DEPARTMENT OF HEALTH

Minnesota All Payer Claims Database Member Public Use File: A User Guide

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MN APCD
All Payer Claims Database

Background

The Minnesota Department of Health (MDH) maintains the Minnesota All Payer Claims Database (MN APCD), a repository of healthcare claims data that supports statewide analyses of healthcare costs, quality, and utilization. Under legislative mandate, MDH releases publicly available summary information from the MN APCD in the form of public use files (PUFs). PUF data are delivered in spreadsheets with aggregated records that prevent the identification of individual members, providers, and health plans. Currently available MN APCD PUFs, derived from medical and pharmacy claims, contain summary data on healthcare services, healthcare utilization, primary diagnoses, and prescription drugs.[1] To aid in the study of cost sharing in Minnesota, MDH has prepared a Member PUF. This document introduces the PUF, illustrates how to interpret PUF records, and includes technical instructions for users who wish to further aggregate PUF records.

Public use file overview

The Member PUF was derived from MN APCD enrollment data and medical and pharmacy claims submitted by insurers. Each record in the PUF aggregates enrollment and claims information by payer type (commercial, Medicare, or Minnesota Health Care Programs) and an additional set of stratifying variables representing the member's age group, gender, level of service utilization during the calendar year, and rural/urban location. The member PUF can be used to study variation in medical and pharmacy expenditures by cost sharing, within or across payer type, and within or across combinations of the additional stratifying variables. Expenditure variables include the medical providers' collective charged amounts as well as the separate amounts paid by the insurer and member and their total for medical costs, prescription drug costs, and combined medical and prescription drug costs.

MDH developed this PUF in partnership with Mathematica and welcomes questions and feedback from users at: health.APCD@state.mn.us.

Design of the public use files

Definition of a member

A member is a person who is covered under a health plan. Plan participants are included in the member PUF if they had one or more months of medical coverage reported in the MN APCD. Participants with only prescription drug coverage are not included. Note, however, that while participants with medical coverage are included in the PUF regardless of whether their coverage encompassed prescription drugs, months without medical coverage are excluded from counts of member months. Months without prescription drug coverage are reported in a separate variable. Furthermore, members are included regardless of whether they incurred any

medical or pharmacy costs during the year. Members with no medical or pharmacy claims during the year are included in the PUF in a separate strata than members who had claims.

Payer type assignment

A member may have had coverage by more than one type of payer during the year. Members with more than one payer type will include, for example, persons transitioning from commercial coverage to Medicare as a result of turning 65 or becoming disabled, persons transitioning between commercial coverage and Minnesota Health Care Programs due to changes in employment or financial circumstances more generally, and persons transitioning from Minnesota Health Care Programs to Medicare by turning 65. For members with more than one payer type during the year, their coverage and expenditures under each payer type are counted separately. That is, if a member had 10 months of commercial coverage and two months of Medicare coverage, the 10 months of commercial coverage and associated expenditures will be counted under the commercial payer type, and the two months of Medicare coverage and associated expenditures will be counted under the Medicare payer type.[2] Each record includes a count of the number of member months of coverage for that payer type and the total member months of coverage across all payer types for persons with that payer type.

Data elements

In addition to stratification by payer type, PUF records are further stratified by:

- Member's age group
- Member's sex
- Member's resource utilization band (RUB)
- Rural Urban Commuting Area (RUCA) classification of the member's ZIP code

Age, sex, and ZIP code correspond to the month closest to July of the respective calendar year. Five age groups (years) are identified: (1) 18 and under, (2) 19 to 44, (3) 45-64, (4) 65 to 74, and (5) 75 and older. The member's RUB is an indicator of the patient's utilization of medical resources during the year. Developed by Johns Hopkins University and produced with their Adjusted Clinical Groups (ACG®) software, RUB distinguishes among six levels of utilization, ranging from healthy users, coded 1, to very high users, coded 5. Members with no utilization (or no valid claims) during the year are coded 0. RUB levels reflect "a combination of concurrent relative resource use and number of comorbidities."[3] The RUCA classification is based on a coding of census tracts by their location and the commuting patterns of their residents. RUCA codes prepared by the Economic Research Service of the U.S. Department of Agriculture were mapped to Minnesota ZIP codes by Mathematica, and ZIP codes were then classified using a scheme recommended by the Washington State Department of Health as: (1) urban core, (2)

suburban, (3) micropolitan, and (4) rural/small town.[4] Thus, each PUF record represents the medical and pharmacy claims associated with a given payer type for members of the same sex, age group, RUB code, and RUCA class.

The contents of the PUF are described in a data dictionary that appears as a tab in the PUF. To reduce the granularity of the data, users can aggregate PUF records across payer type or any other stratifier or combination of stratifiers. For aggregation guidance, see Appendix B.

Exclusions from the public use file

Medical and pharmacy claims submitted to the MN APCD include duplicate and denied claims as wells as other claims with various types of deficiencies that detract from their analytic usefulness. The Minnesota Department of Health (MDH) removes duplicate and denied claims as well as claims that fail a number of tests—including whether the claim was filed on behalf of an in-state resident and reported a positive total amount paid.

As noted above, the member PUF is restricted to members with one or more months of medical coverage. Members were excluded if sex or age were missing from the eligibility file. Members were also excluded if their ZIP codes were missing or invalid (that is, could not be matched to the ZIP codes used to assign the RUCA code). Medical or pharmacy claims that could not be matched to any member were excluded. In addition, matched medical claims were excluded from members' records if they had negative total paid amounts or if the amount paid by managed care (the "prepaid" amount) was positive but the total paid amount was zero.

After claims were aggregated to produce a preliminary or "full" version of the PUF, records representing fewer than 11 unique members were redacted to prevent identification of individual members. Approximately 6% of claims and 2% of total paid amount from the MN APCD are redacted from the Member PUF.

Other important data considerations

The MN APCD includes medical and pharmacy claims for Medicare, Minnesota Health Care Programs, and most commercial plans. The MN APCD was not designed to include claims for healthcare covered by Tricare, Veterans Affairs, the Indian Health Service, Workers' Compensation, or for care provided to Minnesotans without health insurance. It also does not include claims for services provided by plans that do not cover general medical care, such as accident-only, vision, or dental plans. In addition, data from certain low-volume carriers (less than $3 million in medical claims or less than $300,000 in pharmacy claims) are exempt from submission to the MN APCD. Lastly, it should be noted that claims data are only as accurate as the coding on submitted claims.

In a decision released on March 1, 2016, the U.S. Supreme Court upheld a lower court's ruling that self-insured health plans could not be required to submit claims data to a state's APCD

(Gobeille v. Liberty Mutual Insurance Co.). The court found that requiring self-insured plans to submit medical and pharmacy claims was preempted by the Employee Retirement Income Security Act (ERISA). The decision does not prohibit the voluntary submission of self-insured plan data to the MN APCD. The effect of this decision was to substantially reduce the volume of commercial claims and enrollment that ERISA-subject self-insured plans reported to the MN APCD. The member PUF, because its membership and claims data are drawn from 2016 and later, will include members whose commercial insurers stopped submitting data early in the year. As a result, the member PUF will tend to understate covered months of commercial coverage for the population it represents. Estimates of cost distributions—means, medians, and standard deviations—should not be greatly affected because they are expressed per covered member per month.[5]

The pharmacy expenditures reported in the member PUF are based on pharmacy claims only. Prescription drugs reported on medical claims, such as those delivered in a clinic or hospital setting, are included as medical expenditures. Pharmacy claims submitted to the MN APCD represent filled prescriptions only. Total paid amounts in this PUF account for proprietary rebates only to the extent that they are reflected in actual transaction payments between a pharmacy benefit manager (PBMs) and a plan sponsor. Rebates and other adjustments that may be paid after claims adjudication by a PBM with a pharmaceutical manufacturer, a plan sponsor, or a patient are not reported to the MN APCD. Since rebate data are proprietary and not available, estimated prescription drug price and spending is biased towards higher estimates of prescription drug price and spending. The impact on prices paid from manufacturer or other coupons used by patients at the point of sale is also not accounted for in the price or spending estimates.

Appendix A: Interpreting PUF data

Table 1 shows selected variables from six Member PUF records representing females 45-64 with commercial coverage and living in urban core areas with high median household income in 2022. The rows present the values of these variables for subsets of these women with different RUB codes. The entries in the first row indicate that 8,739 women with a RUB code of 0 had 79,987 months of commercial coverage in 2022 and 80,572 total months of coverage when other payer types were included. Among their months of commercial coverage these women had 4,165 months without drug coverage. Consistent with a RUB code of 0 (implying no medical or pharmacy claims during the year), these women collectively had no hospitalizations and no identified chronic conditions. In contrast, a much smaller number (4,366 women) had RUB codes of 5. This group had 48,972 months of commercial coverage, 50,963 months of coverage from all payers, and 2,365 months without drug coverage. Collectively, they had 2,551 hospitalizations and 30,628 chronic conditions.

Table 1. Select counts for females 45-64 with commercial coverage in urban core areas with high median household income, by RUB code, 2022.

Unique members	Resource utilization band	Total member months	Member months covered by payer type	Months without drug coverage	Hospitalizations	Chronic conditions
8,739	0	80,572	79,987	4,165	0	0
14,548	1	145,847	144,626	5,940	0	1,175
13,135	2	142,595	141,415	8,118	.	3,907
60,500	3	693,749	687,488	33,699	461	100,574
13,646	4	160,326	157,688	7,814	870	55,752
4,366	5	50,963	48,972	2,365	2,551	30,628

Note: "." indicates that a value between 1 and 10 was suppressed to prevent disclosure.

Per CMS guidelines, records based on fewer than 11 members were redacted (removed from the PUF). In addition, small counts for individual variables are replaced with a dot (.) as shown in the RUB 2 row in Table 1. Three variables in the PUF have nonzero counts between 1 and 10 (so values are redacted): NOT_RX_MONTH_SUM, ALL_CAUSE_INPAT_HOSP_SUM, and CHRONIC_CONDITION_COUNT_SUM.

Table 2 reports several mean cost variables for the same six records as shown in Table 1. Table 2 shows the mean amounts paid per member per month by commercial insurers and members for (1) medical services; (2) prescription drugs; and (3) combined medical services and prescription drugs.[6] Except for rounding error, the mean total amount paid equals the sum of the previous four mean amounts. For example, for women with RUB equal to 3, insurers paid an average of $340.45 for medical services per member per month and $125.33 per member

per month for prescription drugs while members paid an average of $95.58 for medical services and $21.70 for prescription drugs. Together, insurers and members paid an average of $583.08 per member per month. The average monthly amount paid for both medical services and prescription drugs by insurers and members rose from $78.86 per member with RUB of 1 to $5,856.23 per member with RUB of 5.

Table 2. Select mean amounts per member month for females 45-64 with commercial coverage in urban core areas with high median household income, by RUB code, 2022.

Unique members	Resource utilization band	Mean medical insurer paid amount	Mean medical member paid amount	Mean pharmacy insurer paid amount	Mean pharmacy member paid amount	Mean total medical plus pharmacy paid amount
8,739	0	$0.00	$0.00	$0.00	$0.00	$0.00
14,548	1	$37.26	$8.39	$26.72	$6.47	$78.86
13,135	2	$97.79	$41.04	$37.66	$10.57	$187.07
60,500	3	$340.45	$95.58	$125.33	$21.70	$583.08
13,646	4	$1,231.08	$167.91	$404.40	$42.42	$1,845.82
4,366	5	$4,633.53	$226.74	$928.47	$67.48	$5,856.23

Interpreting data across years

Table 3 reports the mean amounts paid per member per month by commercial insurers and members for combined medical services and prescription drugs for the same six records as shown in Tables 5 and 6 but including records from both 2021 and 2022. Comparing mean amounts across years—for example, calculating percent changes, as shown in Table 3—is straightforward. For example, for women ages 45-64 with RUB equal to 4, in high median income households, insurers and members paid a mean amount of $1,859.06 per member per month in 2021, and a mean amount of $1,845.82 per member per month in 2022.

Table 3. 2021 to 2022 percent change in mean total paid amounts per member per month for females 45-64 with commercial coverage in urban core areas with high median household income, by RUB code.

Resource utilization band	2021 total member months	2021 mean total medical plus pharmacy paid amount	2022 total member months	2022 mean total medical plus pharmacy paid amount	2021 to 2022 change in mean total medical plus pharmacy paid amount (%)
0	61,932	$0.00	80,572	$0.00	0.0%
1	171,870	$71.97	145,847	$78.86	9.6%
2	144,132	$184.02	142,595	$187.07	1.7%
3	707,211	$568.70	693,749	$583.08	2.5%
4	157,496	$1,859.06	160,326	$1,845.82	-0.7%
5	50,491	$5,729.11	50,963	$5,856.23	2.2%

Note: the number of medical months cannot be compared across years due to the unknown volume of unreported self-insured commercial claims.

Comparing sum values—medical member months and total paid amounts—is more complicated, but only for commercial payers. Recall that commercial claims from 2016 onward in the MN APCD do not include all self-insured commercial claims in Minnesota, and the numbers of self-insured months and claims (whether or not reported) likely vary from year to year. In separate analysis of this issue, average values did not seem to be much or at all biased by the omission of self-insured months and claims. However, total sum values for commercial payers cannot be compared. In contrast, sum values for Medicare and Minnesota Health Care Programs can be compared across all PUF years—with the caveat that underlying enrollment in those programs may change due to larger numbers of Minnesotans becoming eligible (for example, in Medicare) or Minnesota Health Care Program changes that affect eligibility.

Appendix B: User calculations

Users may wish to construct totals, means, or other statistics across payer type or across one or more of the other stratifiers. How this is done will vary with the type of statistic.

Counts and dollar amounts

Some of the count variables and all of the dollar totals (variables ending in "SUM") can be added across any combination of rows to obtain unduplicated totals while other count variables can be summed only within the same payer type. Means, medians, and standard deviations cannot be summed across records, but the means, approximate medians, and standard deviations for a combination of records either within or across the same payer type can be calculated as described in the next three sections. Counts of months covered by a given payer type (MED_MONTH_PAYER_ SUM), months without drug coverage (NOT_RX_MONTH_SUM), and the total number of hospitalizations (ALL_CAUSE_INPAT_ HOSP_SUM) are fully additive and can be summed both within and across payer type to obtain unduplicated totals. Counts of unique members (UNIQUE_MEMBERS), total covered months by all payers (MED_MONTH_ALL_SUM), and the number of chronic conditions (CHRONIC_CONDITION_COUNT_SUM) are additive only within payer type. They can be summed across records with the same payer type to obtain unduplicated totals, but they cannot be summed across records with different payer types. This is because the values of each of these variables will be repeated for members covered by more than one payer type during 2016.

Means

All of the means reported in the member PUF were calculated by dividing a total dollar amount (which is specific to a payer type) by the number of covered member months for that same payer type. Mean dollar amounts for combinations of records can be calculated as the weighted average of the means of the individual records, where the weights are the months of coverage by the payer type (MED_MONTH_PAYER_SUM). A more direct calculation is to sum the corresponding totals from which the means were calculated and divide this sum by the sum of the months of coverage by the payer type. This calculation is illustrated in Table 4 using data on the insurer-paid medical costs from the six records in Tables 5 and 6.[7] This represents an aggregation of records over RUB code within a single combination of age group, sex, RUCA class, and median household income class.

Table 4. Calculation of mean for an aggregate of records.

Resource utilization band	Months covered by payer type	Mean medical insurer paid amount	Total medical insurer paid amount	Grand mean
0	79,987	$0.00	$0.00	N/A
1	144,626	$37.26	$5,390,121.27	N/A
2	141,415	$97.79	$13,830,269.42	N/A
3	687,488	$340.45	$234,061,234.18	N/A
4	157,688	$1,231.08	$194,172,561.74	N/A
5	48,972	$4,633.53	$227,121,983.60	N/A
Sum	1,260,176	N/A	$674,576,170.21	$535.30

Medians

One cannot determine the exact median of a statistic without access to the underlying microdata (in this case the individual claims). Unlike means, the median or weighted median of a set of subgroup medians (for example, the medians of amounts paid by payer type) is not the median of the overall group (that is, the median of the amounts paid across all three payer types). However, with a very large number of subgroups and none of them substantially larger than the others, the weighted median of the subgroup medians provides a good approximation of the median of the overall group. One can apply a calculation similar to the one illustrated in Table 4 to obtain the approximate median for an aggregate of PUF records. First, substitute "Median medical insurer paid amount" for "Mean medical insurer paid amount". Then replace "Total medical insurer paid amount" in each row with the product of "Months covered by payer type" and "Median medical insurer paid amount". This calculation is illustrated in Table 5.

Table 5. Calculation of approximate median for an aggregate of records.

Resource utilization band	Months covered by payer type	Median medical insurer paid amount	Product	Grand median
0	79,987	$0.00	$0.00	N/A
1	144,626	$0.00	$0.00	N/A
2	141,415	$0.00	$0.00	N/A
3	687,488	$0.00	$0.00	N/A
4	157,688	$228.79	$36,077,437.52	N/A
5	48,972	$559.31	$27,390,529.32	N/A
Sum	1,260,176	N/A	$63,467,966.84	$50.36

Standard deviations

Calculating the standard deviation for an aggregate of PUF records is more complex than calculating the mean, as it requires performing several computational operations on the data from the individual records. The operations described below are illustrated in the corresponding numeric columns in Table 6. Columns with non-numeric names represent PUF data.

(1) Square the standard deviation (SD) from each record and multiply it by the number of covered months. Summing these products across records yields the *within group sum of squares*.[a]

(2) Calculate the difference between each record mean and the grand mean (see Table 4 for grand mean calculation) and square this difference.

(3) Multiply the squared difference from (2) by the number of covered months. Summing these values across records yields the *between group sum of squares*.[b]

(4) Sum the *within group sum of squares* and the *between group sums of squares* and divide the result by the total number of covered months in the aggregate record to calculate a mean squared deviation or variance. Take the square root of the variance to obtain the standard deviation of the aggregate record.

Table 6. Calculation of standard deviation for an aggregate of records.

RUB	Months covered by payer type	SD of insurer paid amount	(1)	Mean medical insurer paid amount	(2)	(3)	(4)
0	79,987	$0.00	0	$0.00	286,546	22,919,962,101	N/A
1	144,626	$217.00	6,810,293,714	$37.26	248,043	35,873,588,635	N/A
2	141,415	$544.88	41,985,295,329	$97.79	191,415	27,068,952,239	N/A
3	687,488	$1,979.18	2,692,996,006,433	$340.45	37,967	26,101,528,620	N/A
4	157,688	$4,828.86	3,676,951,264,800	$1,231.08	484,110	76,338,307,467	N/A
5	48,972	$17,471.18	14,948,317,619,371	$4,633.53	16,795,489	822,508,693,816	N/A
Sum	1,260,176	N/A	21,367,060,479,648[a]	N/A	N/A	1,010,811,032,879[b]	$4,213.99

[a] Within group sum of squares

[b] Between group sum of squares

Example column calculations in Table 6:

(1) $0 = 79{,}987 \times (0.00)^2$

(2) $286{,}546 = (0.00 - 535.30)^2$

(3) $22{,}919{,}962{,}101 = 286{,}546 \times 1{,}260{,}176$

(4) $\$966.46 = \sqrt{(21{,}637{,}060{,}479{,}648 + 1{,}010{,}811{,}032{,}879)/1{,}260{,}176}$

[1] At this time, all PUFs are available free of charge to the user community. PUFs may be downloaded online by completing a survey form: https://survey.vovici.com/se/56206EE333F13F0F.

[2] Coverage during a month was assigned hierarchically. If commercial coverage was indicated during a month, that month was assigned to the commercial payer type. In the absence of commercial coverage, Medicare was assigned as the payer type if coverage by both Medicare and Minnesota Health Care Programs was indicated.

[3] *The Johns Hopkins ACG® System Version 12.1 User Documentation* (Baltimore, MD: The Johns Hopkins University, 2019).

[4] Washington State Department of Health, "Guidelines for Using Rural-Urban Classification Systems for Community Health Assessment," Revised October 27, 2016, p. 13.

[5] Note, however, that coverage by self-insured plans will be underrepresented among coverage by all commercial plans. To the extent that the medical and pharmacy expenditures incurred by participants in self-insured plans are different from those of participants in other commercial plans, the expenditure data reported for participants in commercial plans will provide biased estimates of the expenditures of participants in all commercial plans.

[6] The MN APCD includes no claims for prescription drug purchases by members without prescription drug coverage from their medical insurers. For these members, any drug purchases paid by the insurer were zero; the member costs are unknown and counted as zero in calculation of the distributional statistics (means, medians, and standard deviations) for medical, pharmacy, and combined expenditures. Users of the PUF should recognize that unless the variable NOT_RX_MONTH_SUM is zero, reported member and total prescription drug expenditures and combined medical and drug expenditures may be less than if calculated only among members with pharmacy coverage.

[7] Note that the mean insurer paid amount for a given record was computed by dividing the total paid amount by the number of covered member months. Because the mean paid amount was rounded to two decimal places, however, multiplying the mean paid amount by the number of covered member months does not reproduce the total paid amount exactly.

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