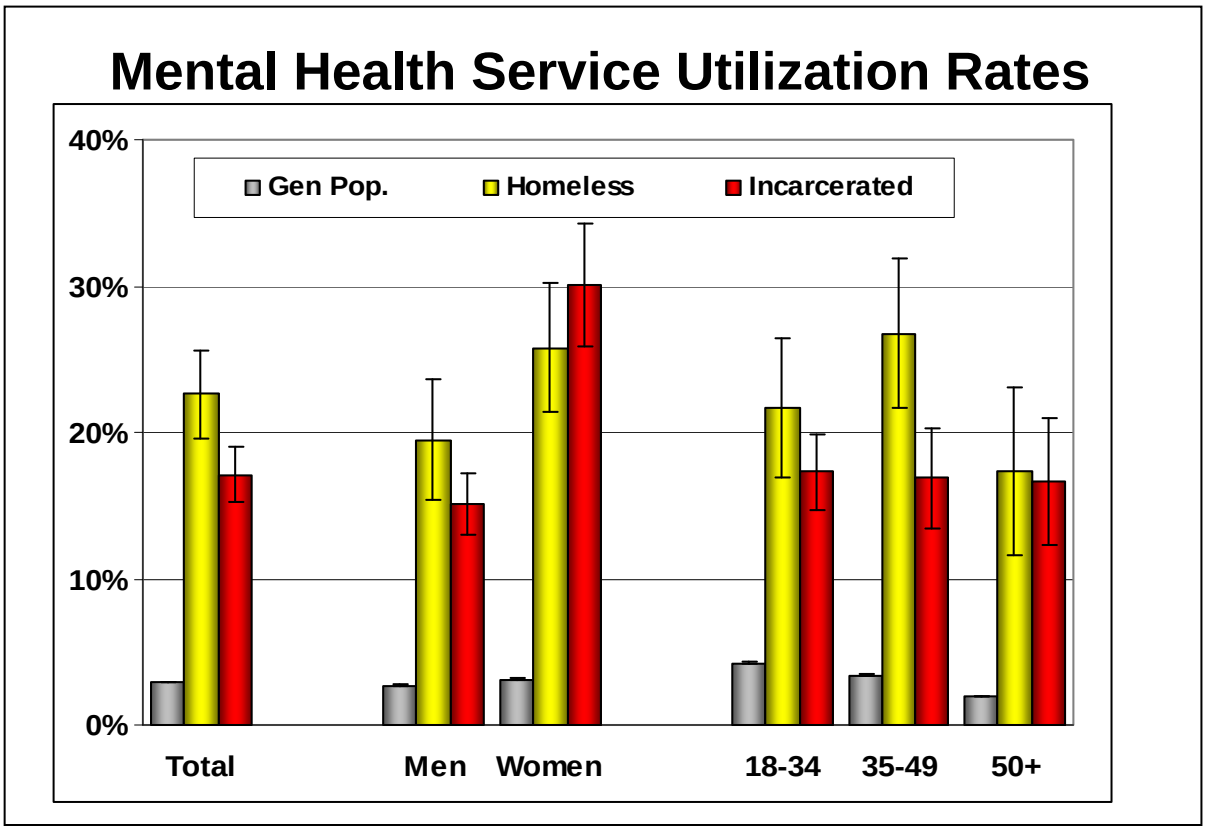
HMIS
Caseload Overlap with Adult Mental Health and Criminal Justice Caseloads in Rural Vermont CY2008



New England Regional Homeless Management Information Symposium
May 18, 2009 UMass Boston Campus Center

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Adult HMIS Caseload Overlap

with Mental Health and Criminal Justice Caseloads in Rural Vermont

CY2008
A Work in Progress

Three Data Sets

Mental Health MIS
Balance of State HMIS
Dept. of Corrections Database

16,161(±131)
Unduplicated Adults

Three Data Elements

Gender

Date of Birth

Mental Health Program

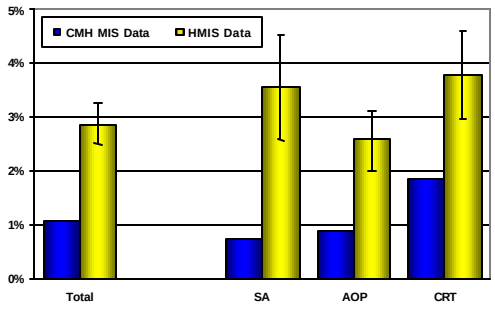
CRT Serious Mental Illness
AOP Less Serious disorders
SA Substance Abuse

WHY?
Federal Reporting Requirement

The CMHS Uniform Reporting System requires annual aggregate reporting of community mental health service recipients' living situation including:

Homeless
Incarceration

Two CMH Homeless Rates
CMH MIS and HMIS Overlap



WHY SO DIFFERENT ?

Community mental health staff are much better at collecting mental health data than they are at collecting data about living situation.

and

Staff of homeless programs are much better at collecting homeless data than they are at collecting data about mental health disorders or services.

Use the best data available

Use MH database for MH data.
Use Homeless database for Homeless data.

We live in an age of information abundance.

Data are Everywhere!

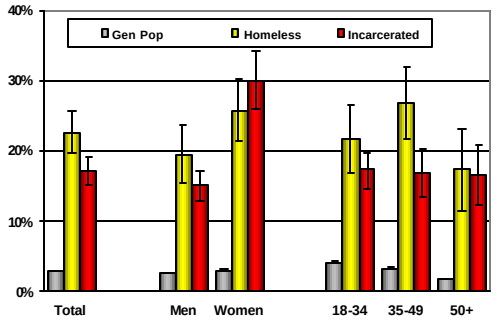
Methodologies for Cross Data Set Analysis

Direct Record Linkage

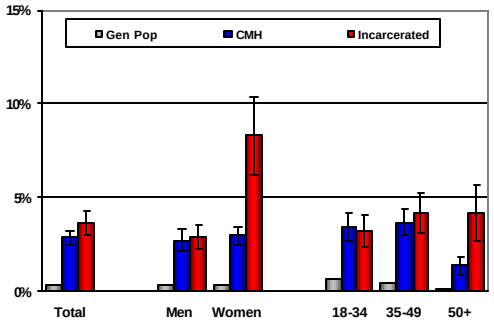
Probabilistic Record Linkage

Probabilistic Population Estimation

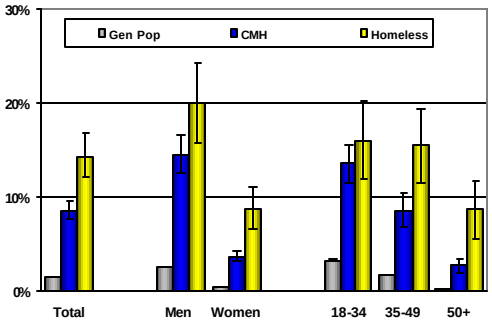
CMH Utilization
VT Total, Homeless and Incarcerated CY2008



Homelessness
VT Total, CMH and Incarcerated CY2008



Incarcerated
VT Total, CMH and Homeless CY2008



How did they do that?

Probabilistic Population Estimation

$$P_j(l_j) = \sum_{i=1}^{l_j} \frac{365}{365 - i}$$

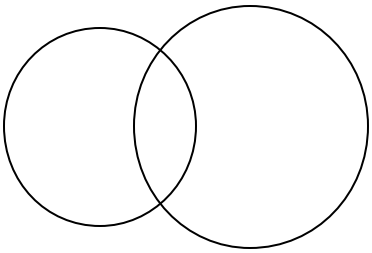
This equation counts the number of birth dates to estimate the number of unduplicated people.

Probabilistic Population Estimates

for Specified Numbers of Birth Dates Within a Given Year

Birth Dates	Number of People		
1	1.003	±	0.103
10	10.15	±	0.776
100	117	±	9
200	290	±	22
300	632	±	64
350	1,177	±	171
360	1,603	±	325

Caseload Overlap

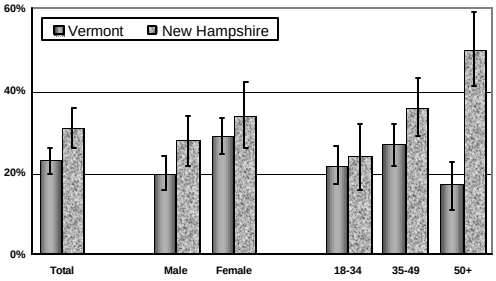


(A È B) = A + B – (A Ç B)

(Whitehead & Russell)

Cross-State Comparisons

Homeless Adults' Access to CMH Services



Next Questions

Point in Time Survey?

Health Care Utilization?
Outpatient Inpatient Emergency

Arrests & Charges?

Time and Space?

Other??

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Barbara Carroll, EdD
& Walter Ochs
Data Analysis & Reporting

Walter Ochs & Karen Danyow
Graphics & Slideshow

For More Information

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METHODOLOGICAL NOTE
PROBABILISTIC POPULATION ESTIMATION

Probabilistic Population Estimation is a statistical procedure that determines the number of people (with known confidence intervals) who are represented in data sets that do not contain unique person identifiers. Probabilistic Population Estimation uses information on the distribution of birth dates in a data set to determine the number of people represented in the data set. The number of people necessary to produce the number of birthdays observed in a single birth year cohort, for instance, would be calculated using the following formula:

$$P_j\left(l_j\right) = \sum_{i=1}^{l} \frac{365}{365-i}$$

where "P_j" is the number of people and "i" is the number of birth dates observed. Similar logic is used to determine the number of people who appear in more than one data set. The table below provides illustrative results of Probabilistic Population Estimation for populations of specified size.

Population Estimates for Specified Numbers of Birth Dates within a Year

Birth Dates	Number of People		Birth Dates	Number of People	
1	1.003	± 0.103	180	249	± 20
10	10.15	± 0.776	250	423	± 38
20	20.6	± 1.54	300	632	± 64
50	54	± 4	330	860	± 101
100	117	± 9	360	1603	± 325

POPULATION OVERLAP

In order to probabilistically determine the number of people shared across data sets that do not include a common person identifier, the sizes of three populations are determined and the results are compared. The number of people in each of the original data sets are the first two populations. The number of people in a data set that is formed by combining the two original data sets is the third data set.

The number of people who are shared by the two data sets is the difference between the sum of the numbers of people represented in the two original data sets and the number of people represented in the combined data set. This occurs because the sum of the number of people represented in the two original data sets includes a double count of every person who is represented in both data sets. The number of people represented in the combined data set does not include this duplication. The difference between these two numbers is the size of the duplication between the two original data sets, the size of the caseload overlap. In terms of mathematical set theory, the intersection of two sets is the difference between the sum of the sizes of the two sets (A+B) and the union of the two sets ($A \cup B$):

$$(A \cap B) = (A + B) - (A \cup B).$$

A video of Dr. Steven Banks explaining PPE is available for viewing at
www.thebristolobservatory.com

RELATED READINGS

Probabilistic Population Estimation

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Large data sets are powerful. Psychiatric Services, May 2003, Vol. 54 No. 5 p. 745 (Pandiani and Banks)

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Mathematical modeling of movement between residential placements: A system analytic approach to understanding systems of care. Journal of Child and Family Studies 3 (1) 41-53 1994 (Pandiani, Maynard, Schacht).

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Impact of Multi-Agency Employment Services on Employment Rates. Community Mental Health Journal 40: 333-345 August 2004 (Pandiani, Tracy, Simon, Banks)

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"Employment Services and Employment Outcomes for Adults with Serious Mental Illness" (Pandiani, Banks, Simon) in Fisher W. (Ed.) 2004 Research on Employment For Persons With Severe Mental Illness, Research in Community and Mental Health 13: 121-143. Elsevier Ltd.

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