State of Colorado

Population in Need of Mental Health Services And Public Agencies' Service Use in Colorado

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I. Introduction

The Population-in-Need project was funded by the State Legislature and designed to improve analysis of the population in need of mental health services in Colorado and to estimate select aspects of need for mental health services**.** Mental Health Services (MHS) has a history of conducting such analyses and the technology available has improved since the last needs assessment was conducted. The project utilized the new technology in: 1) estimating the number of individuals in the population with serious mental disorders (*prevalence*); and 2) estimating the number of individuals who received services from the public sector in the same year (*utilization*). The difference between *prevalence* and *utilization,* as defined here, produces estimates of persons with serious mental disability who do not receive services in any public sector, and therefore may be considered as having the greatest *unmet need* for mental health services.

The prevalence component of the project focused on the target group with serious mental disorders. The utilization component included all persons served through public mental health as well as persons served from other public sectors with serious mental disorders. Each component has been used in other States, however this is the first time they have been combined.

The goal of this study is to estimate the number of people with SED/SMI and to identify where they may already be receiving publicly funded services. The results will be utilized to inform funding of services, contracting, planning, and policy.

Prevalence. The target population was individuals with serious disorders who would qualify for public funding of services. Serious disorders were defined for children and adolescents as Serious Emotional Disturbance (SED) and for adults as Serious Mental Illness (SMI). The population of interest was limited to individuals/families under 300% of federal poverty level (FPL), since these are the people who are likely to utilize public mental health services, rather than private insurers. Appendix A presents the actual FPL's for Census 1990. Guidelines for this study were extrapolated as Census 2000 numbers were not available.

Results from national epidemiological surveys and research studies were used to generate synthetic prevalence estimates in the population of interest in accordance with federal

definitions.[1] A model to predict prevalence of SED/SMI was constructed based on these epidemiological studies, and applied to each service area. Estimates were developed for counties and demographic groups using 2000 Census population data to the extent available.

Service Utilization. The number of unique individuals served directly by the mental health system, either in community mental health centers or clinics, in Mental Health Institutes, or by Medicaid Fee-for-Service was estimated via Probabilistic Population Estimation (PPE). PPE utilizes anonymous records for individuals served to estimate the degree of overlap in various data sets. This new technology bypasses confidentiality issues by using only birth date, gender, and county.[2]

The benefit of using the new PPE technology becomes apparent when estimating the number of individuals served across mental health and other public sectors. For children and adolescents this included Child Welfare, Youth Corrections, Special Education, and Alcohol and Drug Abuse. For adults this included Developmental Disabilities Services, Alcohol and Drug Abuse, and Veterans Mental Health Administration. Estimates of prevalence of SED/SMI in these other sectors were determined via pilot studies within the state of Colorado, or through aggregation of earlier study results.

Need. A conservative measure of unmet need was obtained by subtracting the number served from prevalence estimates of individuals with serious mental disorders (SED and SMI) in the population of interest. It must be stressed that this study addresses only certain aspects of need for mental health services. The *need* labeled as "unmet" in this study represents the lower bound of unmet need, i.e., persons with SED/SMI who are not receiving any public system services. The other end of the continuum of *need* in the public mental health system might be the number of people with SED/SMI who are not receiving effective (or any) services specifically targeted towards mental health treatment. The meaning and implications of number with *unmet needs* depends on the operational definition.

Use of Findings

Findings may be used for:

- Mental health planning. They may be used to help target needed services for individuals in service areas and subpopulations (age, sex, and race/ethnicity).

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[1] Federal definitions are discussed in Appendix C. Dr. Charles Holzer, University of Texas Medical Branch was the epidemiologist generating estimates for the project. Some of his work may be seen at http://129.109.4.19/estimation/estimation.htm.

[2] Probabilistic Population Estimation. Pandiani, John, Ph.D. and Banks, Steve, Ph.D. Bristol Associates. The technology for estimating service utilization across multiple organizations has been used in several states and is documented in the literature.

- Interagency coordination. Findings show overlap in service utilization between mental health and other public sectors.
- Advocacy for individuals with serious mental health disorders who are not served.
- Policy discussion.

Findings should be integrated with other knowledge from stakeholders to inform interpretation and decision-making.

Report Overview and Organization

Following this Section I introduction, Section II describes the model for estimating unmet need. The model is very simple, subtracting the number of individuals receiving services from estimates of the prevalence of serious mental disorder. Major decision points affecting the final estimates of unmet need were reviewed.

Section III provides an overview of Colorado demographics. Demographics provide the basis for generating prevalence estimates. Appendix B outlines the steps used to create the demographic data needed to develop the prevalence estimates. This Section hones in on the population of interest defined as individuals in families under 300% of FPL.

Section IV presents the estimates of the prevalence of persons with serious mental disorders (SED/SMI) in the population of interest. To supplement this Section, Appendix C has background topics related to prevalence estimates.

Section V covers services provided by the mental health sector. It presents the number of consumers served by the Colorado public mental health sector, which was defined to include services funded through: a) the Mental Health Services (MHS), b) Medicaid Mental Health Managed Care, and c) Medicaid Fee-For-Service.

Section VI broadens the review of service utilization to include other public sectors in addition to mental health programs. The individuals served were unduplicated and counted across files. This step will further the understanding of the broader public sector systems serving individuals with SMI or SED.

Section VII presents estimates of unmet need. Section VIII provides another use of the findings, the final discussion and recommendations.

II. The Model for Estimating Need

The model for estimating need in this study is conceptually very simple. Unmet need is obtained by subtracting the number of individuals **utilizing** services from the **prevalence** of serious disorder. This may be expressed in the formula:

Prevalence minus **Utilization** equals **Need**

Despite the conceptual simplicity, there are a number of decision points affecting the ultimate outcome. There is no single model that meets the needs of all states and it is important that these decisions reflect the intent of the project. The intent of this Section is to explicate some of the basic decision points affecting the outcome of the model.

This project was not unusual in selecting as the target population of children and adolescents with serious emotional disturbance and adults with serious mental illness, and in utilizing federal guidelines as much as possible in defining these target groups. The project was also not unusual in employing an epidemiologist to make synthetic estimates of the prevalence of individuals in these target populations. The technology in this area continues to be refined resulting in more accurate estimates being made at a reasonable cost. The alternative that would result in the most accurate estimates would entail conducting an expensive epidemiological survey.

This project was unusual in emphasizing service utilization beyond mental health to include other public sectors. Employment of this strategy depends on a broad public service focus of administrators: reaching out beyond traditional administrative silos. There are many barriers to taking this broad view including confidentiality and inter-system cooperation. While other states have done this, technology bypassing confidentiality issues is still rather rare.

The project was unique in employing what can be considered the best alternatives given the resources available for both estimating prevalence rates and estimating service utilization and combining them to estimate need. The result was a relatively conservative estimate of unmet need in the population of interest.

Decision points affecting resulting unmet need are discussed separately for prevalence estimates and service utilization.

Prevalence Estimates

The target population was persons with serious emotional disturbance (SED) and persons with serious mental illness (SMI). The population of interest was individuals in families under 300% of the federal poverty guideline, including households, institutional and group quarters. Some explanation is in order for these selections.

Target Population. The target population was persons with serious emotional disturbance (SED) and persons with serious mental illness (SMI). This was in keeping with federal guidelines. While it is certain that additional individuals need mental health services (i.e., those with acute problems), individuals with serious disorders were considered a relatively conservative focus.

Institutions. The Census separates households from institutions, and group quarters. Major institutions are nursing homes, prisons, and hospitals. Major group quarters are college dormitories, homeless shelters, and military quarters. (Institutions and group quarters are all referred to as institutions in this report.)

The utility of including the institutional population with the household population is related to the likelihood that persons within the institutional or group quarter settings will seek services within the public mental health sector, versus having services provided to them by the institution or group setting. The project was explicitly designed to include individuals served in institutions, as the need for services for these individuals may be greater.

Income. Having included the institutional population, arguments could be made to include the entire household population, or to choose a poverty level cutoff for the household population. A key factor is the responsibility of the public mental health system. The specified mission is helping individuals who cannot afford to pay, and offering services on a sliding fee scale. Therefore, a cutoff was selected of less than 300% above the FPL. However, many people above this level do not have insurance, and when they do their coverage does not have an adequate behavioral health benefit for individuals with serious mental disabilities.

Prevalence Estimates. Data from two major national studies, the National Comorbidity Survey (NCS) and the Epidemiological Catchment Area (ECA), were used to estimate the prevalence of adults with SMI. The NCS, a nationally representative sample household survey conducted in 1990–91, assessed the prevalence of DSM–IV–R disorders in persons aged 15–54 years old. This sample included more than 1,000 census tracts from 174 counties in 34 states. The ECA, a general population survey of five local areas in the U.S., was conducted in 1980–85 to determine the prevalence of DSM III disorders in persons age 18 and older. As the NCS does not have data on persons age 55 and older, the ECA data are used to estimate the prevalence of serious mental illness among persons 55 years and older.

Results from the NCS were used in combination with expert opinion for estimates for children and adolescents.

While the synthetic prevalence estimates are the most cost-effective technology available they have limitations and caution is in order in using estimates. Any survey conducted in a different time and place may not accurately reflect what is happening in Colorado. There may be economic or social changes, or even local cultural issues which affect the presence of the disorders being estimated.

Service Utilization

Many issues underlie the determination of who to count as receiving services, i.e., having some need met. This study quantified the number of unique individuals who received services in any public sector during the year. The intent of the study was to identify the population clearly in need of mental health services. Thus if an individual was receiving services in any public sector, they were considered to have already gained access to the system. The most immediate target for services, therefore, is the population with serious mental disorders who are not receiving any services.

The questions arise, then, of which sector databases to include, and in what proportion.

Who to Count. In the mental health sector, service utilization included anyone served by programs operated or contracted by Mental Health Services and Medicaid managed care and Fee-for-Service programs. The other sectors were selected because they are services that provide some mental health treatment along with their core services, and are publicly funded. Unfortunately, data from Department of Corrections was unavailable. It is not clear the impact that the inclusion of these data would have. While there is an estimated 14% of prisoners who have a serious mental illness, most receive minimal treatment.

By limiting the model to those persons living under 300% Federal Poverty guidelines, we virtually eliminate the need for consideration of the private sector, as few at these income levels have private insurance. The model was conservative in calculating need, decreasing the overall estimated need by the number of unique individuals with serious mental illness receiving services in any public sector.

Prevalence in Other Sectors. The current model was constructed from databases from disparate data systems in the various agencies. All files contained date of birth, gender, and county of residence for each individual served. The data sets ranged from those individuals who actually received a mental health service during the year (Veterans' Affairs) to all clients served in that arm during the year (Child Welfare, Youth Corrections, Alcohol and Drug, and DDS). The Education dataset contained everyone in the school system who has been identified as having a Significant Identifiable Emotional Disability.

In an attempt to accurately represent the contributions of these other systems to reducing need for mental health services, i.e., estimating the number of people in the study population who have gained access to services in another sectors, estimates were made of prevalence of SED/SMI in each sector.

The estimates of prevalence were based on available research, either in the literature or performed locally. When making a judgment about prevalence, the tendency was always in the interest of conservatism; i.e., higher number of persons getting services, and therefore lower need.

For individuals under age 21 the following estimates were used for individuals served with serious disorders:

Youth Corrections	24%
Child Welfare	25%

Alcohol and Drug	50%
Special Education	100%

The prevalence estimate for Youth Corrections was based on a Colorado DYC study directly assessing SED in the Youth Corrections population. The rate for Child Welfare was estimated to be 20-30%, near that of DYC. The rate of co-occurring SED/substance use is known to be even greater in the ADAD population. Since the data from Education included only those with an identified emotional disorder, all were counted.

For individuals ages 21 and over, these estimates were made:

DDS	7%
Alcohol and Drug	30%
Veterans Administration	100%

The prevalence of SMI in DDS does not differ greatly from that in the general population, while the rate in ADAD is significantly greater. All people in the VA data set were included in the prevalence estimate since the file contained only those who had received mental health services.

These figures can be easily modified in the model, both at the county and statewide level, as estimates are refined.

III. Colorado Demographics

Population data serve as a foundation of the project and were used to calculate the prevalence estimates reported in the next Section. The population data presented in this report reflect Census 2000 demographic data. While the data reported are from Census 2000, the underpinnings of the project actually reside in 1990 Census data because the census data level of detail needed were not yet available for 2000.

The development of the demographic foundation will be explained first. The Section presents 2000 Census general population data for the State and service areas. The Section finishes by narrowing the population to a more targeted population of interest who would qualify for public funding of services.

Demographic Base

Very detailed demographic data were needed to develop the demographic matrices used to generate the synthetic estimates of need reported in the next Section. There was a need for individual level demographic data only available from the decennial census long form. The most recent census long form data available were from the 1990 U. S. Census of Population and Housing.

Examples of the additional demographic data utilized from the 1990 Census included poverty level, living situation, and marital status. These are variables we know to be related to prevalence of serious mental disorder. In all, some 8,100 cells were generated as the basic demographic matrix for the project. The matrix was generated from the Public Use Microsample or PUMS data from Census Summary Tape File 3. Recognizing that the detailed long form data represent a 5% sample, the matrix was adjusted to reflect 1990 Census tables generated from the 100% Census (Summary Tape Files 1 and 2).

The matrix was adjusted to reflect Census 2000 data released to date (Summary File 1). The electronic file (Summary File 1) includes statistical data on the following population items: sex, age, race, Hispanic or Latino origin, household relationship, and household and family characteristics. Please refer to Appendix B for more information about the model.

Data for all prevalence estimates were generated at the county level and aggregated to service areas and the state. While detailed demographic data were generated, this report shows only data for service areas and age groups.

2000 Census Population

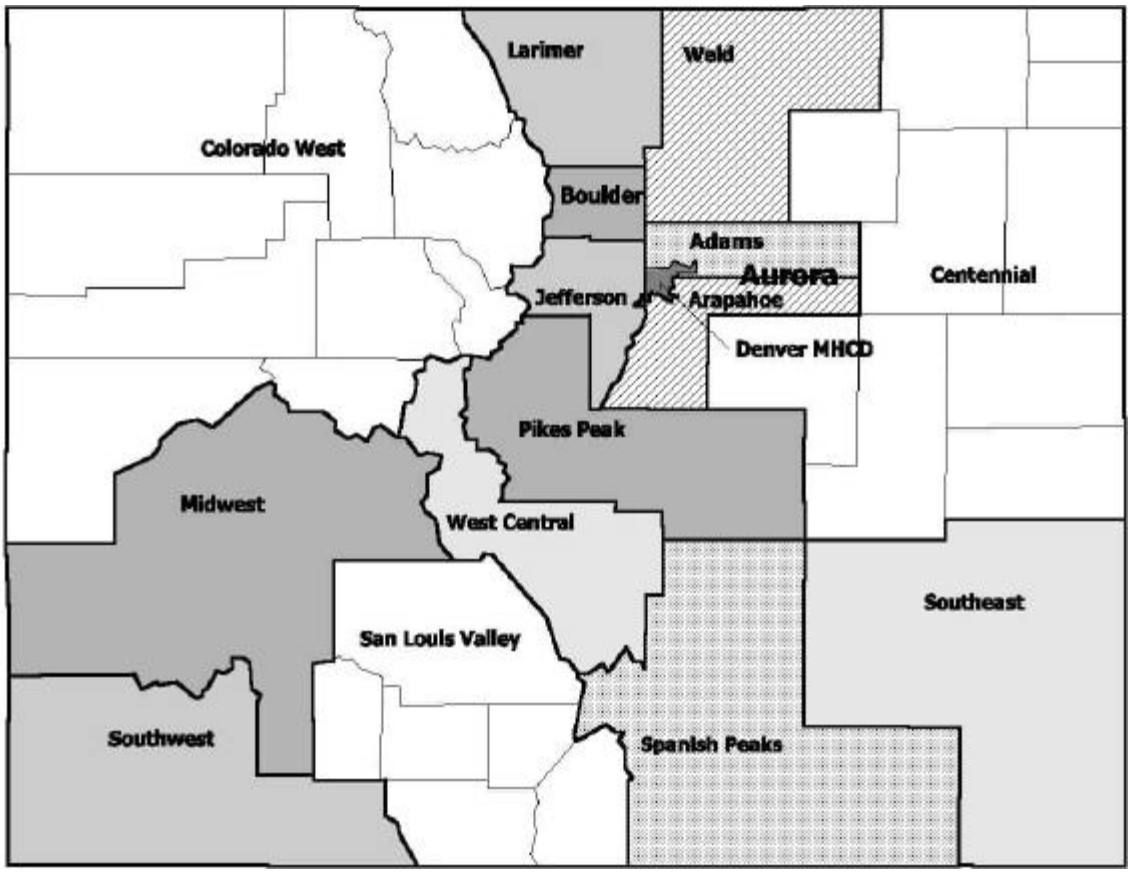
The State is divided into 17 geographic regions for the community mental health system (see map on the following page). Table 1 provides summary population counts for each service area by age group. More detailed counts by education, gender, marital status, poverty, race/ethnicity, and residence are available on our website (http://129.109.4.19/estimation/estimation.htm)

Table 1. Population of Service Areas by Age Group

	Age Group						
MH Service Area	**0-11**	**12-17**	**18-20**	**21-64**	**65+**	Total	*% Grand Total*
Adams	62,617	28,634	13,733	192,793	25,831	323,608	*7.5%*
Arapahoe/D.	81,948	40,380	12,034	261,960	31,267	427,589	*9.9%*
Aurora MHC	52,213	23,995	11,162	168,488	20,535	276,393	*6.4%*
Boulder	44,213	22,624	17,512	184,269	22,670	291,288	*6.8%*
Centiennial	18,790	10,680	4,190	58,124	14,086	105,870	*2.5%*
Colorado West	45,512	24,695	11,966	182,249	28,582	293,004	*6.8%*
Denver	85,387	36,379	21,883	348,561	62,426	554,636	*12.9%*
Jefferson	87,844	48,751	19,335	333,451	51,754	541,135	*12.6%*
Larimer	38,832	20,923	15,908	151,794	24,037	251,494	*5.8%*
Midwestern	12,912	7,375	3,636	50,118	12,307	86,348	*2.0%*
North Range	34,163	16,870	11,566	102,097	16,240	180,936	*4.2%*
Pikes Peak	100,913	50,307	25,073	328,328	47,386	552,007	*12.8%*
San Luis V.	8,263	4,764	2,468	24,774	5,921	46,190	*1.1%*
Southeast	8,653	5,139	2,289	28,344	8,024	52,449	*1.2%*
Southwest	12,128	7,418	3,991	47,574	8,960	80,071	*1.9%*
Spanish Peaks	27,127	14,753	7,056	90,079	25,526	164,541	*3.8%*
West Central	9,892	5,701	2,352	45,236	10,521	73,702	*1.7%*
Total	731,407	369,388	186,154	2,598,239	416,073	4,301,261	*100.0%*
	17%	*9%*	*4%*	*60%*	*10%*	*100%*	

Three service areas each had over 12% of the population of the State: Denver, Pikes Peak, and Jefferson. Together they accounted for 36% of the total population. Adding in Arapahoe/Douglas, almost one-half of the population lives in 4 Service Areas located in the central front range of the State.

Map: 17 Mental Health Service Areas



Population of Interest

The population was narrowed to individuals who would financially qualify for public support of services. Providers of services operate on a sliding fee scale such that the greater the income of the family, the less public financial support for services. Individuals in families above 300% of federal poverty guidelines would pay entirely for their services. Individuals in families immediately below that cutoff would pay for most of the cost but would get some financial support. Individuals with lower incomes might receive full financial support for services.

The population of interest included individuals in institutions and group quarters as well as individuals in family households. Institutions and group quarters were included due to the effort to collect service utilization data not only in the mental health sector but other public sectors as well. Examples of institutions (listed in order of size in the population)

were nursing homes, prisons, and state mental hospitals. Group quarters included college dormitories, homeless shelters, and military quarters.

Table 2 shows the total population of the State along with the population of interest. Focusing on the population of interest increased the proportion of children and decreased the proportion of adults. Grossly, 30% of the total population was under age 21, 60% ages 21-64, and 10% ages 65 and over. This compares with the population of interest proportions of 37%, 52%, and 11% respectively.

Table 2. Total Population and Study Population (<300% Poverty)

Ages	Total	%	<300% Poverty	%
00-11	731,407	17%	453,557	22%
12-17	369,388	9%	188,041	9%
18-20	186,154	4%	118,604	6%
21-54	2,598,239	60%	1,091,704	52%
65+	416,073	10%	228,834	11%
Total	4,301,261	100%	2,080,740	100%

Table 3 provides the count of persons <300% FPL by age group, for each service area.

Table 3. Study Population by Service Area and Age Group

	Ages						
MH Service Area	**0-11**	**12-17**	**18-20**	**21-64**	**65+**	Grand Total	*% Grand Total*
Adams	40,762	15,005	7,411	82,278	15,700	161,156	*7.7%*
Arapahoe/D.	32,366	12,346	4,526	66,982	12,836	129,056	*6.2%*
Aurora MHC	31,137	11,085	6,245	62,090	8,712	119,269	*5.7%*
Boulder	21,026	9,712	12,669	65,690	10,542	119,639	*5.7%*
Centennial	13,941	6,982	2,920	30,952	9,091	63,886	*3.1%*
Colorado West	30,988	13,068	7,540	84,428	17,845	153,869	*7.4%*
Denver	63,826	25,125	16,230	173,236	35,346	313,763	*15.1%*
Jefferson	42,429	17,265	8,015	94,835	23,938	186,482	*9.0%*
Larimer	22,752	9,672	12,186	65,331	13,183	123,124	*5.9%*
Midwestern	9,913	4,606	2,563	27,366	8,286	52,734	*2.5%*
North Range	24,909	10,283	8,799	51,649	10,773	106,413	*5.1%*
Pikes Peak	65,480	26,145	16,430	142,505	22,457	273,017	*13.1%*
San Luis V.	7,231	3,639	1,933	16,683	4,243	33,729	*1.6%*
Southeast	7,297	4,006	1,834	18,442	5,610	37,189	*1.8%*
Southwest	9,481	4,825	2,909	26,478	6,035	49,728	*2.4%*
Spanish Peaks	21,919	10,537	4,771	53,789	16,688	107,704	*5.2%*
West Central	8,089	3,733	1,622	28,975	7,546	49,965	*2.4%*
Grand Total	453,557	188,041	118,604	1,091,704	228,834	2,080,740	*100.0%*
% Grand Total	*22%*	*9%*	*6%*	*52%*	*11%*	*100%*	

Institution Population by Poverty Level

The proportion of individuals in institutions and group quarters statewide was relatively small at 2.3%. These individuals were evenly divided between institutions (47%) and group quarters (53%). Individuals living in institutions and group quarters comprised 5% of the population in <300% FPL.

Individuals in institutions and group quarters are of some note because the prevalence rates are higher for individuals in institutions than households. The proportion of these individuals in service areas ranged from .7% (Arapahoe/Douglas) to 10.7% (West Central). Note that West Central is home to a federal prison.

Table 4. All Individuals Living in Institutions and Group Quarters

MH Service Area	Individuals	% of Service Area
Adams (not Aurora)	3,058	.9%
Arapahoe/Douglas	3,020	.7%
Aurora MHC	3,520	1.3%
Boulder	10,378	3.6%
Centennial	1,694	1.6%
Colorado West	4,906	1.7%
Denver	12,309	2.2%
Jefferson	8,788	1.6%
Larimer	8,628	3.4%
North Range	5,454	3.0%
Midwestern	2,356	2.7%
Pikes Peak	18,197	3.3%
San Luis Valley	1,317	2.9%
Southeast	2,544	4.9%
Southwest	2,183	2.7%
Spanish Peaks	3,944	2.4%
West Central	7,853	10.7%
Total	100,149	

IV. Estimates of Persons with Serious Mental Disorder

This Section presents estimates of children and adolescents with serious emotional disturbance (SED) and adults with serious mental illness (SMI). Appendix C covers several background topics related to prevalence estimates, including: 1) an overview of the estimation of prevalence; 2) the National Comorbidity Study and Estimated Prevalence; 3) estimation procedures for adults aged 18-54; 4) estimation procedures for older adults; 5) estimation procedures for children and adolescents; and 6) estimation procedures for institutions and group quarters.

Definitions

The definitions of serious mental illness and serious emotional disability published by the Center for Mental Health Services (CMHS) in the Federal Register are as follows.

Serious Mental Illness (SMI)

> "…, adults with a serious mental illness are persons 18 years and older who, at any time during a given year, had a diagnosable mental, behavioral, or emotional disorder that met the criteria of DSM-III-R and … that has resulted in functional impairment which substantially interferes with or limits one or more major life activities.…"
>
> The definition states that "adults who would have met functional impairment criteria during the referenced year without the benefit of treatment or other support services are considered to have serious mental illnesses….DSM-III-R 'V' codes, substance use disorders, and developmental disorders are excluded from this definition…."
>
> DEPARTMENT OF HEALTH AND HUMAN SERVICES
> Substance Abuse and Mental Health Services Administration
> Estimation Methodology for Adults With Serious Mental Illness (SMI)
> AGENCY: Center for Mental Health Services, Substance Abuse and Mental Health Services Administration, HHS.
> *Federal Register: June 24, 1999 (Volume 64, Number 121). Pages 33890-33897*
> *Online via GPO Access [wais.access.gpo.gov][DOCID: fr24jn99-67]*

Serious Emotional Disability (SED)

> The CMHS definition is that children with "serious emotional disturbance" are persons:
>
> 1. From birth up to age 18

2. Who currently or at any time during the past year have had a diagnosable mental, behavioral, or emotional disorder of sufficient duration to meet diagnostic criteria specified within DSM- III-R

3. That resulted in functional impairment, which substantially interferes with or limits the child's role or functioning in family, school, or community activities (p.29425).

The definition goes on to indicate that "these disorders include any mental disorder (including those of biological etiology) listed in DSM-III-R or their ICD-9-CM equivalent (and subsequent revisions) with the exception of DSM-III-R `V' codes, substance use, and developmental disorders, which are excluded, unless they co-occur with another diagnosable serious emotional disturbance…." (p. 29425).

"Functional impairment is defined as difficulties that substantially interfere with or limit a child or adolescent from achieving or maintaining one or more developmentally-appropriate social, behavioral, cognitive, communicative, or adaptive skills. Functional impairments of episodic, recurrent, and continuous duration are included unless they are temporary and expected responses to stressful events in their environment. Children who would have met functional impairment criteria during the referenced year without the benefit of treatment or other support services are included in this definition…." (p. 29425).

Federal Register: Volume 58, Number 96. Pages 29422-29425.

Estimation Tables

Estimates were made for children and adolescents with SED and adults with SMI. Model constructions were based on the NCS for adults and the ECA survey for the elderly. Both studies were used in combination with other research and expert opinion for estimates for children and adolescents. The methodology and many estimation tables may be found at (http://129.109.4.19/estimation/wiche2k/wiche2k.htm).

Estimation tables were developed for counties and aggregated to service areas and the State. Tables were broken down by socio-demographic groups of age, gender, race/ethnicity, poverty level, and residence type. The table on the following page presents estimates of individuals with SED/SMI by service area and age group. Appendix D shows prevalence estimates for the entire Colorado population, the household population, and the household population less than 300% poverty.

Children, youth, and adults were reflected in the same proportions in the State population and the prevalence estimates for the study population. Prevalence rates for ages 18-20 were slightly greater than the proportion of the State population (9% to 6%). Ages 65+ showed slightly lower prevalence. (11% of State population vs. 8% prevalence).

Table 5. Prevalence of Persons with SED/SMI (<300% FPL)

Age Group

Service Area	**0-11**	**12-17**	**18-20**	**21-64**	**65+**	**Total**	*% Total*
Adams	3,323	1,195	804	6,694	842	12,858	*7.6%*
Arapahoe/D.	2,582	989	541	5,149	746	10,007	*5.9%*
Aurora MHC	2,502	905	707	4,770	459	9,343	*5.5%*
Boulder	1,692	784	1,598	4,891	605	9,570	*5.7%*
Centennial	1,159	564	353	2,401	490	4,967	*2.9%*
Colorado W.	2,536	1,065	1,022	6,487	942	12,052	*7.1%*
Denver	5,523	2,268	2,163	14,632	1,982	26,568	*15.7%*
Jefferson	3,372	1,576	1,082	7,478	1,483	14,991	*8.9%*
Larimer	1,834	759	1,450	4,844	676	9,563	*5.7%*
Midwestern	820	374	321	2,135	451	4,101	*2.4%*
North Range	2,085	855	1,097	4,134	563	8,734	*5.2%*
Pikes Peak	5,355	2,175	1,803	10,816	1,224	21,373	*12.7%*
San Luis	630	314	218	1,308	191	2,661	*1.6%*
Southeast	627	331	227	1,780	371	3,336	*2.0%*
Southwest	784	391	351	1,988	286	3,800	*2.3%*
Spanish Peaks	1,886	954	586	4,551	912	8,889	*5.3%*
West Central	672	316	302	4,021	754	6,065	*3.6%*
State	37,382	15,815	14,625	88,079	12,977	168,878	*100%*
% Total	*22%*	*9%*	*9%*	*52%*	*8%*	*100%*	

Proportions of the populations in service areas corresponded closely when comparing prevalence rates with individuals in the population of interest. All but three service areas changed in proportion of the State population very little (.3% or less). The biggest difference was West Central, increasing 1.2% of the State total (from 2.4% to 3.6 %).

V. Individuals Served by the Public MH Sector

This Section presents summaries of services provided by the public mental health sector in Fiscal Year 1999. This Section describes the scope of the mental health sector, the method for obtaining unduplicated counts of individuals served, and a summary of the number of individuals who received mental health services across the public sector. The Section following this explores further analysis by including other agencies.

The public sector refers to services supported at least in part with state or federal money. Public mental health services refer to community and inpatient services, whether purchased or provided through Mental Health Services or Medicaid. This includes Medicaid Managed Care and Fee-for-Service.

The methodology used to count individuals served was Probabilistic Population Estimation (PPE). It was necessary to employ this methodology in the mental health sector because records for individuals could not be unduplicated across the community mental health system, the state hospitals, and Medicaid Fee-for-Service.

> "…The methodology developed and used by Bristol, probabilistic population estimation, is rooted in probability theory and allows for the estimation of overlap between and among any data sets when the date of birth and gender are provided. The method is particularly appropriate when there are concerns about confidentiality surrounding the sharing of information across sectors, when there is no common identifier, and when it is not necessary to identify specific individuals.
>
> "…As part of the development of the method, numerous validity tests were conducted, whereby the estimated overlap was compared to the known overlap using a unique identifier. The results demonstrated that the known rate was included in the confidence intervals from the estimation method.…"[3]

More information about the PPE may be found in Appendix E.

Mental Health Services contracted with Bristol Observatory[4] to employ this methodology. Bristol Observatory generated unduplicated counts of individuals who

[3] Minutes from March 30, 2001 meeting of Bristol staff with Mental Health Services, Denver, CO.

[4] The Bristol Observatory, 521 Hewitt Road, Bristol, VT 05443. Phone: (802) 453-7070. E-mail: bristob@together.net.

received mental health services in the Colorado public mental health system.[5]

The report

> ". . .provides unduplicated counts of the number of people who received publicly funded mental health services in the State of Colorado during 1999. Findings are presented in detail and summarized for each of 16 service areas….
>
> "The unduplicated counts of people who received publicly funded mental health services that are reported here are based on analysis of five data sets provided by the Colorado Mental Health Services. These include both inpatient and outpatient programs supported by both mental health and Medicaid fee for service programs."[6]

See Appendix F for a list of data sets used in this analysis.

The report from Bristol Observatory provided data for Table 6. Bristol provided more detailed data in the report and also made comparisons among service areas of rates of service utilization per 100,000 population.

Table 6 shows just over 77,000 individuals served by the public mental health sector. 32% of individuals served were under age 18 (evenly divided between two age groups). Another 5% were youths transitioning into the adult system. 59% were adults ages 21-64, and 6% were older adults ages 65+.

Denver and Pikes Peak served the greatest proportion of individuals, at 17% and 10% of the State population.

It is important to note that in the calculation of unmet need for this study, all persons served in the public system were counted as people with SED/SMI who are receiving services, i.e., in the context of this study, their needs are "met." Since estimates required unduplication across anonymous data sets, necessary whenever at least one dataset has no personally identifiable information, diagnostic information could not be carried through. A prevalence estimate for SED/SMI could be applied. A less conservative approach is to count only those identified with SED/SMI

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[5] UNDUPLICATED COUNTS OF INDIVIDUALS WHO RECEIVED MENTAL HEALTH SERVICES IN COLORADO During 1999 from Colorado Mental Health Services and/or Medicaid Fee For Service Programs By Age, Gender, And Geographical Region. Bristol Observatory, April 23, 2001.

[6] Taken from the Introduction/Overview of the Bristol Observatory Report of April 23, 2001.

Table 6. All Individuals Served by Public Mental Health Sector

Mental Health	Age Group						%
Service Area	0-11	12-17	18-20	21-64	65+	Total	*Total*
Adams		-- 1,951 --			-- 2,897 --	4,848	*6%*
Arapahoe		-- 1,316 --			-- 1,917 --	3,233	*4%*
Aurora		-- 2,015 --			-- 3,304 --	5,319	*7%*
Boulder	443	513	175	1,995	275	3,401	*4%*
Centennial	364	411	138	1,325	315	2,553	*3%*
Co. West	904	1,139	365	3,787	164	6,358	*8%*
Jefferson	899	1,046	335	3,942	160	6,383	*8%*
Larimer	680	582	178	2,223	418	4,082	*5%*
Denver	2,297	1,425	442	7,827	1,312	13,303	*17%*
Midwestern	221	323	102	967	108	1,720	*2%*
N. Range	404	424	127	1,827	345	3,128	*4%*
Pikes Peak	1,458	1,473	475	4,125	328	7,885	*10%*
San Luis	197	363	111	930	99	1,700	*2%*
Southeast	241	314	81	740	113	1,488	*2%*
Southwest	267	290	100	1,089	55	1,801	*2%*
Spanish Peaks	697	884	289	2,989	229	5,089	*7%*
West Central	246	327	122	1,142	99	1,936	*3%*
State Sum	12,549	12,185	4,117	45,339	4,657	77,138	*100%*
% Total	*16%*	*16%*	*5%*	*59%*	*6%*	*100%*	

Notes: The service area of individuals was based on county of residence, not service area of provider. This created a challenge in separating Aurora from Adams and Arapahoe. A meeting including Directors from the three Centers was held to discuss the best approach for separating Aurora.

Service utilization estimates were generated separately for service areas and the State as a whole. The State does not equal the sum of the service areas.

See Appendix G for details.

VI. Mental Health and Other Public Sectors

This Section addresses service utilization by persons with serious mental disorders in the public sector. While the last Section summarized services provided by the mental health sector, this Section takes the analysis to other public sectors. For children and adolescents, other public sectors included Child Welfare, Youth Corrections, Special Education, Developmental Disabilities, and Alcohol and Drug Abuse. For adults this included Developmental Disabilities, Alcohol and Drug Abuse, and Veterans Mental Health Administration.

The objective in analyzing service utilization data across sectors was to estimate the total number of individuals with serious mental disorder who received services in the year from any public sector. It was recognized that services were provided in sectors other than mental health. Ideally, each sector would: 1) Use a similar method to identify individuals with mental disorder; and 2) Be able to identify individuals actually receiving mental health services and the amount of services received. Since this was not in place, a database was obtained from each sector of individuals served and estimates were made of individuals with serious disorder served in each sector.

The greater the magnitude of the service utilization estimate, the more conservative (lower) estimate of unmet need. All consumers served in the Mental Health sector were included in estimates of individuals with serious disorder. Relatively high percentages of individuals with serious disorder were estimated in other sectors.

This Section estimates the number of individuals served in each public sector, number of individuals served with serious mental disorders, and unduplicated counts of individuals served across all sectors. The justification was that anyone with serious mental disorder in any sector that provides mental health services has at least gained access to some services. A stronger assumption would be that those individuals are receiving sufficient mental health services outside of the community mental health system. Analyses were conducted separately for persons under age 21 and persons ages 21 and above.

Under Age 21 Served

Data were obtained from a report by Bristol Observatory. The title of the report was:

> "This report provides unduplicated counts of the number of young people (less than 21 years of age) in Colorado who received services from mental health, child welfare, youth corrections, [alcohol or drug abuse], and/or special education for severe identified emotional disorders during 1999.

"The unduplicated counts of young people served by the four service sectors that are reported here are based on analysis of five data sets provided by the state level agency for each service sector. (See Appendix F for a list of data sets used in this analysis.) Because these data sets do not share unique person identifiers, Probabilistic Population Estimation was used to derive the unduplicated counts for each service sector and for local systems of care as a whole. Probabilistic Population Estimation is a statistical procedure that provides valid and reliable estimates of the number of people represented in anonymous data sets and the number of people shared by these data sets. These estimates are based on a statistical comparison of the observed distribution of dates of birth in the data set to the expected distribution of dates of birth (based on the general population. (See Appendix E for a more detailed description of this statistical procedure.)

"It should be noted that all figures presented in the Bristol reports are based on a probabilistic model and represent inferential statistical estimates. The figures reported below provide the "best estimate" from the Bristol report. Bristol reports also include a range above or below the "best estimate." The range represents a 95% confidence interval that the actual figure is within the range. Ranges tend to be very small."[7]

Overview. Child Welfare provided general services to 50,260 individuals in 1999. It was the largest of the five sectors considered. Mental Health was the second largest sector, providing services to 27,987 individuals, followed by Youth Corrections (9,632 individuals), Special Education (8,447 individuals), DDS (6,588 individuals), and ADAD (5,229 individuals).

Table 7. Overview: Under Age 21 Served 1999

Mental Health, Child Welfare, Youth Corrections, Special Education, Developmental Disabilities, and Alcohol and Drug Abuse

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

[7] Children's Service Utilization Rates: Unduplicated Counts, Per Capita Rates, and Caseload Segregations/Integration Mental Health, Child Welfare, Youth Corrections, Special Education By Age, Gender, And Geographical Region, Colorado 1999. September 26, 2001. (Some data were updated Dec. 2001.)

Estimate

Child Welfare provided services to 10,372 individuals also served by Mental Health in 1999. Special Education provided services to 2,855 individuals also served by Mental Health; Youth Corrections to 2,344; DDS to 626; and ADAD to 720.

Thus, the tables provide a more complete picture of public service for these individuals with serious disturbance.

Based on a 25% estimate of SED/SMI in Child Welfare, there were 12,565 individuals with SED/SMI receiving services in Child Welfare. 10,372 individuals were also served by Mental Health (overlap). The assumptions were two-fold. One is that those 10,372 identified in the overlap were, at least for the most part, the persons with SED/SMI. The second assumption was that the remaining 2,193 individuals with SED/SMI were receiving mental health services through Child Welfare.

Unduplication across all sectors indicates that approximately 37,781 people were receiving mental health services, or had gained access to a system that provides those services in one form or another.

Of those 37,781, Mental Health served 74% of them. The largest population of individuals with SED/SMI under age 21 served by any sector other than mental health was Child Welfare; however, many of those individuals were also served by Mental Health. The largest target group outside of mental health was found in Special Education.

Table 8. Under Age 21 Served

Mental Health, Child Welfare, Youth Corrections, Special Education, DDS, Alcohol and Drug, and Total

	MH	Child Welfare				Youth Corrections				Special Education			
	Mental Health Served	Total Served	Seen MH (overlap)	Estimated SED 25%	SED Not Served MH	Total Served	Seen MH (overlap)	Esti-mated SED 24%	SED Not Served MH	Total Served	Seen MH (overlap)	Estimated SED 100%	SED Not Served MH
Statewide	27,987	50,260	10,372	12,565	2,193	9,632	2,344	2,312	0	8,447	2,855	8,447	5,592

Table 8. Continued
Under Age 21 Served 1999

	Alcohol and Drug				DDS				Total
	Total Served	Seen MH (overlap)	Estimated SED 50%	SED Not Served MH	Total Served	Seen MH (overlap)	Estimated SED	SED Not Served MH	Estimated SED Served
Statewide	5,229	720	2,614	1,895	6,486	340	454	114	37,781

Adults Ages 21 and Above Served

The project obtained data from three adult sectors in addition to mental health: Developmental Disabilities Services, Alcohol and Drug Abuse Division, and Veterans Health Administration. The Veterans Administration data included only individuals who received mental health services.

The mental health sector served 49,151 adults ages 21 and above in 1999. The Alcohol and Drug sector served 19,554 individuals; Veterans Administration 9,823; and DDS 7,264. The proportion of individuals served by MH and also served in another sector (overlap) was much lower than those seen for individuals under age 21.

Table 9. Ages 21 and Above Served

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

Estimates of persons with SMI in sectors other than MHS were significant, with the VA serving approximately 9,823 and ADAD serving 8,866 adults. Across all sectors, the total unduplicated estimate of adults with SMI who are receiving services in the public sector was 64,644 (figure not shown in table).

Table 10. Adults Ages 21 and Above Served 1999

Mental Health, DDS, Alcohol and Drug, Veterans Administration and Total

	MH	DDS				Alcohol and Drug			
	Mental Health Served	Total Served	Seen MH (overlap)	Estimated Persons SMI 7%	SMI Not Served MH	Total Served	Seen MH (overlap)	Estimated Persons SMI 30%	PSMI Not Served MH
Statewide	49,151	7,264	1,272	508	0	29,554	2,958	8,866	5,908

Table 10. Continued: Adults Ages 21 and Above Served 1999

	Veterans Health Administration				Total
	Total Served	Seen MH (overlap)	Estimated Persons SMI 100%	SMI Not Served MH	SMI Served All Sectors
Statewide	9,823	238	9,823	9,585	64,644

VII. Estimates of Need for Mental Health Services

An estimate of need was obtained by subtracting the number of individuals served from the prevalence estimates of serious disorder. This is an absolute number of individuals likely to need mental health services but who did not receive them. Table 12 shows the prevalence estimates of serious mental disorders, the number of individuals served (separately for the mental health sector and all sectors), and an estimate of need. Findings are shown for individuals under age 21, and ages 21 and above.

Table 11. Need Summary

Under 300% Poverty

	Persons SED/SMI	Served Mental Health	Served All Sectors	Unserved Any Sector	*% Not Served*
Under Age 21	67,822	27,987	37,781	30,041	*44%*
Ages 21 and Above	101,056	49,151	64,644	36,412	*36%*
Statewide Total	168,878	77,138	102,425	66,453	*39%*

The most extreme need in the State for the population to be served by the public mental health system, i.e., persons with SED/SMI who are not receiving any public services, was estimated at 66,453 individuals; 39% of all individuals with serious mental disorders expected to need public mental health services did not receive them in 1999. The total unmet need was greater for adults over age 21 than under, although the percentage of unmet need was higher for persons under age 21.

Interpretation

Several steps must be undertaken before using these findings to draw conclusions about the service system or making changes in the system. Section VIII discusses the utility of stakeholder involvement, ways to validate findings, and use of findings.

Table 12. Prevalence, Number Served and Unmet Need

	Prevalence			Served						Unmet Need		
	(HH < 300% Poverty + Inst.)			Ages < 21		Ages 21+		Total		< 21	21+	Total
	Ages < 21	**Ages 21+**	**Total**	***Mental Health***	**Any Sector**	***Mental Health***	**Any Sector**	***Mental Health***	**Any Sector**			
State	67,822	101,056	168,878	*27,987*	37,781	*49,151*	64,644	*77,138*	102,425	30,041	36,412	66,453

VIII. Discussion and Recommendations

This project has quantified a specific need for mental health services in Colorado. Findings provide a larger picture than has been available ever before regarding unmet need for mental health services in all of the service areas throughout the State.

While the methodology is state-of-the-art in the concurrent analyses of anonymous datasets, the findings have limitations. For instance, there is a need to more precisely assess the delivery and effectiveness of mental health services in other sectors. An additional caveat is in what the project did not address: the quality and appropriateness of care received. For these reasons it is extremely important to at least begin assessing these issues. Being aware of the issues and how they relate to the current study is critical for stakeholders to integrate the results with other knowledge before drawing conclusions about the service system and making changes.

This Section discusses some of the ways to validate and use the findings. It goes on to propose actions steps, several of which have been planned for implementation. Two issues have been identified and are being considered for relevance and feasibility.

Validation of Findings

Prevalence Estimates. It is important for anyone referencing the prevalence estimates to be aware that these are "estimates" provided by a set of methodologies operating with a finite amount of information. As such, the results reflect the demographic characteristics and their relationship to presence of SED/SMI for the population comparable to the NCS and ECA on the equivalent demographic characteristics, i.e., age, sex, ethnicity, marital status, education, poverty, and residence type. As such, the results of the estimates should currently be considered in the context that they are based on data from particular epidemiological studies.

Service Utilization. Another step in the analysis should demonstrate the reliability of service utilization estimates. A number of approaches can address:

- Whether the results reflect existing reports in each sector of total service utilization
- Accuracy of estimates about the proportion of individuals in each sector with serious mental disorders and the number of individuals also served by mental health
- Whether individuals with serious mental disorders in each sector were receiving mental health services even if not provided directly by the public mental health sector

- And finally, whether the need compares reasonably with estimates from historic and other models in use

Use of Findings

In addition to the intended and related uses of the information gleaned from this study, findings may be used for:

- ✓ Mental health planning, i.e., targeting needed services by geographic area and subpopulation (age, sex, and race/ethnicity).
- ✓ Prevalence estimates of SED/SMI by race/ethnicity, and ultimately assessments of system usage by race/ethnicity breakouts
- ✓ Interagency coordination. Results show overlap in service utilization between mental health and other public sectors; in the best interest of these persons coordination of care is indicated.
- ✓ Advocacy for individuals with serious mental health disorders not served.
- ✓ Policy discussion. Existing policy impacts and new policy development.
- ✓ Multiple system usage. Resource allocation for subpopulations served in multiple systems; implications for cost efficiencies.
- ✓ Indicator for access. In addition to estimating need, data from the project may be used to develop penetration rates for geographic areas and demographic groups.

Proposed Action Steps

Findings of this project provide a larger picture than has been available ever before in Colorado regarding need for mental health services throughout the State.

A comparison of the proportion of individuals in the prevalence estimates for each age group with the proportion served in the mental health sector for the same age group describes different populations. Under age 21, adolescents appear well served while children and transitional adults appear less well served. Ages 21 and above indicate adults were well served while older adults were less well served.

A limitation of the service utilization data was dividing age groups into two, below 21 and ages 21 and above. This in turn limited the unmet need estimates to the same age groups. Additional groupings would be valuable. Findings in this report indicate major differences in sub-groupings.

Planned for Implementation

The project has funded an update of prevalence estimates with Census 2000 data. Policy discussion could further inform this update.

The results must be reviewed, discussed, and interpreted by stakeholders, not simply to get "buy-in," but to make them meaningful and utilitarian. A stakeholder group might analyze the findings and suggest potential modifications in Mental Health Services goals. Stakeholders could assess whether consumers in certain racial/cultural or age groups are underserved. Findings should be examined to determine if they suggest the need for more integration of services between mental health and alcohol and drug abuse programs, or the need for more integration between mental health and corrections program.

Counts of individuals served in the public mental health sector could be augmented with information about the amount and nature of services received, particularly for the most severely and persistently mentally ill population served. For example, a report of the number of individuals with severe and persistent mental illness, and their level of services in quartiles could be generated for demographic groups and service areas. This would provide more information to stakeholders targeting services for the most disabled population.

Indicators of the quality and appropriateness of services provided to clients with serious mental disorders should be considered in conjunction with utilization indicators such as developed in this study. The national Mental Health Statistics Improvement Program (MHSIP), for instance, has developed indicators of access, appropriateness, and outcome. Colorado has been seminal in these efforts, specifically in the development and application of performance measurement, indicators, and outcomes. The state was one of the original five states receiving MHSIP funds from SAMHSA to determine the feasibility of obtaining a set of measures from a number of states. Colorado has continued its strong involvement in the 16-State Performance Indicator Pilot, and the most recent Data Infrastructure Grant.

Under Consideration

Estimates of individuals with serious disorders in sectors other than mental health could be improved with a common screening method across sectors. Results from this project help show the importance of the work in progress in this area, particularly for children and adolescents: 37% of the children and adolescents seen in child welfare were also served in the mental health sector. For adults, inclusion of the adult corrections system population would be valuable. Developing and utilizing a common screening method across sectors can help strengthen intersystem coordination of services for a vulnerable population.

In addition to screening for serious mental disorder in other sectors, it would be useful to have information on the amount and type of mental health services provided to clients by the other sectors. This project planned to gather information on both individuals identified with serious disorders as well as the nature of mental health services received; however, the information was not available from most other sectors.

The project was unique among states in utilizing the most current technology in both estimating prevalence and service utilization across public sectors. As such, longitudinal experience with these findings and how they vary over time subject to internal and external influences will be informative as to the required frequency of repeating the

project. In these respects, it is critical to replicate the project in the future, benefiting also from the lessons learned in this initial endeavor.

Future Directions

Permanent, binding arrangements to track clients and services across sectors should be pursued. It may not be feasible across all sectors. However when possible, it would provide not only an unduplicated count of individuals but also the amount of services provided. There appeared to be considerable support in several sectors for such an approach.

The project has supported intersystem coordination and much has been learned. Planned uses of knowledge gained through the project will improve services to consumers with serious mental disorders.