



# Estimating Colorado Population-in- Need of Public Mental Health Services


Nancy Johnson Nagel, Ph.D.

October 3, 2002



TECHNOLOGY HAS ALLOWED US TO GET WHERE WE ARE TODAY

Where would we be without it??



**“If GM had kept up with technology like the computer industry has, we would all be driving \$25 cars that got 1,000 miles per gallon.”**


**- Bill Gates**



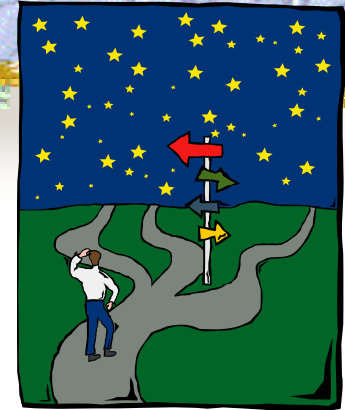
To which the car industry might say . . . .

Yes, but –

- Every time they repainted the lines on the road you would have to buy a new car
- Occasionally, your car would die on the freeway for no reason, and you would just accept this, restart, and drive on
- Macintosh would make a car that was powered by the sun, was reliable, five times as fast, twice as easy to drive, but would only run on 5% of the roads
- Occasionally, executing a maneuver would cause your car to stop and fail and you would have to re-install the engine. For some strange reason, you would accept this.

- 
- You could only have one person in the car at a time, unless you bought Car95 or CarNT. But then you would have to buy more seats
  - The oil, gas and alternator warning lights would be replaced by a single “general car default” warning light
  - New seats would force everyone to have the same size butt
  - The airbag system would say “Are you sure?” before going off

## What do we mean by “Unmet Need”?



- ❖ Having diagnosable mental illness and receiving no mental health services?
- ❖ Having SED/SMI and receiving no mental health services?
- ❖ Having diagnosable mental illness and receiving inadequate services?
- ❖ Having SED/SMI and receiving inadequate services?
- ❖ Having diagnosable mental illness and receiving no mental health services and income less than 185% FPL?



## Measuring Sectors of “Need”

	<b>Not Receiving Services</b>	<b>Receiving MH Services</b>	<b>Receiving Other Human Services</b>	<b>Receiving appropriate, effective MH services in sufficient quantity</b>
<b>Any Mental Health Diagnosis</b>	<b>Not Included</b>	<b>Included</b>	<b>Not Included</b>	<b>Not Included</b>
<b>SED/SMI Diagnosis</b>	<b>Included</b>	<b>Included</b>	<b>Included</b>	<b>Not Included</b>

# Building the Model for “Need” and “Met” in the Colorado PIN Project

## #Methodology

#Prevalence Estimation = Need

#System Usage = Met

## #Integrity

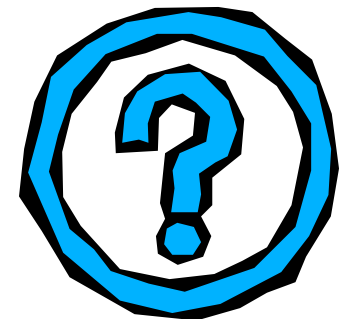
#Recognize operational limitations of model

## #Tracking

#Close monitoring of process

## #Decision points

#what sectors, what prevalences



## Steps in Indirect Estimation

### **ONE: Analysis of survey data rates for demographic cells**

**Divide survey sample from direct estimation technique (National Comorbidity Survey) into optimal set of demographic cells, defined by factors that are predictors of psychiatric disorders using multivariate analyses.**

**Model factors: AGE, SEX, RACE, MARITAL, EDUCATION, POVERTY, RESIDENCE**



## Steps in Indirect Estimation

### **TWO:** Determine cell-specific rates of disorder for each cell

Cross-tabulation of all the demographic variables with the specified diagnostic Variables produces crude rates of disorders for each of the study cells

### **THREE:** Use survey regression estimates for cells

Logistic regression was used to analyze the distribution of rates among the 480 cells defined by the study factors. Used to examine the strength and significance of demographic predictors and to generate estimates of the “true” prevalence for each of the cells.

### **FOUR:** Estimate local population structure (county and statewide) for demographic cells from census projections

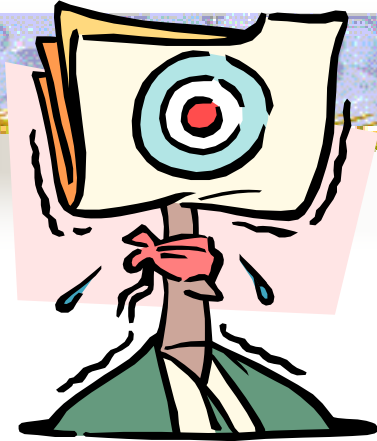
Combined four U.S. Census data sets to construct the demographic matrix.

Date sets used:

STF1a (Age x Sex x Race, Hispanic)  
STF3a (Socioeconomic Characteristics)  
Public Use Microdata Sample (PUMS) aka  
Census Long Form (5% sample)  
Census projections for age, sex, and race



## Steps in Indirect Estimation



**FIVE:** Apply rates from survey to each population cell

The smoothed risks (of disorder) from the logistic regression analysis are multiplied by the corresponding cells of the demographic matrix

**SIX:** Combine cell counts for total estimates of prevalence

**SEVEN:** Rates for aggregated demographic subgroups and for a specific area

The estimated number of cases divided by the total population in the subgroup



## Estimated Number of Unique Individuals who Use Human Services Systems in FY

### PROBABILISTIC POPULATION ESTIMATION (PPE)

Uses universal identifiers with probabilistic determination to estimate the number of unique persons in a data set

Original data set is aggregated into a data set that is aggregated into a data set that consists of gender/year-of-birth records

Total number of people represented in the complete data set and the confidence intervals are obtained by combining results of every birth year by gender cohort in the original data set

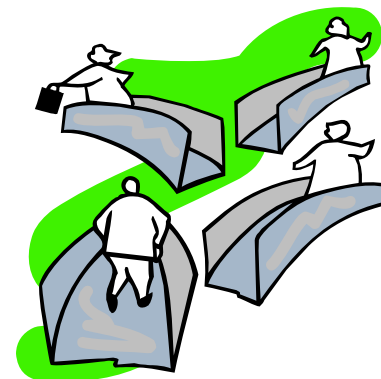
Birthdate/gender combinations have expected distributions defined by likelihood of occurrence; if a particular combination occurs in a data set with a greater frequency than would be expected in an independent, random sample of individuals, we can conclude that there is duplication in the data set.

# PPE Overview

**Integrates demographic information in database**

**Applies probability theory to approximate the number of duplicated persons in a data set to ultimately arrive at unique persons served across systems**

**With measure reflecting only that people did or did not receive any services, caution in interpretation is warranted I.e, There is no measure of effectiveness**



# Data Sources Included

## MENTAL HEALTH

Community Services, Capitated – CCAR

33,315 records

Community Services, Non-capitated – CCAR

45,831 records

Inpatient Services, Medicaid FFS

729 records

Inpatient Services, NonMedicaid

2339 records

Medicaid FFS: Community and Inpatient Services

62,900 records



# Data Sources Included

CHILD WELFARE

57,223 records

DIVISION OF YOUTH CORRECTIONS

18,786 records

EDUCATION (SIED)

7983 records

MRDD

14,256 records

ADAD

44,400 records

VA

9,823 records



# Other Sector Utilization: Under Age 21

	<b>Mental Health</b>	<b>Child Welfare</b>	<b>Youth Corrections</b>	<b>Special Education</b>	<b>DDS</b>	<b>Alcohol and Drug</b>
<b>Total Served</b>	27,987	50,260	9,632	8,447	6,588	5,229
<b>Overlap MH and sector</b>		10,372	2,344	2,855	626	720
<b># Subtracted from Need Estimate</b>	27,987	12,565	2,312	8,447	454	2,614

# Other Sector Utilization: Age 21 +

	<b>Mental Health</b>	<b>DDS</b>	<b>Alcohol and Drug</b>	<b>Veterans Administration</b>
<b>Total Served</b>	49,151	7,264	29,554	9,823
<b>Overlap MH</b>		1,258	2,958	238
<b>Number subtracted from Need</b>	49,151	508	8,866	9,823



## Colorado Estimated Persons < 300% FPL with SED/SMI Not Receiving Any Public Services

	<b>AGES &lt; 21</b>	<b>AGES 21+</b>	<b>TOTAL</b>
<b>Colorado Prevalence of SED/SMI for &lt;300%FPL (1)</b>	67,822	101,056	168,878
<b>Persons Served in the Public MH System in CO (2)</b>	27,987	49,151	77,138
<b>Estimated Persons with SED/SMI Served in Other Sectors (2)</b>	9,794	15,493	25,287
<b>Estimate of Persons with SED/SMI Not Served</b>	30,041	36,412	66,453

- (1) Synthetic Estimation Models based on NCS and ECA and applied to Colorado census data
- (2) Probabalistic Population Estimation Procedure (Banks & Pandiani, 2001) using anonymous data from:
- ✓Mental Health Services – Enrolled FY 99, Medicaid and Non-Medicaid, Inpatient and Community
  - ✓Medicaid MIS – Medicaid Fee-for-Service, Community and Inpatient with MH diagnosis
  - ✓CDHS, CYF, Child Welfare
  - ✓CDHS, CYF, Division of Youth Corrections
  - ✓CDHS, OHR, Developmental Disability Services
  - ✓CDHS, OBHH, Alcohol and Drug Abuse Division
  - ✓Special Education
  - ✓Department of Veterans' Affairs