Using **Data Analytics** *to Better Understand* **Medicaid** *Populations with* **Serious Mental Illness**

Main Objectives

This technical resource outlines preliminary steps that state Medicaid agencies can use to identify Medicaid adult beneficiaries with Serious Mental Illness (SMI) and to gain a better understanding of this population to inform future decision-making. This resource also provides examples of potential data outputs that can be replicated using a state's Medicaid data.

Table of Contents

Using Data Analytics to Better Understand Medicaid Populations with Serious Mental Illness

National Medicaid Coverage and Spending for Mental Illness and SUD Treatment

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In 2014, Medicaid accounted for 25 percent of total national expenditures for mental health, and 21 percent of total national expenditures for substance use disorder services. More recent data shows that Medicaid covered 21 percent of all adults with mental illness and 26 percent of all adults with SMI. [1]

A. Background

Many state Medicaid agencies are planning, designing, or implementing delivery system reforms to improve health outcomes and reduce the total cost of care for individuals with Serious Mental Illness (SMI). This has prompted states to seek a more comprehensive understanding of service needs, cost trends, and delivery system processes. The Medicaid Innovation Accelerator Program (IAP) created this technical resource to help states with initial data analytic efforts using Medicaid claims and encounters data and to gather specific insights about adults receiving Medicaid who have SMI.

Medicaid data is a useful resource to assist states in better understanding how to address the needs of the individuals they serve. Medicaid claims data, including encounters from managed care organizations (MCOs), in combination with Medicaid eligibility and provider files, are a rich source of information about Medicaid beneficiaries and the services they utilize.

This technical resource focuses specifically on the use of Medicaid data to understand demographic and diagnostic characteristics of adults with SMI, as well as their utilization patterns and the cost of services they access. In this document, high-level instruction is provided to assist states in conducting preliminary analyses of populations with SMI and to identify where additional analysis could reveal helpful insights. Key considerations for states pursuing these analyses are also included.

State Medicaid agencies can use this resource in collaboration with state behavioral health (mental health and substance abuse) authorities to foster mutual understanding of Medicaid beneficiaries with SMI, key population attributes, their use of Medicaid services, and Medicaid service costs.

About the Medicaid Innovation Accelerator Program (IAP)

In July 2014, the Centers for Medicare & Medicaid Services (CMS) launched a collaboration between the Center for Medicaid and CHIP Services and the Center for Medicare & Medicaid Innovation called the Medicaid Innovation Accelerator Program (IAP). The goals of IAP are to improve care for Medicaid

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[1] Source: [Kaiser Family Foundation Medicaid's Role in Behavioral Health.](#)

beneficiaries and reduce costs by supporting states in their ongoing payment and delivery system reforms through targeted technical support, such as this technical resource.

B. Objectives

The objective of this document is to outline preliminary steps state Medicaid agencies can take to identify adult Medicaid beneficiaries with SMI and to gain a better understanding of the population (e.g., size, geographic distribution, demographic and diagnostic characteristics, service utilization, and service cost) that may be used to inform program management decision-making. Information gleaned from states' analyses can also lay the foundation on which the state Medicaid agency can build further analyses to identify: 1) potential issues related to care access, quality, service gaps, and cost trends; 2) program design options, such as whether additional services should be covered or additional Medicaid delivery system strategies pursued; 3) cost and utilization patterns to be further validated specific to the population with SMI; and 4) the effectiveness of initiatives designed to improve care for populations with SMI.

This resource can be used to enable Medicaid directors, policy developers, data analytics staff and other program personnel to understand the types of analysis and information that can be generated using Medicaid data (claims, encounters, beneficiary and provider data), as well as other data readily available to state Medicaid agencies such as local geographic data. This resource does not provide specific programming logic nor defines a specific set of detailed data queries.

C. Organization of the Technical Resource

This resource contains three types of analyses: beneficiary, utilization, and cost. Each of these provides an overview of the analyses, example questions to be answered by these data, minimum data required for each analysis, a high-level approach for carrying out the analyses, and output tables or graphs. The output examples in this technical resource are not based on actual data from any specific state. To reflect this, the examples are marked as "mock data." **This mock data should not be used as benchmarks.**

The following describes the three types of analyses:

1. **Analysis of Beneficiary Data** focuses on understanding the adult population with SMI, and on key considerations for states interested in developing a definition of SMI to answer the analytical questions being asked. The population with SMI can then be stratified according to characteristics such as gender, race, age, and diagnosis.

2. **Analysis of Utilization Data** focuses on using Medicaid data to understand use of services. Table examples include: top services by utilization, utilization of select procedures, and average length of stay (ALOS).

3. **Analysis of Cost Data** focuses on analyzing and understanding the cost of care provided to adult Medicaid beneficiaries with SMI. Table examples include: average annual cost of care by SMI condition, and top services reimbursed for the population with SMI by cost.

D. Preliminary Considerations

This section covers three areas, that states should consider addressing, before beginning the beneficiary, cost, and utilization analyses.

- The selected definition of SMI used for purposes of these analyses will be critical in guiding the **scope of analysis** and output. As such, the first part of this section provides considerations for identifying which definition to use.
- As **claims data** are the most critical building block for the analyses, the second part of this section provides some explanation for how these data can be valuable to state Medicaid agencies embarking on an analysis of their population with SMI.
- To best understand the adult population with SMI, it may be helpful for state Medicaid agencies to establish a **comparison group** of adult Medicaid beneficiaries without SMI. The third part describes how defining a comparison group to analyze alongside the population with SMI can provide additional insights.

Determining the Scope of the Analysis

This resource is tailored to states seeking to better understand their Medicaid population with SMI. One of the early steps a state will need to take is to determine the scope of its analysis. This starts with defining the population to be analyzed and developing the related specifications (e.g. diagnosis codes, thresholds) to isolate that population. This resource does not use a specific SMI definition since states define SMI in different ways depending on the entity, context, and purpose for which it is being used (e.g. legal, clinical, epidemiological, or operational). Further, the beneficiary population that the state identifies for its analyses may align with or build upon the state's statutory definition of SMI, federal definitions, or other sources. As the state Medicaid agency considers whether to adopt or refine an existing definition of SMI for purposes of this analysis, it should take into account how the definition aligns with its policy and programmatic priorities for its Medicaid population.

Many definitions of SMI, including the formal definitions adopted by the U.S. Department of Health and Human Services and the Social Security Administration, are based on a finding that the condition has resulted in serious functional impairment which substantially interferes with or limits one or more major life activity.[2] However, because these definitions rely on information that is not typically captured in claims data, they may not be operationally practical for use in developing specifications to

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[2] The SAMHSA National Registry of Evidence-based Programs and Practices (NREPP) provides a discussion of the U.S. Department of Health and Human Services' definition of SMI, including the evolution of the terms and meaning within a recovery framework. For more information, see
https://www.documentcloud.org/documents/4059829-Behind-the-Term-Serious-Mental-Illness.html.
The Social Security Administration (SSA) also provides guidance on determining eligibility for Supplemental Security Income (SSI) benefits for those with mental health conditions. Although a clear distinction between mental health "impairment" and SMI is not offered, the information documents the final rule for the structure of a mental disorder claim evaluation by the SSA. https://www.gpo.gov/fdsys/pkg/FR-2016-09-26/pdf/2016-22908.pdf. States can use these resources to inform discussions on specific decisions regarding diagnostic categories and severity when defining SMI.

identify the population to be analyzed using this resource (which is structured to rely solely on Medicaid claims data).

In addition, states can also define SMI statutorily to establish eligibility criteria for certain publicly-funded behavioral health treatment services. For example, a state's statutory definition of SMI could be limited to preserve resources for a population determined to be most in need of comprehensive services, but this may not be the most appropriate definition for purposes of analyzing a state's complex need or high-cost Medicaid population with serious mental illness.

A state might also want to use more than one parameter when defining the scope of the target population for analysis. For instance, states might consider including diagnosis coupled with service utilization to define the target population for analyses. The following are examples of how states might use diagnoses and utilization parameters as they select their SMI target population for analysis. Note that the examples provided can be used to study a broad group of Medicaid beneficiaries with SMI, a more targeted group of beneficiaries with SMI, or a combination of broad and targeted sub-group(s) of beneficiaries with SMI. Some options for defining the scope of the population for analysis are as follows:

- Using some or all of a set of diagnoses associated with SMI to create the target population cohort; for example, analyses could:
    - Target a broad population by including schizophrenia, major depression, and bipolar disorder, as well as other diagnoses such as schizoaffective and other psychotic disorders (e.g. ICD-10 codes F20.x-F33.x)
    - Target a subset of beneficiaries such only those with schizophrenia, or bipolar disorder
- Identifying a set of diagnoses with data queries of service utilization often associated with beneficiaries with SMI; for, example analyses could:
    - Define a set of mental health diagnoses that are associated with disproportionately high rates of hospitalization and/or emergency room use for behavioral health reasons (e.g. three or more inpatient psychiatric admissions within a six-month time-period)
    - Define a set of mental health diagnoses that are associated with use of a state's rehabilitative services option, 1915(i) services, or Targeted Case Management
- Refining or narrowing the target population by examining preliminary indicators of over-, under- or mis-utilization related to the population with SMI within your state Medicaid program; for example, analyses could:
    - Identify all Medicaid beneficiaries with two or more emergency or acute inpatient visits for any mental health condition and no associated pharmacy claims
    - Identify all Medicaid beneficiaries defined by high emergency department use for any mental health condition, along with no utilization of primary care services
    - Identify all Medicaid beneficiaries with at least one inpatient visit or two outpatient visits for selected mental health condition(s), e.g. schizophrenia, bipolar disorder, etc., within a specific period of time (suggested one year)

As states refine their target population, they may want to review other recent studies, conducted internally or externally, related to the state's population with SMI. Similarly, it may also be helpful to consider documented provider, beneficiary, advocate or other stakeholder feedback related to the population with SMI in the state.

Each state Medicaid agency will want to consider a range of factors in determining the scope of their analyses and should use an SMI definition (and related specifications) that meets their needs. Based on what is learned, states may also want to allow for some further revisions to the definition they use as they study the results of their analyses at the various steps in this technical resource.

Data Available from Claims and Encounters

Medicaid fee-for-service (FFS) claims and managed care encounters (claims data reported by Medicaid MCOs to state Medicaid agencies) provide a rich source of information about Medicaid beneficiaries and the services they use. Claims and/or encounters data will be used in all analyses described in this resource.

Claims data provide information about beneficiaries' diagnoses and related services. Claims will also provide information on the provider of the service, and the cost of the service. Additionally, claims contain the place of service, which can help researchers understand whether the service was delivered at home, in an office, or another setting, such as a hospital emergency department or a behavioral health clinic. The date/dates of service are also located on a claim and may help researchers to determine spans of care and how often a beneficiary is seeking care. These data can be extremely helpful when tracking beneficiary utilization among types of services.

Claims data can be enhanced by linking additional provider and beneficiary eligibility information from the state's information systems. For example, some states have identified in their provider systems whether a provider has met patient-centered medical home (PCMH) certification or recognition. Information like this can be important when trying to assess the integration of care for Medicaid beneficiaries with SMI. Consulting other state data sources also allows state Medicaid agencies to see which beneficiaries have Medicare coverage or another third-party insurance and what reimbursement contributions are being made to the beneficiaries' total cost of care.

Important demographic information about the beneficiary, such as age, gender, eligibility category, and whether they reside in the community or institutional setting, can be found in the state's beneficiary eligibility subsystem of the Medicaid Management Information System (MMIS). For example, depending on the sophistication of the state's data system, it may be possible to tell if the beneficiary is in a health home or other advanced system of care.

While claims data can go a long way in providing an understanding of the population with SMI, they do have limitations. For example, Medicaid claims data will not show how quickly someone could get an appointment. In addition, Medicaid data alone are not representative of total state expenditures for Medicaid beneficiaries with SMI. For instance, Medicaid claims data may not include non-Medicaid mental health services funded with state-only dollars. Each state will need to address limitations that are specific to their state Medicaid data when conducting their analyses.

In addition, some Medicaid services may be provided by a sister agency (i.e. another department or agency in the state). Since payment methods for some of these services may be different from standard Medicaid services, such as being based on allocated staffing costs using a time-study methodology, claims for these services may not contain the same level of detail as provider claims. However, these claims still contain data elements that are useful for analysis, such as procedure codes.

Population with SMI versus a Comparison Group

Comparing a Medicaid population with SMI against a Medicaid population without SMI can provide useful insight. States can consider identifying a comparison group, defined as the adult population without SMI, based on the state Medicaid agency's definition of SMI as discussed earlier.

For purposes of the instructions included for this technical resource, the comparison group was defined based on the absence of any primary or secondary diagnosis of an SMI condition (including those without a filled prescription for an antipsychotic within thirty days of a diagnosis).

State Medicaid agencies should consider whether an additional subset or subsets of the population should be identified and compared to the comparison group to determine if there are indicators of undiagnosed or unreported SMI, such as those with high emergency department utilization or high readmission rates. State Medicaid agencies should also consider whether subsets of the population should be excluded from analyses, as non-SMI related factors may impact the results of the analyses. For example:

- **The 65+ group:** Significant portions of service and cost data for this population are covered by Medicare. If research questions are formulated about care management, this population may impact the results because many of these beneficiaries primarily receive their services through Medicare.

- **Institutional populations:** When performing analysis, including the institutional population may impact results because this population is prone to long and costly hospital stays.

It is important to understand all available state Medicaid beneficiary, provider, and claims information before determining the structure of an analysis to avoid inaccuracies and to produce the most actionable analyses.

E. Analysis of Beneficiary Data

This section is designed to help states identify their adult SMI and comparison group populations, as well as to identify and understand other basic demographics about both populations. This section will capture: 1) the number of state Medicaid adult beneficiaries with SMI and in the comparison group; 2) SMI diagnoses among the populations identified; 3) population characteristics such as race, ethnicity, age, gender, geographic locale, delivery system, and other population groupings; and 4) prevalence of co-occurring physical health conditions.

E.1 Identifying the Population with SMI and the Comparison Group

The first step in identifying the population of adult Medicaid beneficiaries with SMI is to work with state policy and clinical leadership to determine which diagnoses to include in an analysis of populations with SMI. This may require:

1) Selecting the list of diagnosis codes that align with SMI qualifying conditions
2) Determining whether the diagnosis needs to be present as the primary or secondary diagnosis, or whether the diagnosis can appear anywhere on the claim (typically, primary and secondary diagnoses are the most reliable for isolating a defined condition, though claims data may allow providers to report eight or more diagnosis codes)
3) Determining whether further confirmation of the diagnosis of an SMI qualifying condition is required (e.g. through the presence of a pharmacy claim for a psychotropic medication) to determine if the beneficiary is under active treatment

> ### Using Pharmacy Claims to Confirm SMI
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> Confirming diagnosis codes with the presence of a pharmacy claim is a common method for determining whether a beneficiary has a given condition. The definition logic for determining SMI used in this resource includes the presence of a pharmacy claim as a criterion.
>
> This approach, however, may unintentionally exclude beneficiaries who should be taking a medication but have not filled their prescription. Separate analysis on medication gaps is required to identify this population.

Additional criteria or logic can be applied to the analyses to further refine these populations. For instance, since many states experience significant eligibility churn in their Medicaid population, state Medicaid agencies may not want to require continuous enrollment during the entire period studied, as it might exclude many high-cost, high-need beneficiaries in the population group. The examples in this technical resource apply parameters and set conditions for age, period analyzed, and continuity of enrollment, but **state Medicaid agencies should establish their own filters based on the goals of their analysis**.

For the sample analyses in this resource, it was assumed that the following criteria were applied to identify the adult Medicaid beneficiaries with SMI: 1) beneficiaries are Medicaid enrolled adults age 18 or over, 2) beneficiaries have at least one primary or secondary diagnosis of an SMI qualifying condition with a filled prescription for an antipsychotic within 30 days of a diagnosis to determine the beneficiary is under active treatment for an SMI qualifying condition, and 3) beneficiaries have been enrolled in Medicaid nine months or longer within a 12-month period (regardless of whether the enrollment was continuous). The analysis period (in this case, 12 months) should be defined by the state Medicaid agency and will be largely influenced by claims adjudication cycles.

Additionally, the sample analyses in this resource assume that the comparison group consists of beneficiaries who: 1) are Medicaid enrolled adults of age 18 or over, 2) have NOT met the criterion for SMI reflected above, and 3) have been enrolled in Medicaid nine months or longer within a 12-month analysis period (regardless of whether the enrollment was continuous).

After confirming the diagnoses, criteria, and logic to be applied to the population with SMI and determining who will be included in the comparison group, state Medicaid agencies can proceed with these data analyses.

Below are the questions these analyses will help to answer, the types of data needed, and an approach to the analyses for identifying adult Medicaid beneficiaries with SMI and the comparison group.

Example Questions to Be Answered

- What is the unduplicated count of the adult Medicaid population with SMI and the percentage of the total Medicaid population that this group comprises?
- What is the unduplicated count and percentage of the Medicaid population contained in the comparison group?

Medicaid Data Required for Analysis

- Beneficiary data:
    - Eligibility start and end dates
    - Beneficiary identifier
    - Age (date of birth)
- Behavioral health International Classification of Diseases (ICD) ICD-9/ICD-10 diagnosis codes (as defined by scope of analysis)
- Claims and encounters data:
    - Beneficiary identifier (such as beneficiary ID number)
    - Dates of service
    - Diagnosis codes
    - Procedure codes
    - National Drug Codes (NDCs)[3] on pharmacy claims (to filter for beneficiaries with filled antipsychotic prescriptions within 30 days of a behavioral health service with a primary or secondary diagnosis of an SMI qualifying condition for purposes of defining SMI)

Analysis Approach for Identifying Adult Medicaid Beneficiaries with SMI & the Comparison Group

To identify the population of adult Medicaid beneficiaries with SMI and the comparison group, consider steps such as the following:

1. Identify the population of adult Medicaid beneficiaries with SMI.
    a. Create a reference table of ICD-9/ICD-10 diagnosis codes used for SMI qualifying conditions as determined by the state.

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[3] For a searchable database of National Drug Codes, state Medicaid agencies may utilize the U.S. Food and Drug Administration (FDA) National Drug Code Directory.

b. Using beneficiary data, query for all Medicaid beneficiaries who were enrolled for at least nine months of the 12-month analysis period and were at least 18 years old for the entirety of the period.

c. Using claims and encounters data, filter for the Medicaid beneficiaries identified in Step 1b. that meet any additional state-identified criteria, e.g. that have at least one claim with a primary or secondary diagnosis of an SMI qualifying condition identified using the ICD-9/ICD-10 diagnosis codes from Step 1a. with a filled prescription for an antipsychotic within 30 days of a diagnosis.

d. Remove duplicate beneficiary records to obtain a unique set of beneficiaries.

e. If the state Medicaid agency chooses to exclude a population from both the population with SMI and the comparison group (e.g. individuals over 65), the data associated with the excluded individuals can also be collected and reported separately in the output table.

2. Identify the comparison group population:
a. Identify all unique Medicaid beneficiaries with minimum enrollment at least nine months of a 12-month period and who were at least age 18 or older for the entirety of the period.

b. Exclude the Medicaid beneficiaries identified in Step 1.

3. Store these data into tables for future use for performing additional analyses below.

Sample Output

Table E.1 shows sample output of this analysis reflecting the proportion of Medicaid beneficiaries with SMI and the comparison group Medicaid population without SMI. Note that the definition for the population with SMI that is used for all sample output data in this resource is set forth on pages 9-10.

TABLE E.1 - COUNT AND PERCENTAGE OF ADULTS WITH SMI AND COMPARISON GROUP - SAMPLE OUTPUT

Adult Population	Unduplicated Count	Percent of Adult Medicaid
Total State Medicaid Population	86,000	100%
Comparison Group	81,273	94.51%
Population With SMI	4,727	5.49%

Conclusion

Identifying adult Medicaid beneficiaries with SMI and a comparison group can provide states with insight as to the scope and scale of these populations in their programs. This initial analysis is foundational to all additional data analyses for the population with SMI, including the remaining analyses in this technical resource.

Understanding the size of the population with SMI is also important for policy development and budgetary planning. For example, a state Medicaid agency may use the prevalence of SMI to help determine adequacy of programs and to understand how modifying behavioral health benefits could address population needs.

The output from the analysis in E.1 may cause states to revisit their definition of SMI. Finalizing an SMI definition can help to ensure that further analyses are appropriately tailored to the state Medicaid agency's goals for understanding the population with SMI.

E.2 Categorizing SMI Diagnoses

This next analysis will provide a deeper understanding of the population with SMI by examining the prevalence of specific behavioral health conditions within the population with SMI and the comparison group.

Example Questions to Be Answered

- What are the most prevalent behavioral health diagnoses among adults with SMI?
- Which behavioral health diagnoses are the most prevalent in the comparison group?
- Are there behavioral health diagnoses that may require reconsideration of the scope of the analyses?

Medicaid Data Required for Analysis

- Previously created data sets
    - Reference table – population with SMI created in E.1
    - Reference table – comparison group population created in E.1
- Selected behavioral health ICD-9/ICD-10 diagnosis codes
- Claims and encounters data:
    - Beneficiary identifier
    - Dates of service
    - Diagnosis codes

Analysis Approach for Categorizing SMI Diagnoses

To identify distribution of the SMI diagnoses among the population of adult Medicaid beneficiaries with SMI and the comparison group, consider steps such as the following:

1. Access the two populations created in E.1 (the population with SMI and the comparison group population).
2. Using claims and encounters data, query both lists independently for any diagnoses of SMI (from the SMI definition utilized for E.1) for each beneficiary in all diagnosis fields (not just primary and secondary diagnosis fields). **Note:** It is likely that individual beneficiaries will have multiple claims with multiple qualifying SMI diagnoses, so counts should be unduplicated by diagnosis and beneficiary.
3. When completed, store the results for further analyses.

Sample Output

Table E.2 demonstrates a breakout of Medicaid beneficiaries with SMI by diagnosis grouping and population.

TABLE E.2 - BREAKOUT OF DIAGNOSIS CATEGORIES AMONG ADULTS WITH SMI AND COMPARISON GROUP - SAMPLE OUTPUT

Diagnosis Category	SMI Count	Percent with SMI	Comparison Group Count	Percent of Comparison Group	Total Adult Medicaid	Percent of Adult Medicaid
Unduplicated Count from E.1	4,727	100.00%	81,273	100.00%	86,000	100.00%
Depression	2,384	50.43%	983	1.21%	3367	3.92%
Bipolar Disorder	1,800	38.08%	1,845	2.27%	3,645	4.24%
Anxiety	1,449	30.65%	6,615	8.14%	8,064	9.38%
Co-occurring SUD	1,132	23.95%	10,882	13.39%	12,014	13.97%
Schizophrenia	902	19.08%	667	0.82%	1,569	1.82%
Schizoaffective Disorder	880	18.62%	1,536	1.89%	2,416	2.81%
Post-Traumatic Stress Disorder	612	12.95%	6,209	7.64%	6,821	7.93%

Note: Percentages will not add up to 100% due to multiple diagnoses.

Figure E.2, presents a subset of the data in the table in bar chart form to demonstrate the differences in the prevalence of each diagnosis in the population with SMI and the comparison group.

FIGURE E.2 – PERCENTAGE OF ADULTS WITH DIAGNOSIS OF SMI AND COMPARISON GROUP - SAMPLE OUTPUT
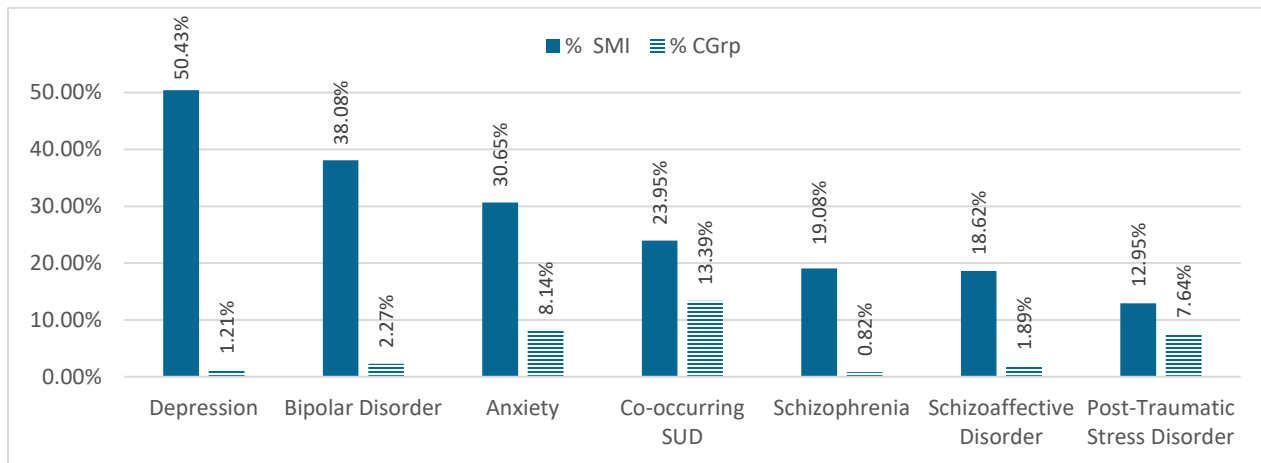
Conclusion

Comparing the distribution of behavioral health diagnoses, between the population with SMI and the comparison group, may help states understand how to target interventions. For example, states may want to target education and care management programs specifically for the population with SMI where the prevalence is extremely high among that population. On the other hand, where the prevalence is high among both the population with SMI and the comparison group population, interventions might be more globally applied. Also, comparing the prevalence of specific behavioral health diagnoses among the population with SMI can serve as an early indicator of conditions that may be driving utilization and cost. This can provide preliminary information on the need for providers of specific services, value-based payment arrangements, and evidence-based practices. Comparing behavioral health conditions between beneficiaries with SMI and the comparison group can also serve to confirm the final scope of the state's analyses of the population with SMI.

E.3 Categorizing Key Beneficiary Demographics

This section will categorize Medicaid beneficiaries by the common population demographics of age, gender, race, ethnicity, and geography, as well as delivery system (FFS or managed care) and program enrollment (Medicaid, Medicaid Expansion).

Example Questions to Be Answered

- What is the age distribution of adult Medicaid beneficiaries with SMI, and how does it compare to the age distribution of the Medicaid population?
- How are adult Medicaid beneficiaries with SMI distributed among race and ethnicity categories?
- How are adult Medicaid beneficiaries with SMI distributed among gender categorizations?
- What Medicaid programs and delivery systems in the state serve the population with SMI?

Medicaid Data Required for Analysis

- Previously created data sets
  - Reference table –population with SMI created in E.1
  - Reference table – comparison group population created in E.1
- Beneficiary data:
  - Beneficiary identifier
  - Age (date of birth)
  - Gender
  - Race/ethnicity
  - County of residence
  - Program eligibility categories
  - Medicare participation/dual eligible status
  - Managed care participation
- Non-Medicaid data:
  - County Categorizations (Frontier, Rural, Urban) for counties located within the state[4]

Analysis Approach for Categorizing Medicaid Beneficiaries by Demographic Elements

To sort the population of adult Medicaid beneficiaries with SMI and the comparison group into demographic categories, consider steps such as the following:

1. Access the two populations created in E.1 (the population with SMI and the comparison group population).

2. Establish the demographic categories in which Medicaid beneficiaries will be sorted. See example of categories in Table E.3.

3. Establish the demographic subcategories in which Medicaid beneficiaries will be sorted. See example of subcategories in Table E.3.

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[4] A listing of Rural, Urban, and Frontier U.S. counties by state can be found on the Federal Census website

4. Using the populations identified in E.1, query both the population with SMI and the comparison group independently to sort Medicaid beneficiaries into the demographic categories and sub-categories established in the previous step. **Note:** Percentages should subtotal to 100% within each population and category

Sample Output

Table E.3 demonstrates a stratified breakout of the population with SMI and the comparison group categorized by age, gender, race, ethnicity, county type and Medicaid programs.

TABLE E.3 - STATEWIDE ADULT POPULATION WITH SMI STRATIFIED BY AGE, GENDER, ETC. - SAMPLE OUTPUT

SMI Profile Category	Subcategory	SMI Count/ Percent	Comparison Group Count/Percent	Medicaid Total
Total Population	Total Population	4,727	81,273	86,000
Median Age	Median Age	47.98	51.14	50.97
Age	Age 18-24	41.82%	54.44%	53.75%
	Age 25-64	38.08%	24.99%	25.71%
	Age 65+	20.10%	20.57%	20.54%
Gender	Female	52.10%	51.90%	51.91%
	Male	47.90%	48.10%	48.09%
Race	Asian	1.60%	1.54%	1.54%
	Black	7.30%	7.49%	7.48%
	Multiracial	0.70%	0.83%	0.82%
	Native American	0.20%	0.24%	0.24%
	White	90.20%	89.90%	89.92%
Ethnicity	Hispanic	15.20%	14.70%	14.73%
	Non-Hispanic	84.80%	85.30%	85.27%
Geography	Frontier	1.35%	1.64%	1.62%
	Rural	23.75%	24.74%	24.69%
	Urban	74.90%	73.62%	73.69%
Medicaid Delivery System	Fee for Service	23.10%	18.40%	18.66%
	Managed Care	76.90%	81.60%	81.34%
Medicaid Program	Medicaid	81.01%	78.30%	78.45%
	Medicaid Expansion	18.99%	21.70%	21.55%
Other	Dual-Eligibles	38.71%	15.21%	16.46%

Conclusion

This analysis provides a closer look at the population with SMI, including whether they live in rural, urban, and frontier areas; whether there may be racial or ethnic health disparities; and the programs through which they are provided services. For instance, a particular age group may make up a disproportionate share of the population with SMI as compared to the comparison group. The analysis may also reveal a concentration of beneficiaries with SMI within a geographic area. In some states, for example, there may be a higher concentration in rural versus urban and frontier areas, which may be an indicator that access to services should be further analyzed.

Examining the prevalence of SMI across delivery systems and programs will help state Medicaid agencies determine where SMI related initiatives should be targeted (e.g. implemented by the state Medicaid agency for fee-for-service populations or by Medicaid managed care plans for the beneficiaries they serve). Any of the analyses described below, including the analyses in other sections, can be further stratified by beneficiary demographics to provide insight into potential disparities. In addition, if available in the state Medicaid data set, states can stratify by income eligibility category to identify clues to where there may be significant social determinants of health needs for the population with SMI.

E.4 Identifying Chronic Physical Conditions among Adults with SMI

Individuals with SMI often experience co-occurring chronic physical health conditions. A key to understanding the population with SMI is knowing their general health status. A high-level approach for identifying the prevalence of chronic physical health conditions among the population with SMI is summarized in this section.

Prior to performing the work in this example, it is recommended that state Medicaid agencies work with their clinical leadership to determine which chronic physical health conditions, diagnosis codes, and other logic, should be used to identify co-occurring chronic physical health conditions. A few examples of potential categories to consider include tobacco use disorder, pulmonary disease, diabetes, obesity, respiratory disorders, and substance use disorder (SUD). Each state should identify a list of conditions relevant to its own Medicaid program.

Example Questions to Be Answered

- What is the prevalence of the selected co-occurring chronic physical health conditions among the population with SMI?
- How does the comparison group population's co-occurring chronic physical health conditions compare to the population with SMI?

Medicaid Data Required for Analysis

- Previously created data sets
  - Reference table – population with SMI created in E.1
  - Reference table – comparison group population created in E.1
- Physical health ICD-9/ICD-10 diagnosis codes
- Claims and encounters data
  - Beneficiary identifier
  - Dates of service
  - Diagnosis code

Analysis Approach to Identifying Chronic Physical Health Conditions

To identify select chronic physical health conditions among adult beneficiaries with SMI and the comparison group, consider steps such as the following:

1. Access the two populations created in E.1 (the population with SMI and the comparison group population).
2. Select the physical health conditions and the related diagnosis codes for the analysis.

3. Query each population for the presence of a claim or encounter with one of the selected physical health diagnoses in the primary or secondary diagnosis fields.
4. Columns in the example are defined as follows:
    a. **SMI Count** – The total number of Medicaid beneficiaries with SMI identified in E1, who have at least one claim with a selected physical health condition, as defined in Step 2.
    b. **Percentage with SMI** – The number of Medicaid beneficiaries with SMI who have an identified physical health condition, divided by the total number of Medicaid beneficiaries with SMI, expressed as a percentage
    c. **Comparison Group Count** – The total number of Medicaid beneficiaries in the comparison group identified in E1, who have at least one claim with a selected physical health condition, as defined in Step 2
    d. **Percentage Comparison Group** – The number of Medicaid beneficiaries in the comparison group with the identified physical health condition, divided by the total number of Medicaid beneficiaries in the comparison group, expressed as a percentage

Sample Output

Table E.4 demonstrates a breakout of the population with SMI and the comparison group by select chronic physical health conditions.

TABLE E.4 - CHRONIC PHYSICAL CONDITIONS OF POPULATIONS WITH AND WITHOUT SMI - SAMPLE OUTPUT

Physical Health Condition	SMI Count	Percent with SMI	Comparison Group Count	Percent of Comparison Group
Total Population	4,727	100%	81,273	100%
Unduplicated Population with at least one physical health condition listed below	2,284	48.32%	40,297	49.58%
Tobacco Use Disorder	1,905	40.30%	16,063	19.67%
Pulmonary Disease	1,807	38.23%	23,013	28.32%
Diabetes	1,781	37.68%	19,960	24.56%
Obesity	1,691	35.77%	11,803	14.52%
Respiratory Disorders	1,243	26.30%	13,569	16.70%
Substance Use Disorder	1,162	24.58%	3,782	4.65%
Hypertension	984	20.82%	14,322	17.62%
Hepatitis C	834	17.64%	15,173	18.67%
Hyperlipidemia	532	11.25%	4,839	5.95%
Cardiovascular Disease	450	9.52%	5,731	7.05%
Human Immunodeficiency Virus	42	0.89%	535	0.66%

Figure E.4 presents a subset of data in the table in bar chart form to demonstrate the differences in the prevalence of select physical diagnoses in the population with SMI and the comparison group.

FIGURE E.4 - CHRONIC PHYSICAL CONDITIONS OF POPULATIONS WITH AND WITHOUT SMI - SAMPLE OUTPUT
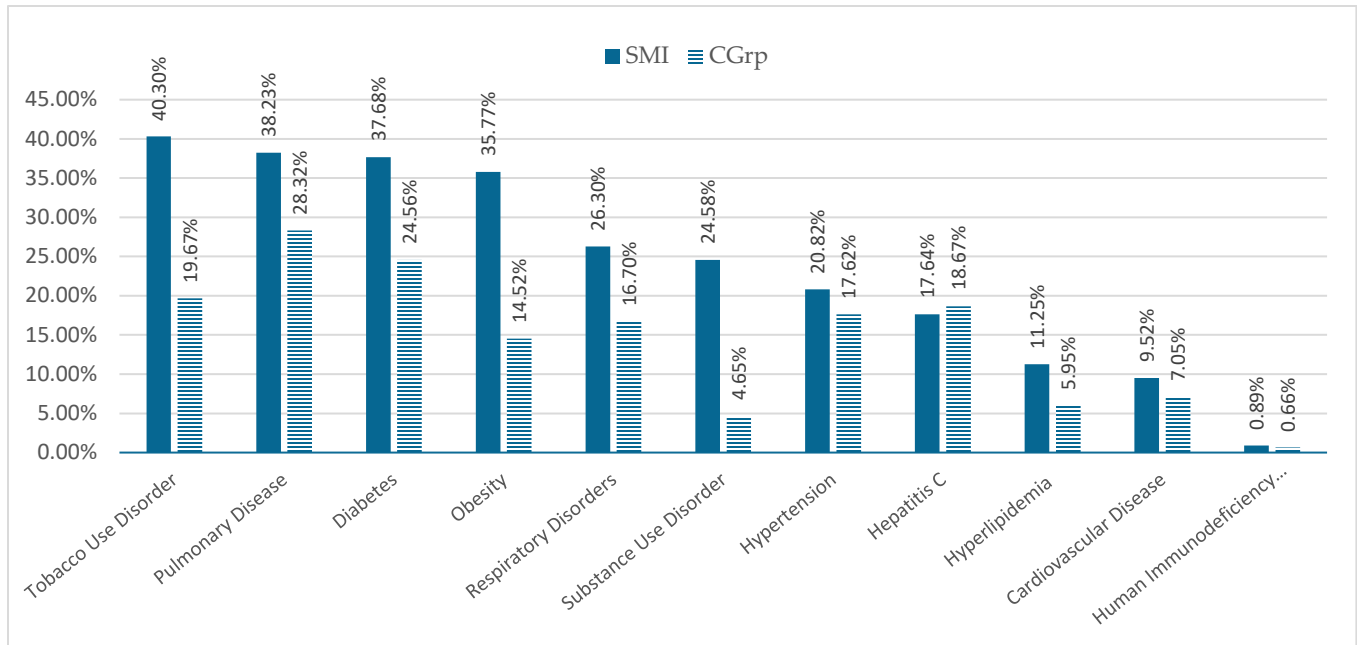
Conclusion

Examining the prevalence of selected chronic physical conditions provides state Medicaid agencies with important information about co-morbidities that can inform initiatives for overall population health management strategies, including integrated physical and behavioral health. For example, if a particular physical health condition is more prevalent in the population with SMI as compared to the comparison group, this may be an important factor for states to consider when prioritizing condition-specific disease management within their integrated physical and behavioral health programs. States may also wish to share information from these analyses with behavioral health providers and managed care entities to help them understand the prevalence of physical health conditions of patients in their state or in stratified subpopulations. States may also want to further analyze data regarding the providers who are rendering care for beneficiaries who have multiple co-morbidities to identify opportunities for improved care coordination and integration.

F. Analysis of Utilization Data

This section is designed to help states identify patterns of utilization for adults with SMI and the comparison group population. Approaches in this section will capture the: 1) services with the highest utilization, 2) utilization of selected services, and 3) average length of stay (ALOS) for selected facility types.

F.1 Identifying Top Services Utilized for Adult Medicaid Beneficiaries with SMI

Patterns of utilization can tell state Medicaid agencies whether services are being provided in expected volumes. Services may be over- or under-utilized based on barriers to care, provider network adequacy, education, or other factors. Understanding utilization patterns will allow state Medicaid agencies to better manage utilization.

Example Questions to Be Answered

- What are the top services/procedures for the population with SMI in terms of volume?
- What is the total volume of these services for the population with SMI compared to the comparison group?
- What is the utilization rate (units per thousand) for those services in both the population with SMI and the comparison group?

Medicaid Data Required for Analysis

- Previously created data sets
    - Reference table – population with SMI created in E.1
    - Reference table – comparison group population created in E.1
- Claims and encounters data
    - Beneficiary identifier
    - Dates of service
    - Procedure code

Analysis Approach for Identifying Top Services Utilized

To identify the top 10 services by volume for adult Medicaid beneficiaries with SMI and in the comparison group, consider steps such as the following:

1. Access the two populations created in E.1 (the population with SMI and the comparison group population).
2. Establish a 12-month period for the analysis that accounts for the timing of claims adjudication (six months is a common runout period for these types of analyses).
3. Query all claims paid for the population with SMI during the period identified in Step 2 by procedure code.
4. Calculate a total count of procedures and rank the procedures from highest to lowest by count.
5. Filter the top 10 procedures by highest count.
6. Query the comparison group for the total counts for each procedure identified in Step 5.

7. Divide the total count by the number of Medicaid beneficiaries in the population with SMI divided by 1,000, to obtain the per thousand utilization rates (i.e. expressed as a formula: Count of procedures / (# of Medicaid beneficiaries in each population total with SMI /1,000) = utilization rate per 1000). In the example shown, 4,727 was used as the number of beneficiaries with SMI (see Table E.1).
8. Complete the formula in Step 6 for the comparison group (i.e. expressed as a formula: Count of procedures / (# of Medicaid beneficiaries in comparison group/1,000) = utilization rate per 1000). In the example shown, 81,273 was used as the beneficiaries count for the comparison group (see Table E.1).

Sample Output

Table F.1, demonstrates the top 10 services and utilization rate for adult Medicaid beneficiaries with SMI and the comparison group over a 12-month period.

TABLE F.1 – TOP SERVICES UTILIZED BY THE POPULATION WITH SMI AND COMPARISON GROUP – SAMPLE OUTPUT

Procedure Code	Procedure Description	SMI Total	SMI Per 1,000	Comparison Group Total	Comparison Group Per 1,000
99285	EMER DEPT HIGH SEVERITY&THREAT FUNCJ	8,643	1,828	10,936	135
99284	EMER DEPT HI SEVERITY&URGENT EVAL	6,704	1,418	7,808	96
90937	HEMODIALYSIS REPEATED EVAL +-REVJ DIAL RX	5,792	1,225	23,079	284
85610	PROTHROMBIN TM	5,741	1,214	35,654	439
A0425	GROUND MILEAGE (AMBULANCE)	5,589	1,182	5,711	70
80048	BASIC METABOLIC PANEL CALCIUM TOTAL	5,500	1,164	15,097	186
G0463	HOSPITAL OUTPATIENT CLINIC VISIT	5,234	1,107	417	5
93005	ECG ROUTINE ECG W/LEAST 12 LDS TRCG ONLY W/O I&R	4,816	1,019	5,919	73
A0427	ALS1-EMERGENCY (ADVANCED LIFE SUPPORT)	3,713	786	3,627	45
70450	CT HEAD/BRN C-MATRL	3,447	729	4,547	56
99283	EMER DEPT MODERATE SEVERITY	2,370	501	4,083	50

Conclusion

High utilization patterns may indicate areas that need attention, such as provider and beneficiary education, utilization management, policy, or benefit design. This analysis is just one way of looking at top services utilized and will provide a raw volume of services provided by the program and the corresponding per-thousand rate. This type of analysis confirms which services are being used in the highest volume by this population.

However, states may also want to consider adding cost to their utilization analysis. For example, identifying services with the highest per unit cost and querying utilization of those services may help states to identify opportunities for interventions. Additional factors may also warrant consideration to provide context for findings regarding utilization. For example, high-volume low-cost services may help to reduce the volume of high-cost services (e.g., high volume home and community-based services may help to reduce high-cost inpatient admissions). In this case, a higher volume is not only warranted but desired. It may also be useful to identify and analyze gaps in care or procedures with low or no utilization. For instance, state Medicaid agencies can explore which groups of Medicaid beneficiaries with SMI have not had an annual check-up. This may indicate a need for states to managed care organizations to place more emphasis on primary care for Medicaid beneficiaries with SMI.

F.2 Examining Utilization of Selected Behavioral Health Services

Analyzing utilization for a population can provide information about which services are utilized most/least by the population with SMI. Prior to conducting this type of analysis, states should review their coverage policies (covered services, limits, prior authorized requirements, etc.) for the relevant services. Consultation with clinical leadership may be helpful in selecting the procedures to be examined and in understanding the impact of coverage policies and clinical practice guidelines on utilization patterns.

Example Questions to Be Answered

- What is the utilization of the selected behavioral health services?
- Do there appear to be gaps in service use?

Medicaid Data Required for Analysis

- Previously created data sets
  - o Reference table – population with SMI created in E.1
- Procedure codes (as identified in the selected subset for analysis)
- Claims and encounters data
  - o Beneficiary identifier
  - o Dates of service
  - o Procedure code

Analysis Approach for Examining Utilization of Selected Behavioral Health Services

To examine utilization of selected behavioral health services among adult Medicaid beneficiaries with SMI, consider steps such as the following:

1. Access the population with SMI created in E.1.
2. Prior to performing the work in this example, it is recommended that state Medicaid agencies work with their clinical leadership to determine the subset of procedure codes for analysis.
3. Establish a 12-month period for the analysis that accounts for the timing of claims adjudication (six months is a common runout period for these types of analyses).
4. Query all claims paid for the population with SMI during the period identified in Step 3 for the procedure codes identified in Step 2.
5. Calculate a total count of procedures.

Sample Output

Table F.2 demonstrates utilization of select behavioral health procedure codes.

TABLE F.2 – SELECT BEHAVIORAL HEALTH PROCEDURES BY VOLUME – SAMPLE OUTPUT

Procedure Code	Description	Count of Beneficiaries	Total Units
90792	Pharmacologic Management	3,709	20,519
90804	Individual Therapy 20 – 30 min	3,478	71,307
90847	Family Psychotherapy	1,885	5,919
90887	Other Psychiatric Services or Procedures	1,604	2,005
H0031	Mental Health Assessment, by Non-physician	1,576	1,582
H0001	Alcohol and/or Drug Assessment	1,393	1,401
90853	Group Psychotherapy	1,087	13,044
90801	Diagnostic Interview Examination	972	3,710
H2011	Crisis Intervention Service, per 15 minutes	953	4,168
H2012	Behavioral Health Day Treatment, per hour	372	134,020
99201	New Patient Office Visit	129	770
H2021	Community-based Wrap-around Services, per 15 mins	51	1,112
H0015	Alcohol and/or Drug Services; Intensive Outpatient	42	714
H2019	Therapeutic Behavioral Services, per 15 minutes	37	185
H0006	Alcohol and/or Drug Services; Case Management	28	2,031
H0025	Behavioral Health Prevention Education Service	23	244
99221	Admission History and Physical; Exam	18	54
90816	Individual Psychotherapy	17	147
H0024	Behavioral Health Prevention Information Dissemination Svc	12	116
H0046	Mental Health Services, Not Otherwise Specified	7	287
H0047	Alcohol and/or Other Drug Abuse Svcs., Not Otherwise Spec.	2	142

Conclusion

This type of analysis can help a state to identify the procedure codes with high/low patterns of utilization within a category of service (e.g. community behavioral health services). State Medicaid agencies can use these results to confirm whether Medicaid beneficiaries are receiving services in the right balance between acute and non-acute services for this service class. Utilization of key behavioral health services among the population with SMI could be used to serve as an initial indicator of the adequacy of behavioral health provider networks.

State Medicaid agencies can gain further insight into this by adding beneficiary demographics such as geography or race/ethnicity to this analysis to see if there is a variance in utilization pattern in different areas across the state and if certain populations seem to be over or under consuming services. This finding could indicate variance of availability of or access to service types and identify targeted care management opportunities.

F.3 Examining Average Length of Stay for Inpatient Hospitalizations

A key utilization metric for inpatient services is Average Length of Stay (ALOS). The analysis below provides ALOS in the population with SMI and the comparison group population across different facility types. For this analysis, ALOS is examined for inpatient acute hospital, inpatient psychiatric hospital, and skilled nursing facility.

Example Questions to Be Answered

- How does the ALOS for each facility type compare between the population with SMI and the comparison group population?

Medicaid Data Required for Analysis

- Previously created data sets
  - Reference table – population with SMI created in E.1
  - Reference table – comparison group population created in E.1
- Claims and encounters data
  - Beneficiary identifier
  - Dates of service
  - Revenue codes
  - DRG codes (or other method for identifying facility claims)

Analysis Approach for Calculating Average Length of Stay for Inpatient Hospitalizations

To calculate ALOS for inpatient acute, inpatient psychiatric, and skilled nursing facility types among adult Medicaid beneficiaries with SMI and the comparison group, consider steps such as the following:

1. Access the two populations created in E.1 (the population with SMI and the comparison group population).
2. Establish a 12-month period for the analysis that accounts for the timing of claims adjudication (e.g. by including a runout period of six months, or longer).
3. Prior to performing the work in this example, it is recommended that state Medicaid agencies work with their clinical leadership to select the facility types for analysis.
4. Query all claims for the Revenue and/or DRG codes (or other method for identifying facility claims) which identify admissions for the facility types selected in Step 3.
5. Count the number of admissions and aggregate the length of stay for each facility type for the population with SMI.
6. Count the number of admissions and aggregate the length of stay for each facility type for the comparison group.
7. Calculate the ALOS for each population by dividing the aggregate length of stay by the number of admissions.

Sample Output

Table F.3 displays the count of admissions and ALOS for the population with SMI and the comparison group for each facility type queried.

Facility	SMI Admissions	SMI Total Days	SMI ALOS	Comparison Group Admissions	Comparison Group Total Days	Comparison Group ALOS
Inpatient – Acute Hospital	3,214	13,499	4.2	1,807	2,891	1.6
Inpatient – Psychiatric Hospital	1,824	24,978	13.69	28	134.4	4.8
Skilled Nursing	231	347	1.5	341	273	0.8

Conclusion

This type of analysis can be used to summarize the ALOS for the population with SMI in multiple facility settings, which may help state Medicaid agencies understand whether beneficiaries with SMI are prone to longer lengths of stay in facilities than the comparison group, and in which facility types those stays occur. Utilization of facility services may indicate availability or non-availability of specific physical or behavioral health outpatient services, both pre-admission and post-discharge. For example, if the ALOS in physical health inpatient settings (acute) is longer for beneficiaries with SMI, it may indicate the need for improved behavioral health support post-discharge.

States can include readmission rates to add another dimension to their analyses. Shorter ALOS coupled with higher readmission rates could indicate inadequate discharge planning or inappropriate discharge. In addition, states may want to further stratify this analysis by subsets of their population. For instance, Medicaid beneficiaries who are dually-eligible for Medicare are expected to be more likely to incur extended skilled nursing lengths of stay due to long-term care needs. By separately capturing ALOS for non-duals, states may get a better sense of where there is high ALOS and where interventions may be most effective.

G. Analysis of Cost Data

Understanding the cost of care for populations with SMI is often a high priority for state officials. This section will help states think about the analytical questions that can be asked to better understand the costs and related considerations that may impact the results. Approaches in this section will capture the: 1) cost of care for Medicaid beneficiaries with SMI, and 2) the top services by cost.

G.1 Calculating Average Cost of Care

Medicaid beneficiaries with SMI tend to use significantly more Medicaid services than those without SMI. Below is high-level cost analysis of the population with SMI versus the comparison group population, which can be used by state Medicaid agencies to better understand the factors that drive costs in their Medicaid population with SMI.

When analyzing cost of care, it is important to understand the impact of dual-eligibles. Beneficiaries who are dually enrolled in Medicare and Medicaid will have a substantial portion of their healthcare costs covered by Medicare, and these costs are generally not included in the Medicaid data being analyzed. When examining costs, it is recommended that dual-eligibles and non-duals be separately analyzed to avoid skewing aggregate results.

This analysis can be extended to utilize any of the demographic breakouts created in Section E above (e.g. "Adults 25-64 with and without SMI" or "Adult males with and without SMI").

Example Questions to Be Answered

- What is the average annual Medicaid total cost of care for beneficiaries who are not dually-eligible for Medicare in both the population with SMI and the comparison group?
- What is the average annual Medicaid total cost of care for beneficiaries who are dually-eligible for Medicare in the population with SMI and the comparison group?
- What is the average Medicaid total cost of care by selected behavioral health diagnoses in the population with SMI?

Medicaid Data Required for Analysis

- Previously created data sets
  - Reference table – population with SMI created in E.1
  - Reference table – comparison group population created in E.1
  - Reference table – breakout of diagnosis category among adults with SMI and comparison group created in E.2
- Claims and encounters data
  - Beneficiary identifier
  - Dates of service
  - Diagnosis code
  - Medicaid amount paid

Analysis Approach for Examining Average Cost of Care

To estimate average cost of care by examining annual expenditures among adult Medicaid beneficiaries with SMI and the comparison group, consider steps such as the following:

1. Access the two populations created in E.1 (the population with SMI and the comparison group population).
2. Establish a 12-month period for the analysis that accounts for the timing of claims adjudication (e.g. including a runout period of six-months, or longer).
3. Calculate a total Medicaid cost of care by summing amount paid from final adjudicated claims/encounters with dates of service in the analysis period. Calculate similar totals for the population with SMI and the comparison group from Step 1.
4. Access the results stored from E.2 (breakouts of Diagnosis Category Among Adults with SMI and comparison group).
5. Subtotal claims for Medicaid beneficiaries who are in the population with SMI and the comparison group by diagnosis.
6. When creating Table G.1.A, select only beneficiaries who are not dual eligibles throughout the measurement period.
7. When creating Table G.1.B, select only beneficiaries who are dual eligibles throughout the measurement period.
8. Calculate the average annual expenditures per beneficiary by dividing total costs by the count of beneficiaries in each category.
9. Calculate a monthly per member per month (PMPM) by dividing the average annual expenditures per beneficiary by the number of months in the analysis (12).

Sample Output

Table G.1.A shows cost of care for the populations with SMI and the comparison group by annual expenditures excluding beneficiaries dually eligible for Medicare and Medicaid (dual-eligibles). Table G.1.B shows the same information for the dual-eligibles. The tables also show annual expenditures for selected diagnosis categories.

Note: While the beneficiary counts for the total Medicaid population, comparison group, and adults with SMI have had duplicates removed, it is likely that individual beneficiaries will have multiple SMI diagnoses. Therefore, diagnoses breakouts cannot be rolled up through simple addition, but beneficiary counts are unduplicated within each diagnosis.

Tables G.1.A and G.1.B demonstrate the total cost of care and PMPM by diagnosis for the population with SMI including and excluding dual-eligibles.

> ### *Medicaid Managed Care Encounters Cost Information*
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> States should consider the potential impact that the varying quality of encounters data have on these cost analyses. In instances where cost information on encounters is unavailable, states could consider using the state Medicaid Fee Schedule to estimate costs.

TABLE G.1.A - AVERAGE COST OF CARE FOR ADULTS WITH SMI (NON-DUALS) – SAMPLE OUTPUT

Adult Non-Duals Population/Selected Diagnosis Categories	Count of Beneficiaries	Total Annual Expenditures	Average Annual Expenditures Per Beneficiary	Monthly Per Member Per Month
Total Medicaid Population	71,844	$310,727,030	$4,325	$360.44
Comparison Group	68,911	$284,948,543	$4,135	$344.58
Adults with SMI	2,897	$41,617,966	$14,365	$1,197.08
Bipolar Disorder	887	$5,103,461	$16,322	$1,360.17
Schizophrenia	424	$3,767,616	$17,856	$1,488.00
Schizoaffective Disorder	422	$4,360,872	$10,002	$833.50

TABLE G.1.B - AVERAGE COST OF CARE FOR ADULTS WITH SMI (DUAL-ELIGIBLES) – SAMPLE OUTPUT

Adult Duals Population/ Selected Diagnosis Categories	Count of Beneficiaries	Total Annual Expenditures	Average Annual Expenditures Per Beneficiary	Monthly Member Per Month
Total Medicaid Population	14,156	$285,993,668	$20,203	$1,683.59
Comparison Group	12,362	$156,720,660	$12,678	$1,056.50
Adults with SMI	1,830	$60,814,560	$33,232	$2,769.33
Bipolar Disorder	913	$41,085,000	$45,000	$3,750.00
Schizophrenia	478	$27,017,516	$56,522	$4,710.17
Schizoaffective Disorder	458	$7,018,392	$15,324	$1,277.00

Conclusion

These types of analyses can help Medicaid agencies to identify if a specific diagnosis, e.g. bipolar disorder, should be a focus of special initiatives which emphasizes preventive care and early interventions, such as behavioral health homes or co-located behavioral health and physical health services. By examining expenditures for the Medicaid population with SMI relative to the comparison group, states can better understand which behavioral health conditions in the population with SMI may be having the largest impact on total cost of care and overall Medicaid spending for both physical and behavioral health services for these beneficiaries. In addition, examining expenditures for beneficiaries who are Medicare and Medicaid dual eligibles separately from beneficiaries who are not dual eligibles could highlight potential interventions for beneficiaries with SMI. For example, state Medicaid agencies may want to perform this cost analysis on beneficiaries who reside in nursing facilities. This will allow state Medicaid agencies to determine whether nursing facility expenditures are higher among dual eligibles with SMI. These data may support enhanced opportunities for home and community-based service programming. Finally, by combining the analyses in G.1 with beneficiary demographic data, states may learn that a county, or counties, may have higher costs related to beneficiaries with SMI, which may indicate a variety of issues, including a shortage of providers or other needed services.

G.2 Identifying Top Cost Drivers by Service for Adult Medicaid Beneficiaries with SMI

Beyond the examination of conditions that are driving costs, state Medicaid agencies can drill down to specific services that are cost driver for their Medicaid beneficiaries with SMI. This section will explain how states can identify these services.

Example Questions to Be Answered

- What are the top services/procedures for the population with SMI in terms of cost?
- What is the total cost of each of these services for the population with SMI compared to the comparison group?
- What is the PMPM cost for these services in both the population with SMI and the comparison group?

Medicaid Data Required for Analysis

- Previously created data sets
  - Reference table – population with SMI created in E.1
  - Reference table – comparison group population created in E.1
- Claims and encounters data
  - Beneficiary identifier
  - Dates of Service
  - Procedure code
  - Amount paid

Analysis Approach for Identifying Top Cost Drivers by Service

To identify the top 10 services by cost for adult Medicaid beneficiaries with SMI and in the comparison group, consider steps such as the following:

1. Access the two populations created in E.1 (the population with SMI and the comparison group population).
2. Establish a 12-month period for the analysis that accounts for the timing of claims adjudication (e.g. including a runout period of six-months, or longer).
3. Query all claims paid for the population with SMI during the period identified in Step 2 by procedure code.
4. Aggregate the amounts paid by procedure and rank the procedures from highest to lowest by aggregate amount paid.
5. Filter the top 10 procedures by aggregate amount paid.
6. Query the comparison group for aggregate amount paid for each procedure identified in Step 5.
7. Divide the aggregate amounts paid by the number of Medicaid beneficiaries in the population with SMI, and separately for the comparison group, for each procedure to obtain the average per beneficiary cost. Divide the result by 12 for a PMPM. In the example shown, 4,727 was used as the number of beneficiaries with SMI, and 81,273 was used for the comparison group (see Table E.1).

Sample Output

Table G.2 demonstrates the top 10 services by cost for adult Medicaid beneficiaries with SMI and the cost of those services in the comparison group over a 12-month period.

TABLE G.2 – TOP TEN SERVICES DELIVERED TO MEDICAID BENEFICIARIES WITH SMI BY COST (WITH COMPARISON GROUP COST) – SAMPLE OUTPUT

Procedure Code	Procedure Description	Annual SMI Total	Annual SMI PMPM	Annual Comparison Group Total	Annual Comparison Group PMPM
99285	EMER DEPT HIGH SEVERITY&THREAT FUNCJ	$4,522,883	$79.73	$5,404,048	$5.54
99284	EMER DEPT HI SEVERITY&URGENT EVAL	$2,130,105	$37.55	$2,580,068	$2.65
A0427	ALS1-EMERGENCY (ADVANCED LIFE SUPPORT)	$2,038,195	$35.93	$1,991,048	$2.04
A0425	GROUND MILEAGE AMBULANCE	$1,662,184	$29.30	$1,944,252	$1.99
74177	CT ABD & PELVIS W/CONTRAST	$816,695	$14.40	$1,333,611	$1.37
70450	CT HEAD/BRN C-MATRL	$723,857	$12.76	$959,406	$0.98
99283	EMER DEPT MODERATE SEVERITY	$448,023	$7.90	$860,909	$0.88
99291	CC E/M CRITICALLY ILL/INJURED 1ST 30-74 MIN	$434,853	$7.67	$498,180	$0.51
J9310	RITUXIMAB CANCER TREATMENT	$428,107	$7.55	$1,106,453	$1.13
26615	OPEN TX METACARPAL FRACTURE SINGLE EA	$399,867	$7.05	$230,954	$0.24

Conclusion

By examining the service-level expenditures for the population with SMI as compared to the comparison group, state Medicaid agencies can determine which services are driving higher costs for the SMI population and consider developing interventions specifically targeting those procedures. For example, if ground ambulance mileage was an outlier for the population with SMI, rather than making broad changes in ambulance transportation policy, the state might focus on the specific transportation needs of Medicaid beneficiaries with SMI. The state might also want to use the beneficiary data such as county location to drill down into emergency department use by the SMI population to determine if they need to redirect behavioral health services, such as crisis intervention, in specific areas. States may want to consult with clinical or policy experts to identify other specific services for which it would be helpful to analyze PMPM expenditures (beyond top 10 by cost) (e.g. services relevant to recent policy interventions). States also may want to consider performing longitudinal analyses on the populations, such as layering the total cost of care and top 10 procedures for longer study periods to analyze trends and how population shifts or other demographic trends, policy initiatives, or other factors may be affecting utilization and cost.

H. Further Possibilities for Using Medicaid Data

This technical resource provides a series of sample analyses that build on each other. Additionally, this resource can serve as a framework for users to begin identifying the Medicaid population with SMI, leading states to uncover insights about the demographics of this population, the services they access, and their impact on overall Medicaid expenditures. The sample analyses described above can be combined in a variety of ways to provide a more comprehensive understanding of the population with SMI. Examples of further analysis include:

- Combining population demographics (E.3 Statewide Adult Population with SMI Stratified by Age, Gender, Race, Etc.) with cost analysis (G.1 Average Cost of Care for SMI) to support focused initiatives with Medicaid beneficiaries in specific population groups, geographies, and/or other classifications that are significant cost drivers.
- Combining prevalent diagnoses (E.4 Chronic Physical Health Conditions of Populations with SMI) with cost analysis (G.1 Average Cost of Care for SMI) to determine whether certain chronic condition co-morbidities are more impactful than others as cost drivers.
- Combining diagnosis category (E.2 Breakout of Diagnosis Category among Adults with SMI) with utilization analysis (F.1 Top Services Utilized by Adult Medicaid Beneficiaries with SMI) to uncover utilization patterns that may be related, but not directly attributed, to a beneficiary's SMI diagnosis.

States could also continue to drill down into available Medicaid data to answer more specific questions at the beneficiary level. For example, Medicaid data can be analyzed to identify important clinical care gaps, such as Medicaid beneficiaries who have a diagnosis of schizophrenia but who do not have a claim for an antipsychotic medication. State Medicaid agencies should work with state behavioral health authorities to identify other significant quality of care gaps that can be identified through the analysis of Medicaid data.

I. Next Steps

While the examples discussed in this technical resource focus exclusively on Medicaid data, some states may want to pursue more advanced data analytics, including use of data sets from other state and national databases. States could build upon the analyses outlined in this resource to: 1) incorporate information on the costs of care provided by the state behavioral health authority, other state programs, Medicare, or other payers or funding streams; 2) identify overlap or gaps which may exist across beneficiaries and payers; and 3) inform an understanding of social determinants of health factors and services for adults with SMI. Non-Medicaid data elements can be used to yield a broader perspective about adults with SMI served in Medicaid programs.

Figure I.1 suggests some additional elements from other data sources that may be useful to states interested in further enhancing their analyses. Note, the lists included in figure I.1 are provided for illustrative purposes only and do not include all potential data elements. For instance, Medicaid systems can also potentially provide other types of FFS and/or MCO data, case management data, provider-level clinical encounters data from Health Information Exchanges (HIEs), and performance and satisfaction data from Healthcare Effectiveness Data and Information Set (HEDIS®), Consumer Assessment of Healthcare Providers and Systems (CAHPS®) and other surveys.

FIGURE I.1 – EXAMPLES OF POTENTIAL DATA ELEMENTS

- Age, Gender, Race
- Procedure Code
- Diagnosis
- Provider Information
- Amount Paid

Medicaid

Other Publicly Funded Health Care

- State-Run Inpatient Psychiatric Hospital
- State and Block-Grant Funded Care
- Veterans Services

- Cash Assistance
- Low Income Subsidies
- Energy Assistance
- Housing Status
- Education
- Transportation Needs
- Daily Living Support Needs

Social Determinant of Health

Non-Health Public Services

- Court Directed Diversion Servces
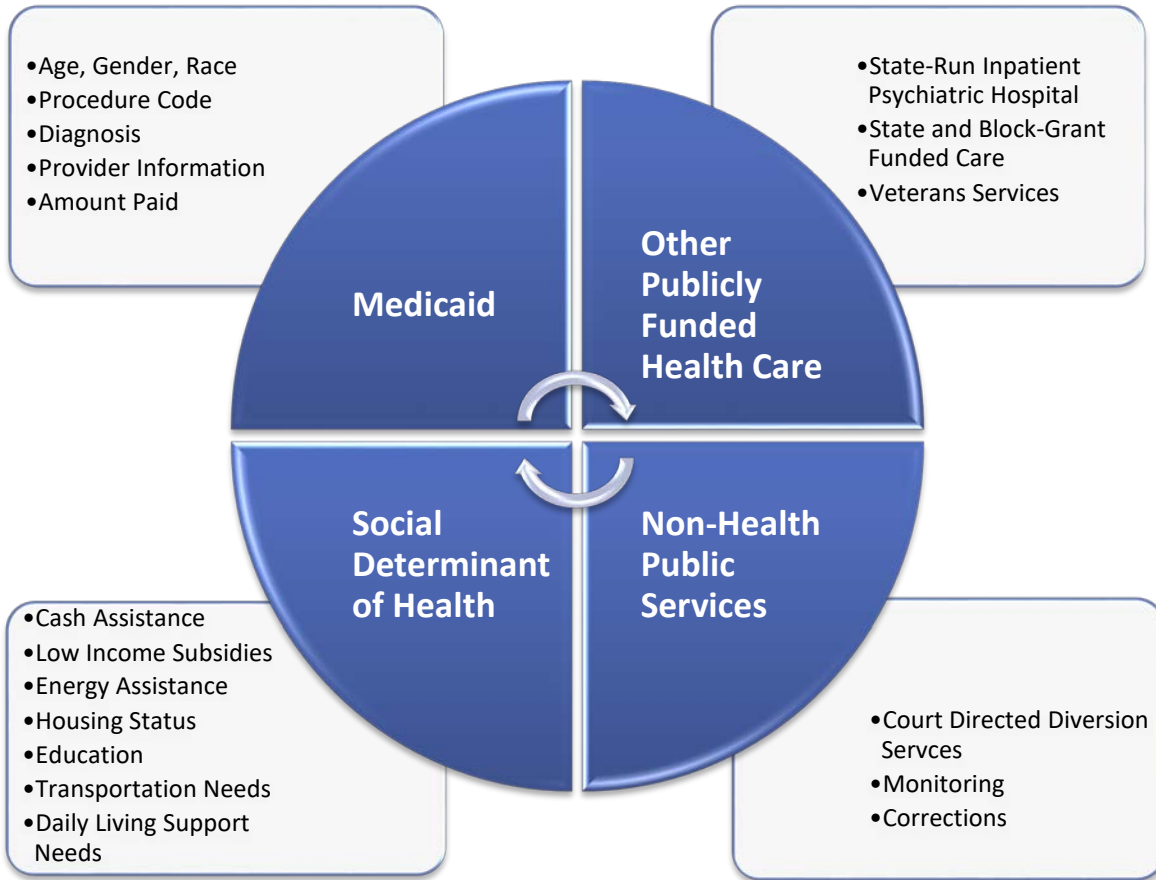- Monitoring
- Corrections

Table I.2, on the next page, provides some examples of potential sources for the data elements listed in Figure I.1.

TABLE I.2 - EXAMPLES OF NON-MEDICAID DATA RESOURCES

Type of Data Source	Name of Data Set	Description
Standardized National Data	Health Resources and Services Administration (HRSA) Data: Uniform Data System (UDS)	Performance reports for HRSA grantees such as FQHCs
Standardized National Data	SAMHSA: National Mental Health Services Survey (NMHSS)	Annual survey of all known mental health treatment facilities in the United States, both public and private
Standardized National Data	SAMHSA: National Survey of Substance Abuse Treatment Services (NSSATS)	Annual census of all substance abuse treatment facilities in the United States, both public and private
Standardized National Data	SAMSHA: Uniform Reporting System (URS)	Data collections of Population, Client Level and Facility and ED data
Non-Standardized State/National Data	State and national licensure boards	License and certification data
Non-Standardized State/National Data	Health Risk Assessment Data	May capture housing status or history of homelessness, transportation needs, employment, or other Social Determinants of Health
Non-Standardized State/National Data	SAMHSA: National Survey on Drug Use and Health (NSDUH)	Estimates of the prevalence, patterns, and consequences of alcohol, tobacco, and illegal drug use and mental disorders in the U.S. civilian, non-institutionalized population, ages 12 and older
Non-Standardized State/National Data	HUD: Homeless Management Information System (HMIS)	State and national estimated counts of sheltered and unsheltered homeless beneficiaries with SMI
Non-Standardized State/National Data	HUD: Annual Homeless Assessment Report (AHAR) to Congress	Summarizes local point-in-time counts of homeless individuals, which can be used for population level estimates

J. Conclusion

It is important for states to find ways to better understand their Medicaid beneficiaries with SMI. Without structured analyses of this population, it could be challenging for states to determine ways to provide appropriate care and to design initiatives that can positively impact these high cost, high need beneficiaries. The analyses outlined in this technical resource are a starting place for states to leverage their Medicaid claims and encounters data in ways that can begin to provide insights into the profile of their adult Medicaid beneficiaries with SMI, how their care drives Medicaid costs, the care they may be receiving, and opportunities for improving that care.

Depending on a state's goals, it may also choose to add other data sources that include a more complete picture of the population. Augmenting the initial analyses outlined in this resource with other data and data sources can also assist the state in understanding how to improve care for its adult population(s) with SMI and is a next step for states to consider pursuing.

K. Acronyms

Acronym	Definition
ALOS	Average Length of Stay
CAHPS®	Consumer Assessment of Healthcare Providers and Systems
CHIP	Children's Health Insurance Program
CMS	Centers for Medicare & Medicaid Services
DRG	Diagnosis-Related Group
ED	Emergency Department
FFS	Fee-for-Service
FQHC	Federally Qualified Health Center
HEDIS®	Healthcare Effectiveness Data and Information Set
HIE	Health Information Exchange
HMIS	Homeless Management Information System
HRSA	Health Resources and Services Administration
HUD	United States Department of Housing and Urban Development
IAP	Medicaid Innovation Accelerator Program
ICD	International Classification of Diseases
MCO	Managed Care Organization
MMIS	Medicaid Management Information System
NDC	National Drug Code
NMHSS	National Mental Health Services Survey
NSDUH	National Survey on Drug Use and Health
NSSATS	National Survey of Substance Abuse Treatment Services
PCMH	Patient-Centered Medical Home
PMPM	Per Member Per Month
SAMHSA	Substance Abuse and Mental Health Services Administration
SMI	Serious Mental Illness
SSA	Social Security Administration
SUD	Substance Use Disorder
T-MSIS	Transformed Medicaid Statistical Information System
UDS	Uniform Data System
URS	Uniform Reporting System