CIVHC
CENTER FOR IMPROVING VALUE IN HEALTH CARE

Chronic Conditions Analysis: Methodological Notes

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Chronic conditions like heart disease and diabetes are more than just personal health challenges—they're among the leading causes of death and disability in the United States. They reduce quality of life, drive up health care costs, and place a heavy burden on health systems nationwide.

CIVHC's Chronic Conditions Analysis sheds light on 31 prevalent chronic diseases from 2017 to 2024 claims data in the Colorado All Payer Claims Database (CO APCD). This analysis reveals trends in how common these conditions are, the average annual cost of care and total spending for individuals living with at least one chronic illness. Equipped with this comprehensive information, communities, researchers, and health care leaders can make informed decisions that improve care, reduce costs, and support healthier lives across Colorado.

Key Considerations

- The analysis includes all public and private health insurance payers submitting data to the CO APCD, which represents the majority of covered lives (70% of medically insured) in the state. The CO APCD does not include roughly half of the self-insured employer covered lives and does not include federal programs such as Tricare, Indian Health Services and the VA.
- When calculating cost measures for treating specific chronic conditions, chronic conditions were identified only when the condition appeared as the **primary diagnosis** on a claim. Secondary diagnoses were not included.

Chronic Conditions

Developed at the person level for a specific reporting year, the selection of chronic health conditions is based on the July 2024 Centers for Medicare & Medicaid Services (CMS) Chronic Conditions algorithm. This methodology creates categories for 31 different Chronic Conditions, which are presented below.

CMS Chronic Conditions

N	Chronic Condition	Reference Period
1	Acute Myocardial Infarction	1 year
2	Alzheimer's Disease	2 years
3	Anemia	2 years
4	Asthma	2 years
5	Atrial Fibrillation and Flutter	2 years
6	Benign Prostatic Hyperplasia	2 years
7	Cancer, Breast	2 years
8	Cancer, Colorectal	2 years
9	Cancer, Endometrial	2 years
10	Cancer, Lung	2 years

N	Chronic Condition	Reference Period
11	Cancer, Prostate	2 years
12	Cancer, Urologic (Kidney, Renal Pelvis, and Ureter)	2 years
13	Cataract	1 year
14	Chronic Kidney Disease	2 years
15	Chronic Obstructive Pulmonary Disease	2 years
16	Depression, Bipolar, or Other Depressive Mood Disorders	2 years
17	Type 1 Diabetes	2 year
18	Type 2 Diabetes	2 year
19	Glaucoma	2 years
20	Heart Failure and Non-Ischemic Heart Disease	2 years
21	Hip/Pelvic Fracture	1 year
22	Hyperlipidemia	2 years
23	Hypertension	2 years
24	Hypothyroidism	2 years
25	Ischemic Heart Disease	2 years
26	Non-Alzheimer's Dementia	2 years
27	Osteoporosis With or Without Pathological Fracture	2 years
28	Parkinson's Disease and Secondary Parkinsonism	2 years
29	Pneumonia, All-cause	1 year
30	Rheumatoid Arthritis/Osteoarthritis	2 years
31	Stroke/Transient Ischemic Attack	1 year

The Center for Disease Control and Prevention (CDC) indicates that there is a lot of variation in defining chronic conditions[1], and identifies three key components: (1) duration (which tends to vary by definition, but is typically months or years rather than days or weeks), (2) functional limitation, and (3) need for ongoing care. Some conditions in this CMC Chronic Conditions Algorithm like pneumonia and hip/pelvic fractures typically reflect an acute condition, however they can turn into recurrent problems that limit a person's daily activities and require ongoing medical care. Additionally, other comorbid chronic conditions are risk factors for pneumonia[2] and hip/pelvic fractures.[3] This, in addition to high prevalence and cost burden among the Medicare population for both conditions,[4,5] is likely the reason for the inclusion of these two conditions on the list of chronic conditions.

Measures in this analysis are calculated annually for sub-groups of insured individuals diagnosed with none of the 31 above chronic conditions, one or more of the 31 chronic conditions, and two or more of the 31 chronic conditions. Individuals who were not diagnosed with any of these conditions are excluded from the analysis.

The analysis also includes aggregated statistics for all individuals who:

- Have at least one of the 31 chronic conditions

[1] https://www.cdc.gov/pcd/collections/pdf/PCD_MCC_Collection_5-17-13.pdf
[2] https://pmc.ncbi.nlm.nih.gov/articles/PMC6030662/
[3] https://pmc.ncbi.nlm.nih.gov/articles/PMC2866546/#b11-ijgm-3-001
[4] https://pubmed.ncbi.nlm.nih.gov/22406959/
[5] https://pmc.ncbi.nlm.nih.gov/articles/PMC6510469/

- Have two or more of the 31 chronic conditions

The reference time frame for determining the presence of these chronic conditions is either one or two calendar years, depending on the condition, as shown in the table above. For example, to identify individuals with anemia in 2024, a chronic condition with a reference period of two years, their CO APCD medical claims are evaluated for services received in either 202 or the previous year, 2022, that match the CMS methodological criteria for anemia.

Description of Measures

Percent Eligible People With Chronic Condition

The percentage of people with a given chronic condition is calculated as follows:

Numerator: The number of people identified as having the chronic condition in CO APCD claims during the measurement year, after applying the CMS algorithm.

Denominator: The number of people with at least one month of either medical or prescription drug eligibility in the CO APCD during the measurement year.

A person is identified as having a specific chronic condition based only on the **primary diagnosis** on their claims. Secondary diagnoses are not used for this measure.

Spending Measures

Spending measures in this report include two types of cost estimates and two separate tabs in the excel workbook:

1. **Total cost of care:** The full cost of an individual's health care, regardless of whether the care was directly related to their specific chronic condition. For example, if an individual with diabetes breaks an arm, the cost of treating the fracture is included in their total cost of care.
2. **Condition-specific cost:** The cost of care directly associated with treating a chronic condition. These costs are more narrowly defined and include only services classified as related to the condition. Costs are included only when the chronic condition is listed as the primary diagnosis. They do not capture costs related to other conditions, complications, or services unless the chronic condition is listed as the primary diagnosis.

Total Spending

Total spending is calculated as a sum of all dollars spent on medical and pharmacy services by health insurance plans and patients combined, during the measurement year. This measure displays an overall sum and breakdowns by the service categories described in the Cost of Care section below: Inpatient, Outpatient, Professional, and Pharmacy.

Cost of Care Per Person Per Year

Cost of Care Per Person Per Year (PPPY) reflects payments made by health insurance payers and insured individuals for medical services and prescriptions filled for Colorado residents. The PPPY calculation does NOT include premiums paid and only reflects payments made by insurance companies and patients for health care services received or prescriptions filled. Prescription drug costs do not include provider administered drugs or rebates received by patients at the point of sale, or by payers after paying for

prescription drugs. Inpatient, Outpatient, and Professional costs do not include payments that occur outside the claims processing process except Medicaid payments made to hospitals. With the exception of Medicaid supplemental hospital payments, this analysis does not include non-claims-based payments to providers that fall outside of the traditional fee-for service system. It is important to note that Medicaid covers services other payers do not, such as resident nursing home care, long-term home health care, and home and community-based services. Use caution when comparing Medicaid payments to other payers, as these services may inflate Medicaid spending data

The PPPY measure is calculated by summing all dollars spent on medical and pharmacy services divided by the total number of insured-years. The total dollars spent on medical and pharmacy services are based on insurance claims submitted to the CO APCD by health insurance plans. Insured-years are calculated by summing the months of insurance eligibility for all people with at least one month of eligibility in the reporting period, then dividing the result by 12. The PPPY value is displayed as a dollar amount.

The cost calculation combines the Health Plan Only Cost PPPY, or the amount of dollars paid solely by health insurance plans, with the Patient Only Cost PPPY, or the amount of dollars paid solely by the patient, also known as "out-of-pocket" cost, which includes copay, coinsurance and deductibles. In other words, the cost calculations display a Total Cost (Health Plan and Patient) PPPY, the sum of Health Plan Cost and Patient Cost.

PPPY Allowed = (sum of allowed amounts ÷ of eligibility months) * 12

Dollar amounts were calculated without any adjustments for population risk. The cost calculation does not include any adjustment for inflation over time.

There are four major service categories displayed for cost measures in this output: **Inpatient, Outpatient, Professional, and Pharmacy.**

- **Inpatient** services refer to health care services received after being admitted to a hospital, skilled nursing facility, or another institution offering inpatient services. Inpatient services include payments for facility services only, and do not include any professional or ancillary payments such as labs that may get billed separately. It is important to note that Medicaid pays for services that are not covered by commercial payers (e.g., long-term care services and nursing facilities) and users should keep this in mind when comparing Medicaid inpatient costs with inpatient costs from other payers.
- **Outpatient** services are health care services received that do not involve a hospital admission. Outpatient services can take place in a hospital or hospital owned facility and include home health services and services provided in ambulatory surgery centers, rural health clinics, Federally Qualified Health Centers (FQHCs), or other outpatient facilities. Outpatient services include payments for facility services only and do not include any professional or ancillary payments such as labs that may get billed separately.
- **Professional** services are those provided by physicians or other health care professionals, such as a nurse practitioner, chiropractor, psychiatrist, or oncologist, and refer primarily to non-facility costs for evaluation and management services (e.g., office visits, specialist consultations, hospital and emergency room visits, home visits, nursing home visits) and procedures (e.g., major and minor surgical procedures, ambulatory procedures, anesthesia, endoscopies, imaging

procedures). These services can be provided in conjunction with an inpatient or outpatient visit across a variety of health care facility types but are displayed separately in the output. This category also includes additional costs from non-facility providers or suppliers for lab tests, cardiovascular tests, durable medical equipment (e.g., the administration of selected drugs, prosthetic devices, oxygen and other supplies), ambulance, chemotherapy, vaccinations, and other services and supplies.

- **Pharmacy** services refer to prescription drugs filled and paid for through health insurance for medications. Please note pharmacy costs do not include any rebates, discounts, or subsidies received by the payer or the patient. These costs also exclude physician-administered drugs that were received in an inpatient or outpatient setting.

PPPY values are calculated using insured-years, but the eligibility criteria vary by service category:

- **Inpatient, Outpatient, and Professional services**: PPPY values are based on insured-years for individuals who had at least one month of medical eligibility during the reporting period.
- **Pharmacy services:** PPPY values are based on insured-years for individuals who had at least one month of prescription drug eligibility during the reporting period.
- **Overall PPPY**: Overall PPPY values are based on insured-years for individuals who had at least one month of either medical or prescription drug eligibility during the reporting period. When an individual has both medical and prescription drug coverage in the same month, that month is counted only once in the insured-year calculation for Overall PPPY.

Note: Not all people with insurance coverage are eligible for both medical and pharmacy services. As a result, the Total PPPY values do not equal the sum of the PPPY values for Inpatient, Outpatient, Professional, and Pharmacy services.

Demographic Characteristics

The output presents measure values by geographical location (by county and Division of Insurance Region) of the insured person's residence, age group, and sex. However, some demographic breakdowns with low cell sizes will be suppressed in the analysis. Demographic breakdowns that were excluded because of small cell sizes are also excluded from overall totals for the chronic conditions they were excluded from. Individuals for whom age or gender information is not available, or unknown, are excluded from all analyses.

Age is calculated as of December 31st of the reporting year. Typical age groups used in this report are: 0 to 17 ("Child"), 18 to 34 ("Young Adult"), 35 to 64 ("Mature Adult"), 65 or older ("Senior Adult").

Only residents of Colorado are reflected in the data. State resident status is determined based on the most recent insurance eligibility record available in a given year, which indicates whether the person resides in a ZIP code within Colorado. All calculations are based on where Colorado residents live, not where they received care. For example, cost of care for people living in Eagle County may not reflect cost to receive care in Eagle County if residents in that area travel to other counties to receive care. For specific information regarding prices for services at particular facilities in Colorado, visit our reports at civhc.org.

Geographic Groupings

Geographic breakdowns available in the output include **Colorado counties** and **Division of Insurance (DOI) commercial insurance geographic rate setting areas**. The following is a list of counties in each DOI region, along with the label displayed for each region in this output:

- Rating Area 1 – **Boulder**: Boulder
- Rating Area 2 – **Colorado Springs**: El Paso, Teller
- Rating Area 3 – **Denver**: Adams, Arapahoe, Broomfield, Clear Creek, Denver, Douglas, Elbert, Gilpin, Jefferson, Park
- Rating Area 4 – **Ft. Collins:** Larimer
- Rating Area 5 – **Grand Junction:** Mesa
- Rating Area 6 – **Greeley:** Weld
- Rating Area 7 – **Pueblo:** Pueblo
- Rating Area 8 – **East:** Alamosa, Baca, Bent, Chaffee, Cheyenne, Conejos, Costilla, Crowley, Custer, Fremont, Huerfano, Kiowa, Kit Carson, Las Animas, Lincoln, Logan, Mineral, Morgan, Otero, Phillips, Prowers, Rio Grande, Saguache, Sedgwick, Washington, Yuma
- Rating Area 9 – **West:** Archuleta, Delta, Dolores, Eagle, Garfield, Grand, Gunnison, Hinsdale, Jackson, La Plata, Lake, Moffat, Montezuma, Montrose, Ouray, Pitkin, Rio Blanco, Routt, San Juan, San Miguel, Summit

The output includes geographic aggregations at the **state** level, and overall for **all urban counties** and **rural counties**. The rural and urban county classification is based on the U.S. Office of Management and Budget county-level designation: counties that are part of a Metropolitan Statistical Area are considered "urban", and all other counties are considered "rural".[6] The following is a list of rural and urban Colorado counties:

- **Urban counties (17):** Adams, Arapahoe, Boulder, Broomfield, Clear Creek, Denver, Douglas, El Paso, Elbert, Gilpin, Jefferson, Larimer, Mesa, Park, Pueblo, Teller, and Weld;
- **Rural counties (47):** Alamosa, Archuleta, Baca, Bent, Chaffee, Cheyenne, Conejos, Costilla, Crowley, Custer, Delta, Dolores, Eagle, Fremont, Garfield, Grand, Gunnison, Hinsdale, Huerfano, Jackson, Kiowa, Kit Carson, La Plata, Lake, Las Animas, Lincoln, Logan, Mineral, Moffat, Montezuma, Montrose, Morgan, Otero, Ouray, Phillips, Pitkin, Prowers, Rio Blanco, Rio Grande, Routt, Saguache, San Juan, San Miguel, Sedgwick, Summit, Washington, Yuma.

Payer Types

Payer groupings available in this output are: All Payers, Commercial, Medicaid, Medicare Advantage, Medicare Fee-For-Service (Medicare FFS).

The Medicaid payer type may occasionally include a few individuals covered by CHP+. It refers to the Child Health Plan Plus health insurance coverage, a public low-cost health insurance option for certain children and pregnant women, for people who earn too much to qualify for Medicaid, but not enough to pay for private health insurance. Chronic conditions in this analysis are primarily present among older

[6] Colorado Rural Health Center (2016). *Colorado: County Designations, 2016.* Retrieved from http://coruralhealth.wpengine.netdna-cdn.com/wp-content/uploads/2016/03/2016.CountyDesignations.pdf on July 13, 2017.

adults and as such, the CHP+ payer type is largely not applicable. The chronic conditions with slightly higher counts for CHP+ individuals (aggregated into the Medicaid payer type) than for all other conditions are Asthma, as well as Depression, Bipolar, or Other Depressive Mood Disorders.

Payer type is assigned based on eligibility months with primary medical insurance information for the respective payer type during a reporting year, counting the number of months with the respective payer type regardless of whether the person had insurance for just a single month, the full year, or any number of months in-between.

Pharmacy eligibility information is considered when assigning a payer type for calculating pharmacy costs, even if the medical eligibility information is not present. Once a person is assigned a payer type, all medical and pharmacy claim records for that person are associated with that assignment, regardless of the insurance type information on the claim record. Secondary insurance information is not considered when assigning a payer type.

For more information about the payer data in the CO APCD used for this analysis, click here.

Data Suppression

Following privacy protection standards used by the Centers for Medicare & Medicaid Services (CMS), data are suppressed for values based on fewer than 11 units. For example, cost PPPY values based on fewer than 11 insured-years or emergency department rates based on fewer than 11 visits. Throughout the data files, data points impacted by low volume are left as blank cells.

Data Limitations

Data presented in this analysis are the result of a process that strives to ensure high quality, reliable, and accurate information. Potential areas of concern are investigated and addressed accordingly, on a regular basis, and while every effort is made to address all known areas of concern for this output, some may remain. Additionally, when comparing costs across different payer types, keep in mind that not all payers cover the same services (i.e. the Medicaid program covers long term care and home health services that are not usually covered by other payers).

Data for small population breakdowns or for rare events should be interpreted with caution, since they are prone to significant fluctuations. Colorado counties with small populations (fewer than 5,000 people overall) at one point during the reporting time frame include: Baca, Cheyenne, Costilla, Custer, Dolores, Gilpin, Hinsdale, Jackson, Kiowa, Lincoln, Mineral, Ouray, Phillips, San Juan, Sedgwick, Saguache, and Washington.

Data Vintage

This output is based on claims data in the CO APCD data warehouse as of the March 2026 release. For more information about number of claims in the CO APCD during a particular reporting year and data discovery information regarding payer submissions, please visit our website at civhc.org.

For more information or additional questions, contact us at info@civhc.org

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