DEPARTMENT OF HEALTH

Minnesota All Payer Claims Database Prescription Drug Public Use Files: A User Guide

NOVEMBER 2023

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MNAPCD All Payer Claims Database

DEPARTMENT OF HEALTH

Background

The Minnesota Department of Health (MDH) maintains the Minnesota All Payer Claims Database (MN APCD), a repository of health care claims data that supports statewide analyses of health care 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. As of November 2023, currently available MN APCD PUFs, derived from medical and pharmacy claims, contain summary data on health care services, health care utilization, primary diagnoses, provider specialties, members, and prescription drugs.[1] This document introduces the prescription drug PUFs, illustrates how to interpret PUF records, and includes technical instructions for users who wish to further aggregate PUF records.

Public Use File Overview

Two versions of MN APCD prescription drug PUFs are available:

- The *Detail* PUF contains retail pharmacy claims data that have been aggregated by the first two segments of the National Drug Code (NDC)
- The S*ummary* PUF contains retail pharmacy claims data that have been aggregated by nonproprietary drug name

PUF levels of aggregation are further explained in the "Definition of a Prescription Drug" section.

Summary and *Detail* PUFs are stratified by payer type (commercial, Medicare, and Minnesota Health Care Programs) and are available for 2009 through 2020.[2]

Prescription drugs administered in medical settings such as hospitals, infusion centers, nursing homes, or other medical offices—although often high in cost and significant drivers of growth—are not included in these PUFs. These drugs are generally billed in medical claims, as opposed to pharmacy claims, which were the basis for the PUFs.

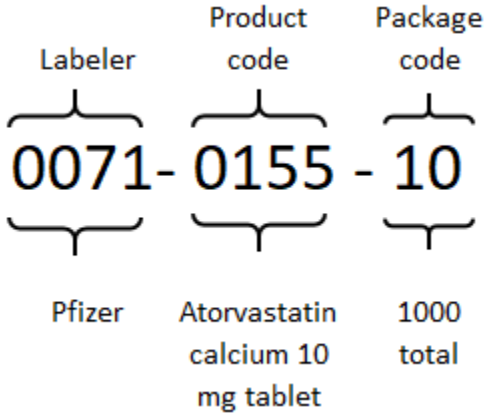
Costs in the PUFs represent health care transactions *before* any applicable rebates. Currently, data on rebates do not exist in a transparent manner and are not required reporting elements under state law that authorizes maintaining the MN APCD. Although these PUFs represent the single largest collection of prescription drug use data for Minnesota, they do not represent prescription drug use by every Minnesotan. For example, the MN APCD does not include claims for certain payers, and the volume of available commercial data has been affected by a recent Supreme Court ruling (see "Other Important Data Considerations" section). **Users must carefully consider their use and interpretation of the data.**

MDH developed the PUFs in partnership with Mathematica and welcomes questions from users at: health.APCD@state.mn.us. MDH appreciates user feedback about experience with the PUFs.

Definition of a Prescription Drug

Prescription drugs are broadly defined by active ingredient (nonproprietary drug name) or more narrowly by the specific product, containing the active ingredient, that a given pharmaceutical company produces. Each product is assigned a unique NDC, which consists of three segments (Figure 1). The first segment identifies the labeler (i.e., the pharmaceutical company). The second segment, which is specific to the labeler, identifies a distinct product in terms of active ingredient(s), active strength, and dosage form. The third segment is a package code, which indicates how a drug is packaged for sale to pharmacies. Package codes may vary with the first two segments of an NDC, but this variation is not relevant to individual prescriptions. Multiple NDCs can share a single nonproprietary drug name.

Figure 1. Illustration of three segments of a National Drug Code.



Data Elements

The PUFs include a number of data elements, including drug characteristics, utilization measures, calculated metrics and rankings, and summary data on the demographics of prescription drug users. NDCs allow linking of descriptive drug characteristics from reference data (Medi-Span[3]) to measures of prescription drug use and spending from claims data. Drug characteristics in the PUFs, which differ between *Summary* and *Detail* files (Figure 2), include:

- Nonproprietary name
- Proprietary name
- Brand/generic classification
- Therapeutic class
- Labeler name
- Dosage form (e.g., tablet, cream, injection)
- Active strength (e.g., a numerical value)
- Active ingredient unit (e.g., milligrams, milligrams per milliliter)

Figure 2. Example of select drug characteristic variables in *Detail* PUF.

Nonproprietary name	Proprietary name	Brand / generic	Therapeutic Class	Labeler	Form	Strength	Unit
ACETAMINOPHEN	UP & UP ACETAMINOPHEN	Generic	Analgesics & Anesthetics	TARGET	TABLET	500	MG/ 1

The assignment of therapeutic classes to drugs relied on the Medi-Span reference dataset. Therapeutic classes provide a helpful categorization with which to easily view and understand prescription drug data that span thousands of drugs.

At both the *Summary* and *Detail* level, the PUFs provide measures of the number of prescriptions and the number of unique members with a prescription, as well as calculated metrics of mean, median, and standard deviation for:

- Days' supply
- Quantity dispensed
- Health plan paid amount
- Member paid amount
- Total paid amount[4]

Additionally, the *Summary* PUF contains drug rankings by a number of dimensions (e.g., cost per prescription) and distributions of prescription drug user demographic characteristics, including:

- Member age group
- Member sex
- Rural/urban classification of member home ZIP code

Metadata

Exclusions

MN APCD retail pharmacy claims meeting any of the following criteria were excluded from the PUFs in order to optimize the analytic usefulness of the files:

- Duplicate or denied claim
- Member with out-of-state residence
- Member with unknown sex
- Negative quantity dispensed
- Negative paid amounts

Additionally, claims with an NDC that could not be matched to Medi-Span (reference database) were excluded. After claims were aggregated to the unit of analysis for each PUF, rows with fewer than 11 unique members or 5 unique prescribers were removed to prevent identification and comply with applicable statutes and data use agreements. The percentage of MN APCD pharmacy claims and costs included in the PUFs are in Tables 1 and 2. Total claim counts and costs are the same at both levels of PUF aggregation for each year.

Table 1. Claims counts at each step of PUF processing.

Year	MN APCD	Unredacted PUF	Redacted PUF	Exclusion %	Redaction %
2009	57,309,514	54,387,452	54,204,314	5.1%	5.1%
2010	58,142,569	56,175,411	55,988,306	3.4%	3.7%
2011	58,898,093	56,300,833	56,112,868	4.4%	4.7%
2012	59,296,570	56,651,835	56,464,416	4.5%	4.8%
2013	61,549,266	59,333,432	59,131,375	3.6%	3.9%
2014	63,822,430	61,289,404	61,081,140	4.0%	4.3%
2015	61,543,378	58,690,365	58,484,306	4.6%	5.0%
2016	57,384,802	54,900,977	54,689,427	4.3%	4.7%
2017	56,726,787	53,998,656	53,774,474	4.8%	5.2%
2018	56,709,651	54,489,371	54,257,814	3.9%	4.3%
2019	55,386,194	53,737,283	53,493,166	3.0%	3.4%
2020	52,207,955	51,323,374	51,076,737	1.7%	2.2%

Table 2. Total paid amount at each step of PUF processing.

Year	MN APCD	Unredacted PUF	Redacted PUF	Exclusion %	Redaction %
2009	$4,037,761,360	$3,905,438,109	$3,836,171,304	3.3%	3.3%
2010	$4,156,874,819	$4,074,458,282	$4,003,756,348	2.0%	3.7%
2011	$4,266,216,269	$4,159,548,816	$4,079,784,568	2.5%	4.4%
2012	$4,737,800,077	$4,599,249,622	$4,500,628,939	2.9%	5.0%
2013	$4,924,595,928	$4,807,656,593	$4,690,691,869	2.4%	4.7%
2014	$5,403,751,589	$5,244,929,237	$5,104,597,942	2.9%	5.5%
2015	$6,094,046,521	$5,892,932,457	$5,711,997,079	3.3%	6.3%
2016	$5,576,476,194	$5,391,087,081	$5,173,491,339	3.3%	7.2%
2017	$5,674,957,410	$5,442,479,075	$5,196,480,944	4.1%	8.4%
2018	$5,811,146,857	$5,602,918,629	$5,331,110,931	3.6%	8.3%
2019	$6,050,159,717	$5,902,979,530	$5,562,902,878	2.4%	8.1%
2020	$6,122,810,216	$6,067,099,860	$5,685,639,152	0.9%	7.1%

Descriptive Statistics

Tables 3 and 4 report payer specific claim counts and total costs for each PUF year. These measures can serve as control totals for users. As noted, rebates paid to pharmacy benefit managers (PBMs) and insurers by the pharmaceutical companies, which partially offset insurer costs, are not included in the MN APCD.[5]

Table 3. Claim counts by payer type

Year	Commercial	Medicare	Minnesota Health Care programs
2009	25,890,263	18,520,283	9,793,768
2010	25,459,557	19,843,226	10,685,523
2011	25,586,407	19,381,641	11,144,820
2012	25,902,527	19,919,042	10,642,847
2013	26,192,419	21,426,707	11,512,249
2014	26,869,092	21,356,758	12,855,290
2015	25,716,181	19,524,214	13,243,911
2016	18,644,798	22,177,751	13,866,878
2017	18,002,726	21,881,598	13,890,150
2018	17,404,325	22,461,554	14,391,935
2019	15,968,275	23,484,027	14,040,864
2020	12,842,207	24,333,448	13,901,082

Table 4. Total paid amount by payer type

Year	Commercial	Medicare	Minnesota Health Care programs
2009	$2,121,503,432	$1,114,148,025	$600,519,846
2010	$2,098,089,560	$1,253,711,689	$651,955,099
2011	$2,135,693,861	$1,247,991,446	$696,099,261
2012	$2,481,309,964	$1,362,042,632	$657,276,343
2013	$2,485,988,742	$1,485,000,862	$719,702,266
2014	$2,628,970,341	$1,616,541,977	$859,085,624
2015	$3,057,511,313	$1,692,026,091	$962,459,676
2016	$2,200,187,328	$1,994,070,450	$979,233,562
2017	$2,222,909,870	$2,010,839,943	$962,731,131
2018	$2,229,108,893	$2,073,130,478	$1,028,871,561
2019	$2,195,314,723	$2,309,863,399	$1,057,724,755
2020	$1,899,377,566	$2,573,050,683	$1,213,210,903

Other Important Data Considerations

Minnesota policymakers structured the requirements for data submission under the MN APCD to focus on payers under its jurisdiction and payers who represent the primary volume of health care services in the state. As such, the MN APCD was not designed to capture pharmacy (or medical) claims for individuals who are covered by Tricare, Veterans Affairs, the Indian Health Service, or Workers' Compensation. Additionally, the the MN APCD does not include:

- Prescription drug use or spending by Minnesotans who are uninsured
- Claims for services provided by plans that do not cover general medical care, such as accident-only, vision, or dental plans
- Low-volume submitters of pharmacy claims, defined as having less than $300,000 in claims volume (exempt from submission to the MN APCD)
- Written prescriptions that were never filled

As noted earlier, prescription drugs administered in medical settings such as hospitals, infusion centers, nursing homes, or other medical offices *are* submitted to the MN APCD. However, the Prescription Drug PUFs include only prescription drugs obtained through a retail pharmacy.

There are a number of additional data characteristics that PUF users should consider. We have referred to most of these characteristics throughout the document but provide additional details here:

- **What price data are available?** Pricing for prescription drugs is opaque and complex. It evolves from negotiations between multiple parties across the supply chain and is influenced by a range of incentives. Absent robust transparency laws, the final price—paid by Medicaid, Medicare, or as a whole or by individual commercial payers—is a closely guarded trade secret. Data systems like the MN APCD generally capture the paid amount *before* rebate transactions occur. This means the actual transacted price is overstated for many drugs in the PUFs.

  Similarly, the MN APCD and the PUFs do not capture the influence of coupons or other discounts from list prices that pharmaceutical manufacturers selectively grant members. Interpretation of cost per prescription should consider supply measures such as quantity dispensed and days' supply.

- **Are self-insured claims part of the data?** In a decision released on March 1, 2016, the U.S. Supreme Court upheld a lower court's ruling that self-insured health plans, or large employers who retain the insurance risk for their employees, could not be required to submit claims data to a state's APCD (Gobeille v. Liberty Mutual Insurance Co.). The court found that requiring private self-insured plans to participate in state APCDs was preempted by the Employee Retirement Income Security Act (ERISA). The ruling does not prohibit the voluntary submission of self-insured plan data to the MN APCD, a decision that rests with employers themselves and not their brokers.

  Although Minnesota is working with self-insured employers and brokers to encourage reporting and create conditions that are conducive to doing so without additional

burden, the court's ruling resulted in a substantial reduction in the volume of commercial claims beginning in the spring of 2016. Summing commercial prescription counts and costs of 2016 (and later) data in the PUFs would therefore result in a considerable underestimate of use and spending across the whole commercial market. To the extent that the demographics of fully and self-insured employees differ, user characteristics could also be affected. The calculation of averages or per-unit measures for commercial enrollees are not expected to be materially impacted by the reduction in the data volume.

Appendix B: Interpreting PUF Data

The following tables show subsets of data from the *Summary* and *Detail* PUFs to illustrate how to interpret key data elements. The sample *Detail* PUF data are derived from three records representing a single two segment NDC and all payer types. The two segment NDC, 60505-2580, is for a generic version of atorvastatin calcium (nonproprietary name), which is used to treat high cholesterol and sold under the brand name Lipitor. This particular NDC, a tablet containing 40 milligrams of the active ingredient and produced by Apotex, accounted for more prescriptions of atorvastatin calcium in 2016 than any other NDC, having grown from a relatively minor contributor in 2012.

Detail PUF

Table 5A shows a variety of mean paid amounts across payer types for the selected NDC in 2019 and 2020. Commercial insurers in 2019 accounted for 43,412 scripts with a mean days' supply of 72.2. The insurers paid an average of $9.37 per script while members paid an average of $10.13. The mean total amount paid was $19.98, which includes a very small amount paid by another source (not shown separately). Medicare accounted for 93,157 scripts with a mean days' supply of 53.3, lower than the commercial average. Medicare paid an average of $12.21 per script while members paid an average of $4.76. The mean total amount paid was $17.24. Minnesota Health Care Programs (MHCP) accounted for many fewer scripts than the other two payers at 25,544 with a mean days' supply of 29.4, about half that of the commercial insurers and Medicare. Minnesota Health Care Programs paid an average of $8.81 per script while members paid an average of $1.09. The mean total amount paid was $9.92.

Table 5A. Select mean cost statistics for two segment NDC 60505-2580 by payer type, 2019 and 2020.

Year	Product NDC	Payer	Number scripts	Days supply mean	Insurer paid mean	Member paid mean	Total paid mean
2019	60505-2580	Commercial	43,412	72.2	$9.37	$10.13	$19.98
2019	60505-2580	Medicare	93,157	53.3	$12.21	$4.76	$17.24
2019	60505-2580	MHCP	25,544	29.4	$8.81	$1.09	$9.92
2020	60505-2580	Commercial	24,411	74.4	$5.58	$10.61	$16.20
2020	60505-2580	Medicare	81,862	60.1	$12.23	$4.45	$16.70
2020	60505-2580	MHCP	18,364	34.4	$6.35	$0.97	$7.35

Comparing the calculated mean amounts across years—for example, calculating the unit or the percent change—is, in general, straightforward. All mean (or average) values can be compared directly. For example, as shown in Table 5B, the mean days' supply in 2020 was higher for all payers. The mean total price paid declined between 2019 and 2020 for each payer. The average

insurer-paid amounts declined much faster than the average member-paid amounts among commercial payers and Minnesota Health Care Programs.

Comparing sum values—specifically, the number of scripts as shown in Table 5A, or the amounts paid—is more complicated, but only for commercial payers. Recall that commercial scripts are understated in 2016 and subsequent years due to unreported self-insured commercial claims. However, 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 has changed due the numbers of Minnesotans becoming eligible (in particular, for Medicare) and Minnesota Health Care Program changes that affect eligibility.

Table 5B. Select percentage change cost statistics for two segment NDC 60505-2580 by payer type, 2019–2020.

Year	Product NDC	Payer	Number scripts	Days supply mean	Insurer paid mean	Member paid mean	Total paid mean
2019–2020	60505-2580	Commercial	-43.8%	3.0%	-40.4%	4.7%	-18.9%
2019–2020	60505-2580	Medicare	-12.1%	12.8%	0.2%	-6.5%	-3.1%
2019–2020	60505-2580	MHCP	-28.1%	17.0%	-27.9%	-11.0%	-25.9%

Additional statistics for the same NDC are shown in Tables 6 and 7, focusing on average costs per user, script, and days' supply. For most patients, the cost per user is probably an annual cost. The exceptions are patients who started or stopped taking the drug during the year or were switched to a different NDC or changed payer during the year.[6][1] In 2019, the cost per user was over twice the cost per script—for example, among commercial payers, $49.69 per user compared with $19.98 per script. This implies that on average the users of this NDC filled over two scripts during the year. The cost per script in Table 6 is identical to the mean total paid in Table 5A (which is calculated per script). The cost per days' supply is more uniform across payers than the previous two measures: in 2019, $0.27 for commercial payers, $0.32 for Medicare, and $0.33 for Minnesota Health Care Programs. The cost per unit dispensed—in this case a single 40 milligram tablet—is slightly more varied at $0.27 for commercial payers, $0.31 for Medicare, and $0.34 for Minnesota Health Care Programs.

[1] Patients continuing with the same NDC but changing payer type will appear in one row of the PUF for part of the year and another row for the rest of the year.

Table 6. Select unit cost statistics for two segment NDC 60505-2580 by payer type, 2019 and 2020.

Year	Product NDC	Payer	Number scripts	Cost per user	Cost per script	Cost per days supply	Cost per unit dispensed
2019	60505-2580	Commercial	43,412	$49.69	$19.98	$0.27	$0.27
2019	60505-2580	Medicare	93,157	$52.24	$17.24	$0.32	$0.31
2019	60505-2580	MHCP	25,544	$37.22	$9.92	$0.33	$0.34
2020	60505-2580	Commercial	24,411	$46.59	$16.20	$0.21	$0.21
2020	60505-2580	Medicare	81,862	$58.68	$16.70	$0.27	$0.27
2020	60505-2580	MHCP	18,364	$30.79	$7.35	$0.21	$0.21

Summary PUF

Table 7 shows selected cost statistics from the *Summary* PUF for all atorvastatin calcium scripts in the MN APCD in 2019 and 2020 (including the NDC used to populate Tables 5 and 6.) Grouping by nonproprietary name combines brand and generic formulations of the drug, as well as all dosage forms and active strengths for the drug sold in Minnesota in each year.

Table 7. Select mean cost statistics for atorvastatin calcium by payer type, 2019 and 2020.

Year	Payer	Number scripts	Days supply mean	Insurer paid mean	Member paid mean	Total paid mean	Cost per days supply
2019	Commercial	437,716	69.6	$8.86	$7.88	$17.00	$0.24
2019	Medicare	866,426	70.2	$12.39	$5.22	$17.78	$0.25
2019	MHCP	265,042	30.0	$8.18	$0.73	$8.97	$0.29
2020	Commercial	369,248	70.9	$8.61	$8.29	$16.91	$0.23
2020	Medicare	959,757	71.4	$12.18	$4.68	$16.91	$ 0.23
2020	MHCP	258,258	36.3	$8.50	$0.74	$9.27	$0.25

In 2020, Medicare accounted for the largest number of atorvastatin calcium scripts (959,747), followed by commercial payers (369,248) and Minnesota Health Care Programs (258,258). Scripts paid by commercial payers or Medicare averaged more than a 60-day supply, while scripts paid by Minnesota Health Care Programs averaged just 36.3 days. The insurer paid, member paid, and total paid amounts were lowest for Minnesota Health Care Programs.

Appendix C: User Calculations

Means for Alternative Units

The mean costs reported on each PUF are calculated over the number of prescriptions filled. Users may also wish to calculate average expenditures over different units—for example, per unique member, per days' supply, or per unit dispensed. Means for alternative units have already been computed in each PUF for the total paid amount, but it can also be calculated for the member-paid or insurer-paid amounts. For example, the average member cost per script can be calculated by dividing the total member cost by the number of scripts, and the average member cost per member can be calculated by dividing the total member cost by the number of unique members. Similarly, the average member cost per days' supply can be calculated by dividing the mean member cost by the mean days' supply, and the average member cost per unit dispensed can be calculated by dividing the mean member cost by the mean quantity dispensed.

Examples of these cost calculations are shown in Table 8 for the single NDC 60505-2580 used in the earlier illustrations, by payer type in 2020. The average cost per member is calculated by dividing the sum of the member paid amounts by the number of unique members. The average member cost per day is calculated by dividing the mean member paid amount by the mean days' supply.

Table 8. Select unit cost statistics for two segment NDC 60505-2580 by payer type, 2020.

Year	Payer	Unique members	Member paid sum	Cost per member	Days supply mean	Member paid mean	Member cost per day
2020	Commercial	8,487	$259,134.83	$30.53	74.4	$10.61	$0.14
2020	Medicare	23,306	$364,851.18	$15.65	60.1	$4.45	$0.07
2020	MHCP	4,387	$17,903.06	$4.08	34.4	$0.97	$0.03

Aggregating Records

Users may wish to aggregate PUF records across payer type or combine selected drugs. Aggregation methods vary by type of statistic.

Counts

Counts of prescriptions filled and paid amounts can be summed across PUF records directly; however, summing counts of unique members across PUF records is more complex. Depending on the rows being summed, a given member may appear in more than one PUF record – most commonly by obtaining prescriptions for more than one drug. In such cases, the sum will overstate the number of unique members by counting some individuals more than once. Summing unique members across payer type within the same NDC or nonproprietary drug is

less likely to produce an overestimate of unique members than is summing across drugs, but changes in payer type within a given year do occur.

Means

When records in the PUF are aggregated, the mean of the aggregate record (i.e., the grand mean for the set of records) can be calculated as the weighted average of the means of the individual records, where the weights are the numbers of prescriptions. This calculation is illustrated in Table 9 using data from the three 2020 records in Table 5. This represents an aggregation of records for a single NDC over payer types.

Table 9. Calculation of mean for an aggregate of PUF records (grand mean)

PUF record	Number of scripts	Mean total paid	Number of scripts x mean total paid	Grand mean
1	24,411	$16.20	395,458.20	N/A
2	81,862	$16.70	1,367,095.40	N/A
3	18,364	$7.35	134,975.40	N/A
Sum	124,637	N/A	1,897,529.00	$15.22*

*1,897,529.00 / 124,637

Medians

Calculating the exact median of a measure requires access to the underlying microdata (i.e., individual claims). Unlike means, the weighted median of a set of individual PUF records is not the median of the aggregate PUF record. However, with a large number of PUF records, none of which having a substantially greater number of claims, the weighted median of the individual record medians provides a good approximation of the median of the aggregate record. The calculation illustrated in Table 9 can be used to obtain the approximate median for an aggregate of PUF records by substituting the variable median total paid for mean total paid.

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 10. Columns with non-numeric names represent PUF data.

(1) Square the standard deviation from each record and multiply it by the number of scripts. 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 9 for grand mean calculation) and square this difference.

(3) Multiply the squared difference from (2) by the number of scripts. 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 scripts 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 10. Calculation of standard deviation for an aggregate of records.

PUF record	Number of scripts	Total paid SD	(1)	Total paid mean	(2)	(3)	(4)
1	24,411	$11.32	3,128,084.13	$16.20	0.96	23,434.56	N/A
2	81,862	$11.64	11,091,449.64	$16.70	2.19	179,277.78	N/A
3	18,364	$17.20	5,432,805.76	$7.35	61.94	1,137,466.16	N/A
Aggregate	124,637	N/A	19,652,339.53[a]	$15.22	N/A	1,340,178.50[b]	17.08

[a]*within group sum of square*
[b]*between group sum of squares*

Example column calculations in Table 8:

(1) $11.32^2 * 24{,}411 = 3{,}128{,}084.13$

(2) $(16.20 - 15.22)^2 = 0.96$

(3) $0.96 * 24{,}411 = 23{,}434.56$

(4) $\sqrt{\frac{19{,}652{,}339.53 + 1{,}340{,}178.50}{124{,}637}} = 12.98$ (standard deviation of aggregate record)

[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] Prescription drug data for 2015 are not currently available in the PUFs.

[3] Copyright ©2022 Wolters Kluwer Clinical Drug Information Inc. Publication of research findings or reference to Medi-Span in these PUFs does not constitute an endorsement by Wolters Kluwer Clinical Drug Information Inc.

[4] As noted earlier, all paid amount variables in the PUFs represent pre-rebate transactional payments.

[5] More information on prescription drug rebates is available here: https://www.milliman.com/-/media/Milliman/importedfiles/uploadedFiles/insight/2018/prescription-drug-rebates.ashx.

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