Section 6: Technical Guide to MACStats

This technical guide provides supplementary information to help readers interpret the exhibits in this data book as well as understand the data sources and methods used. In addition, we explain why MACPAC's statistics, particularly those on enrollment and spending, may differ from each other or from those published elsewhere.[1]

Interpreting Medicaid and CHIP Enrollment and Spending Numbers

Published numbers for enrollment in Medicaid and the State Children's Health Insurance Program (CHIP) can vary substantially depending on the source of data, the enrollment period examined, and the individuals included in the data.

Data sources

Medicaid and CHIP enrollment and spending numbers are available from data compiled by states and the federal government in the course of administering these programs. Program data are updated on different schedules, so the latest year of available data may differ depending on the source. MACPAC commonly uses the following types of administrative data, which are submitted by the states to the Centers for Medicare & Medicaid Services (CMS):

- Form CMS-64 data for state-level Medicaid spending and enrollment;
- Transformed Medicaid Statistical Information System (T-MSIS) data for person-level detail;
- CMS performance indicator enrollment data;
- Medicaid managed care enrollment reports; and
- Statistical Enrollment Data System (SEDS) data for CHIP enrollment.

CMS began reporting two new administrative data sources on enrollment in 2014, referred to here as performance indicator enrollment data and CMS-64 enrollment data.[2] These sources differ in the timing of the reports and the enrollees covered. Performance indicator enrollment data are published monthly by CMS and include only full-benefit Medicaid and CHIP enrollees. CMS-64 enrollment data are published quarterly and include Medicaid enrollees with limited benefits but exclude CHIP enrollees.

Additionally, CMS-64 enrollment data include detailed information about the new adult group made eligible under Section 1902(a)(10)(A)(i)(VIII) of the Social Security Act (the Act) by the Patient Protection and Affordable Care Act (ACA, P.L. 111-148, as amended). MACPAC uses the spending and enrollment data submitted on the CMS-64 to produce an exhibit on spending and enrollment from the most recent year for all Medicaid enrollees and those adults newly eligible for Medicaid under the ACA (Exhibit 23).

T-MSIS. T-MSIS is the updated version of the Medicaid Statistical Information System (MSIS) and builds on the person-level and claims-level data previously available under MSIS to improve timeliness, reliability, and completeness of national Medicaid and CHIP data. Additionally, T-MSIS is designed to capture considerably more data and information. It includes additional variables and expands reporting options for many existing variables. All states are now submitting T-MSIS data.

CMS takes each state's raw T-MSIS data and standardizes them into a research-ready dataset known as the T-MSIS Analytic Files (TAF). The TAF is further refined to remove certain personally identifiable information and proprietary information on managed care payment amounts to providers before the data are publicly released as the TAF research identifiable file (RIF). In addition, CMS has released updated versions of earlier TAF RIF files as states have addressed certain data quality issues.

CMS has developed resources to help users understand how to use the TAF data and identify potential concerns in validity and reliability. In conjunction with the TAF data releases, CMS publishes an interactive, web-based Data Quality Atlas that contains information for all years of TAF data that have been released.[3] These resources provide insight

on the quality and usability of the TAF and include summary statistics on a number of priority fields (e.g., eligibility group, dually eligible status, type of service). These statistics include information on file usability, the percentage of values missing, benchmark comparisons to other data sources (e.g., performance indicator enrollment), and data anomalies that may require special consideration.

One consequence of the extended transition from MSIS to T-MSIS is that not all states transitioned at the same time, and data for 2014 and 2015 are split between MSIS and T-MSIS data.[4] Additionally, CMS has been working closely with states to improve the quality and completeness of the data.[5] These quality improvement efforts have focused on more recent data, and not all states have gone back to prior periods to make these improvements and resubmit the data. The CMS data quality resources have shown the quality and completeness of data are better for more recent periods.

Because of the mix of data sources for 2014 and 2015 and the improvements in data quality over time, fiscal year (FY) 2018 was the first year of T-MSIS data that was used for MACStats. In this data book, we used the most recently available T-MSIS data that had more than 12 months of claims run-out.

Survey data. MACStats also uses nationally representative surveys based on interviews of individuals, including the National Health Interview Survey (NHIS) and the Medical Expenditure Panel Survey (MEPS). The NHIS was redesigned in 2019, so users should be cautious about making comparisons to prior years. Additionally, certain measures in previous editions of MACStats are no longer available.

Estimates of Medicaid and CHIP enrollment from survey data tend to be lower than estimates generated from administrative data, in part because survey respondents tend to underreport Medicaid and CHIP coverage. However, survey data provide many more details on individual and family circumstances (e.g., health status, ease in accessing services, and reasons for delaying care) and can therefore provide a richer picture of the individuals enrolled in Medicaid and CHIP.

Enrollment period examined

Characterizations of the size of the Medicaid and CHIP populations may vary based on the enrollment period examined. The number of individuals enrolled at a particular point during the year will be lower than the total number enrolled at any point during an entire year. Point-in-time numbers are sometimes referred to as average, full-year equivalent, or person-year enrollment. These statistics are often used for budget analyses (such as those by the CMS Office of the Actuary) and when comparing enrollment and expenditure numbers. Per-enrollee spending levels based on full-year equivalents ensure that amounts are not biased by individuals' transitions in and out of Medicaid coverage during the year.

Enrollees versus beneficiaries

Depending on the source and the year in question, data may reflect different ways of characterizing individuals in Medicaid. Certain terms commonly used to refer to people with Medicaid have specific definitions in administrative data sources provided by CMS:[6]

- Enrollees (less commonly referred to as eligibles) are individuals who are eligible for and enrolled in Medicaid or CHIP. Before FY 1990, CMS did not track the number of Medicaid enrollees but tracked only beneficiaries (see below). In some cases, CMS has estimated the number of enrollees before 1990.
- Beneficiaries, or persons served (less commonly referred to as recipients), are enrollees who receive covered services or for whom Medicaid or CHIP payments are made. Before FY 1998, individuals were not counted as beneficiaries if managed care payments were the only Medicaid payments made on their behalf. Beginning in FY 1998, however, Medicaid managed care enrollees with no fee-for-service (FFS) spending were also counted as beneficiaries, which increased the number of individuals reported in enrollment statistics. Generally, the number of beneficiaries will approach the number of enrollees as more of these individuals use Medicaid-covered services or are enrolled in managed care.[7] (In common usage outside of CMS statistical publications, the term beneficiaries is typically synonymous with enrollees.)

Institutionalized and limited-benefit enrollees

Administrative Medicaid data include enrollees who are in institutions, such as nursing facilities, as well as individuals who receive only limited benefits (e.g., coverage for emergency services only). Survey data tend to exclude such individuals from counts of coverage. In percentage terms, the difference between estimates from administrative data and estimates from survey data tends to be largest among older beneficiaries, who are more likely to be living in institutions (in which case they are excluded from most surveys) and more likely to be receiving limited Medicaid benefits that pay only for their Medicare premiums and cost sharing (which may not be counted as Medicaid coverage in some surveys).

CHIP enrollees

Medicaid-expansion CHIP enrollees are children who are entitled to the covered services of a state's Medicaid program but whose Medicaid coverage is generally funded with CHIP dollars. Depending on the data source, Medicaid enrollment and spending figures may include both Medicaid enrollees funded with Medicaid dollars and Medicaid-expansion CHIP enrollees funded with CHIP dollars. For MACStats, we generally exclude Medicaid-expansion CHIP enrollees from Medicaid analyses, but some data sources do not allow these children to be broken out separately.

Understanding Data on Health and Other Characteristics of Medicaid and CHIP Populations

MACStats uses data from the federal NHIS and the MEPS to describe Medicaid and CHIP enrollees in terms of their self-reported demographic, socioeconomic, and health characteristics as well as their use of care. Background information on these surveys is provided here.

NHIS and MEPS data

The NHIS is an annual face-to-face household survey of civilian non-institutionalized persons designed to monitor the health of the U.S. population through the collection of information on a broad range of health topics.[8] A subsample of households that participated in the previous year's NHIS undergo further interviews for the household component of the MEPS, which collects more detailed information on use of health care services and expenditures.[9]

Although other surveys are available, the NHIS is the main survey data source used in MACStats because it provides relatively timely estimates and because its sample size is large enough to produce reliable estimates by coverage source and to detect meaningful differences between them. In addition, it is generally considered to be one of the best surveys for health insurance coverage estimates, and it captures detailed information on individuals' health statuses.[10]

However, the NHIS is known to produce higher estimates of service use than the MEPS.[11] As a result, MACStats includes estimates of service use from both sources. For purposes of comparing groups of individuals, the NHIS has the advantage of providing the most recent information available; for other purposes, such as measuring levels of service use relative to a particular benchmark or goal, consulting estimates from the MEPS or another source might be more appropriate.

The NHIS has some limitations. As in most surveys, respondents in the NHIS do not always accurately report information about participation in programs such as Medicaid, CHIP, Medicare, Supplemental Security Income, and Social Security Disability Insurance. As a result, survey data may not match estimates of program participation computed from the programs' own administrative data. In addition, although the NHIS asks about participation in Medicaid and CHIP in two different questions, program participation estimates from the survey are not reported separately. One reason for this is that many states' CHIP and Medicaid programs use the same name, so respondents may not necessarily know which program funds their children's coverage. Even when the programs have different names, it may be difficult for respondents and interviewers to correctly categorize the coverage. As a result, separate survey questions regarding participation in Medicaid and CHIP are generally used to minimize the undercounting of Medicaid and CHIP enrollees, not to produce valid estimates separately for each program. Thus, survey data analyses typically combine Medicaid and CHIP into a single category.

In previous editions of MACStats, NHIS data allowed MACPAC to use responses to several questions to

identify children and youth with special health care needs (CYSHCN). Based on an approach developed by the Child and Adolescent Health Measurement Initiative, children were identified as meeting CYSHCN criteria if they had at least one diagnosed or parent-reported ongoing health condition and elevated service use. Following the 2019 redesign, a number of variables used to identify specific health conditions, as well as some of the variables related to elevated service use, are no longer available. As such, we are no longer able to identify CYSHCN using the NHIS, although the measure remains in the MEPS.

Beginning with the 2022 edition of MACStats, NHIS data are reported using the Washington Group on Disability Statistics measures. The measures describe the functional status of individuals across domains of seeing; hearing; mobility; communication; cognition; self-care; anxiety; depression; dexterity; playing; learning; relationships; and kicking, biting, or hitting others. The questions ask about the level of difficulty in basic domains of functioning and, when used with other questions on the survey, can evaluate if adults and children with functional limitations are able to participate in everyday activities at levels similar to their peers without functional limitations.[12]

Methodology for T-MSIS Analysis

As noted above, MACStats uses T-MSIS data to create exhibits on Medicaid enrollment and spending by eligibility group. Although we used the raw T-MSIS data instead of the TAF, our process of identifying final action records is similar and should produce similar results as the TAF. We relied on the final action indicator CMS appends to claims as part of its TAF development process. Additionally, claims are organized by service date (ending date of service) to assign a claim to a particular time period, which is similar to the TAF.[13] Our tabulations of the raw T-MSIS data produced similar totals to the TAF; however, there were some differences due to a difference in how many months of claims run-out were included.

Our process of assigning enrollee characteristics is similar to prior years, relying on the most recent valid value for a particular characteristic. T-MSIS includes a new eligibility group variable that expands the number of groups reported and is more specific than the basis-of-eligibility variable reported in MSIS. As such, we developed a new algorithm to aggregate these more granular eligibility codes into our larger groupings of child, adult, disabled, and aged. In addition, we further split adults into the new adult group and other adults.[14] Furthermore, the new T-MSIS eligibility groups do not specifically separate individuals who qualify on the basis of a disability from the aged and do not separate children from adults in many categories. We included age as another identifier to assign enrollees to our larger groupings. The assignment of beneficiaries is shown in Exhibit 49.

We also assigned Medicaid enrollees a unique national identification (ID) number using an algorithm that incorporates state-specific ID numbers and beneficiary characteristics, such as date of birth and sex. The national enrollment counts are then unduplicated using this national ID, which results in slightly lower enrollment counts than the sum of state-level enrollment.

T-MSIS includes spending amounts on a claim at both the header and line levels. To calculate spending, we used the Medicaid paid amounts reported on the header.[15] We included payment amounts from FFS, capitation, service tracking, and supplemental payment claim types that were linked to an individual enrollee. We did not include any lump sum payments, such as supplemental payments, that could not be linked to a specific enrollee. Additionally, we did not include paid amounts from encounter records because that spending is already represented in the amount the state made in capitation payments.

To classify claims into our broad service categories, we primarily relied on the type-of-service variable (Exhibit 51). Because type of service is reported at the line level, it is possible for a single claim to include multiple types of service. To assign a single type of service to a claim, we applied the type of service associated with the greatest proportion of line-level spending. We did additional checks to assess the reasonableness of the type of service assignment. For facility-based services (e.g., hospital, nursing facility), we checked to see if the claim had a bill type that corresponded to a facility service or a valid revenue code. For professional services, we checked for place of service. In cases in which a final type of service was still undetermined, we defaulted to the claim file in which the claim was reported. Claims in the inpatient file were assigned to the hospital category, claims in the long-term care file were assigned to the institutional long-term services and supports (LTSS) category, claims in the prescription drug file were assigned to the drug category, and claims in the other services file were assigned to the non-hospital acute care category.

EXHIBIT 49. MACPAC Assignment of T-MSIS Eligibility Groups

MACPAC group	T-MSIS eligibility code	Age
Child	06, 07, 08, 28, 29, 30, 31, 54, 55	Any age
	01, 02, 03, 04, 14, 27, 32, 33, 35, 36, 56, 69, 70, 71, 76	Age under 19 years
New adult group[1]	72, 73, 74, 75	Any age
Other adult[2]	05, 09, 34, 53	Any age
	01, 02, 03, 04, 27, 33, 35, 36, 56, 70	Age 19 and older
	32, 69, 71, 76	Age 19–64
Disabled	11, 12, 13, 14, 15, 16, 17, 18, 19, 20, 21, 22, 23, 24, 25, 26, 37, 38, 39, 40, 41, 42, 43, 44, 45, 46, 47, 48, 49, 50, 51, 52, 59, 60	Age under 65 years (age 19–64 for code 14)
Aged	11, 12, 13, 14, 15, 16, 17, 18, 19, 20, 21, 22, 23, 24, 25, 26, 32, 37, 38, 39, 40, 41, 42, 43, 44, 45, 46, 47, 48, 49, 50, 51, 52, 59, 60, 69, 71, 76	Age 65 and older

Notes: T-MSIS is Transformed Medicaid Statistical Information System. Excludes individuals enrolled in CHIP-financed Medicaid coverage (e.g., Medicaid-expansion CHIP) when the CHIP code indicates separate or Medicaid-expansion CHIP (values of 2 or 3) or the T-MSIS eligibility code is 61–68.

[1] Includes both newly eligible and not newly eligible adults who are eligible under Section 1902(a)(10)(A)(i)(VIII) of the Social Security Act (the Act). Newly eligible adults include those who were not eligible for Medicaid under the rules that a state had in place on December 1, 2009. Not newly eligible adults include those who would have previously been eligible for Medicaid under the rules that a state had in place on December 1, 2009; this includes states that had already expanded to adults with incomes greater than 100 percent of the federal poverty level as of March 23, 2010, and receive the expansion state transitional matching rate.

[2] Includes adults under age 65 who qualify through a pathway other than disability or Section 1902(a)(10)(A)(i)(VIII) of the Act (e.g., parents and caretakers, pregnancy).

Source: MACPAC, 2025, analysis of T-MSIS data.

We used additional variables to categorize managed care and non-institutional LTSS claims. We assigned any claim classified as a capitation payment (claim type 2) as managed care regardless of the type of service assigned to the claim.

Beginning in 2025, we implemented a new method for classifying a claim as non-institutional LTSS (Exhibit 51). Building on recent MACPAC work to compare different approaches to identify home- and community-based services (HCBS) and to calculate HCBS spending and utilization, we adapted the methodology developed for CMS's LTSS Expenditures and Users Reports and KFF State Health Facts (MACPAC 2025, 2024; Stepanczuk et al. 2024; Chidambaram and Burns 2023). To identify HCBS claims, we started with the approach used in the TAF-based LTSS Expenditure and User Reports to determine whether a claim was paid for by an HCBS authority (i.e., Sections 1915(c), 1915(i), 1915(j), and 1915(k) of the Act) (Stepanczuk et al. 2024). We relied on the claim's program type, waiver type, HCBS service type, or benefit type. Because what a state reports in these four data elements can conflict, we employed a hierarchical approach tested and validated by the LTSS Expenditure and User Reports, which prioritize the program type code found on the claim, followed by the waiver type code, HCBS service code, and benefit type code. For four states without Section 1915(c) waivers—Arizona, New Jersey, Rhode Island, and Vermont—we adapted the KFF State Health Facts methodology to identify claims under their Section 1115 demonstrations (Chidambaram and Burns 2023). Furthermore, we used HCBS taxonomy to isolate these Section 1115 demonstration claims to HCBS (Rooney et al. 2023). For more information on the various methodological approaches to identifying HCBS users and expenditures, please see MACPAC's publication on *Methodological Approaches for Analyzing Use and Spending in Medicaid Long-Term Services and Supports: A Comparative Review* (MACPAC 2024).

To estimate the effect of this change in how we classify non-institutional LTSS, we compared the new method to the prior method that classified a claim as non-institutional LTSS if any of the following variables so indicated: type of service, program type, or Title XIX service category (i.e., CMS-64 service category). In FY 2023, the new method identified about 5 percent less non-institutional LTSS spending nationally across both FFS and managed care claims. Approximately 98 percent of spending identified under the new method overlapped with the prior method.

With the update to the method in classifying non-institutional LTSS, we also used managed care encounter claims to identify users of non-institutional LTSS displayed in Exhibit 20, compared to the prior method that only identified users based on FFS claims. This inclusion of enrollees using non-institutional LTSS under managed care arrangements increased the overall number of LTSS users displayed in Exhibit 20 compared to prior years. However, the new method in classifying non-institutional LTSS identified approximately 27 percent fewer users across FFS and managed care than the prior method. While the new method led to a large decrease in users in several states compared to the prior method, the result is in greater alignment with other analyses such as the CMS LTSS Expenditure and User Report. Managed care encounter claims were used only to identify LTSS users; the paid amount on encounter claims is not used in any MACStats exhibits.

Due to these changes, exhibits showing spending and users of non-institutional LTSS using T-MSIS data (Exhibits 18, 19, 20) may not be directly comparable to prior editions of MACStats.

Additionally, readers should note that due to changes in both methods and data, T-MSIS figures shown in this year's data book may not be directly comparable to figures from earlier editions that were based on MSIS data. Key differences between the current and previous methodologies include the following:

- We assigned a time period to T-MSIS claims using the service date. This corresponds to how CMS classifies the time period in the TAF. In our previous work with MSIS, we used the file submission date (which generally corresponds to a paid date) when assigning a claim to a particular time period.
- The new eligibility groups in T-MSIS mean that some enrollees may be classified differently than under MSIS, depending on how states map individuals between the two systems. In particular, the new T-MSIS eligibility categories do not separate individuals who qualify on the basis of a disability from the aged and do not separate children from adults in many categories. We included age as another identifier to categorize beneficiaries into our larger groupings. Although we had previously taken those age 65 and older in the disabled category and classified them as aged, this is the first time we specifically incorporated age into the classification of children and adults. Furthermore, the separate identification of the new adult group may make it difficult to compare adults to prior years. The other adult category generally corresponds to the adult category used in previous MACStats publications based on MSIS data, but in states that expanded coverage to adults before the ACA, the expansion adults that would have appeared in the adult category in prior years are now included in the new adult group category.
- The expanded type-of-service categories in T-MSIS means that some spending may be classified differently than under MSIS, depending on how states map services between the two systems. This is particularly true for non-institutional LTSS. Previously in MSIS, we relied on program type, because HCBS was not a separate type of service. We still use program type, and we use a hierarchical approach involving several additional variables. This expansion of the algorithm may result in our capturing more claims as non-institutional LTSS.
- State practices for classifying enrollees and services in T-MSIS may change over time as states become more familiar with the T-MSIS reporting structure and requirements. Future changes in enrollment and spending, particularly across eligibility groups or service categories, may reflect changes in reporting in addition to changes in policy. Finally, enrollment and spending amounts for a particular year could change over time if states correct reporting errors and anomalies for past years.

Methodology for Adjusting Benefit Spending Data

The Medicaid benefit spending amounts presented in this data book were calculated based on T-MSIS data that have been adjusted to match total benefit spending reported by states in CMS-64 data.[16] Although the CMS-64 provides a more complete accounting of spending than T-MSIS and is preferred when examining state or federal spending totals, it cannot be used for analysis of benefit spending by eligibility group and other enrollee characteristics. Thus, we adjust T-MSIS amounts for several reasons:

- CMS-64 data provide an official accounting of state spending on Medicaid for purposes of receiving federal matching dollars; in contrast, T-MSIS data are used primarily for statistical purposes.
- T-MSIS generally understates total Medicaid benefit spending because it excludes disproportionate share hospital (DSH) payments and additional types of supplemental payments made to hospitals and other providers, Medicare premium payments, and other amounts such as certain managed care state directed payments.[17] Although states may report DSH and other supplemental payments through T-MSIS, most states are not reporting these data consistently at this time.
- T-MSIS generally overstates net spending on prescribed drugs because it excludes rebates from drug manufacturers. Although T-MSIS does allow states to report drug rebate collections, most states are not reporting these data consistently at this time.
- The extent to which spending in T-MSIS differs from that reported on the CMS-64 varies by state, meaning that a cross-state comparison of unadjusted T-MSIS amounts may not reflect true differences in benefit spending. (See Exhibit 50 for unadjusted benefit spending amounts in T-MSIS as a percentage of benefit spending in the CMS-64.)

The methodology MACPAC uses for adjusting T-MSIS benefit spending data involves the following steps:

- We aggregate the service types into broad categories that are comparable between the two sources. (See Exhibit 51 for additional detail on these categories.) This is necessary because there is not a one-to-one correspondence of service types in T-MSIS and CMS-64 data. Even service types with identical names may be reported differently in the two sources due to differences in the instructions given to states. Although T-MSIS includes a new variable that corresponds to the service categories reported on the CMS-64, many states are not currently submitting complete information under this variable. The submission of complete and accurate information for this variable would allow us to make more direct comparisons between T-MSIS and the CMS-64 in the future.
- We calculate state-specific adjustment factors for each of the service categories by dividing CMS-64 benefit spending by T-MSIS benefit spending.
- We then multiply T-MSIS dollar amounts in each service category by the state-specific factors to obtain adjusted T-MSIS spending. For example, in a state with an FFS hospital factor of 1.2, each Medicaid enrollee with hospital spending in T-MSIS would have that spending multiplied by 1.2; doing so makes the sum of adjusted hospital spending amounts among individual Medicaid enrollees in T-MSIS total the aggregate hospital spending reported by states in the CMS-64 (as noted later, MACPAC excludes some amounts from the CMS-64 hospital total).[18]

These adjustments to T-MSIS data are meant to provide more complete estimates of Medicaid benefit spending across states that can be analyzed by eligibility group and other enrollee characteristics. Other organizations, including the CMS Office of the Actuary, KFF, and the Urban Institute, use similar methodologies, although these may differ in some ways—for example, by using the proportion of spending across eligibility groups in T-MSIS to allocate CMS-64 spending to these groups. Even so, data anomalies in T-MSIS may create large discrepancies between the results obtained by our methodology and results obtained by methodologies used by other organizations. We expect to see these discrepancies wane as states get used to T-MSIS reporting and the accuracy and consistency of their T-MSIS data improves.

EXHIBIT 50. Medicaid Benefit Spending in T-MSIS and CMS-64 Data by State, FY 2023 (millions)

State	Benefit spending totals included in analysis			Amounts excluded from CMS-64 benefit spending totals	
	Unadjusted T-MSIS	CMS-64[1]	T-MSIS as a percentage of CMS-64	DSH	Incentive and uncompensated care pool waivers
Total	**$793,963**	**$850,130**	**93.4%**	**$17,609**	**$12,279**
Alabama	6,466	7,668	84.3	209	–
Alaska	2,672	2,544	105.0	16	–
Arizona	20,309	21,971	92.4	166	49
Arkansas	6,436	8,620	74.7	23	–
California[2]	118,778	120,957	98.2	806	2,301
Colorado	11,848	12,715	93.2	245	–
Connecticut	10,788	10,196	105.8	230	–
Delaware	3,493	3,327	105.0	16	–
District of Columbia	4,020	4,094	98.2	63	–
Florida	29,826	32,362	92.2	356	1,923
Georgia	13,443	15,470	86.9	537	–
Hawaii[3]	2,924	2,999	97.5	44	–
Idaho	3,619	3,568	101.4	12	–
Illinois	24,920	31,839	78.3	444	–
Indiana	21,175	17,145	123.5	202	–
Iowa	6,893	6,906	99.8	18	–
Kansas	4,807	5,042	95.3	98	82
Kentucky	15,713	16,284	96.5	37	–
Louisiana	14,192	15,915	89.2	473	–
Maine	3,855	4,125	93.5	58	–
Maryland	16,271	16,804	96.8	184	–
Massachusetts	21,995	22,408	98.2	109	891
Michigan	19,344	22,698	85.2	664	–
Minnesota	18,694	18,438	101.4	70	–
Mississippi	5,616	6,183	90.8	164	–
Missouri	15,211	15,178	100.2	767	–
Montana	2,203	2,364	93.2	–	–
Nebraska	3,948	3,732	105.8	34	–
Nevada	5,064	5,583	90.7	22	–
New Hampshire	2,226	2,182	102.0	277	–
New Jersey	20,623	21,531	95.8	1,124	–
New Mexico	7,596	8,089	93.9	36	–
New York	83,328	93,959	88.7	3,904	–

EXHIBIT 50. (continued)

State	Benefit spending totals included in analysis			Amounts excluded from CMS-64 benefit spending totals	
	Unadjusted T-MSIS	CMS-64[1]	T-MSIS as a percentage of CMS-64	DSH	Incentive and uncompensated care pool waivers
North Carolina	19,589	19,017	103.0	426	–
North Dakota[2]	1,708	1,522	112.2	2	–
Ohio	27,769	31,077	89.4	777	–
Oklahoma	7,684	9,499	80.9	71	–
Oregon	10,692	14,722	72.6	77	–
Pennsylvania	43,189	42,698	101.1	1,297	–
Rhode Island	3,361	2,414	139.2	158	894
South Carolina	7,522	8,303	90.6	610	–
South Dakota	1,084	1,187	91.3	2	–
Tennessee	12,218	11,650	104.9	95	816
Texas	48,045	49,976	96.1	2,067	5,241
Utah[2]	4,161	4,555	91.3	11	–
Vermont	1,804	1,894	95.2	23	83
Virginia	21,454	21,841	98.2	-6	–
Washington	17,707	28,822	61.4	376	0
West Virginia	5,619	5,399	104.1	74	–
Wisconsin	11,399	11,930	95.6	143	–
Wyoming	664	725	91.6	0	–

Notes: T-MSIS is Transformed Medicaid Statistical Information System. FY is fiscal year. DSH is disproportionate share hospital. Includes federal and state funds. T-MSIS and CMS-64 data reflect unadjusted amounts as reported by states. Both sources exclude spending on administration, the territories, and Medicaid-expansion CHIP enrollees; in addition, CMS-64 amounts exclude $24.5 billion in offsetting collections from third-party liability, estate, and other recoveries. For greater detail on the difference between T-MSIS and CMS-64, please see the Methodology for Adjusting Benefit Spending Data section. DSH payments and incentive and uncompensated care pool payments made under waiver expenditure authority of Section 1115 of the Social Security Act have also been excluded from CMS-64 totals. For informational purposes, the DSH and waiver expenditure amounts that were excluded are shown here.

– Dash indicates zero; $0 indicates an amount less than $0.5 million that rounds to zero.

[1] The total amount reported on the CMS-64 may differ slightly from the state and national totals of our adjusted T-MSIS spending reported in other exhibits due to rounding when applying certain adjustments.

[2] State has a state plan amendment (SPA) that allows the state to receive the enhanced federal medical assistance percentage (FMAP) for children enrolled in Medicaid who would have, before January 1, 2014, been enrolled in CHIP if not for the elimination of the Medicaid asset test. These children cannot be separately identified in the T-MSIS data. Because the state claims the spending for these children as Medicaid-expansion CHIP, we reduced child enrollment and spending in these states based on the proportion reported in their SPAs. Correspondingly, we reduced California's T-MSIS spending by approximately $785.6 million, North Dakota's T-MSIS spending by approximately $10.8 million, and Utah's T-MSIS spending by approximately $36.9 million.

[3] The CMS-64 total for Hawaii excludes $1.0 million in fee-for-service (FFS) drug spending because the state did not report any FFS drug spending in T-MSIS.

Sources: MACPAC, 2025, analysis of T-MSIS data as of February 2025; CMS-64 financial management report net expenditure data as of June 2024.

EXHIBIT 51. Service Categories Used to Adjust FY 2023 Medicaid Benefit Spending in T-MSIS to Match CMS-64 Totals

Service category	T-MSIS service types[1]	CMS-64 service types
Hospital	• Inpatient hospital • Outpatient hospital, including mental health other than outpatient substance abuse treatment • Emergency hospital • Critical access hospital • Skilled care, exceptional care, and non-acute care—hospital residing • Electronic health record (EHR) payments to provider (on hospital claim)	• Inpatient hospital non-DSH • Inpatient hospital non-DSH supplemental payments • Inpatient hospital GME payments • Outpatient hospital non-DSH • Outpatient hospital non-DSH supplemental payments • Emergency services for aliens[2] • Emergency hospital services • Critical access hospital base and supplemental payments
Non-hospital acute care	• Rural health clinic • Laboratory • Radiology • EPSDT • Family planning • Physician • Dental • Outpatient substance abuse treatment • Other practitioner • Home health—supplies, equipment, and appliances • Private duty nursing • Nursing, including advanced practice, pediatric, nurse-midwife, and nurse practitioner • Respiratory care for ventilator-dependent individuals • Clinic • Physical, occupational, speech, and hearing therapy • Over-the-counter medications (not on pharmacy claim) • Dentures • Medical equipment and prosthetics (not on pharmacy claim) • Eyeglasses • Hearing aids • Diagnostic and screening services • Preventive services • Well-baby and well-child services • Rehabilitative services • Targeted case management • Other case management • Care coordination • Transportation • Enabling services	• Physician (including primary care physician payment increase) • Physician services supplemental payments • Preventive services with USPSTF Grade A or B and ACIP vaccines • Dental • Nurse-midwife • Nurse practitioner • Other practitioner • Other practitioner supplemental payments • Non-hospital clinic base and supplemental payments • Rural health clinic • Federally qualified health center • Laboratory and radiology • Sterilizations • Abortions • Hospice • Targeted case management • Statewide case management • Physical therapy • Occupational therapy • Services for speech, hearing, and language • Non-emergency transportation base and supplemental payments • Private duty nursing • Rehabilitative services (non-school based) • School-based services • EPSDT screenings • Diagnostic screening and preventive services • Prosthetic devices, dentures, eyeglasses • Freestanding birth center • Health home with chronic conditions • Health home for enrollees with substance use disorder

EXHIBIT 51. (continued)

Service category	T-MSIS service types[1]	CMS-64 service types
Non-hospital acute care (continued)	• Sterilizations • Prenatal care and prepregnancy family planning • Other pregnancy-related procedures • Hospice • Disposable medical supplies • Indian Health Service—family plan • Religious non-medical health care institutions • EHR payments to provider in outpatient setting (not on hospital claim) • COVID-19 in vitro diagnostic products or testing-related services • Medication assisted treatment (MAT) and drugs for evidenced-based treatment of Opioid Use Disorder (OUD) (not on a pharmacy claim) • Residential pediatric recovery center • Other care	• Health home for children with medically complex conditions • Tobacco cessation for pregnant women • COVID-19 vaccines and administration • MAT treatment services for OUD • Qualified community-based mobile crisis intervention • Care not otherwise categorized
Drugs	• Prescribed drugs • Over-the-counter medications (on a pharmacy claim) • Medical equipment and prosthetic (on a pharmacy claim) • EHR payments to pharmacy provider • MAT and drugs for evidence-based treatment of OUD (on a pharmacy claim)	• Prescribed drugs • Drug rebates (national, state sidebar, ACA offset—fee for service) • MAT drugs for OUD • MAT drug rebates (national, state sidebar, ACA offset—fee for service)
Managed care and premium assistance	Claim type 2 (capitated payment) or type of service: • Capitated payments to comprehensive risk based managed care plans (HMO, HIO, PACE) • Capitated payments to PHP • Capitated payments for PCCM • Premium payments for private insurance • Per member, per month (PMPM) payments for health home services; Medicare Parts A, B, or D premiums; Medicare Advantage dual special needs plans • PMPM payments for other payments	• MCO (i.e., comprehensive risk-based managed care) • MCO drug rebates (national, state sidebar, ACA offset—MCO) • MCO MAT drug rebates (national, state sidebar, ACA offset—MCO) • PACE • PAHP • PIHP • PCCM • MCO, PAHP, and PIHP payments associated with the primary care physician payment increase, Community First Choice option, preventive services with USPSTF Grade A or B, ACIP vaccines, certified community behavior health clinics, and services subject to electronic visit verification requirements • Premium assistance for private coverage

EXHIBIT 51. (continued)

Service category	T-MSIS service types[1]	CMS-64 service types
LTSS non-institutional	Based on the following hierarchy: 1) Program type: • HCBS waiver • HCBS—1915(i) • HCBS—1915(j) • HCBS—1915(k) 2) If program type is missing waiver type: • 1915(c) waiver (values 06–20) • 1115 managed LTSS or other demonstration in Arizona, New Jersey, Rhode Island, and Vermont* 3) If program type and waiver type are missing, HCBS service code: • 1915(c) • 1915(i) • 1915(j) • 1915(k) 1115 waiver in Arizona, New Jersey, Rhode Island, and Vermont* 4) If program type, waiver type, and HCBS service code are missing, benefit type is: • Self-directed personal assistance under 1915(j) Community First Choice 1915(k) 5) If all variables above are missing, type of service: • Home health, including nursing; home health aide; and physical, occupational, speech, and hearing therapy • Personal care • Residential care • HCBS waiver • Payments to individuals for personal assistance services under 1915(j) * For Arizona, New Jersey, Rhode Island, and Vermont, a claim selected using waiver type or HCBS service code must also have at least one line with a procedure code mapped to a HCBS taxonomy in CMS's Data Quality Atlas methodology brief no. 7061.	• Home health • Personal care • Personal care—1915(j) • HCBS waiver • HCBS—1915(i) • HCBS—1915(j) • HCBS—1915(k) • Certified community behavior health clinic

EXHIBIT 51. (continued)

Service category	T-MSIS service types[1]	CMS-64 service types
LTSS institutional	• Nursing facility • Inpatient hospital and nursing facility services for individuals age 65 and older in an institution for mental disease (IMD) • Intermediate care facility • Inpatient psychiatric or skilled nursing facility for individuals under age 21 • Inpatient and residential substance abuse treatment • EHR payments to LTSS institutional provider • Inpatient psychiatric services for beneficiaries ages 22 to 64 who receive services in an IMD	• Nursing facility • Nursing facility supplemental payments • Intermediate care facility for persons with intellectual disabilities • Intermediate care facility for persons with intellectual disabilities supplemental payments • Mental health facility for individuals under age 21 or age 65 and older, non-DSH
Medicare[3,4]		• Medicare Part A and Part B premiums • Medicare coinsurance and deductibles for QMBs

Notes: FY is fiscal year. T-MSIS is Transformed Medicaid Statistical Information System. DSH is disproportionate share hospital. GME is graduate medical education. EPSDT is early and periodic screening, diagnostic, and treatment. USPSTF is U.S. Preventive Services Task Force. ACIP is Advisory Committee on Immunization Practices. MAT is medication-assisted treatment. OUD is opioid use disorder. ACA is the Patient Protection and Affordable Care Act (P.L. 111-148, as amended). HMO is health maintenance organization. HIO is health insuring organization. PACE is Program of All-Inclusive Care for the Elderly. PHP is prepaid health plan. MCO is managed care organization. PCCM is primary care case management. PAHP is prepaid ambulatory health plan (a type of PHP). PIHP is prepaid inpatient health plan (a type of PHP). HCBS is home- and community-based services. LTSS is long-term services and supports. ICF/ID is intermediate care facility for persons with intellectual disabilities. QMB is qualified Medicare beneficiary. Service categories and types reflect fee-for-service spending unless noted otherwise. Service types with identical names in T-MSIS and CMS-64 data may still be reported differently in the two sources due to differences in the instructions given to states; amounts for those that appear only in the CMS-64 (e.g., drug rebates) are distributed across Medicaid enrollees with T-MSIS spending in the relevant service categories (e.g., drugs).

[1] Claims in T-MSIS include variables for claim type (e.g., fee for service, capitated payment), type of service (such as inpatient hospital, physician, personal care), program type (including HCBS waiver), and Title XIX service category code (corresponds to CMS-64 category). When classifying T-MSIS claims into service categories, we generally relied on type of service, with a few exceptions. We classified all claims with a claim type indicating a capitated payment as managed care regardless of the type of service associated with the claim. For non-institutional LTSS, we also included any claim with a program type indicating HCBS or a Title XIX service category code that matched the CMS-64 service types we select for this category.

[2] Emergency services for non-qualified aliens are reported under individual service types throughout T-MSIS but primarily as inpatient and outpatient hospital. As a result, we include this CMS-64 amount in the hospital category.

[3] Medicare premiums are not reported in T-MSIS. We distribute CMS-64 amounts proportionately across dually eligible enrollees identified in the T-MSIS for each state.

[4] Medicare coinsurance and deductibles are reported under individual service types throughout T-MSIS. We distribute CMS-64 amounts for QMBs across CMS-64 spending in the hospital, non-hospital acute, and LTSS institutional categories before calculating state-level adjustment factors based on the distribution of Medicare cost sharing for hospital, Part B, and skilled nursing facility services among QMBs using 2020 Medicare data. See MedPAC and MACPAC, 2024, Table 5: Fee-for-service Medicare Part A and Part B cost sharing incurred by dual-eligible and non-dual Medicare beneficiaries (dollars in billions), CY 2021, in *Data book: Beneficiaries dually eligible for Medicare and Medicaid*, Washington, DC: MedPAC and MACPAC, https://www.macpac.gov/wp-content/uploads/2024/01/Jan24_MedPAC_MACPAC_DualsDataBook-508.pdf.

Sources: MACPAC, 2025, analysis of T-MSIS and CMS-64 financial management report net expenditure data. Greener, E., A. Carpenter, and L. Nolan. 2023. *Identifying enrollees who use home and community-based services in the TAF* (TAF DQ brief #7061). Baltimore, MD: CMS and https://www.medicaid.gov/dq-atlas/downloads/supplemental/HCBS-In-TAF-Supplement.xlsx.

Understanding Managed Care Enrollment and Spending Data

There are four main sources of data on Medicaid managed care available from CMS.

Medicaid Managed Care Enrollment Report

The Medicaid Managed Care Enrollment Report provides state-reported aggregate enrollment statistics and other basic information for each managed care plan within a state. This report is the source of information on Medicaid managed care most commonly cited by CMS as well as by outside analysts and researchers.

T-MSIS

T-MSIS provides person-level and claims-level information for all Medicaid enrollees. For managed care, T-MSIS claims include records of each capitated payment made on behalf of an enrollee to a managed care plan (generally referred to as capitated claims) as well as records of each service received by the enrollee from a provider under contract with a managed care plan (which may be referred to as encounter or so-called dummy claims). All states collect encounter data from their Medicaid managed care plans, and CMS is working with states so these data are reported into T-MSIS. Managed care enrollees may also have FFS claims in the T-MSIS if they used services beyond those covered by a managed care plan's contract with the state.

CMS-64

The CMS-64 financial management report provides aggregate spending information for Medicaid grouped into major benefit categories, including managed care. The spending amounts reported by states on the CMS-64 are used to calculate their federal matching dollars.

SEDS

The SEDS provides aggregate statistics on CHIP enrollment and child Medicaid enrollment that include the number of individuals covered under FFS and managed care systems. The SEDS is currently the primary source of information on managed care participation among separate CHIP enrollees across states. However, states can submit information on separate CHIP into T-MSIS, so T-MSIS may become another source of information on separate CHIP in the future.

Historically, the annual Medicaid managed care enrollment report generally contains the most recent information available from CMS on Medicaid managed care for all states; however, it does not provide information on many characteristics of enrollees in managed care (e.g., basis of eligibility and demographics such as age, sex, race, and ethnicity). It does provide information on whether individuals are dually eligible for Medicare. Due to improved timeliness, T-MSIS provides data that are as recent as the Medicaid managed care report, and these data can be analyzed at the beneficiary level. As a result, MACStats also includes statistics based on T-MSIS and CMS-64 data, such as the percentage of individuals enrolled in managed care by eligibility group and the percentage of Medicaid benefit spending attributable to managed care.

When examining managed care statistics from various sources, the following issues should be noted:

- Figures in the annual Medicaid managed care enrollment report published by CMS include Medicaid-expansion CHIP enrollees. Although we generally exclude these children (about 5 to 6 million) from Medicaid analyses in MACStats, it is not possible to do so with the CMS annual Medicaid managed care enrollment report data.[19]
- The types of managed care reported by states may differ somewhat between the Medicaid managed care enrollment report and T-MSIS. For example, some states report a small number of enrollees in comprehensive risk-based managed care in one data source but not the other.
- The Medicaid managed care enrollment report provides point-in-time figures. In contrast, T-MSIS data allow the calculation of the number of enrollees ever enrolled in managed care during a fiscal year or other period of time.

Endnotes

[1] For technical guides to earlier editions of MACStats, see the MACStats archive page of the MACPAC website at https://www.macpac.gov/publication/macstats-archive/. For MACStats before December 2015, the technical guide is included in each year's June report.

[2] CMS has been collecting Medicaid and CHIP performance indicator data on key processes related to eligibility and enrollment since late 2013. In part because the new Medicaid and CHIP performance indicator enrollment data do not identify newly eligible individuals for whom there is a higher federal matching rate, CMS is using a separate process to collect monthly Medicaid enrollment by eligibility category when states submit their CMS-64 quarterly expenditures. Specifically, a new CMS-64 enrollment form has been created to accompany the current expenditure forms. Although enrollment is submitted at the same time as expenditures, there is not a direct link between the amount of federal expenditures claimed by states and the number of enrollees reported. Instead, CMS uses CMS-64 enrollment data for monitoring and oversight purposes.

[3] The Data Quality Atlas can be found at https://www.medicaid.gov/dq-atlas/welcome.

[4] The timing of each state's transition from MSIS to T-MSIS can be found at https://www.medicaid.gov/medicaid/data-and-systems/downloads/macbis/taf-rif-availability-chart.pdf.

[5] Centers for Medicare & Medicaid Services (CMS), U.S. Department of Health and Human Services. 2018. Letter from Tim Hill to state health officials regarding "Transformed-Medicaid Statistical Information System (T-MSIS)." August 10, 2018, https://www.medicaid.gov/federal-policy-guidance/downloads/sho18008.pdf.

[6] See, for example, Centers for Medicare & Medicaid Services (CMS), 2010, Brief summaries and glossary (2010 edition), in *Medicare & Medicaid statistical supplement*, Baltimore, MD: CMS, https://www.cms.gov/Research-Statistics-Data-and-Systems/Statistics-Trends-and-Reports/MedicareMedicaidStatSupp/Downloads/2010SummariesGlossary.zip.

[7] States make capitated payments for all individuals enrolled in managed care plans even if no health care services are used. Therefore, all managed care enrollees currently are counted as beneficiaries or persons served, regardless of whether they have used any health services.

[8] Centers for Disease Control and Prevention (CDC), U.S. Department of Health and Human Services, 2023, About the National Health Interview Survey, http://www.cdc.gov/nchs/nhis/about_nhis.htm.

[9] Agency for Health Care Research and Quality (AHRQ), U.S. Department of Health and Human Services, 2019, Medical Expenditures Panel Survey: Survey background, http://meps.ahrq.gov/mepsweb/about_meps/survey_back.jsp.

[10] Kenney, G., and V. Lynch, 2010, Monitoring children's health insurance coverage under CHIPRA using federal surveys, in *Databases for estimating health insurance coverage for children: A workshop summary*, Plewes, T.J., ed., Washington, DC: National Academies Press, http://www.nap.edu/catalog/13024.html.

[11] Rhoades, J.A., J.W. Cohen, and S.R. Machlin, 2010, Methodological comparison of estimates of ambulatory health care use from the Medical Expenditure Panel Survey and other data sources (pp. 2828–2837, health policy statistics section), in JSM Proceedings, Alexandria, VA: American Statistical Association, http://www.asasrms.org/Proceedings/y2010/Files/307444_58577.pdf.

[12] IPUMS Health Surveys. 2019. User note: Washington Group on Disability Statistics Measures. https://nhis.ipums.org/nhis/userNotes_washingtongroup.shtml.

[13] In Kansas, several claims were missing service dates. We used paid dates to assign these claims to a time period.

[14] The new adult group includes those enrollees who are eligible under Section 1902(a)(10)(A)(i)(VIII) of the Act. We include both newly eligible adults and not newly eligible adults eligible under this pathway. Newly eligible adults include those enrollees who were not eligible for Medicaid under the rules that a state had in place on December 1, 2009, and received a federal matching rate of 100 percent in 2014 through 2016, phasing down to 90 percent in 2020 and subsequent years. Adults considered not newly eligible include those enrollees who would have previously been eligible for Medicaid under the rules that a state had in place on December 1, 2009; this includes states that had already expanded to adults with incomes greater than 100 percent of the federal poverty level as of March 23, 2010, and receive the expansion state transitional matching rate. Other adults include adults under age 65 who qualify through a pathway other than disability or Section 1902(a)(10)(A)(i)(VIII) of the Act (e.g., parents and caretakers, pregnancy).

[15] Until December 2017, Georgia did not report header-level spending for capitation payments. If the header amount was zero or missing, we used the aggregate line-level spending for capitated payments in Georgia.

[16] Medicaid benefit spending reported here excludes amounts for Medicaid-expansion CHIP enrollees; the territories; administrative activities; the Vaccines for Children program (which is authorized by the Medicaid statute but operates as a separate program); and offsetting collections from third-party liability, estate, and other recoveries.

[17] Some of these amounts, including certain supplemental payments, managed care state directed payments, and drug rebates, are lump sums that are not paid on a claim-by-claim basis for individual Medicaid enrollees. Nonetheless, we refer to these CMS-64 amounts as benefit spending, and the adjustment methodology described here distributes them across Medicaid enrollees with T-MSIS spending in the relevant service categories.

[18] The sum of adjusted T-MSIS benefit spending for all service categories is equal to CMS-64 benefit spending, exclusive of offsetting collections from third-party liability, estate, and other recoveries. These collections are not reported by type of service in the CMS-64 and are not reported at all in the T-MSIS.

[19] We generally exclude children enrolled in Medicaid-expansion CHIP from Medicaid analyses because their funding stream (Title XXI of the Act) differs from that of other Medicaid enrollees (Title XIX of the Act). In addition, spending (and often enrollment) for the Medicaid-expansion CHIP population is reported by CMS in CHIP statistics along with information on separate CHIP enrollees.

References

Agency for Health Care Research and Quality (AHRQ), U.S. Department of Health and Human Services. 2019. Medical Expenditures Panel Survey: Survey background. http://meps.ahrq.gov/mepsweb/about_meps/survey_back.jsp.

Centers for Disease Control and Prevention (CDC), U.S. Department of Health and Human Services. 2023. About the National Health Interview Survey. https://www.cdc.gov/nchs/nhis/about/index.html.

Centers for Medicare & Medicaid Services (CMS), U.S. Department of Health and Human Services. 2018. Letter from Tim Hill to state health officials regarding "Transformed-Medicaid Statistical Information System (T-MSIS)." August 10, 2018. https://www.medicaid.gov/federal-policy-guidance/downloads/sho18008.pdf.

Centers for Medicare & Medicaid Services (CMS). 2010. Brief summaries and glossary. In *Medicare & Medicaid statistical supplement*. Baltimore, MD: CMS. https://www.cms.gov/Research-Statistics-Data-and-Systems/Statistics-Trends-and-Reports/MedicareMedicaidStatSupp/Downloads/2010SummariesGlossary.zip.

Chidambaram, P., and A. Burns. 2023. *How many people use Medicaid long-term services and supports and how much does Medicaid spend on those people?* Washington, DC: KFF. https://www.kff.org/report-section/how-many-people-use-medicaid-long-term-services-and-supports-and-how-much-does-medicaid-spend-on-those-people.

Greener, E., A. Carpenter, and L. Nolan. 2023. *Identifying enrollees who use home and community-based services in the TAF*. TAF Methodology Brief, no. 7061. Baltimore, MD: CMS. https://www.medicaid.gov/dq-atlas/downloads/supplemental/7061-Identifying-HCBS-in-TAF.pdf.

IPUMS Health Surveys. 2019. User note: Washington Group on Disability Statistics measures. https://nhis.ipums.org/nhis/userNotes_washingtongroup.shtml.

Kenney, G., and V. Lynch. 2010. *Monitoring children's health insurance coverage under CHIPRA using federal surveys. In Databases for estimating health insurance coverage for children: A workshop summary*. Washington, DC: National Academies Press. https://www.ncbi.nlm.nih.gov/books/NBK209630/.

Medicaid and CHIP Payment and Access Commission (MACPAC). 2025. *Spending and utilization for Medicaid home- and community-based services*. July 2025. Washington, DC: MACPAC. https://www.macpac.gov/wp-content/uploads/2025/07/Spending-and-Utilization-for-Medicaid-Home-and-Community-Based-Services.pdf.

Medicaid and CHIP Payment and Access Commission (MACPAC). 2024. *Methodological approaches for analyzing use and spending in Medicaid long-term services and supports: A comparative review*. August 2024. Washington, DC: MACPAC. https://www.macpac.gov/wp-content/uploads/2024/10/Methodological-Approaches-for-Analyzing-Use-and-Spending-in-Medicaid-Long-Term-Services-and-Supports-A-Comparative-Review.pdf.

Rhoades, J.A., J.W. Cohen, and S.R. Machlin. 2010. Methodological comparison of estimates of ambulatory health care use from the Medical Expenditure Panel Survey and other data sources. In *JSM Proceedings*. Alexandria, VA: American Statistical Association, http://www.asasrms.org/Proceedings/y2010/Files/307444_58577.pdf.

Rooney, J., C. Irvin, J. Self, et al. 2023. *Identifying and classifying Medicaid home and community-based services claims in the Transformed Medicaid Statistical Information System*, 2016–2020. Washington, DC: Office of the Assistant Secretary for Planning and Evaluation, U.S. Department of Health and Human Services. https://aspe.hhs.gov/sites/default/files/documents/5ddae662bdcd7b04379e6f176a283441/identify-classify-hcbs-claims-tmsis-brief.pdf.

Stepanczuk, C., C. Murray, M. Eckstein, and A. Wysocki. 2024. *Methodology for identifying Medicaid long-term services and supports expenditures and users*, 2019–2021. Chicago, IL: Mathematica. https://www.medicaid.gov/medicaid/long-term-services-supports/downloads/ltss-users-expenditures-method.pdf.