TOOL • JULY 2025

Center for Health Care Strategies

From Data to Decisions: Best Practices for Using Data Analysis to Inform Medicaid Policies and Programs

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TAKEAWAYS

- Data-driven policy and program decision-making help Medicaid agencies pinpoint population needs, target resources, and demonstrate impact.
- This guide outlines four practical steps — planning, designing, analyzing, and communicating — for transforming data into clear, actionable evidence for policy and program decisions.
- Using continuous glucose monitor access as an example, this guide walks through each step using two hypothetical states to illustrate practical choices on research questions, data sources, methods, and messaging.
- Applying these best practices can support policies and programs that improve member outcomes while effectively investing limited Medicaid dollars.

Data analysis is an essential tool that state Medicaid agencies can use to make evidence-based policy and program decisions. Data can help states effectively understand population health needs, target programs where they are needed most, evaluate policy changes, and demonstrate the value of policies to stakeholders. Rigorous analysis can support Medicaid staff to make informed decisions about programs and services that make the most of limited resources while improving health outcomes for Medicaid members.

This guide offers considerations for Medicaid agencies interested in using data analysis to inform policy and program design and implementation. It draws on insights from technical assistance provided through the *Continuous Glucose Monitor Access Accelerator*, a national initiative led by the Center for Health Care Strategies with support from The Leona M. and Harry B. Helmsley Charitable Trust to help states expand access to continuous glucose monitors (CGM) within Medicaid. While the project focuses on improving support for people living with diabetes, the insights in this guide are generalizable to Medicaid agencies interested in using data to enhance a broad range of policies and programs that improve the care and services for Medicaid members. It is organized into four key stages of data analysis and related best practices:

1. Planning

2. Designing

3. Analyzing

4. Communicating

Made possible through support from The Leona M. and Harry B. Helmsley Charitable Trust.

Each section includes vignettes describing the experiences of two hypothetical states developing data-driven CGM coverage policies, providing both theoretical frameworks and practical applications.

By following the best practices outlined in this guide, states can develop more effective, evidence-based strategies that make the most of existing resources to support Medicaid members.

1. Planning

Careful, upfront planning — including having clear **objectives and research questions** — can help ensure that data analyses align with **stakeholder audience** goals and expectations, and also provides an opportunity to identify **potential data limitations** early, reducing the need for major revisions later.

Strategic Objectives and Research Questions

Effective data analysis requires clearly defined research questions that directly connect to decisions that audiences need to make, such as evaluating a policy change or determining implementation approaches to share with stakeholders. These questions serve as guideposts to ensure a state's analysis stay focused on strategic objectives. Example research questions include:

- *What is the impact of recent policy changes on access to care and related health outcomes?*
- *Which eligible populations are not accessing services or benefits, and what barriers do they face?*
- *What evidence supports expanding coverage eligibility to populations currently not included?*

Stakeholder Audiences

The value of an analysis depends largely on how well it addresses the specific needs of key stakeholders, such as legislators, the governor's office, agency leaders, managed care organizations (MCOs), providers, and the public. The following questions can help ensure the findings will be relevant and actionable:

- *What, if any, decisions will this audience need to make?*
- *What level of detail and technical complexity is appropriate for each audience?*
- *What evidence will be most compelling given each audience's needs and priorities?*

Data Limitations

Before committing significant resources to an analysis or analysis plans, it is important for states to evaluate whether available data can adequately address identified research questions. This assessment helps set realistic expectations and may guide refinements of the analysis approach. Key steps include:

- Identifying any gaps or limitations in the data;
- Assessing if data will be available within the timeframe of the analysis; and
- Considering alternative approaches if primary research questions cannot be answered with available data, such as, *"Can the question be answered in academic literature?"* Or *"Have other states conducted similar analysis with their Medicaid population?"*

Planning in Action: State CGM Vignettes

The following vignettes illustrate how two hypothetical states — **State A** and **State B** — developed research questions based on specific policy contexts and data availability, while aligning their analysis with stakeholder priorities.

State A wanted to understand the impact of recent changes to its Medicaid CGM coverage policy, which now includes members with type 2 diabetes who either require insulin or have experienced problematic hypoglycemia. Early in the process, the state project team assessed their data capabilities and confirmed the ability to track CGM use through claims data and A1c levels through MCOs' quality reporting and other clinical data sources. However, they noted the need to work with MCOs to gather complete outcome data. Recognizing that leadership would be particularly focused on the policy's impact on both cost and health outcomes, project leads identified the following research questions:

- *How many newly eligible members are accessing CGMs after the policy change?*
- *Has there been an impact on health outcomes resulting from the policy change?*
- *Are there implications for costs, beyond the cost of CGM devices, because of the policy change?*

State B identified that CGM uptake was low despite broad coverage criteria, with an initial review of claims data showing that only 15 percent of eligible members used a CGM within the past calendar year. To better understand access barriers experienced by Medicaid members, the state analyzed geographic and demographic trends, as well as provider prescribing patterns. To guide the analysis, project leads identified the following research questions:

- *How does CGM use differ by geographic areas and by eligible members' demographics?*
- *How does CGM use differ between members with type 1 versus type 2 diabetes and those with different histories of glycemic instability?*
- *How do providers' CGM prescribing patterns vary by provider type?*

Policy/Program Lifecycle and Data Analysis

While it is best to conduct data analysis early, it is not always feasible. The table below describes considerations for selecting an analysis approach based on the policy or program lifecycle stage.

LIFECYCLE STAGE	ANALYSIS APPROACH
Development	• Understand potential policy impacts on different populations • Compare policy alternatives using evidence from similar programs
Pre-Implementation	• Collect baseline data before a policy change to establish a comparison group • Design an evaluation approach that addresses program objectives before changes take effect • Support timely assessment of early implementation (e.g., six-month review) • Gather data to inform policy implementation, perhaps identifying areas of greatest need
Post-Implementation	• Delay analysis until after policy adoption • Establish a retrospective baseline using data from before the policy change • Assess impact using a comparison group or historical data • Define realistic evaluation timeline with stakeholder audiences

2. Designing

A well-designed analysis requires attention to detail in research design. Clearly defining **data sources**, **study populations**, and **outcome measures** at the outset helps ensure consistency and transparency. It is also important to identify and report on any known data limitations, which can lend credibility to a state's findings when sharing results with key audiences.

Data Sources

Typical data sources for Medicaid agencies include:

- Medical claims and encounter data, including inpatient, outpatient, and pharmacy claims to provide information on medical diagnoses, equipment used, and costs;
- Medicaid enrollment and demographic data to provide data on age, race/ethnicity, eligibility category, and other relevant patient characteristics;
- Clinical data, such as A1c or blood sugar level values; and
- Provider- and MCO-reported quality measures.

The use of other data sources will depend on specific research questions, such as:

- Information from surveys, interviews with Medicaid providers or members, or other data collected with primary methods; and
- Population-level social determinants of health data (e.g., Area Deprivation Index or Community Deprivation Index) or health-related social needs data (e.g., housing insecurity).

Study Population

Research questions will drive the choice of a study population or subpopulations. For instance, if a Medicaid agency wants to understand the impact of a newly covered benefit, then the study population may be new service users, recently eligible Medicaid members, or members with specific clinical characteristics relevant to the new policy or program. Some research questions may require patient subpopulations to be segmented by demographic variables, such as race/ethnicity, region, or age, and others by primary provider or prescribing provider. Gaps identified in data may also inform the extent to which specific subpopulations can be assessed.

Identify study sample selection criteria before beginning an analysis. Common criteria include specifying enrollment requirements, such as the number of months enrolled during a specific period, or a minimum level of service utilization (e.g., number of CGM prescriptions or durable medical equipment orders filled). Members of the study population should be enrolled in Medicaid during the period over which outcomes are examined, though the state may specify that each study sample member requires a minimum number of months enrolled.

Comparison Groups

Selecting appropriate comparison groups is critical for distinguishing between the actual impact of a policy or intervention and changes that might have occurred due to other factors. Without well-designed comparison groups, it is difficult to determine whether observed outcomes are potentially attributable to the policy or program change being studied. Consider these approaches *(see next page)*:

COMPARISON TYPE	DESCRIPTION	STRENGTHS	LIMITATIONS
Randomized Groups	Compare outcomes between randomly assigned intervention and control groups	"Gold standard" for causal inference	Rarely feasible in real-world context due to ethical and resource constraints
Similar Non-Users	Compare outcomes between those receiving intervention vs. similar individuals who are not	Rarely feasible in real-world context due to ethical and resource constraints	Selection bias concerns; requires careful statistics-based matching techniques
Geographic Comparisons	Compare outcomes between those receiving intervention vs. similar individuals who are not	Ability to control for population differences; offers a contemporary comparison	Selection bias concerns; requires careful statistics-based matching techniques
Historical Comparisons	Compare outcomes between regions with and without the intervention	Offers natural and contemporary comparison groups, as well as insight that can aid targeted geographic interventions	Must be cautious with drawing causal inference due to regional variations in demographics, health care delivery, and other factors; can control for differences with statistical models

Outcome Measures

Selection of outcome measures should align with a state's specific research objectives. When analyzing a Medicaid policy or program change, outcome measures typically include:

- Relevant clinical outcomes, such as A1c levels;
- Utilization measures to track service use patterns such as primary care visits or hospital admissions; and
- Cost measures to assess financial impacts such as monthly per-member costs.

Tailor how outcome measures are formatted to identified research questions and intended audiences:

- **Percentages**: Most accessible for policymakers and the public, offering straightforward comparability.
- **Per-member-per-month rates**: Particularly valuable for quality improvement tracking; allowing teams to monitor changes over consistent time periods.
- **Per-1,000 rates**: Effective for standardizing comparisons of utilization across different populations.

Regardless of measurement format, it is important to clearly define the frequency and timing of the analysis. This includes:

- **Measurement frequency**: Monthly, quarterly, annual, or another cadence.
- **Study time periods**: Before/after policy implementation, before/after program enrollment or service initiation, longer-term follow-up periods to assess sustained effects, or multiple measurement periods to capture implementation stages or changes over time.*

* While there is no typical timeframe, common periods of time include six- or twelve-month intervals.

Risk Adjustment

Risk adjustment is essential for meaningful comparison across Medicaid populations with varying characteristics.[†] Consider what data is available for adjustment, including:

- Relevant clinical factors;
- Demographic characteristics (e.g., age, socioeconomic, and social risk factors);
- Prior health care utilization patterns; and
- Regional variations in health care delivery.

Designing in Action: State CGM Vignettes

Following the planning phase, **State A** and **State B** are ready to apply the above design principles to structure their CGM analyses. Note how each state defined its study populations, data sources, and outcome measures to align with its research questions defined during the planning phase.

State A defined its study population as all members with type 2 diabetes who became newly eligible under the expanded coverage criteria. It gathered data from multiple sources: claims data to track CGM initiation and ongoing use; MCO quality measures for clinical outcomes; and member eligibility files for demographic information. For comparison groups, the state used a propensity score matching method to identify members with similar clinical characteristics from the period before policy implementation, as well as a similar group of members who had not yet accessed CGMs following the policy change.[‡] The state specified key definitions upfront, including how to measure continuous CGM use (use of CGM over the duration of the study period and at least two clinical visits to interpret CGM results) and glycemic control (A1c levels). Outcome measures included CGM initiation rates, proportions of members with continuous CGM use over six months, mean A1c levels, diabetes-related emergency department visits, and total diabetes-related per-member per-month costs.

State B combined multiple data sources to understand access barriers impacting its CGM-eligible population. To do this, it merged claims data of eligible members who had no CGM claims in the last 12 months with members' geographic region, demographic characteristics, and census tract-level social vulnerability scores. The state also identified the types of providers who most frequently prescribed CGMs.

3. Analyzing

Data analysis can take many forms. Starting with **descriptive analyses** before moving to more complex **statistical analyses** can support a clearer picture of the state's findings and ensures it is asking the right questions of the data. Analyzing results requires careful attention to both what the data show and what they do not. While it can be tempting to draw conclusions about program impact, it is important to consider alternative explanations for any patterns observed in the data.

[†] For a similar approach to risk adjustment in analyzing CGM utilization, see Atac et al. (2025). The authors used logistic regression models adjusting for demographic variables and clinical characteristics to assess CGM uptake among people with type 1 diabetes and compare utilization rates across subpopulations.

[‡] For a similar methodological approach using propensity score matching, see Weinstein et al. (2023). The authors matched CGM users and non-users, adjusting for demographic and clinical characteristics to evaluate the effectiveness of CGMs on emergency department visits. They also exact-matched individuals based on factors such as endocrinology visits, insulin type, diabetes type, and prior CGM use.

Descriptive Analysis

Descriptive analysis provides the foundation for understanding data and identifying important patterns before conducting more complex analyses. This step is essential for developing contextual understanding and generating initial insights. Begin with clear descriptive statistics such as:

- Demographic and clinical characteristics of study populations;
- Trends (monthly, quarterly, annually) in service/program adoption and use; and
- Outcome differences between primary subpopulations.

Well-presented descriptive data can be powerful for communicating early findings to stakeholders, especially when presented visually. Consider how descriptive data can help the state shape the story it is telling and reveal important patterns that may warrant further investigation. Descriptive statistics are also valuable in identifying disparities across populations and opportunities for targeted interventions with the potential for significant impact.

Statistical Analysis

As the state progresses beyond descriptive statistics, consider additional analyses that can provide meaningful insights for identified research questions. Determine when descriptive statistics are sufficient and when additional analysis is needed based on audience's needs and the complexity of the relationships that the state is examining. Consider additional analyses when appropriate, such as:

- **Statistical significance** testing to compare outcomes across subpopulations or intervention and comparison populations (e.g., testing if a policy change is associated with improved outcomes);
- **Regression analysis** to control for confounding factors (e.g., adjusting for age and prior health conditions when analyzing intervention impacts); and
- **Sensitivity analyses** to test assumptions about sample selection criteria or other factors that might influence the findings (e.g., testing whether findings remain consistent when using different definitions of program participation or timeframes).

Statistical approaches strengthen the validity of findings by adjusting for observable patient, provider, regional, or program-related characteristics and lend more credence to potential causal relationships.

Analyzing in Action: State CGM Vignettes

Following the design phase, **State A** and **State B** are ready to apply analysis approaches to answer their research questions. Notice how each state builds upon their initial findings with additional analyses to better understand patterns and relationships in the data.

State A began with descriptive statistics showing month-by-month changes in CGM use over the first year of expanded coverage. The state's regression analyses, adjusting for clinical and demographic member characteristics, showed differences in health outcomes (visits to the emergency department, hospitalizations, and costs) between CGM users and similar non-users.[§] The state conducted sensitivity analyses using different definitions of ongoing CGM use (e.g., number of sensors filled in six months) to

[§] For a similar approach to analyzing CGM outcomes while adjusting for clinical and demographic characteristics, see Martens et al. (2023). The authors used linear mixed-effects models adjusting for age, sex, baseline HbA1c, and site effects when comparing glycemic outcomes between CGM users and blood glucose monitor users.

ensure robust findings.** Cost analyses examined both device-related spending and potential offsets from reduced diabetes-related emergency department visits and hospitalizations.

State B mapped CGM uptake rates by county, revealing variation across different geographic areas of the state. The state also identified demographic groups with lower rates of CGM use, such as finding that Medicare-Medicaid dually eligible members were accessing CGMs at lower rates than the average Medicaid-only population in areas with both high and low numbers of endocrinologists. Lastly, analysis of prescribing patterns showed that nurse practitioners were prescribing CGMs at similar rates to endocrinologists and primary care providers.

4. Communicating

Effectively communicating findings is crucial for informing policy and program decisions. Sharing results works best as an iterative process, with opportunities to gather feedback on research design and refine analyses based on stakeholder input. Early and ongoing communication helps ensure that analyses remain aligned with policy and program needs, and a carefully considered **presentation approach** ensures that findings resonate with stakeholder audiences.

There are several approaches to communicating findings, including:

- Sharing preliminary findings to gather feedback and refine analysis;
- Aligning the presentation of final results with policy decision timelines; and
- Planning for regular updates as new data become available.

Presentation Approach

How the state presents its findings is just as important as the analysis itself, particularly when communicating across different stakeholder audiences A thoughtful presentation strategy includes:

- Leading with key findings and policy implications;
- Using clear, simple visualizations;
- Providing technical details in brief and easy-to-read appendices;
- Including actionable recommendations when appropriate; and
- Tailoring the level of detail and technical complexity to each audience.

It is important to present findings in an accessible way to build understanding and trust with key audiences. This can increase the likelihood that findings will inform meaningful policy and program improvements.

** For an example of sensitivity analysis in CGM research, see Martens et al. (2023). The authors tested whether their findings remained consistent when using different methods to handle missing HbA1c data, including multiple imputation and complete case analysis.

Communicating in Action: State CGM Vignettes

Following the analysis phase, **State A** and **State B** are ready to communicate their findings to different stakeholders. Note how State A used an iterative approach, sharing preliminary results to refine their analysis before final reporting, while State B developed data visualizations tailored by audiences.

State A shared preliminary findings with key stakeholders three months after policy implementation. They used simple visualizations to illustrate initial CGM uptake trends and early outcome indicators. This allowed the project team to gather feedback on their analysis approach and refine their methods before the six-month policy review, including additional variables to control for in their regression analysis. Stakeholders posed questions about the initial data that led the project team to add new approaches to reviewing the data that the team had not considered before. Their final report, aligned with the one-year review of the policy change, included charts showing CGM adoption rates and outcome measures, with detailed statistical analyses and sensitivity tests included in appendices. They also acknowledged the limitations of their final analysis, noting that other factors could also be driving changes in health outcomes, for example, CGM use might coincide with increased motivation to improve overall diabetes management.

State B developed visualizations to share findings with different stakeholders. For leadership, the project team created county-level maps highlighting areas with low CGM uptake and showing racial disparities in access rates. For their population health team, they prepared detailed breakdowns of CGM use rates by race/ethnicity and geographic region. Their provider engagement team received data showing the county-level maps alongside the CGM prescribing provider breakdown, which they used to develop targeted outreach strategies to nurse practitioners in geographic regions with lower CGM uptake. They shared quarterly updates with their MCOs, helping them identify opportunities to improve CGM access in specific regions and populations.

Conclusion

Data analysis is a powerful tool that can help Medicaid agencies make evidence-informed policy decisions, identify opportunities for improvement, and evaluate the impact of program changes. By following the principles outlined in this guide — thoughtful planning, rigorous design, careful analysis, and effective communication — states can use data to better serve members, while optimizing limited resources.

Through the use of hypothetical state CGM policy examples, this guide illustrates how Medicaid agencies can practically apply these principles. By using thoughtful analysis of program and service access, usage patterns, and outcomes, states can better target their resources more effectively.

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