substance use disorders among homeless adults than among the general population. Although considerable variability exists in reported rates, as methods have improved and standardized, estimate ranges have narrowed. This research has been based primarily on diagnostic interviews conducted during single encounters with samples of homeless adults (usually without accompanying children), obtained on a single day, or to represent the composition of the homeless population on a single day. The recent development of administrative databases for registering and tracking public shelter users has made possible an alternate strategy for epidemiological and services research among the homeless population. By integrating shelter registry data with automated data on public mental health and substance abuse services utilization, research based on longer time frames and including more detailed services and diagnostic information is possible. This paper reports the results of a study of the population of homeless adults (with and without accompanying children) using public shelters in Philadelphia over a three year period (1990-1992) and of their use of publicly reimbursed mental health and substance abuse services over a nine year period (1985-1993). This procedure yields estimates of the treated prevalence of mental health and substance use disorders among the homeless based on diagnostic encounters in clinical settings. A preliminary analysis of the intersection of shelter and behavioral health service use patterns is also reported.

Literature Review

Beginning in the early 1980s, the burgeoning of urban shelter systems and a growing population of visibly disturbed persons living in street locations prompted mental health officials and researchers to conduct epidemiological surveys of the homeless population (for reviews see Robertson, 1986; Fischer &

Breakey, 1986; Fischer & Breakey, 1991; Robertson, 1992; Susser, Canover & Struening, 1989, Solarz, 1988; Tessler & Dennis, 1989). Concerned that the growth in the homelessness problem was in large part occurring among persons with severe and persistent mental disorders and perhaps as a result of deinstitutionalization policies, early research efforts most commonly sought to examine the rate of previous psychiatric hospitalization among the homeless, and, less systematically, to measure symptoms. Robertson's (1986) review notes that by 1986, 21 studies had been conducted that examined rates of previous psychiatric hospitalization, and found a range of rates between 15% and 42%. Robertson (1986) attributes divergent estimates to noncomparable methods, and observes that methodological limitations prohibited generalizations from these studies to the larger homeless population.

Fewer studies have attempted to measure psychiatric symptoms, or to ascertain prevalence rates for specific psychiatric disorders (Robertson, 1986). The first two published studies attempting to produce diagnostic classifications found rates of mental disorders (including substance abuse) as high as 84% (Arce, Tadlock, Vergare & Shapiro 1983) and 91% (Bassuk, Rubin & Lauriat, 1984). However, both studies had methodological limitations (Ropers, 1988). The study by Arce, Tadlock, Vergare & Shapiro (1983) was conducted at a single shelter site for men in Philadelphia that screened applicants on the basis of need (not defined by the authors), which led to the selection of a non-probability sample of 193 persons from among 600 applicants for shelter. Diagnosis was based on the review of admission records that the authors report "varied greatly" (p. 813) in thoroughness. The Bassuk, Rubin and Lauriat (1984) study of 78 persons in Boston involved clinical interviews, but did not employ a standardized diagnostic instrument, and was based on a cross-sectional sample from a single shelter location. Both samples were nonrandom. Neither study included a control group, and clinicians were not blind to the residential status of the subjects. Neither study included a reliability check on diagnosis. The studies did find comparably high rates of schizophrenia of 34% (Arce et al., 1983) and 29% (Bassuk, Rubin & Lauriat, 1984). The studies also report comparably high rates of primary substance abuse diagnoses of 24.6% (Arce et al., 1983) and 29% (Bassuk, Rubin & Lauriat, 1984).

Several investigators subsequently applied more rigorous, and more comparable methods, including the use of standardized diagnostic instruments, multiple sampling sites, probability samples, and larger sample sizes. Studies of homeless samples in Los Angeles (Koegel, Burnam and Farr, 1988), California (Vernez, Burnam, McGlynn et al., 1988), Baltimore (Fischer, Shapiro, Breakey, et al., 1986) and Buffalo (Toro and Wall, 1989) used the Diagnostic Interview Schedule (DIS), and found lifetime rates of schizophrenia ranging from 1.4% (n=76) (Toro et al., 1989) to 13.1% (n=328) (Koegel, et al., 1988). As Fischer and Breakey (1991) observe in their review of this literature, the range narrows to between 11% (n= 315) (Vernez et al., 1988) and 13.1% (n=328) (Koegel et al., 1988) if one includes only those studies with large sample sizes (each greater than 300). These rates are also consistent with another study in Baltimore with a large sample (n=203) by Breakey et al. (1989) which found a rate of schizophrenia of 10.5% based on clinical interviews.

The results from the studies with large samples also converge regarding the lifetime prevalence rates for other disorders (Fischer & Breakey, 1991): 21% to 29% had affective disorders, 2% to 3% were demented, 14% to 20% had anti-social personality disorder (Breakey et al., 1989; Koegel, et al., 1988; Vernez, et al., 1988). If, provisionally, one were to define "major mental disorder" as schizophrenia and affective disorders, lifetime rates in these large samples converge between 32% and 42%.

Regarding current, as opposed to lifetime, psychiatric status, Tessler and Dennis (1992) report in their review of eight NIMH-funded research projects that measurement and sampling variation produce a fairly broad range of prevalence estimates (20% to 46%) for any current symptoms. However, they too note that

> ...the range narrows (28-37%) when one focuses on studies which used standardized assessment instruments to determine current psychiatric status (Baltimore, 37% [Fischer et al., 1986]; Los Angeles, 28-33% [Koegel et al., 1988]; Ohio, 31% [Roth, Bean, Lust et al., 1985] and Boston, 29% [Mulkern, Bradley, Spence et al., 1985]. The St. Louis researchers [Morse & Calsyn, 1985] also used a standardized assessment instrument and found that 46% of their sample scored above the cutoff point on the Global Severity Index of the Brief Symptom Inventory. However, when they made the distinction between chronic and acute mental illness, they found only 20% of their sample to be seriously and persistently mentally ill (p. 30).

These estimates of current symptoms include any mental health disorder and exclude substance abuse.

In their review, Fischer and Breakey (1991) caution that "not all mentally ill persons are equally disadvantaged by their illness, and simply carrying a diagnosis of a major mental illness is not sufficient to define a group of persons with special needs" (p. 1122). Few studies have attempted to examine issues of severity or chronicity. Wright and Weber (1987) report that two-thirds of persons with psychiatric conditions who used Health Care for the Homeless programs nationally had moderately to severely disabling impairments. Breakey et al. (1990) found 13% of homeless men and 24% of homeless women to be severely and persistently mentally ill based on criteria that included a rating of dysfunctionality and prior hospitalizations. Koegel et al. (1988) set criteria based on results from the DIS to calculate a rate of 28% with severe and chronic mental illnesses. This distinction is particularly relevant to public mental health agencies, many of which have a mandated responsibility to care for persons with severe and persistent mental disabilities.

While the prevalence of mental health disorders has often received more public attention, researchers have consistently found higher rates of substance abuse than mental disorders among the homeless population. Fischer and Breakey's review (1991) cites seven studies of single adults that found a range of lifetime prevalence rates for alcohol use disorders from 28%-68%, with rates lower among women than men, and with five of those studies finding rates in excess of 50%. The two studies of adults in family shelters (Bassuk, Rubin & Lauriat, 1986; Bassuk & Rosenberg, 1988) produced divergent rates of 68% and 12% respectively. Studies of drug use disorders have found prevalence rates ranging from 1% (Bassuk et al., 1986) to 37.1% (Toro & Wall, 1989). Koegel et al. (1988) report a combined "substance use disorders" lifetime prevalence rate of 69%, and a six month prevalence rate of 31.2%, again, using the DIS and based on a large sample (n=379). Koegel et al. (1988) also report that half of the group with chronic and severe mental disorders had a co-occurring substance use disorders, a finding consistent with the other NIMH-funded studies reviewed by Tessler and Dennis (1992).

What has been called the "first generation" of homelessness research (Tessler & Dennis, 1992) has improved dramatically on earlier attempts to identify the prevalence of psychopathology among the homeless population. Despite geographic and other sampling differences, an improvement in methods,

including probability samples, larger samples, and the standardization of diagnostic protocol, has resulted in convergent estimates of the rate of mental illness in the homeless population. It is often stated that "one-third of the homeless are mentally ill," and this appears broadly consistent with the estimates reported above. However, it less clear whether the "one-third" estimate is intended to refer to any mental disorder, serious mental disorders, or severe and persistent mental disabilities. Based on Tessler and Dennis' review (1992), one-third is their best estimate for *any current* symptoms. Based on Fischer and Breakey's review (1991) of studies with large samples and standardized diagnostic instruments, one-third appears a fair mid-point for the *lifetime* rate of serious mental disorders (schizophrenia and affective disorders). The prevalence of severe and persistent mental disabilities is undoubtedly lower than one-third (either lifetime or current), but the evidence available for deriving such an estimate over multiple sites is more limited. Substance use disorders affect at least one-third, and possibly as high as one half or more of the homeless population, and could well be changing as substance use preferences have changed, specifically through the increased use of cocaine and "crack" (Susser, Canover & Struening, 1989).

Reviewers of this literature have also noted some limitations to this research. Despite including larger samples, samples are not always representative of the homeless population. With few exceptions (Bassuk et al., 1986; Bassuk & Rosenberg, 1988), research subjects have been adults without accompanying children, and mostly male, thus, excluding adults in homeless families, who are mostly female. When enough women have been included in samples to enable comparisons, they have generally had higher rates of reported mental disorder (Tessler & Dennis, 1992). However, Fischer and Breakey (1991) caution that "the evidence of a gender difference is somewhat limited. In many cases, this conclusion has relied on treatment history or other indirect measures that may contain a sex bias. Moreover, few studies have focused on women" (p. 1123). That much of this research does not include women, or adults with accompanying children (as well as their children) prohibits generalizing estimates that "one-third of the homeless are mentally ill" to the "homeless population," or even to the "adult homeless population."

These studies also relied on self-report for symptom identification and for psychiatric history (i.e. hospitalizations), and on single encounter interviews with diagnostic instruments developed for domiciled populations. As Koegel et al. (1988) observe, "self-report data ... is vulnerable to denial and the desire to present oneself in a socially appropriate light. On the other hand, ...estimate[s] may be inflated by false-positive responses ... and by the difficulty of assessing disorder in a situation in which environmental pressures and adaptive strategies produce behaviors that can be mistaken for mental illness" (p. 1090). Susser, Canover and Struening (1989) and Ropers (1988) also argue that standard diagnostic instrumentation could lead to the false identification of disorders, given that the exigencies of homelessness could produce adaptational behaviors that are construed as symptomatic of mental disorder.

Some studies have offered alternatives to these approaches. Snow, Baker and Anderson (1986) established several criteria for determining the presence of a mental disorder, and did not rely on reported symptoms alone. Snow et al. (1986) required that people meet two of three criteria, including prior psychiatric institutionalization, designation as mentally ill by other homeless individuals, and conduct that was "so bizarre and situationally inappropriate that most observers would be likely to construe it as symptomatic of mental illness" (p. 412). Nine percent of the Austin, Texas, sample (n=144) of "street" homeless was identified as mentally ill by this method. However, the study lacked many of the advances made by other researchers, specifically, a diagnostic interview and a probability sample, making it noncomparable.

Snow et al.'s study offered another innovation in that it tracked a sample of persons (n=747), whose names were obtained from the Salvation Army client register, through the Texas State Hospital registry and through Austin's local community mental health center records. Through this procedure, the authors identified 16% of the homeless population as having a prior treatment for a mental health or substance abuse disorder, mostly for substance abuse. It is not clear from the authors' description how comprehensive the local mental health authorities' records were. Wright (1988) has observed that the Snow et al. (1986) method is a lower boundary estimate not a "best guess" given that it captures the treated population only.

Wright (1988) also uses treatment data from the national Health Care for the Homeless (HCH) records to estimate the rate of mental disorder among that population at about "one-third," but the overall population on which that rate is based is one which received some medical treatment through this program, and therefore may not be representative. Wright (1988) does argue that the HCH population is demographically similar to the homeless populations in many cities and that the accessibility of the program would argue for its representativeness.

An important difference between the research of Wright (1988) and Snow et al. (1986) based on treatment records, and that of other epidemiological studies, is that their samples were not obtained cross-sectionally. Susser, Canover and Struening (1989), Fischer and Breakey (1991), and Tessler and Dennis (1992) have observed that one of the primary limitations of epidemiological research on the homeless to date is that the samples were obtained at a single point in time (cross-sectionally) or were designed to represent the composition of the population at a single point in time:

> It is probably premature to develop a typology of homelessness based on cross-sectional data alone. It is misleading to infer from the NIMH studies that homeless persons can be assigned to categories which are mutually exclusive and analytically distinct from one another, and which provide valid descriptions of homelessness over even brief periods. Even those categories which seem to be most basic, such as shelter users vs. street dwellers, quickly break down when homeless persons are tracked over time (Koegel, 1987). The fact is that many people move in and out of homelessness, and between sectors of the public system of care, and that a host of situational as well as individual factors determine the distribution of homeless persons at any single point in time (Tessler & Dennis, 1992, p. 44).

Such criticisms are supported by the findings from recent research that has examined the period-prevalence of homelessness (Burt, 1994; Link, Susser, Stueve, et al. 1994; Culhane, Dejowski, Ibanez et al. 1994). Analyzing data from longitudinal shelter registry systems in New York City and Philadelphia, Culhane et al. (1994) found that the prevalence rate of shelter use in the general population reaches near 3% in three years in Philadelphia and 3.3% in five years in New York City, although both cities have point prevalence rates of homelessness between .2% and .3%. The high rate of turnover in the homeless population suggests that short-term and episodic homelessness is much more prevalent than long-term homelessness (as defined by shelter use) when the problem is viewed longitudinally. Reviewers of the epidemiological literature (Susser, Canover and Struening, 1989) have similarly noted that single point in

time measures are likely to overrepresent persons with long-term homelessness relative to longitudinal research designs. Given that prior research has found that people with mental health and substance use disorders are more likely to be homeless for longer periods (Tessler & Dennis, 1992), the question has been raised as to whether people with short-term homelessness are indeed less likely to have mental health and substance abuse problems than people with long-term homelessness, and whether, therefore, the prevalence of these conditions among the homeless population would be lower based on samples obtained longitudinally (see Culhane et al, 1994; Rossi, 1994; Kondratas, 1994).

Preliminary to addressing the question of proportionate representation of subpopulations by shelter utilization pattern, it is necessary to identify the subpopulations, such as those with mental health and substance abuse problems. Because Philadelphia maintains an automated registry of shelter users and has a high degree of automation for the tracking of publicly reimbursed mental health and substance abuse services, it is possible to integrate these data sources and to develop treatment rates for the homeless population using multiple years of shelter and health care data.

Hypotheses and Research Questions

It is hypothesized that people with serious mental illnesses will represent a lower proportion of the homeless population over a three year period than has been found in previous research based on cross sectional samples, and than will be found on a single night using the same dataset and case identification procedures. Although homeless adults with accompanying children are not well represented in previous research, it is hypothesized based on the limited literature (Bassuk, Rubin & Lauriat, 1986) that they will be less likely to have major mental illness and substance abuse problems than adults unaccompanied by children. Consistent with previous research, it is hypothesized that substance abuse is a more prevalent problem than mental health disorders, and that approximately half of the population with serious mental illness will have substance abuse problems. Other questions, while not the subject of specific hypotheses, will be explored. What are the differences in the diagnostic distributions of homeless men and women, without accompanying children? Can the shelter registry data, which include information on mental health and substance abuse needs, shed light on the proportion of shelter users with mental health and

substance abuse conditions that have gone untreated, and are therefore not captured by treatment databases? Can longitudinal data on mental health and shelter services be used to examine the sequencing of shelter and health care use?

Methods

Data Sources

For this study, homelessness was defined by the presence of a record in the Office of Services to the Homeless Adults [OSHA] Client Registry System (see description below). The presence of a mental health and/or substance use disorder was determined by the presence of a treatment record in databases which track publicly reimbursed mental health and substance abuse services in Philadelphia. The following is a description of the data sources selected for use in this study:

The Office of Services to the Homeless and Adults Client Registry System [OSHA]: A database maintained by the City of Philadelphia that registers all persons who request shelter from the City of Philadelphia. For purposes of the present study, information on identifiers (name, social security number, birthdate, race, gender, veteran's status), dates of service (first shelter admission date) and indicators for mental health and substance abuse problems, were selected from the among the available variables (see Culhane et al., 1994, for a description of the dataset and for information on shelter admission procedures). In 1993, the public shelter system had an average capacity of approximately 2,400 beds on a given night, which accounted for approximately 84% of all shelter beds in the City of Philadelphia. The database begins December 21, 1989 and as of April 21, 1994 contained 37,728 observations. [1]

The Medicaid Management Information System [MMIS]: MMIS contains claims for mental health services rendered to Medicaid-eligible Philadelphia residents. Records include treatment, demographic, and patient-status parameters. A unique Medicaid identifier (unique ID) based on an algorithm that includes client name, date of birth and social security number identifies individuals in the file. For purpose of the present study, the following variables will be used: identifiers (social security number and the unique ID), dates of service, types of service, and diagnoses (primary and secondary).

This file contains adjudicated claims from fiscal 1985 to fiscal 1993, and includes information for approximately 130,000 individuals.

Drug and Alcohol Medicaid Management Information System [D&AMMIS]: D&AMMIS is identical to MMIS, except that D&AMMIS only contains records for inpatient services for which a primary diagnosis of substance abuse has been recorded. This file also contains claims from fiscal 1985 to fiscal 1993, and includes information for approximately 34,000 individuals.

The HealthPASS Paid Claims File [HPC]: HPC contains claims for inpatient psychiatric and substance services to Medical Assistance clients whose benefits are administered by a health insurance organization, HealthPASS. HealthPASS covers persons in a geographic area within the City of Philadelphia. The records in HPC are not available in MMIS, but are comparable in format, and include an identifier unique to MMIS created from an algorithm using Medicaid numbers. This file contains inpatient claims only. The file contains claims from fiscal 1985 to fiscal 1993, and includes information on mental health and substance abuse treatment for 11,200 individuals.

The Community Reporting System [CRS]: CRS contains admission, discharge and service records on all clients using services from agencies under contract with the City of Philadelphia to provide mental health services, including community mental health centers, outpatient clinics, partial hospitals, rehabilitation programs, residential programs, and services provided to persons in the Philadelphia jail. In previous analyses it was discovered that over 30% of the mental health services to Medicaid clients were found in CRS and not in MMIS, even when the client was continuously enrolled in Medical Assistance. For the purposes of the present study, the following variables will be used: identifiers (social security number and the unique identifier in the MMIS files), dates of service, diagnoses (primary and secondary) on intake (not per service), and services provided. The CRS file contains information from July 1, 1984 through June 30, 1992, and includes information for approximately 145,000 individuals.

Medicare Provider Analysis and Review File [MEDPAR]: The MEDPAR file contains data from hospital bills of Medicare beneficiaries discharged from Medicare certified hospitals, including data on beneficiary identifiers (social security number), demographics, diagnosis, and dates of service. The

MEDPAR file used for this study contains information from fiscal 1986 to fiscal 1991, and includes information for 14,211 persons from Philadelphia who received a diagnosis for schizophrenia or major affective disorder.

The Patient Census Information System [PCIS]: PCIS is a database maintained by the Commonwealth of Pennsylvania Office of Mental Health, containing service records for all Philadelphia residents treated in state psychiatric hospitals. For the purposes of the present analysis, the following variables will be used: identifiers (social security number and the unique identifier for MMIS), dates of service, and diagnoses (primary and secondary). The database extends from fiscal 1986 to fiscal 1993, and contains information on approximately 2,200 individuals.

These data sources do not include Medicaid-reimbursed ambulatory substance abuse services and substance abuse services obtained at agencies funded by the City of Philadelphia on a facility (not client) basis, and so will produce an undercount of users of publicly funded outpatient substance abuse services. Veterans Administration data were also not included in this analysis.

Data Quality

As part of standard data management procedures, the longitudinal mental health services databases used for this study have undergone reliability and vailidity auditing (Hadley, 1994). Because redundancy in information exists across several of the databases, editing routines have been developed to identify inconsistencies in patient and service information, and a reporting framework is used to identify problems. These edit routines contain the following components: (1) check of correspondence between variable field specifications and data fields; entries outside the field are flagged and modified according to specifications; (2) check of consistency of client sociodemographic attributes with client identifiers across data files; (3) recoding and compression of data to achieve efficient CPU processing and storage space; (4) checks for duplicate records; (5) checks for redundancy across data sources and data files by service type, provider, date and client; (6) checks on logic of sequencing of episodes of care per patient; and (7) use of a variety of statistical diagnostic routines on specific variables to establish whether the data contained in each variable reflects its intended content.

In addition, routine validation studies are conducted on the diagnosis and services-received fields in the MMIS and CRS files using charts and records maintained on clients seen face-to-face by research staff at several community provider agencies. Although many limitations exist with these data, completion rates on relevant utilization and patient characteristic elements are over 90%. Lurie et al. (1992) also found the accuracy of Medicaid claims for schizophrenia to be 87%.

Procedures

Unduplication of the Shelter Registry Database and Selecting the Three-Year Study Period: The registry data set from the Office of Services to the Homeless and Adults (OSHA) contains 37,728 observations collected between December 21, 1989 and April 21, 1994. The data were unduplicated to create one first shelter admission record per adult, and to identify adults as either with accompanying children or without.[2] The final unduplicated count is 36,301 cases. Limiting possible shelter admission dates to first admissions occurring between January 1, 1990 and December 31, 1992 (the three year study period) resulted in the selection of 27,638 records from the original database for this analysis. Separating records by the presence/absence of accompanying children revealed that 20,894 individuals entered the system unaccompanied by children and that 6,654 individuals were accompanied by one or more children.

Integrating the Shelter and Mental Health Services Files: The OSHA registry was merged separately with the MMIS identifier file, the D&AMMIS file, the HPC file, the CRS file, the MEDPAR file and the PCIS file. Social security numbers from the mental health services' files were matched on all social security numbers from the OSHA file. An additional merge was made on unique identifiers for those files that contained a unique identifier. The unique identifiers consist of the first three letters of the last name, the first letter of the first name, the month and the day of birth and a digit indicating gender. A match on either identifier was considered a sound match. Only those observations from the identifier files that have a counterpart in the OSHA registry were kept. The resulting matches were then merged with the service files from the respective databases to obtain information on service usage and diagnoses. (The data integration procedures are detailed in accompanying Figures 1-8. See Schinnar, Rothbard, Hadley and Rovi (1990) for further discussion of data integration procedures using Philadelphia's longitudinal mental health services files.)

Creating Diagnostic Distributions: The MMIS, D&AMMIS, HPC, MEDPAR and CRS files are unduplicated at the service level, rather than at the level of the individual; thus, it is possible for an individual to have multiple diagnoses spread across the span of the databases. The presence or absence of any particular diagnosis (mental health or substance abuse) can be determined by searching for such a diagnosis across the service records. To obtain single diagnoses per individual across the databases, two types of diagnosis variables were created: most frequently occurring primary diagnosis, and most recent primary diagnosis. Primary diagnoses and dates of service were collected through a series of merges between the OSHA dataset and the mental health services files. After dates and diagnosis had been standardized a SQL table was used to get a count of each different diagnosis for each case. In the case of a tie, the most recent diagnosis of the most frequent was accepted as the most frequent. Cases were also sorted by ID number and by date, so that the most recent diagnoses would be listed last for each case. The result is a dataset with one most frequent diagnosis per person and one most recent diagnosis per person. Crosstabulations were conducted on the most frequently occurring diagnosis variable by gender and household type, by age group, and by veteran status.[3] A crosstabulation was also performed comparing the diagnostic distribution of shelter users in the Medicaid mental health data to the diagnostic distribution of other persons (non-homeless) receiving Medicaid reimbursed mental health services.

The treated prevalence for mental health and substance use disorders for three years of shelter admissions was compared to two one-day censuses, one in winter and one in summer. The one-day censuses were obtained by selecting only those persons with a shelter stay record for the given day (January 15, 1992 and July 15, 1992). Stay histories were obtained from the shelter tracking file, which during the study period excluded one large facility for single men (approximately 300 beds). Single men are registered for these beds in the registry database, but their stay in that facility is not tracked in the tracking file.

Subclassifications of mental health and substance abuse disorders were created to facilitate comparisons of prevalence estimates by varying case inclusion criteria, as well as to make other analyses practical and more readily interpretable. Diagnoses were grouped as serious mental illnesses, other

mental illnesses and substance use disorders. "Serious mental illness" was defined by the DSM-IIIR codes 293 (transient organic psychotic condition), 294 (other organic psychotic condition, chronic), 295 (schizophrenia), 296 (affective psychoses), 297 (paranoid state), 298 (other nonorganic psychoses) and 311 (depressive disorder). A "substance use disorder" was defined by DSM-IIIR codes 291 (alcohol psychoses), 292 (drug psychoses), 303 (alcohol dependence), 304 (drug dependence) and 305 (nondependent drug abuse). "Other mental disorders" was defined as all other mental health diagnoses, excluding diagnoses of childhood (313 and 314).[4] Diagnostic codes are not broken down beyond the integer in the Medicaid data used for this study. The demographic composition of these subpopulations were compared to each other and to shelter users with no mental health or substance abuse treatment history.

Comparison of Case Inclusion Criteria: Dichotomous variables were created indicating the presence or absence of a serious mental illness, other mental illness, and substance use disorder, by most frequently occurring diagnosis and by most recent diagnosis. The presence of *any* such diagnosis was determined by searching all primary and secondary diagnoses. Dichotomous variables were then created indicating the presence or absence of "ever" receiving a diagnosis for serious mental illness, other mental illness and substance abuse. (The "ever" grouping includes duplicate cases, as a person could have received each type of diagnosis, while the most frequent and most recent classifications do not include duplicate cases.) The concurrence of diagnoses types and their relative prevalence by these varying case inclusion criteria were examined by performing crosstabulations of the most frequently occurring diagnosis and the "ever" classifications, and of the most frequently occurring diagnosis and the most recent diagnosis classifications. This procedure also allows one to estimate the co-occurrence of disorders, such as the extent to which persons with a most frequently occurring diagnosis for a serious mental illness have ever received a substance use disorder diagnosis.

Average Monthly First Admissions to Shelter [Incidence]: To assess the frequency with which people with serious mental illnesses, other mental illnesses and substance use disorders enter the Philadelphia shelter system on a monthly basis, cases were sorted by date of first shelter admission.

Again, variables indicating the presence or absence of one of the three categories of primary diagnosis (by most frequently occurring diagnosis) were used, as were variables indicating the presence or absence "ever" of a primary or secondary diagnosis for substance abuse. The average frequency of admission by month, by diagnosis group, and by household type (accompanied or unaccompanied by children) was calculated.

Estimates of Untreated Mental Health and Substance Use Disorders: During the intake and assessment interview prior to shelter admission, case workers record much of the identifying information in the shelter registry database. Included in that interview is an opportunity for the case worker to indicate whether the client has a mental health problem and whether the client has a substance abuse problem (referred to hereafter as an "indicator"). These indicators may be flagged on the basis of a self-report by the client, or on the determination of the case worker. Although no systematic criteria are applied for denoting positive indicators, the indicators provide additional information on behavioral health status that has not been used in this analysis thus far, and that may provide potentially useful information. First, the indicator may identify persons who have not received prior mental health or substance abuse treatment as detected by our analysis, but who have some presenting mental health and/or substance use condition at the time of the interview. As such, the indicator may identify additional, "untreated" cases of persons with a presenting mental health or substance abuse problem. Second, among the treated and untreated, the indicator may serve as a marker for a *current* rather than a *past* problem, which may be useful for future analyses of the relationship between presenting conditions and shelter stay history. The diagnostic history information obtained from the mental health services databases can also be used as a check on the ability of the intake interview to identify people with prior treatments for these conditions.

Unfortunately, not all persons receiving shelter from the City of Philadelphia will undergo an intake and assessment interview.[5] Prior to inclusion of the behavioral indicator information in this analysis, we had to redefine our base population to those persons who had completed an intake and assessment interview. A consultation with personnel at OSHA outlined the criteria to determine if a case

had gone through an intake interview. If a case had blank fields for "social worker number," "social worker unit," and had "unknown," "homeless," or "winter bed" in the field for "intake reason" the case did not go through the intake interview. If a person had ever, within the three year span of this analysis, filled out the information indicating they participated in the intake interview, then that information was retained.

Among the adult population in Philadelphia using public shelters in this period (27,638 unduplicated cases), 21,466 cases (77.7%) had undergone an intake interview. The temporary dataset with the mental health and substance abuse indicators information was then merged with the datasets containing the grouped diagnostic classifications (serious mental illness [SMI], substance abuse [SA] and other mental health [OMH] disorders) for both *most frequently occurring* diagnoses and *ever any* such diagnosis. Groups were also created of persons who had no mental health and no substance abuse treatment records. The treatment rate by SMI, OMH and ever any mental health diagnosis was then calculated for the population receiving an intake. The percentage receiving a positive mental health indicator by diagnostic group was also calculated, as was the rate of mental health problems per the intake population as denoted by the mental health indicator. Separately, the treatment rates by SA (most frequently occurring diagnosis) and *ever any* SA disorder were calculated for the population receiving an intake. The percent receiving a positive substance abuse indicator by diagnostic group was also calculated, as was the rate of substance abuse problems per the intake population as denoted by the substance abuse indicator. Finally, two dichotomous variables were created noting the presence/absence of either a treated/indicated mental health condition and/or a treated/indicated substance abuse condition, utilizing all information sources (behavioral indicators in OSHA and primary and secondary diagnoses in the treatment databases). A crosstabulation of those variables was performed.

The Relationship between Inpatient and Emergency Service Usage and the Onset of Homelessness: Until now, mental health services data have been used to identify the treated population of shelter users, and, by varying case inclusion criteria, to determine rates of various disorders in the homeless population. This analysis was intended to explore the significant potential of these service

records for identifying the treatment patterns associated with homelessness by diagnostic group. For this preliminary investigation, researchers examined the frequency of inpatient and emergency service use most proximal to (before and after) the onset of homelessness (defined as the date of first admission to shelter).

The shelter dataset was limited to cases with initial shelter admission dates between April 1, 1990 and March 31, 1992 (2 years), resulting in an unduplicated population of 17,968 cases.[6] This selection of cases was merged with the five mental health services databases for service dates between April 1, 1989, and March 31, 1993 (one year on either side of the shelter admission dates). The lagtime between incidents of inpatient and emergency service usage, and homelessness onset (first shelter admission) was calculated by selecting the admission and discharge dates closest to the shelter admission date (before and after, for both inpatient and emergency services). Thus, the lags represent the time between a prior inpatient/emergency service discharge date and the date of first shelter admission, and between the date of first shelter admission and the subsequent inpatient/emergency service admission. All other service activity was ignored, so that each client had only one possible episode of inpatient and emergency service use before and after shelter admission (maximum of two per service type). The groups with service use "prior" or "after" homelessness onset were then merged with the dataset which contains the most frequently occurring mental health/substance abuse diagnoses to produce three groups: serious mental illness, other mental illness, and substance abuse. Ten-day intervals were created to aggregate data on time between shelter admission and inpatient/emergency discharge/admission. To allow each client to have an equal opportunity for a service discharge/admission, only service dates within 120 days of first shelter admission were kept.

Results

Database Merges: Figures 1 through 7 depict the data integration procedures and the results of the merges between the shelter registry database and each of the services databases. Figure 8 and Table 1 summarize the results, showing that 12,517 unduplicated persons from among a population of 27,638

shelter users were identified across the services databases for the three year study period. No matched cases were identified through the merge with the Medicare service files.

Diagnostic Distributions by Gender and Household Type by Most Frequently Occurring Diagnosis: Of the 12,517 individuals identified with a mental health or substance abuse service history, 10,282 were unaccompanied by children and 2,235 were accompanied by children, for treatment rates of 49% and 33.2% respectively. Among all adults who stayed in a Philadelphia public shelter between 1990 and 1992, 20% had had treatment between 1985 and 1993 with a most frequent diagnosis for a mental disorder and 25.2% had had treatment with a most frequent diagnosis for substance abuse (see Table 2).

The rate of treatment for serious mental illness was 10.7%, with the rate for adults unaccompanied by children (12.1%) being nearly double the rate for adults with children (6.2.%). Schizophrenia was the most commonly identified SMI (and most commonly identified mental disorder), with a rate twice the rate of affective psychoses. However, the rate of schizophrenia was not higher than the rate of affective psychoses among adults with children, only among adults without accompanying children, who accounted for 86% of the SMI among homeless adults. Adjustment reaction disorder was the most common mental disorder among the non-SMI, affecting 4.5% of homeless adults, affecting women (6.5%) more than twice as often as men (3.0%), and affecting adults with children (7.2%) twice as often as adults without children (3.6%).

In general, gender differences were evident across mental health diagnoses for adults without children, with women having nearly double the rates of men, while gender differences were less evident among adults with children. Single women without accompanying children had the highest rate of prior mental health treatment (30.9%), 50% higher than the treatment rate for the overall population. Single women also had the highest rate of SMI (18.6%) among the groups by gender and household type, a rate that was double the rate for single men (9.9%). However, combining the genders across household type, men and women had nearly equal rates of SMI (11.8% and 10.7% respectively).

Substance abuse diagnoses (most frequently occurring) were more common than mental health diagnoses overall. The substance abuse rate for adults without children (28.6%) was twice the rate for

adults with children (14.6%). Across household types, men (30%) had nearly double the rate of women (18.4%). Much of the gender difference in substance abuse rates, and the higher observed rate of substance abuse diagnoses than mental disorders, is attributable to the high rate of substance abuse among men without accompanying children (30.4%), who represented 70% of the homeless adults with a primary substance abuse diagnosis. Overall, two-thirds of the substance abuse diagnoses were for drug dependence or psychoses (17.9%). Alcohol dependence/psychoses diagnoses were much less common (5.7%).

Diagnostic Distributions by Age and by Most Frequently Occurring Diagnosis. Prior treatment with a most frequent mental health diagnosis was more common among homeless adults over the age of 45 (22.1%) than among adults under age 45 (19.4%) (see Table 3). SMI was also more common among older homeless adults than younger homeless adults. Adults under the age of 30 (the largest subgroup) had a rate of schizophrenia of 4.3%, compared to 6.8% for adults 31-45 and to 8.9% for adults over 45. However, 73% of the homeless adults with SMI were under the age of 45.

Drug dependence or psychosis was twice as common among adults under 30 (20.1%) and aged 31-45 (19.6%) than among adults over 45 (10.4%). In contrast, alcohol dependence or psychoses rates increased with age, and the rate was three times as high among older adults (over 45, 9.6%) than among young adults (under 30, 3.2%). Eighty-eight percent of the primary drug abuse diagnoses occurred in the under 45 age groups, while 65% of the alcohol abuse cases occurred in the under 45 age groups.

Diagnostic Distributions by Veteran Status and by Most Frequently Occurring Diagnosis. Veterans and non-veterans had roughly comparable rates of treatment for mental health and substance abuse diagnoses, despite the fact that this study did not include Veterans Administration data (see Table 4). Non-veterans had slightly higher rates of treatment for mental health diagnoses, and veterans had slightly higher rates of treatment for substance abuse diagnoses. Veterans account for 10.7% of the total homeless adult population, including 13.7% percent of the adults without accompanying children and 17.7% of the single men. Nearly all (95.6%) of the homeless veterans were adults without accompanying children.

Comparing Homeless With and Without Mental Health/Substance Use Disorders. Comparing homeless adults by diagnostic subgroup, including those without a prior treatment for a mental health or substance abuse disorder, reveals that women are more likely to be overrepresented among those with "other mental health disorders" [OMH], with SMI and with no MH/SA disorders relative to the overall homeless population, and underrepresented among the SA group (see Table 5). Homeless adults who are accompanied by children are underrepresented among the SMI group and SA group. As noted previously, older people are more likely to be represented among the SMI than the other groups, and younger people more likely to be represented among the OMH and SA groups. Black persons represent a greater proportion of the SA group and a lower proportion of the SMI and OMH subgroups compared to their representation in the homeless population. Veterans are similarly more likely to be represented among the SA group, and are also slightly overrepresented in the SMI group. Pregnant women are overrepresented among the OMH group and underrepresented in the SMI and SA groups. People with SMI are twice as likely to be represented among the physically disabled than all of the other subgroups.

Comparing Homeless and Non-homeless Medicaid Mental Health Service Users by Most Frequently Occurring Diagnosis. Table 6 compares homeless and non-homeless adults from the Medicaid management information system (MMIS and D&AMMIS). Results show that among the homeless with a prior treatment for mental health or substance abuse disorders, they are more likely to have a SMI diagnosis, particularly schizophrenia, than the non-homeless. People with schizophrenia comprise 62% more of the homeless than the non-homeless Medicaid population. In contrast, the non-homeless are much more likely to have an adjustment reaction disorder diagnosis. Among treated homeless adults, substance abuse is proportionately a much greater problem (51.8% of the treated) than among the non-homeless MA population (13.3%). Drug dependence or psychoses account for 34.1% of the treated homeless and only 7.9% of the treated nonhomeless MA populations.

The third column in Table 6 shows the treated homeless as a percentage of the treated MA population. Overall, 6.8% of the Medicaid population receiving treatment for SA or a mental disorder between 1985 and 1993 became homeless in the three-year study period. A higher proportion (7.8%) of

the MA population with a SMI diagnosis (most frequent) was homeless at some point between 1990 and 1992. Nearly 10% of the MA population treated for schizophrenia between 1985 and 1993 was homeless between 1990 and 1992. The three-year rate of homelessness is highest among those treated for substance abuse (20.1%) (recall that SA records are for inpatient only). Nearly 22% of the MA population treated for drug dependence/psychosis (inpatient) between 1985 and 1993 became homeless in the three-year study period, the highest of any rate among the treated population.

A Comparison of the Diagnostic Distributions of Cross-Sectionally and Longitudinally Selected Populations. Table 7 shows the diagnostic distributions, by most frequently occurring diagnosis, of the three-year study period and populations obtained from one day censuses in the winter and summer of 1992. Contrary to what was hypothesized, people with SMI are not more likely to be represented in the single day, as opposed to the three-year populations, when they are unaccompanied by children. Unaccompanied adults with SMI are *more* likely to be among the three-year population, suggesting a *higher* rate of turnover among people with SMI than among other homeless adults. Adults accompanied by children are slightly more likely to be comprised of people with SMI during the one-day time frames than across three years. Adults with primary diagnoses for substance abuse *are* over-represented in the single-day censuses, across household types, suggesting that adults with substance abuse problems *do* turn over at a lower rate than other homeless adults. Adults with substance abuse diagnoses are approximately one-third more likely to be among the single day censuses than the three-year population.

These results are qualified by the fact that, for the time period of this study, one large facility for single men (approximately 300 beds) was not tracked by the database from which the one-night censuses were obtained, although users of those beds are registered in the registry database. People who use these beds on a short-term basis ("one-nighters") are not required to undergo a complete intake and assessment interview, and people with SMI are slightly more likely to be among those who use such beds (see Figure 9 and related discussion in later section on estimating untreated disorders). In addition, the tracking database does not include periods of homelessness occurring outside of shelter.

Comparison of Case Inclusion Criteria. Table 8 shows the results of the crosstabulation of diagnostic subgroups by case inclusion criteria, crossing frequencies for the "most frequent diagnosis" and "ever" such a disorder criteria, and the "most frequent diagnosis" and "most recent diagnosis" criteria. The "ever" frequencies show that while 10.6% of homeless adults have a most frequent diagnosis of SMI, 16% of homeless adults ever received such a diagnosis. The most recent and most frequent criteria produce nearly identical rates. Two-thirds of the cases with a SMI "ever" diagnosis that were not so classified by the most frequent criterion, received a most frequent diagnosis for substance abuse, and one-third were classified as having an OMH disorder.

Nearly one-third of homeless adults have ever received a substance abuse diagnosis, compared to 25.2% by the most frequent criterion. Again, the most frequent and most recent criteria produce comparable rates. Thirteen percent of those ever receiving an SA diagnosis were classified as SMI by the most frequent criterion, resulting in 38% of the SMI cases (most frequent) having ever received a substance abuse diagnosis (thus having a co-occurring substance use disorder). Approximately 26% of the OMH group (most frequent) ever received a substance abuse diagnosis.

Monthly First Admissions to Shelter (Incidence) by Most Frequently Occurring Diagnosis. Until now, aggregate, multi-year data have been reported on the frequency of persons using shelter and having a prior treatment for mental illness or substance abuse. To depict the incidence of homelessness on a monthly basis by diagnostic subgroup, cases were sorted by date of first shelter admission and aggregated by month. As shown in Table 9, on average, 73 persons with a prior treatment for a severe mental disorder enter the shelter system for the first time each month in Philadelphia over this three-year period. All but 9 of these persons are unaccompanied by children, and 27 have ever had a prior treatment for substance abuse. An average of 96 persons with a prior treatment for other mental health disorders enter shelter for the first time each month, a third of whom have also been treated for a substance abuse problem. An average of 189 people, or 25% of those entering shelter for the first time, have a prior treatment for substance abuse (most frequent diagnosis). Approximately half (53%) of all first time

shelter entrants each month, or 409 people, have no prior treatment record for mental illness or substance abuse.

Estimates of Untreated Mental Health and Substance Use Disorders. To assess the extent to which homeless adults without prior treatment records may have "untreated" mental health and substance use disorders, shelter intake interview "indicators" for substance abuse and mental health problems (denoted in the shelter registry database) were tabulated by diagnostic subgroups. (Only those undergoing an intake interview were included in this analysis.)

Results in Table 10 show that very few additional cases of people with mental health problems were identified through the inclusion of the indicator information. Only 1.8% of the homeless population not previously identified as having a mental health problem through the treatment databases was flagged as having a mental health problem, resulting in only a marginal increase in the overall rate of mental health problems among homeless adults. Given the low rate with which people *with* prior treatment records for mental health problems were similarly flagged (21%), the ability of this indicator to identify untreated cases may be poor. As illustrated in Figure 9, using the SMI (most frequent) group as an example, only 36.6% of adults with SMI who went through an intake interview were flagged as having a mental health problem. This may reflect persons who were currently symptomatic, but it may also suggest that the mental health indicator information is unreliable.

In contrast, the indicator information for substance abuse problems is both much more consistent with the treatment databases, and identifies a significant number of "untreated" cases. Three-quarters of the most frequent SA group received a positive indicator, as did 71% of those ever receiving an SA diagnosis. Among those never receiving an SA diagnosis, 31% were given a positive SA indicator. This would increase the rate of identified SA problems among homeless adults by 20.7 percentage points.

Table 11 shows the results of a crosstabulation combining all sources of information on behavioral health status, including both the treatment databases and the indicator information, for those persons completing an intake and assessment interview. Overall, 65.4% of homeless adults admitted to Philadelphia shelters from 1990 to 1992 have been identified as having some mental health and/or

substance abuse problem between 1985 and 1993; one-third of homeless adults (34.6%) have not been so identified. More than half of homeless adults (55.4%) have been identified as having a substance use disorder/problem, and nearly one-third (29.5%) as having a mental health disorder/problem (includes non-SMI). Approximately one in five (19.6%) have been identified as having both a mental health and a substance abuse problem (includes non-SMI).

The Relationship between Inpatient and Emergency Service Usage and the Onset of Homelessness. Table 12 and Figures 10 and 11 show the results of the preliminary investigation of the relationship between behavioral health services utilization and the onset of homelessness. Results show that first-time shelter entrants have significant inpatient use both before and after their first admission to shelter, with slightly higher rates of use after first shelter admission than before, across diagnostic groups. Overall, 15% of the treated population has a discharge from inpatient care prior to shelter admission, with the highest observed rate for persons with substance abuse problems (20.3%). More than half (57%) of the population with an inpatient episode within 120 days prior to first shelter admission *also* had an inpatient episode within 120 days after first shelter admission. Overall, 25.7% of the treated population had an inpatient episode either before or after first shelter admission.

Nine-hundred forty persons with substance abuse problems were discharged from inpatient care within 120 days prior to shelter admission in the two year study period. Approximately half (49%) of these discharges occurred within 30 days of shelter admission, and a quarter within 10 days, as illustrated in the Figure 10. More than half (62%) of the substance abuse group discharged from inpatient care prior to first shelter admission had another inpatient episode within 120 days after first shelter admission. Forty percent of the inpatient admissions following first shelter admission occurred within 30 days. Overall, 34.2% of the treated substance abuse population received inpatient care either before or after first shelter admission and within 120 days of that shelter admission.

Approximately 16% of persons with severe mental disorders with a first shelter admission were discharged from inpatient care within 120 days prior to their first shelter admission. Among that group, 36% were discharged within 30 days prior to shelter admission, and 66% within 60 days prior. A little

less than half (44%) of those discharged prior to shelter admission received inpatient care again after shelter admission. Forty-four percent of the inpatient episodes after shelter admission (and within 120 days) occurred within 30 days of shelter admission, and 70% within 60 days of shelter admission. Overall, 25.6% of the treated severely mentally ill homeless received inpatient care either before or after first shelter admission and within 120 days of that shelter admission.

Persons with "other mental health" disorders had a much lower rate of inpatient use both before and after shelter admission (and within 120 days), at approximately 4% in both cases. Half of the inpatient discharges prior to shelter admission received inpatient care again after shelter admission. Again, both inpatient discharges and admissions clustered around the date of first shelter admission, with 50% of the inpatient discharges (within 120 days) occurring within 30 days before shelter admission, and 46% of the inpatient admissions occurring within 30 days after shelter admission. Overall, 8.6% of the "other mental disorders" group had an inpatient episode either before or after first shelter admission and within 120 days of that shelter admission.

Emergency care use is much higher among persons with serious mental disorders than other groups, although this may be a function of the limited emergency care data in substance abuse databases. Approximately 14% of the seriously mentally ill received emergency services either before or after first shelter admission, again clustering around the date of first shelter admission. This pattern was also evident, though it is less strong, among the other diagnostic groups.

Discussion

Although this study found a lower rate of serious mental illness among the homeless adult population than has been commonly reported, the rate of *some* identified mental disorder or problem (29%) is consistent with the oft cited "one-third of the homeless are mentally ill" estimate. However, it is important to note that because this study involved nine years of treatment records, it is closer to a lifetime prevalence rate than a one-year prevalence rate, and is *not* an accurate estimate of the presence of a current disorder. Some people may have received a single treatment for a condition nine years before their shelter admission, and that would be included in this study's enumeration. The rate of treatment for

a serious mental disorder is much lower than the "one-third" estimate, ranging from 10.7% to 16.0%, depending on the case inclusion criteria applied, and the rate would likely be lower if homeless children were included in prevalence estimates, and who account for one-third of Philadelphia's homeless population during this study period. Because of major methodological differences, however, this study is not comparable to earlier studies from which previous estimates have been derived. The present study population was obtained over three years, not at a single point in time; diagnosis was determined based on an aggregation of treatment records generated in clinical settings over a nine year period, not by a single encounter, diagnostic interview with both previously treated and untreated persons.

Assuming that people with SMI are homeless for longer periods, as has been found repeatedly in previous research (Dennis et al., 1993; Koegel et al., 1988; LaGory, Ritchey & Mollis, 1986; Susser, Struening & Canover, 1989), it was hypothesized that a higher rate of serious mental illness would still be found at a single point in time than over time using the same case identification methods (treatment records). However, this hypothesis was not confirmed, suggesting either that people with SMI are not in fact overrepresented in point-in-time populations, or that the lower one-day rates found in this study are attributable to an untreated population that previous research has successfully identified, or that other methodological differences contribute to these conflicting results. Each of these explanations may have merit and are considered below.

The SMI may in fact turn over at a higher rate than other segments of the homeless population. While this would be inconsistent with point-prevalence research that has found that people with SMI report to be homeless for longer durations, such measures are based on self-report and are therefore indirect measures of homelessness duration. And, as Robertson (1992) notes in a literature review, "other studies show little or no difference in mental health status as a function of the duration of homelessness (Kahn et al, 1987), or show higher prevalence among more recently homeless people (Susser, Struening & Canover, 1989)" (p. 76). The present study's finding is also more consistent with recent studies that have involved more direct measures of homelessness duration. For example, preliminary longitudinal analyses of a sample of homeless adults tracked in Los Angeles (Koegel & Burnam, 1994) found that the presence

of a serious mental disorder is associated with a greater likelihood of exiting homelessness. A study comparing "new" and "chronic" homeless in Montreal (Fournier, Caulet, Cote, et al., 1994) found no difference between the groups in prior hospitalization for mental illness. The present study's finding of a high rate of hospitalization among people with SMI soon after homelessness onset may also help to explain shorter homelessness episodes among people with SMI, as they enter the treatment system and in doing so possibly resolve their homelessness. Nevertheless, this inconsistency in findings between point and period prevalence research deserves more study. One option is a study of shelter utilization by subgroup using days in shelter as a direct measure of homelessness duration (Culhane & Kuhn, forthcoming), recognizing that street homelessness is not captured by this approach and that duration measures may need to be supplemented by additional, non-shelter information.

Another possible explanation for the low point-prevalence rates of SMI identified in this study, particularly compared to other studies, is that an unknown number of persons may be "untreated," and therefore not captured by this study's method based on treatment records. Confidence in this study's findings can be supported by the fact that very nearly half of the study population was seen in some clinical setting (typically multiple), and at which time(s) a diagnosis was given. However, this would still not account for the half of the population for whom no treatment record exists, and who therefore have an unknown rate of mental disorder, or for people whose prior treatment was for a different condition than they might have currently. One might predict that the rate of untreated cases of SMI would be relatively low, given the nature of SMI, and particularly for people with schizophrenia, the rate of which is relatively more consistent between this study and those from previous point prevalence research efforts based on large samples of single adults. However, the rate of affective psychosis (3.1%) is much lower in this study than that from previous research, and may therefore suggest that homeless persons with affective psychoses have a higher likelihood of being untreated and not captured by this method of case identification. (Similarly, personality disorders, while not included in the SMI category, were found to be much less prevalent in this study than in single day, diagnostic interview research, and therefore may have a higher likelihood of being untreated.) Finally, further confidence in the ability of this study to identify

cases of SMI may be supported by the very low frequency with which "untreated" persons were flagged with a mental health indicator by shelter intake workers, recognizing that there are evident problems with that case identification procedure. More research is needed to assess directly the degree of correspondence between rates derived from on-site, structured diagnostic interviews, and those based on research using treatment records.

Other methodological differences may offer yet another set of possible explanations for the low point-in-time rate of SMI found in this study compared to that in other research. The identification of cases on a one-day basis in this study was limited by the lack of data from one large facility for single men (300 beds) in the tracking database. Persons with SMI using these beds will be identified through the registry database (thus, they are included in the three-year prevalence estimates), but not in the tracking file (from which the one day censuses were obtained). The data in Figure 8 provide some evidence that SMI are more likely to be in this large facility, given that those are the beds used by people who do not receive an intake interview, and among whom people with SMI are slightly overrepresented. Alternatively, it may be that previous, point prevalence research falsely identifies people with mental disorders, possibly because adaptational behaviors mimic mental disorder, or because instruments were intended for domiciled populations, or because estimates of homelessness duration are based on self-report. Differences in findings may also be a consequence of previous research having unrepresentative samples, including an underrepresentation of adults accompanied by children. Furthermore, differences could be a function of the different periods in which the studies were conducted. Substance abuse may be more common among people who became homeless in the 1990s than among those who became homeless in the mid-1980s, when most of the single-day, diagnostic interview research was conducted. This would both increase the proportion of people with substance abuse disorders and decrease the relative proportion of people with SMI. Finally, it is also worth noting that policy difference in localities and changes in policies over time would likely effect a change in shelter utilization by varying subpopulations. Future research should examine how local variations in the responsiveness of treatment systems to the needs of homeless people with SMI are related to varying lengths of stay and to the inconsistencies in study

findings by location. For example, Philadelphia's efforts to create housing alternatives for homeless people with SMI may have increased opportunities for stable exits from homelessness in Philadelphia, which may be more or less true of other locales.

Other findings are more consistent with the extent literature. Single women without accompanying children are twice as likely to have a SMI or other mental disorder than single men. Single adults are twice as likely to have a SMI than adults in families. Substance abuse rates are higher than mental disorder rates and affect more than half of the adult population (with all diagnostic and indicator information included). Young adults are more likely to be drug dependent, and older adults to have alcohol problems. Contrary to our hypothesis, half of the people with SMI were not found to have prior treatment for a substance use disorder, but more than one-third (38%) were. People with substance use disorders *are* overrepresented in the single day versus three year study frames, thus likely to stay homeless longer. Each of these findings generally confirms results from previous studies done on samples obtained on a single day and based on direct interviews. In that regard, the primary contribution of this study is the confirmation offered with a large study population, with diagnoses verified by treatment records, and with the inclusion of a correspondingly large number of single women and adults with children in the study population, thus enabling firmer comparisons between genders and by household type.

Because this study included the known population of adult shelter users, it contributes additional information previously unavailable in the literature. Data provided in the tables can be used to calculate the proportion of homeless adults with specific conditions by demographic group. For example, it was calculated that 86% of homeless adults with SMI are single adults without accompanying children, and that 70% of homeless adults with a primary diagnosis for a substance use disorder are single men. Such information may be useful for determining the relative size of subpopulations and the needed capacity of programs designed to serve them.

This study was also able to determine the rate of *homelessness* among diagnostic groups, here based on the treated Medicaid population. Previous research based on the Philadelphia data (Culhane, et al., 1994) found that 2.8% of the general population in Philadelphia was homeless between 1990 and

1992, including 6.2% of the city's black population and 7.9% of the city's black children. This study found that 6.8% of the adult Medicaid population with a treatment history for mental health or substance abuse disorders (from 1985 to 1993) was homeless in the same three year period, including 7.8% of the seriously mentally ill, 9.5% of people with schizophrenia, and an extraordinary 20.1% of the population with a Medicaid-reimbursed, inpatient substance abuse treatment record. Thus, while the study found a lower rate of SMI than previous research, it has documented the disproportionate rate at which both people with SMI, particularly people with schizophrenia, and people with substance abuse problems, become homeless, and the magnitude of these populations over time. It is worth noting that the *rate of homelessness* among diagnostic subgroups may be a better comparative measure of the magnitude of the homeless mentally ill population across place and time than measuring the rate of mental illness among the homeless, given that the latter is entirely dependent on the proportionate representation of other groups among the homeless, such as people with substance abuse problems, and given that the size of such subpopulations are likely to change significantly by place and time.

Another contribution of this methodological approach is that it affords a better view of the dynamic nature of homelessness, thus potentially enhancing the applicability of study results for policy and program planning. For example, the average number of monthly first admissions, or the incidence of cases, shown in Table 9, demonstrate that, while homelessness may affect nearly 3,000 people with SMI over three years, on average 73 people with SMI enter shelters for the first time each month. This finding suggests that it is potentially practical and programmatically feasible for public mental health officials to design an alternate service system for people with SMI who become homeless, potentially avoiding the costly decompensation and hospitalization that might otherwise frequently result when such persons are placed in congregate shelters. Planners might consider the utility of targeted crisis intervention programs, including crisis residences and other programs, as places to which to divert people with SMI from shelter. Such programs could address in tandem the mental health and housing emergencies of people with SMI, and could attempt to do so in a reasonably short time-frame (30-45 days), enabling the programs to handle the flow of new cases while remaining relatively modest in size. Such an alternate system would require

that shelter intake and assessment workers can identify people with SMI upon admission to shelter, an ability found by this study to be poor at present in Philadelphia. Access to a treatment registry for shelter intake workers could facilitate improved case identification.

Because of its reliance on treatment records, the methodological approach taken in this study is necessarily limited as a means of establishing overall prevalence rates for specific disorders in the homeless population. However, perhaps the greatest potential strength of this approach is the contribution it can make in the area of health services research. This study's preliminary investigation of the intersection between behavioral health service use and homelessness onset is an example of how this method could be applied to the analysis of both the treatment paths to homelessness and the subsequent impact of homelessness on behavioral health service use and costs. This study found very high rates of hospitalization among people with SMI and SA disorders (25% and 34% respectively) near the onset of their homelessness (within 120 days), and that nearly half of those hospitalized before the onset of their homelessness were hospitalized again soon after. This as well as the temporal proximity of inpatient, emergency services and shelter utilization suggests that these may be mutually reinforcing events. This may also suggest that, for people with serious mental illness, homelessness is more of symptom of decompensation than a chronic condition. However, much research remains to be done to explore the extent of these service system interactions, to explain why they occur, to determine the costs of their intersection, and to identify improved ways in which services could be organized to reduce residential and behavioral instability among this population.

As one example, future research could investigate why there is such a high rate of substance abuse hospitalization among adult shelter admissions (and *vis versa*), especially the peaking of inpatient discharges 10 days prior to shelter admission so dramatically evident in Figure 10. This suggests that a high frequency of people leaving substance abuse detoxification programs go to shelter for "aftercare" and for rehabilitation. This interpretation is supported by the recent growth of "clean and sober" shelters as part of the Philadelphia shelter system. Many of these facilities have no time limit on stays and provide peer support and drug rehabilitation counseling; some of the few such residential programs for recovering

addicts in Philadelphia. Future research should investigate the reasons for shelter admissions among recent detoxification discharges.

In conclusion, future research should also consider the potential benefits of homelessness tracking systems and integrated database research for the study of homelessness. In addition to mental health services research, the integration of shelter records with other administrative databases could better inform the dynamic nature of the homelessness problem, identify areas for potential interagency cooperation, and suggest points of more effective intervention, including the targeting of homelessness prevention activities. As shelter management information systems become more widely available, and include improved standardization of data elements (see Culhane, 1995), such research could make a substantial contribution to furthering knowledge about homelessness, its causes, course, and potential policy and program recommendations to reduce it.

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Footnotes

[1] This figure approximates the number of households provided shelter in that period and does not include a count of children (see Culhane et al., 1994, for child counts).

[2] The data were unduplicated by creating a series of variables consisting of the first three or four characters of a client's first or last name and social security number. Observations that meet all the following criteria -- the same first three letters of the first name, the same first four letters of the last name, and the same first four digits of a social security number -- were flagged and set aside. This process was repeated three more times on the observations remaining in the registry data set: (1) for observations with the same first three letters of the first name, same first four letters of the last name, and the same last four digits of a social security number; (2) for observations with the same second three letters of the first name, same first four letters of the last name, and the same last four digits of a social security number; and (3) for observations with the same social security number. Each record was sorted by the truncated variables, and duplicates were temporarily deleted. An identifying number was given to the truncated variables. This temporary dataset was then merged with the original data using the truncated variables. This allowed contradictory information (such as variants of a social security number) to be kept as variables. This identifying number will be used to unduplicate information gathered in merges with other datasets. Since it is possible that an individual may have entered the shelter system more than once, and that on these occasions the individual may or may not have been accompanied by children, or given the same demographic information, it was also necessary to establish a method of gathering consistent demographic data. The data were first limited by intakes dates. All positive indicators were retained across duplications for each individual and the dataset was unduplicated to a unique identifier per case. Thus, if a person ever entered the shelter system with children, they are always given a positive indicator for a family for this analysis. This same method was employed for the veteran, substance abuse and mental illness indicators.

[3] Because veteran status is determined in the intake interview process, and because some persons can avoid an intake interview, veterans are compared to the nonveteran intake population, not the entire population of shelter users (see section on estimating untreated disorders in procedures).

[4] Diagnostic categories were created in consultation with reviewers at the US Center for Mental Health Services. Adults in the Philadelphia Shelter System could have had a childhood diagnosis from a record of treatment as an adolescent (eg. a 21 year old in 1992 would have been 14 years old when the treatment databases begin). Reviewers of preliminary analyses requested that we examine cases with diagnoses 312 (disturbance of conduct, not elsewhere classified), 313 (disturbance of emotions specific to childhood and adolescence), 314 (hyperkinetic syndrome of childhood) and 315 (specific delays in development). Upon examining the subgroups under each of these diagnoses it was apparent that 312 and 315 pertained to more than children. For example, diagnosis 312 includes disorders of impulse control, including gambling. Diagnosis 315 includes specific developmental problems relating to reading, arithmetic and speech and language development that are not exclusive to children, although they may have developed as children. The service records for persons with most frequently occurring diagnoses 313 and 314 (n=135) (the exclusively childhood diagnoses) were reviewed, and it was found that 98% of these diagnoses were obtained by homeless adults when they were children or adolescents (prior to age 21). A decision was made to suppress these diagnoses in the classification procedures so that adult diagnoses, while perhaps less frequent than the childhood diagnoses, could be recognized as most frequently occurring.

[5] The Philadelphia shelter system can be accessed through two points: the central intake office during business hours and the designated after-hours facilities for people arriving after 5pm. People who enter the system through the central intake office receive an intake assessment, at which time they are interviewed and their record in the OSHA database is opened. Women (accompanied and unaccompanied by children) who initially access the system after 5 pm are required to go through the intake assessment process the next day before they are permitted to spend a consecutive night in shelter. Men, however, are able to avoid an intake and access the after-hours shelter without restriction, but they cannot receive a long-term shelter placement without going through the assessment process at central intake during

business hours. Men who use the after hours facility must still complete a short intake form, which includes identifying data, and that information is recorded in the OSHA database.

[6] Only two years of shelter admissions, stopping March 31, 1992, were included in this analysis so that people admitted on that date would still have 365 days of mental health services recorded on the treatment databases, which extend to June 30, 1993. A three month buffer was left for the end of the treatment databases (April-June) because at the time of this study the last quarter of fiscal 1993 had some incomplete data awaiting provider reconciliation with the state Medicaid authority.

Tables

Table 1: Number of Cases Matched by the Merging of Shelter and Mental Health Services Files, by Data Source

Data Source	Matched Cases
Medicaid Mental Health (MMIS)	7,232
Medicaid Drug and Alcohol (D&AMMIS)	7,490
Community Reporting System (CRS)	6,278
Medicare (MEDPAR)	0
Pennsylvania State Hospitals (PCIS)	242
HealthPass (HPC)	1,645
Unduplicated Total	12,517

Table 2: Treated Prevalence (1985-1993) for Mental Disorders and Substance Abuse for Three Years of Adult Shelter Users (1990-1992) by Most Frequently Occurring Diagnosis, Gender and Household Type

Diagnosis	Treatment Rate								
	Single Male (N=15,796)	Single Female (N=5,188)	Total Singles (N=20,984)	Parent Male (N=405)	Parent Female (N=6,249)	Total Parent (N=6,654)	Total Male (N=16,201)	Total Female (N=11,437)	Total Adults (N=27,638)
Serious Mental Illness	9.9%	18.6%	12.1%	6.2%	6.2%	6.2%	9.9%	11.8%	10.7%
Schizophrenic Disorder	6.7%	10.8%	7.7%	2.5%	1.6%	1.7%	6.6%	5.8%	6.2%
Affective Psychoses	2.3%	5.4%	3.0%	2.7%	3.3%	3.2%	2.3%	4.2%	3.1%
Other SMI	1.0%	2.4%	1.4%	1.0%	1.3%	1.3%	1.0%	1.8%	1.3%
Adjustment Reaction	2.9%	5.7%	3.6%	7.2%	7.2%	7.2%	3.0%	6.5%	4.5%
Personality/Neurotic	2.7%	5.1%	3.3%	2.7%	3.9%	3.8%	2.7%	4.4%	3.4%
Other Mental Health	1.4%	1.5%	1.4%	0.7%	1.5%	1.4%	1.4%	1.5%	1.4%
Total Mental Health	17.0%	30.9%	20.4%	16.8%	18.8%	18.7%	17.0%	24.3%	20.0%
Alcohol Dependence/Psychoses	8.0%	3.6%	6.9%	4.4%	1.7%	1.9%	7.9%	2.6%	5.7%
Drug Dependence/Psychoses	20.6%	17.8%	19.9%	10.6%	11.6%	11.5%	20.3%	14.4%	17.9%
Non-Dependant Drug Abuse	1.8%	1.9%	1.8%	1.5%	1.1%	1.1%	1.8%	1.4%	1.6%
Total Substance Abuse	30.4%	23.3%	28.6%	16.5%	14.4%	14.6%	30.0%	18.4%	25.2%
Total Mental Health and Substance Abuse	47.3%	54.2%	49.0%	33.3%	33.2%	33.2%	47.0%	42.7%	45.2%

Table 3: Treated Prevalence (1985-1993) for Mental Disorders and Substance Abuse for Three Years of Adult Shelter Users (1990-1992) by Most Frequently Occurring Diagnosis, and by Age

Diagnosis	Under 30 (N=11,087)	31-45 (N=10,824)	Over 45 (N=5,727)
Serious Mental Illness	8.4%	11.0%	14.4%
Schizophrenic Disorder	4.3%	6.8%	8.9%
Affective Psychoses	2.8%	3.0%	3.8%
Other SMI	1.3%	1.2%	1.7%
Adjustment Reaction	5.9%	3.6%	3.3%
Personality/Neurotic	3.5%	3.3%	3.5%
Other Mental Health	1.9%	1.1%	1.0%
Total Mental Health	19.7%	19.1%	22.1%
Alcohol Dependence/Psychoses	3.2%	6.2%	9.6%
Drug Dependence/Psychoses	20.1%	19.6%	10.4%
Non-Dependant Drug Abuse	1.7%	1.6%	1.6%
Total Substance Abuse	25.0%	27.4%	21.7%
Total Mental Health and Substance Abuse	44.6%	46.4%	43.8%

Table 4: Treated Prevalence (1985-1993) for Mental Disorders and Substance Abuse for Three Years of Adult Shelter Users (1990-1992) by Most Frequently Occurring Diagnosis, and by Veteran Status (Intake Population Only)

Diagnosis	Vets (N=2,268)	Non-Vets (N=18,941)
Serious Mental Illness	10.8%	9.9%
Schizophrenic Disorder	6.7%	5.4%
Affective Psychoses	2.8%	3.1%
Other SMI	1.3%	1.4%
Adjustment Reaction	3.4%	5.0%
Personality/Neurotic	2.5%	3.7%
Other Mental Health	1.1%	1.5%
Total Mental Health	17.6%	20.1%
Alcohol Dependence/Psychoses	8.8%	5.6%
Drug Dependence/Psychoses	20.7%	18.6%
Non-Dependant Drug Abuse	1.8%	1.8%
Total Substance Abuse	31.3%	25.9%
Total Mental Health and Substance Abuse	48.9%	46.0%

Table 5: Demographic Characteristics of Homeless Adults, by Diagnostic Group

	SMI (N=2,906)	OMH (N=2,541)	SA (N=6,839)	No MH/HA (N=15,352)	Total (N=27,638)
Female	46.2%	55.6%	30.6%	42.1%	40.9%
Age					
18-30	31.3%	49.0%	39.5%	39.5%	39.5%
31-45	40.7%	33.8%	43.0%	37.5%	38.8%
Over 45	28.0%	17.2%	17.5%	20.8%	20.4%
Family	14.1%	32.2%	14.1%	28.8%	23.9%
Race					
Black	82.0%	82.6%	90.9%	83.5%	85.1%
White	13.0%	9.7%	5.5%	7.7%	7.9%
Veterans*	11.6%	7.5%	12.6%	10.0%	10.7%
Pregnant*	3.1%	6.5%	3.5%	4.4%	4.3%
Physical Disability*	2.1%	1.2%	1.0%	1.2%	1.2%

* Percentages based on an intake population only, N=21,466.

Table 6: Proportionate Distribution, by Most Frequently Occurring Diagnosis, of Medicaid Reimbursed, Adult Mental Health and Substance Abuse Service Users, by Homeless Status and Homeless as a Percent of the Medicaid Population

Diagnosis	Homeless (N=8,210)	Not Homeless (N=112,156)	Homeless as Percent of MA Users (N=120,366)
Serious Mental Illness	34.1%	29.5%	7.8%
Schizophrenic Disorder	20.4%	14.2%	9.5%
Affective Psychoses	9.6%	11.5%	5.8%
Other SMI	4.1%	3.8%	7.3%
Adjustment Reaction	8.9%	28.3%	2.2%
Personality/Neurotic	9.0%	16.6%	3.8%
Other Mental Health	2.4%	12.3%	1.4%
Total Mental Health	54.4%	86.8%	4.4%
Alcohol Dependence/Psychoses	12.6%	4.3%	17.7%
Drug Dependence/Psychoses	30.1%	7.9%	21.9%
Non-Dependant Drug Abuse	2.9%	1.1%	16.6%
Total Substance Abuse	45.6%	13.2%	20.1%
Total Mental Health and Substance Abuse	100.0%	100.0%	6.8%

Table 7: Treated Prevalence of Mental Health and Substance Abuse Disorders by Three Years of Shelter Admissions (1990-1992) and One-Day Census (Summer and Winter), by Household Type

Diagnosis	Three Year		One-Day Summer		One-Day Winter	
	Total Singles (N=20,984)	Total Parent (N=6,654)	Singles (N=639)	Parent (N=418)	Singles (N=966)	Parent (N=465)
Serious Mental Illness	12.1%	6.2%	8.8%	6.5%	9.6%	6.7%
Schizophrenic Disorder	7.7%	1.7%	5.8%	1.0%	5.5%	1.3%
Affective Psychoses	3.0%	3.2%	1.6%	3.8%	2.8%	3.2%
Other SMI	1.4%	1.3%	1.4%	1.7%	1.3%	2.2%
Adjustment Reaction	3.6%	7.2%	4.4%	6.7%	2.8%	8.2%
Personality/Neurotic	3.3%	3.8%	3.9%	4.3%	4.3%	4.5%
Other Mental Health	1.4%	1.4%	2.2%	1.9%	1.4%	2.4%
Total Mental Health	20.4%	18.7%	19.2%	19.4%	18.2%	21.7%
Alcohol Dependence/Psychoses	6.9%	1.9%	8.0%	2.6%	9.6%	1.9%
Drug Dependence/Psychoses	19.9%	11.5%	27.5%	14.6%	24.6%	14.8%
Non-Dependant Drug Abuse	1.8%	1.1%	3.4%	2.9%	2.6%	3.2%
Total Substance Abuse	28.6%	14.6%	39.0%	20.1%	36.9%	20.0%
Total Mental Health and Substance Abuse	49.0%	33.2%	58.2%	39.5%	55.1%	41.7%

Table 8: Treated Prevalence Rates for Mental Health and Substance Abuse Diagnosis by Varying Case Inclusion Criteria

Note: Rates are over a total three year sheltered population of 27,638, and total treated population over same time period is 12,497.

EVER*

		Most Frequent Diagnosis		
		SMI	OMH	SA
	Unduplicated N	2,943 *10.6%*	2,580 *9.3%*	6,972 *25.2%*
SMI	4,425 *16.0%*	2,943 *10.6%*	502 *1.8%*	980 *3.5%*
OMH	5,336 *19.3%*	1,223 *4.4%*	2,580 *9.3%*	1,533 *5.5%*
SA	8,786 *31.8%*	1,127 *4.1%*	687 *2.5%*	6,972 *25.2%*

MOST RECENT**

		Most Frequent Diagnosis		
		SMI	OMH	SA
	Unduplicated N	2,943 *10.6%*	2,580 *9.3%*	6,972 *25.2%*
SMI	2,893 *10.5%*	2,567 *9.3%*	136 *0.5%*	190 *0.7%*
OMH	2,548 *9.2%*	128 *0.5%*	2,207 *8.0%*	213 *0.8%*
SA	7,056 *25.5%*	248 *0.9%*	237 *0.9%*	6,571 *23.8%*

*Columns in the "ever" table are not additive.
A treated individual may have more than one diagnosis over time.
**Columns in the "recent" table are additive.
Each treated individual has only one most "recent" diagnosis.

Table 9: Average Monthly First Admissions to Shelter, by Most Frequent Diagnosis, 1990-1992

	Total	SMI No SA	SMI with SA	Other MH No SA	Other MH with SA	SA Only	All Other
Single Adults							
Raw	583	39	25	48	18	163	290
(%)	100	6.7	4.3	8.2	3.1	28.0	49.7
Adults with Children							
Raw	184	7	2	25	5	26	119
(%)	100	3.8	1.1	13.6	2.7	14.1	64.7
Total							
Raw	767	46	27	73	23	189	409
(%)	100	6.0	3.5	9.5	3.0	24.6	53.3

Table 10: Accuracy of Positive OSHA Indicators for Mental Health and Substance Abuse by Diagnostic Group

INTAKE POPULATION ONLY
N=21,466

Mental Health	N	Treated Rate Per Intake Population	Percent with Indicator	Indicator Rate Per Intake Population
Most Freq SMI	2,143	10.0	36.6	3.6
Most Freq Other MH	2,274	10.6	13.1	1.4
Ever Any MH	5,948	27.7	21.2	5.9
Ever No MH	15,518	0.0	2.5	1.8

Substance Abuse	N	Treated Rate Per Intake Population	Percent with Indicator	Indicator Rate Per Intake Population
Most Freq SA	5,722	26.6	75.1	20.0
Ever Any SA	7,144	33.3	72.8	24.2
Ever No SA	14,322	0.0	31.0	20.7

Table 11: Identified Mental Health and Substance Abuse Problems (Presence/Absence) by Combined OSHA Indicator and Treatment Record Information, 3 Years of Shelter Admissions*

		Identified Substance Abuse Problem		
		Absent	Present	
Identified Mental Health Problem	Absent	34.6% 7,431	35.9% 7,696	70.5% 15,127
	Present	10.0% 2,137	19.6% 4,202	29.5% 6,339
		44.6% 9,568	55.4% 11,898	100.0% 21,466

* Includes shelter population receiving an intake assessment only. Rates are a percent of total adult population.

Table 12

I. Behavioral Health Services Discharge prior to First Admittance to Shelter

INPATIENT				
INTERVAL	TOTAL	SMI	SA	OMH
-120	65	18	41	6
-110	56	9	45	2
-100	60	11	46	3
-90	61	15	39	7
-80	70	16	48	6
-70	80	18	56	6
-60	80	16	62	2
-50	88	22	63	3
-40	112	23	82	7
-30	138	31	97	10
-20	171	37	119	15
-10	328	69	242	17
Sum	1,309	285	940	84
Rate per Treated Population	15.0%	15.5%	20.3%	3.7%

EMERGENCY				
INTERVAL	TOTAL	SMI	SA	OMH
-120	12	7	4	1
-110	16	9	5	2
-100	14	10	1	3
-90	15	11	2	2
-80	10	7	1	2
-70	13	9	1	3
-60	19	13	4	2
-50	16	10	4	2
-40	33	25	4	4
-30	15	10	3	2
-20	30	17	7	6
-10	57	34	12	11
Sum	250	162	48	40
Rate per Treated Population	2.9%	8.8%	1.0%	1.8%

II. Behavioral Health Services Admission after First Admittance to Shelter

INPATIENT				
INTERVAL	TOTAL	SMI	SA	OMH
0	160	14	138	8
10	215	53	145	17
20	171	34	130	7
30	142	25	108	9
40	156	23	127	6
50	143	24	112	7
60	123	22	95	6
70	109	19	85	5
80	109	14	84	11
90	99	16	79	4
100	89	20	64	5
110	80	9	68	3
120	76	14	60	2
Sum	1,672	287	1,295	90
Rate per Treated Population	19.1%	15.6%	27.9%	4.0%

EMERGENCY				
INTERVAL	TOTAL	SMI	SA	OMH
0	21	14	2	5
10	58	43	7	8
20	38	25	7	6
30	23	9	6	8
40	22	9	6	7
50	16	11	3	2
60	15	12	2	1
70	14	10	4	0
80	10	7	2	1
90	8	3	2	3
100	5	4	1	0
110	9	3	4	2
120	15	10	3	2
Sum	254	160	49	45
Rate per Treated Population	2.9%	8.7%	1.1%	2.0%

III. Behavioral Health Services Both Before and After First Admittance to Shelter

INPATIENT				
	TOTAL	SMI	SA	OMH
Sum	749	124	583	42
Rate per Treated Population	8.6%	6.7%	12.6%	1.8%

EMERGENCY				
	TOTAL	SMI	SA	OMH
Sum	86	66	8	12
Rate per Treated Population	1.0%	3.6%	0.2%	0.5%

IV. Behavioral Health Services Either Before or After First Admittance to Shelter (unduplicated)

INPATIENT				
	TOTAL	SMI	SA	OMH
Sum	2,251	470	1,585	196
Rate per Treated Population	25.7%	25.6%	34.2%	8.6%

EMERGENCY				
	TOTAL	SMI	SA	OMH
Sum	418	256	89	73
Rate per Treated Population	4.8%	13.9%	1.9%	3.2%

Figures

Notes to Accompany Figures 1-8

Figure 1:

OSHA cases with intake dates between Jan. 1, 1990 and Dec. 31, 1992 were merged with the D&A Claims file using two different identifiers. One merge used social security numbers for matching , and the other used a created identifier, the "uniqcr." This uniqcr is created using birth dates as one component. OSHA cases with known invalid birth dates were not included in the merge using the uniqcr. The results from both merges were concatenated, sorted by the OSHA idenfier [the "OSHA id"] and unduplicated to a single claim per unique case.

Figure 2:

OSHA cases with invalid birth dates (1/1/01, 1/1/60, 6/1,60, 6/6/60 and 6/6/66) were merged with the D&A claims file using social security numbers. Matches were given the uniqcr from the D&A file in place of the invalid OSHA uniqcr. These matches were unduplicated and merged back with the OSHA file used for uniqcr merges. This file was named OSHA-c. It is used for all other merges between OSHA and the service files that depend on a uniqcr for a match.

Figure 3:

The OSHA-c file was merged with the CRS file using the uniqcr. The matches were unduplicated to a single claim per OSHA case.

Figure 4:

The OSHA file was matched with the identifier for the Medicaid identifier file [the "MAWHO" file]. Two matches were made using two different identifiers. One match used the social security number , the other match used the uniqcr. The results of the two merges were concatenated, sorted by the OSHA id and unduplicated to a single claim per OSHA case.

Figure 5:

The file with matches between OSHA and the MAWHO file was merged with the MA service file on an identifier common to the MAWHO and the MA file. This identifier is referred to as the uniqma, and is derived from several other variables, including a Medicaid identifier number. Matches from this merge were sorted by the OSHA id and reduced to a single claim per OSHA case.

Figure 6:

The PCIS file had multiple social security numbers and uniqcrs for each case. The OSHA file was merged with the PCIS file twice using social security numbers and three times using uniqcrs. The results of these five merges were concatenated, sorted by OSHA id and duplicated to a single claim per OSHA case.

Figure 7:

The HealthPASS file and the OSHA file have no identifiers in common. During previous merges between OSHA and MAWHO and OSHA and D&A, the uniqma from each merge was saved in temporary files. These temporary files, MAWHO/OSHA and DA/OSHA were merged separately with the uniqma file. The results from the two merges were concatenated, sorted by OSHA id and unduplicated to a single claim per case.

Figure 8:

Merges between OSHA and all the service files were concatenated. Variables were named and dates reconfigured so all information would be standardized across the merges. The resulting file was then sorted by OSHA id and unduplicated to a single claim per OSHA case.

Figure 1: Merge Between OSHA Cases and D&A File

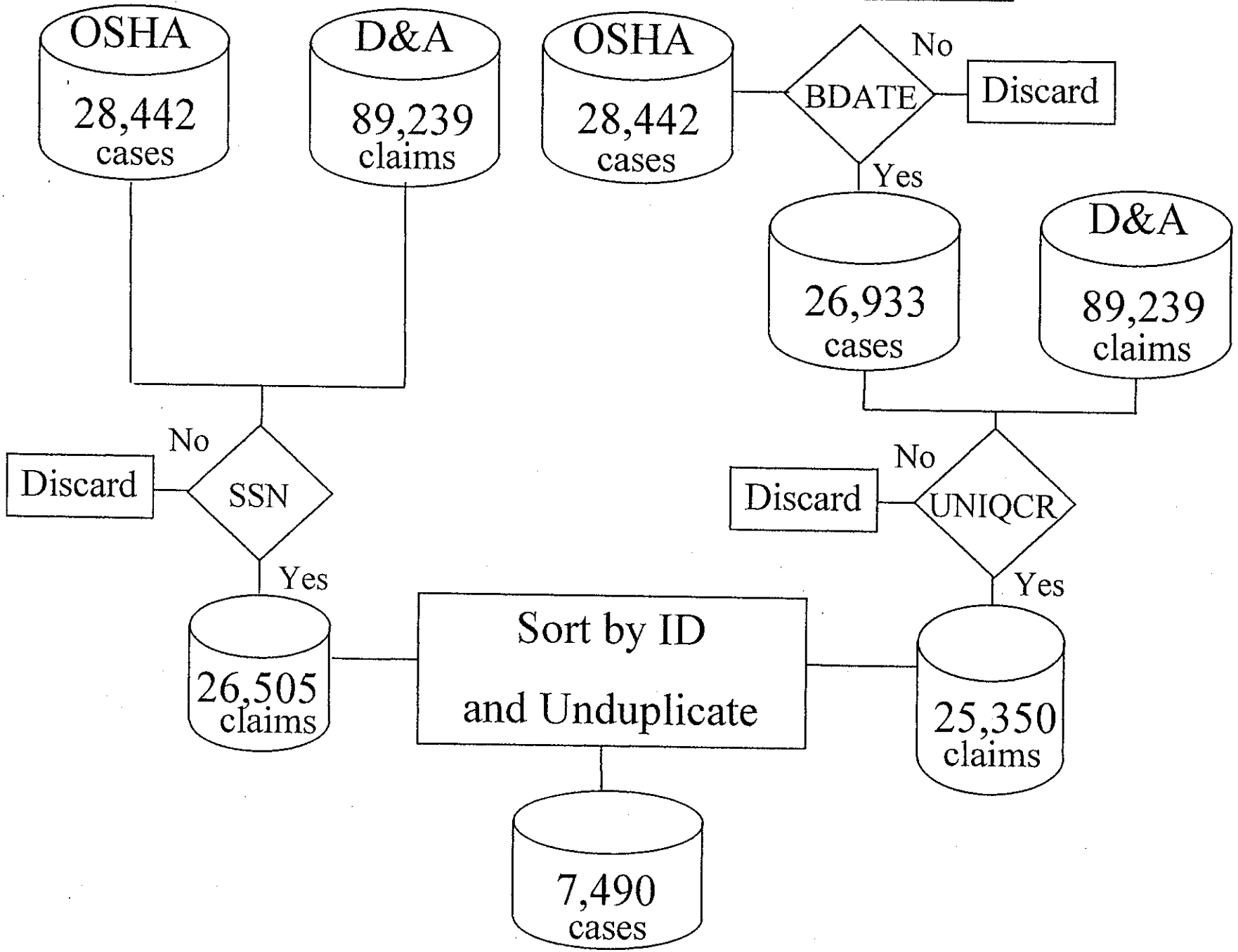


Figure 2: Correction of Invalid Birth Dates on OSHA Files

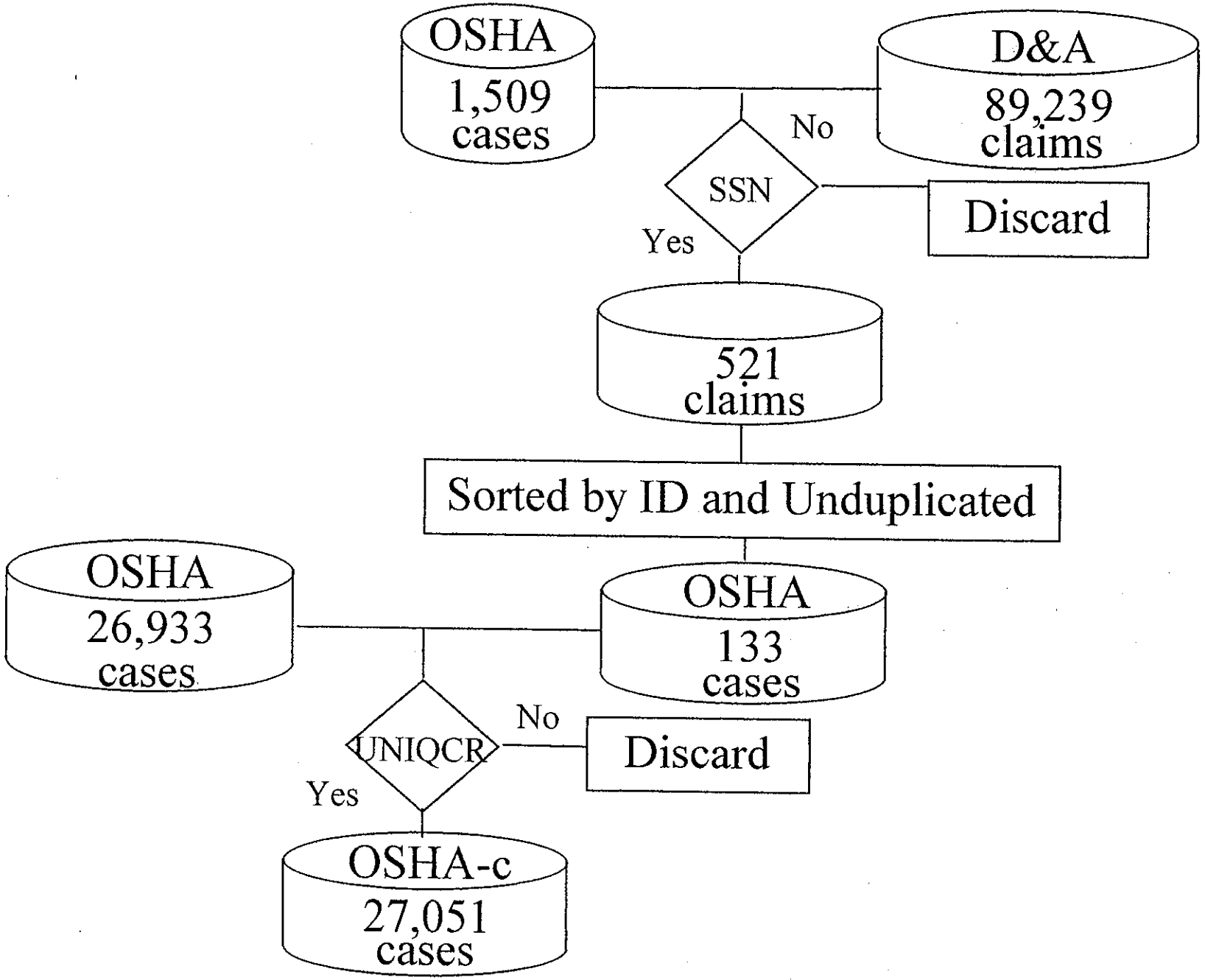


Figure 3: Merge Between OSHA Cases and CRS Claims

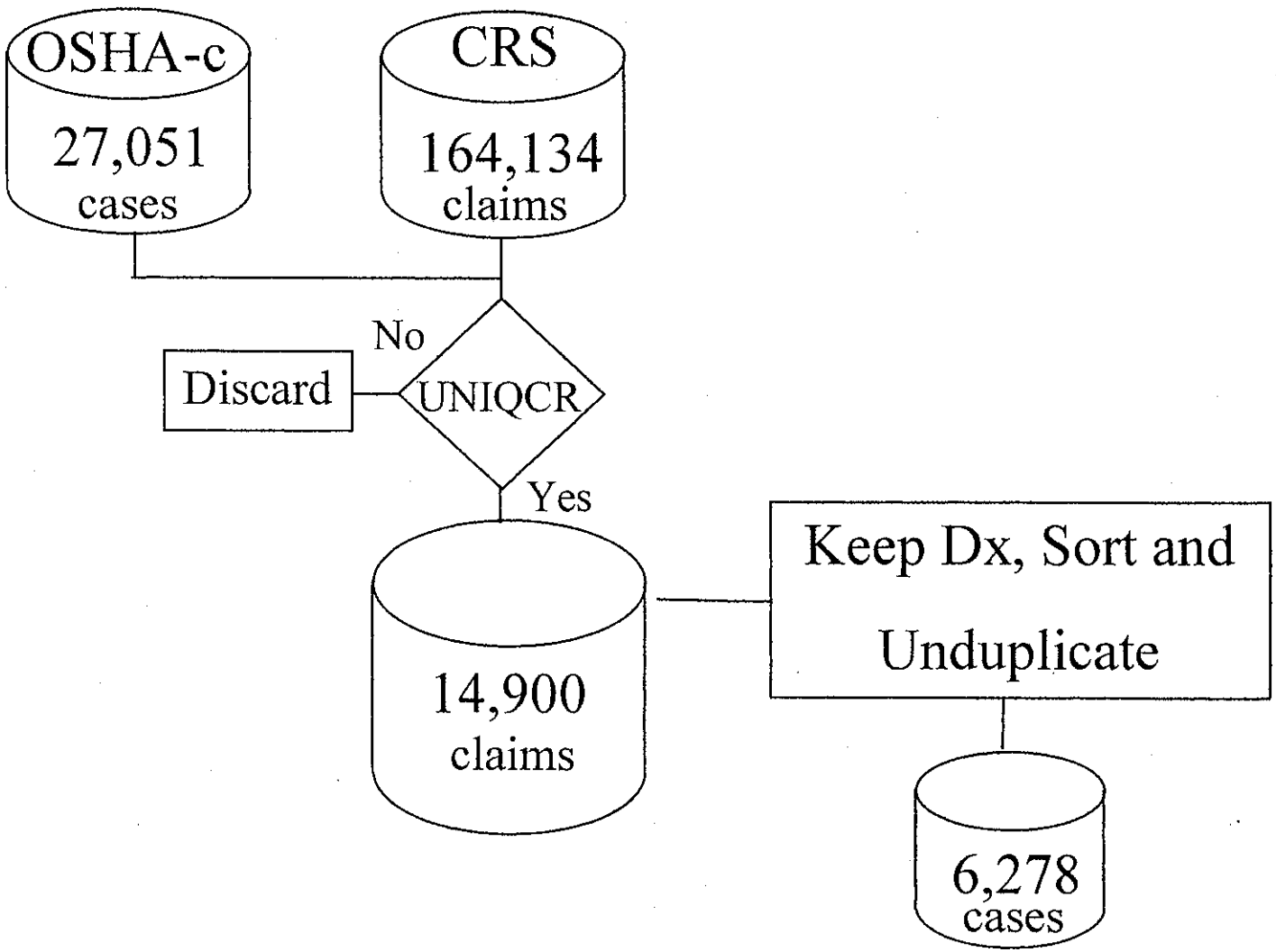


Figure 4: Merge Between OSHA Cases and the MAWHO File

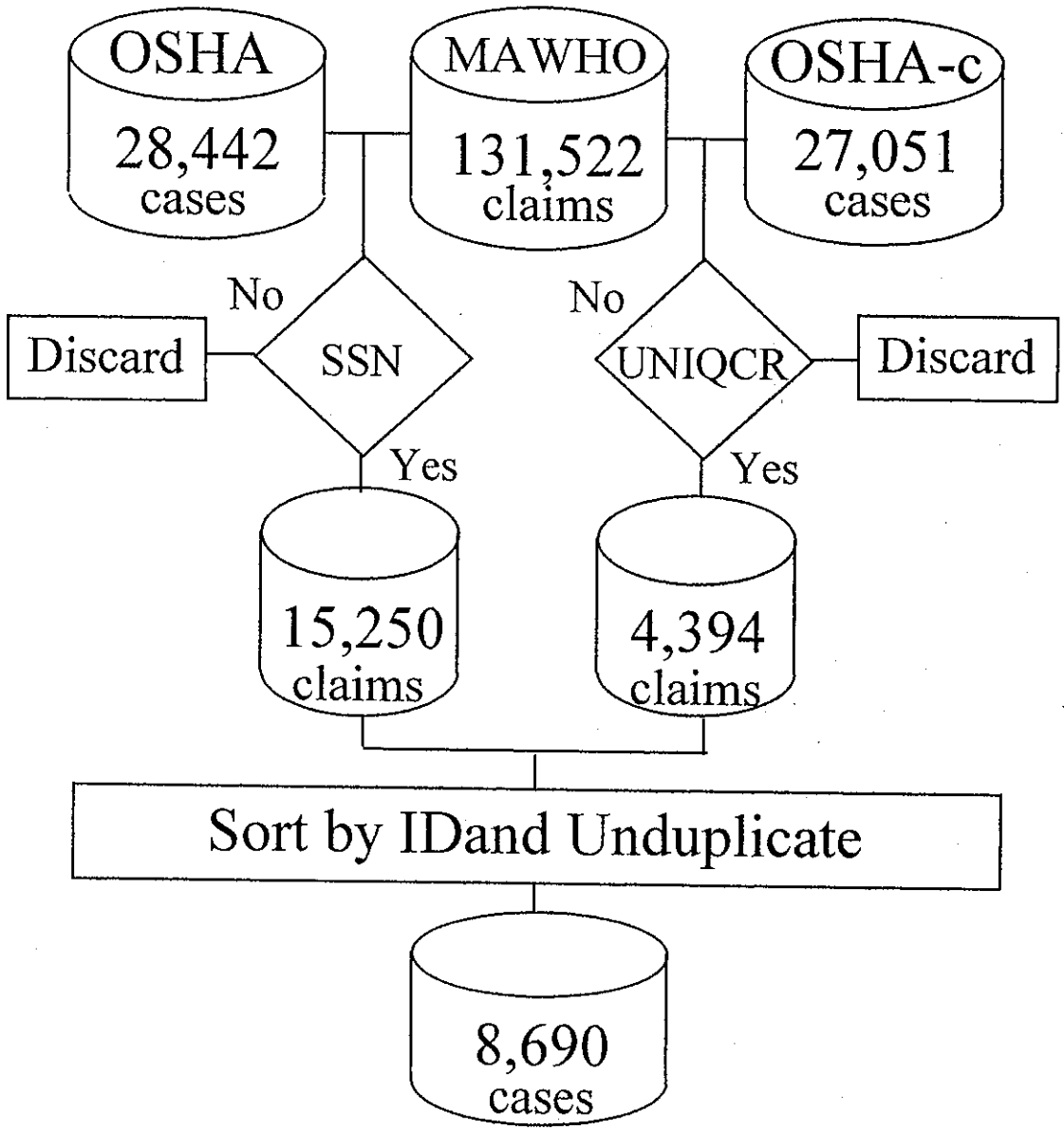


Figure 5: Merge Between OSHA Cases Found in the MAWHO File and MA Services

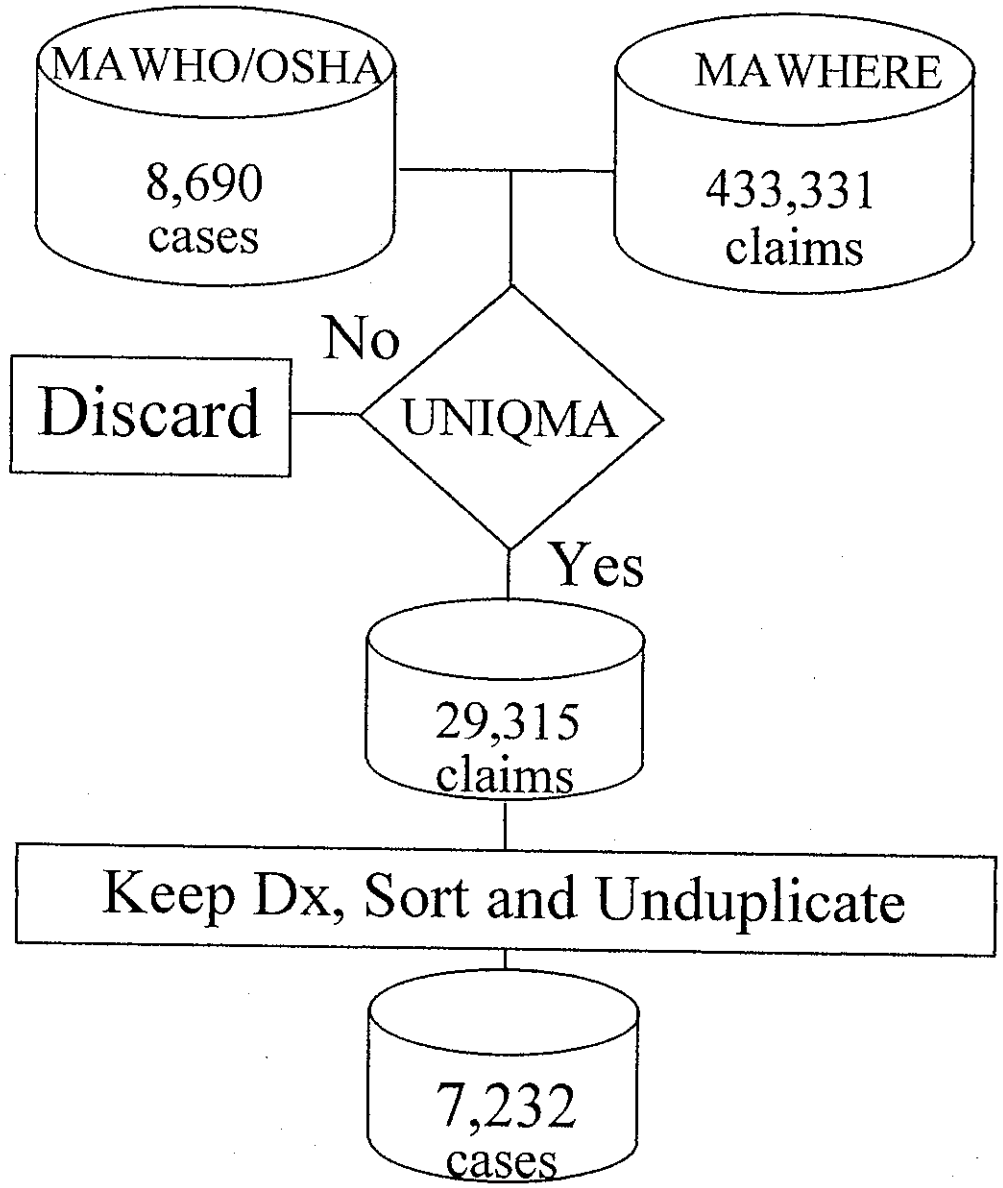


Figure 6: Merge Between OSHA and PCIS Using Multiple Identifiers

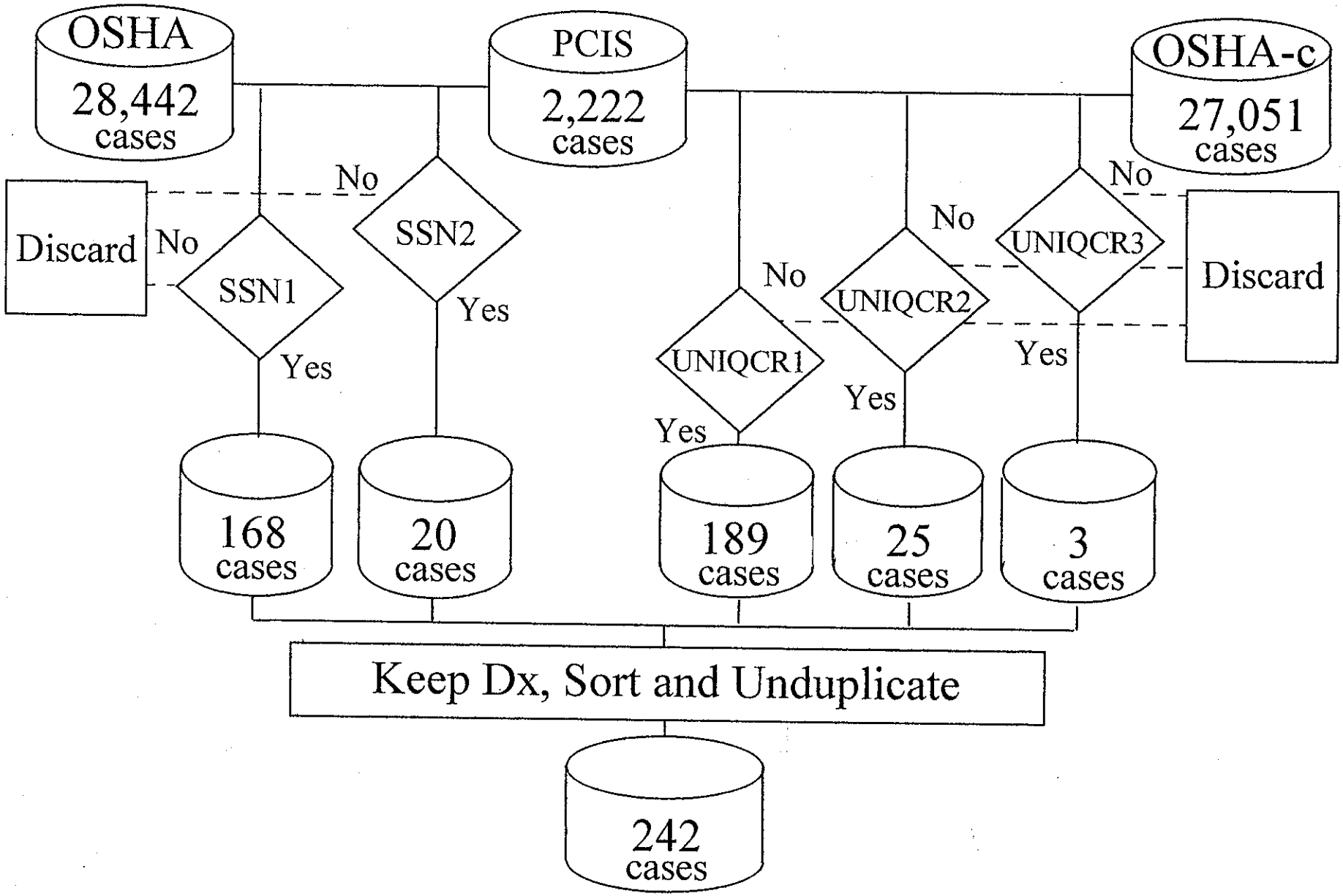


Figure 7: Merge with HealthPass Using Temporary Files Created from OSHA Merges with MAWHO and D&A

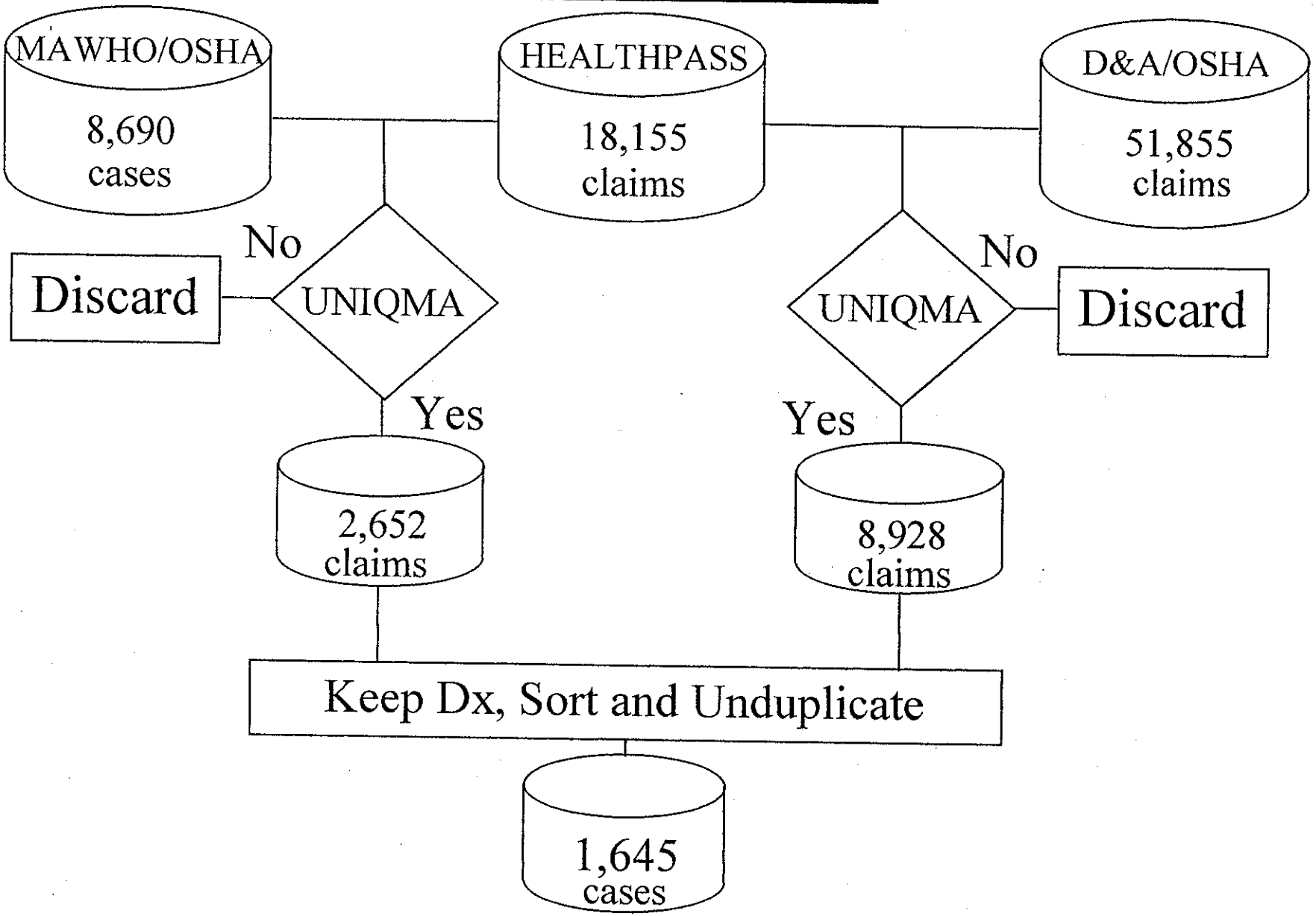


Figure 8: Merge of All Previous Merges

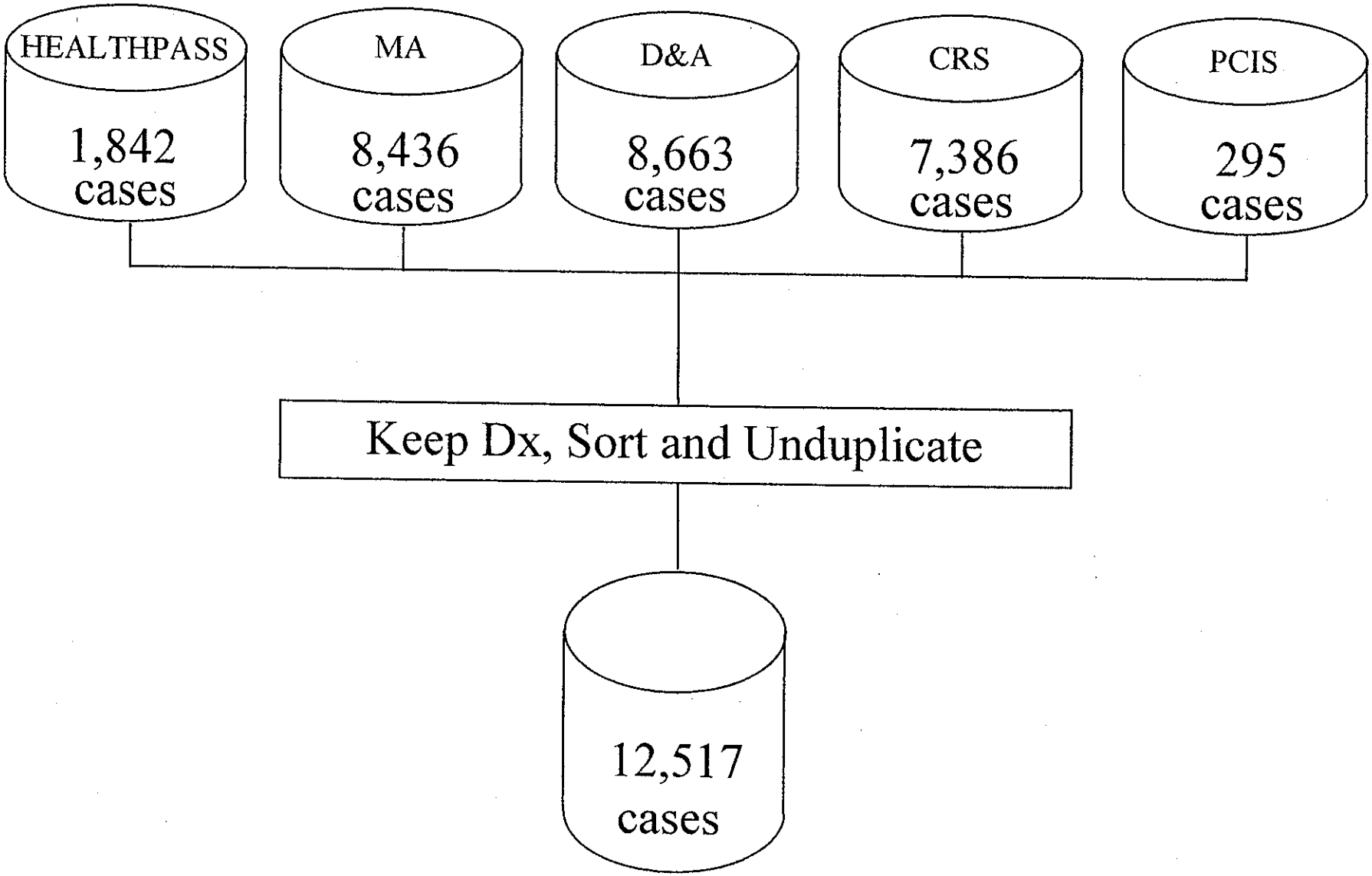
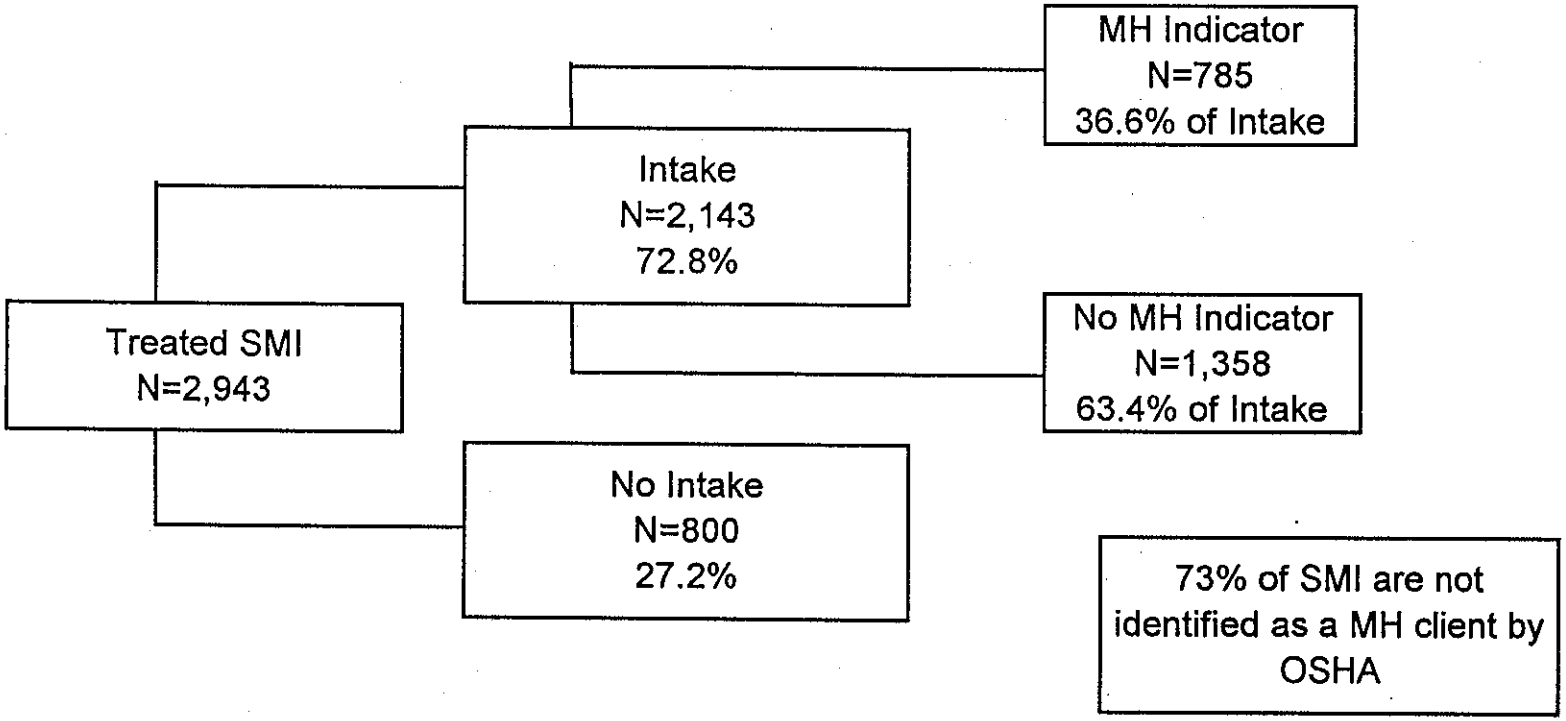


Figure 9: Intake and Serious Mental Illness Flow Chart



OSHA Intake
N=21,466

Intake for SMI	72.8%
Intake Rate for All	77.7%
Intake Rate for Non-SMI	67.0%

Figure 10: Inpatient Discharge Before/Admission After First Admission to Shelter - 120 Day Range (Origin represents shelter admission)

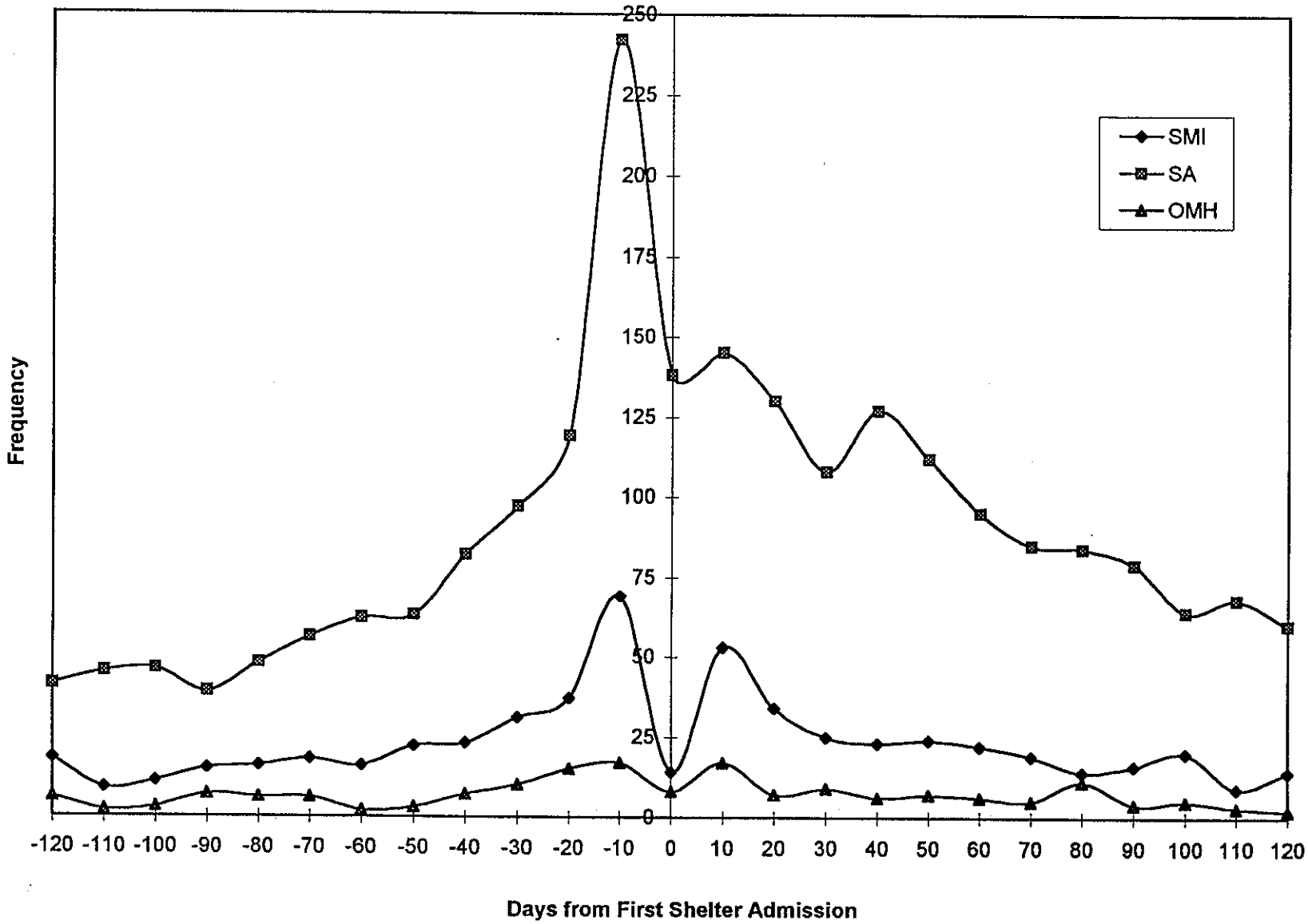


Figure 11: Emergency Services Use Before and After First Admission to Shelter - 120 Day Range (Origin represents shelter admission)