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| **Demographics** |
| **Measure** | **Source** | **Most Recent Year Available** | **Technical Notes** | **Variable Name** |
| **Age**  | Colorado State Demography Office <https://demography.dola.colorado.gov/data/> | 20182020 (estimates) | 0-18 19-6465+60+ ***Census Groups:***Under 5 years5-9 years 10-14 years15-19 years20-24 years 25-29 years30-34 years 35-39 years40-44 years45-49 years 50-54 years55-59 years 60-64 years65-69 years70-74 years 75-79 years 80-84 years85+ years | pop\_0\_18\_percpop\_19\_64\_percpop\_60\_over\_percpop\_65\_over\_percpop\_5\_under\_perc pop\_5\_9\_perc pop\_10\_14\_perc pop\_15\_19\_perc pop\_20\_24\_perc pop\_25\_29\_perc pop\_30\_34\_perc pop\_35\_39\_perc pop\_40\_44\_perc pop\_45\_49\_perc pop\_50\_54\_perc pop\_55\_59\_perc pop\_60\_64\_perc pop\_65\_69\_perc pop\_70\_74\_perc pop\_75\_79\_perc pop\_80\_84\_perc pop\_85\_over\_perc**NOTE: We will use the following age groups to align with our disease models:**0-1920-3940-6465+ |
| **Race** | Colorado State Demography Office <https://demography.dola.colorado.gov/data/> | 2019 (estimates) | WhiteBlackAsian/Pacific IslanderAmerican Indian | WHITE\_perc BLACK\_perc ASIAN\_PAC\_ISL\_perc AMER\_IND\_perc |
| **Race** | American Community Survey 5-year estimates <https://www.census.gov/programs-surveys/acs/data.html> (<https://data.census.gov/cedsci/advanced> | 2018  | White Black American Indian/Alaska NativeAsianNative Hawaiian/Pacific IslanderOther | white\_not\_hisp\_ACS black\_not\_hisp\_ACS AI\_AN\_not\_hisp\_ACS asian\_not\_hisp\_ACS NH\_PI\_not\_hisp\_ACS other\_not\_hisp\_ACS |
| **Ethnicity**  | American Community Survey 5-year estimates <https://www.census.gov/programs-surveys/acs/data.html> (<https://data.census.gov/cedsci/advanced> | 2018 | HispanicNon-Hispanic | hispanic\_ACS(not in dataset but implicit) |
| **Language** | American Community Survey 5-year estimates <https://www.census.gov/programs-surveys/acs/data.html> (<https://data.census.gov/cedsci/advanced>CDC SVI dataset <https://svi.cdc.gov/data-and-tools-download.html> | 2018 | SpanishIndo-EuropeanAsian and Pacific IslandOtherPersons age 5+ who Speak English Less Than Well (from CDC SVI) | lang\_spanish\_only lang\_indo\_european\_only lang\_asian\_PI\_only lang\_other\_only less\_than\_well\_ENG |
| **Household Size** *(Physical Environment)* | Colorado State Demography Office<https://demography.dola.colorado.gov/population/data/profile-county/>CDC SVI dataset <https://svi.cdc.gov/data-and-tools-download.html> | 2018 | Average number of household membersPercentage of occupied housing units with more people than rooms estimate (from CDC SVI)* (Occupied housing units with more people than rooms estimate / Occupied housing units estimate)\*100
 | household\_sizecrowded\_housing |
| **Population Density** | Colorado State Demography Office<https://demography.dola.colorado.gov/population/data/profile-county/> | 2018 | Population density per square mile | pop\_density\_sqmi |

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| **Social and Economic Factors** |
| **Measure** | **Source** | **Most Recent Year Available** | **Technical Notes** |
| Education | American Community Survey 5-year estimates <https://www.census.gov/programs-surveys/acs/data.html> (<https://data.census.gov/cedsci/advanced>) CDC SVI dataset <https://svi.cdc.gov/data-and-tools-download.html> | 2018 | *(Population 25 years and over)*High school or less *(includes “Less than 9th grade”, “9th to 12th grade, no diploma” and “High School Graduate”)*Some College *(includes “Some College” and “Associate’s degree”)*Bachelor’s or more *(includes Bachelor’s degree and Graduate or Professional degree)*Persons (age 25+) with no high school diploma (CDC SVI) | high\_school\_diploma some\_college bach\_or\_more no\_high\_school\_dip |
| Occupation | American Community Survey 5-year estimates <https://www.census.gov/programs-surveys/acs/data.html> (<https://data.census.gov/cedsci/advanced>)  | 2018 | *(Civilian employed population 16 years and over)*Management, business, science, and arts occupationsService occupationsSales and office occupationsNatural resources, construction, and maintenance occupationsProduction, transportation, and material moving occupations | manag\_biz\_sci\_arts\_occ service\_occ sales\_office\_occ nat\_construction\_maint\_occ prod\_transp\_mat\_occ |
| Industry | American Community Survey 5-year estimates <https://www.census.gov/programs-surveys/acs/data.html> (<https://data.census.gov/cedsci/advanced>) | 2018 | *(Civilian employed population 16 years and over)*Agriculture, forestry, fishing and hunting, and miningConstructionManufacturingWholesale TradeRetail TradeTransportation and warehousing, and utilitiesInformationFinance and insurance, and real estate and rental and leasingProfessional, scientific, and management, and administrative and waste management servicesEducational services, and health care and social assistanceArts, entertainment, and recreation, and accommodation and food servicesOther services, except public administrationPublic administration | agri\_forestry\_ind construction\_ind manuf\_ind wholesale\_ind retail\_ind transp\_ware\_util\_ind information\_ind finance\_ins\_ind prof\_sci\_ind edu\_health\_social\_ind arts\_ent\_rec\_ind other\_ind public\_admin\_ind |
| Unemployment | CDC SVI dataset <https://svi.cdc.gov/data-and-tools-download.html> | 2018 | The ACS calculated Unemployment Rate = total unemployed/civilian population age 16+ in the labor force  | unemployment |
| Uninsurance | Uninsured in the total civilian noninstitutionalized population  | uninsurance |
| Income | Per capita income | per\_cap\_income |
| Poverty | Percentage of persons below poverty estimate  | below\_poverty |
| CDC Social Vulnerability Index | CDC SVI dataset <https://svi.cdc.gov/data-and-tools-download.html> | 2018 | Overall SVI RankingRanking by theme:SocioeconomicHousehold Composition/DisabilityMinority Status/LanguageHousing Type/Transportation | SVI\_overall\_rank socio\_econ\_rank household\_disab\_rank minority\_language\_rank household\_disab\_rank |
| Social Distancing Index | Colorado Health Institute and American Community Survey <https://www.coloradohealthinstitute.org/research/colorado-covid-19-social-distancing-index> | 2018 |  | TBD |

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| **Morbidity (Disease Prevalence)** |
| **Measure** | **Source** | **Most Recent Year Available** | **Technical Notes** |
| Asthma | Colorado Department of Public Health and Environment (CDPHE): CO Behavioral Risk Factor Surveillance System (2014-17)<http://www.cohealthmaps.dphe.state.co.us/cdphe_community_level_estimates/> | 2017 | Percent of Adults 18+ ever diagnosed with Asthma by a doctor, nurse, or other health professional, and still having the condition | To be added to dataset |
| Cardiovascular Disease | Percent of Adults 18+ ever diagnosed with Angina or Coronary Heart Disease by a doctor, nurse, or other health professional | To be added to dataset |
| Current Smoking | Percent of Adults 18+ who currently Smoke Cigarettes | To be added to dataset |
| Diabetes | Percent of Adults 18+ ever diagnosed with Diabetes by a doctor, nurse, or other health professional | To be added to dataset |
| Obesity | Percent of Adults 18+ with a Body Mass Index greater than or equal to 30 | To be added to dataset |
| ObesityCardiovascular Disease COPDDiabetesChronic Kidney DiseaseAny Condition | Centers for Disease Control and Prevention (CDC): Behavioral Risk Factor Surveillance SystemBRFSS respondents were classified as having an underlying medical condition if they answered “yes” to any of the following questions: “Have you ever been told by a doctor, nurse, or other health professional that you have COPD, emphysema, or chronic bronchitis; heart disease (angina or coronary heart disease, heart attack, or myocardial infarction); diabetes; or chronic kidney disease?” Respondent-reported height and weight were used to calculate BMI; respondents with BMI ≥30 kg per m2 were considered to have obesity. A created variable captured persons having any of these conditions. | 2018 | <https://www.cdc.gov/mmwr/volumes/69/wr/mm6929a1.htm?s_cid=mm6929a1_w> ***Prevalence estimates for adults 18+:***Obesity Heart diseaseCOPDDiabetesChronic kidney diseaseAny of the 5 conditions aboveNationwide estimates of underlying medical conditions were weighted to adjust for survey design. For county-level prevalence, estimates of each and of any condition were generated using a multilevel regression and poststratification approach (*5*) for 3,142 counties in all 50 states and DC. This approach has been validated in comparison with direct BRFSS survey estimates and local surveys for multiple chronic disease measures at state and county levels (*5*,*6*). Briefly, a multilevel regression model was constructed for each outcome using individual-level age,¶ gender, race/ethnicity,\*\* and educational-level†† data from the 2018 BRFSS, and data on county-level percentage of the adult population living at <150% of the poverty level from the 2014–2018 American Community Survey (ACS), a survey sent to about 3.5 million addresses each month that asks about topics not included on the decennial census, including education and employment. The model parameters were applied to 2018 Census county-level population estimates by age, gender, and race/ethnicity to calculate the predicted probability of each outcome. Because the U.S. Census Bureau does not provide county-level population data for education level by age, sex, and race/ethnicity, a bootstrapping approach§§ was used to impute it. The estimated prevalence was obtained by multiplying the probability by the total population by county. Model-based estimates for any condition were validated by comparing them with the weighted direct survey estimates from counties with sample size ≥500 (213) in BRFSS; the Pearson correlation coefficient was 0.89. The county-level estimates of having any underlying medical condition were categorized into six county urban/rural classifications using CDC’s National Center for Health Statistics definitions (large central metro/city, large fringe metro/suburb, medium metro, small metro, micropolitan, noncore/rural) (*7*). The overall weighted direct survey estimates were conducted using SUDAAN (version 11; RTI International), and other analyses were conducted using SAS (version 9.4; SAS Institute).The underlying medical conditions included in these prevalence estimates were selected using the subset of the list of conditions with the strongest and most consistent evidence† of association with higher risk for severe COVID-19–associated illness on CDC’s website as of June 25, 2020 (*2*) and for which questions on the BRFSS aligned. These included chronic obstructive pulmonary disease (COPD), heart conditions, diabetes mellitus, chronic kidney disease (CKD), and obesity (defined as body mass index [BMI] of ≥30 kg per m2). Conditions from the list of those with mixed and limited evidence§ of association with increased risk for severe COVID-19 illness were not included (*2*). | obesity\_18\_over\_cdc\_estheart\_dis\_18\_over\_cdc\_estcopd\_18\_over\_cdc\_estdiabetes\_18\_over\_cdc\_estckd\_18\_over\_cdc\_estany\_condition\_18\_over\_cdc\_est |
| Chronic conditions among Medicare Beneficiaries 65+* Diabetes
* Hypertension
* Cardiovascular disease
* COPD
* Asthma
* Obesity (30+ BMI, 35+ BMI, all BMI focus on adults)
* Multiple chronic conditions
 | CMS Chronic Condition Warehouse: Medicare Beneficiaries <https://www.cms.gov/Research-Statistics-Data-and-Systems/Statistics-Trends-and-Reports/Chronic-Conditions/Medicare_Beneficiary_Characteristics>The data used in the chronic condition reports are based upon CMS administrative enrollment and claims data for Medicare beneficiaries enrolled in the fee-for-service program. These data are available from the CMS Chronic Condition Data Warehouse (CCW), [www.ccwdata.org](http://www.ccwdata.org). Data Suppression: Data have been suppressed in cases when there are fewer than 11 Medicare beneficiaries in the cell. | 2017 | *(Medicare Beneficiaries 65+)*Individual chronic conditions:Prevalence estimates are calculated by taking the beneficiaries with a particular condition divided by the total number of beneficiaries in Medicare fee-for-service population, expressed as a percentage. DiabetesHypertensionCardiovascular disease:Heart failureIschemic heart diseaseAtrial fibrillation COPDAsthmaMultiple chronic conditions:Prevalence estimates are calculated by taking the beneficiaries with a particular number of conditions divided by the total number of beneficiaries in our fee-for-service population, expressed as a percentage.0 to 1 chronic conditions2 to 3 chronic conditions4 to 5 chronic conditions6 + chronic conditions*For all the chronic condition reports the Medicare beneficiary population is limited to fee-for-service beneficiaries. Medicare beneficiaries with any Medicare Advantage enrollment during the year were excluded since claims data are not available for these beneficiaries. Also, beneficiaries who were enrolled at any time in the year in Part A only or Part B only were excluded, since their utilization and spending cannot be compared directly to beneficiaries enrolled in both Part A and Part B. Beneficiaries who die during the year are included up to their date of death if they meet the other inclusion criteria.* | diabetes\_65\_over hypertension\_65\_over heart\_failure\_65\_over ischemic\_heart\_65\_over atrial\_fibr\_65\_overcopd\_65\_over asthma\_65\_over\_0\_1\_chronic\_65\_over\_2\_3\_chronic\_65\_over\_4\_5\_chronic\_65\_over\_6\_more\_chronic\_65\_over |

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| **Morbidity (Hospitalization)** |
| **Measure** | **Source** | **Most Recent Year Available** | **Technical Notes** |
| * Diabetes
* Hypertension
* Cardiovascular disease
* COPD
* Asthma
* Influenza
 | Hospital Cost Utilization Project: State Inpatient Database <https://www.hcup-us.ahrq.gov/sidoverview.jsp>CIVHC (Center for Improving Value in Health Care) - <https://www.civhc.org/get-data/co-apcd-overview/> CDPHE influenza data from current season <https://www.colorado.gov/pacific/cdphe/influenza> | 2017 |  | TBD |

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| **Mortality** |
| **Measure** | **Source** | **Most Recent Year Available** | **Technical Notes** |
| * Heart disease
* Chronic respiratory disease
* Diabetes
* Influenza
* Pneumonia
 | Centers for Disease Control and Prevention Wide-ranging Online Data for Epidemiologic Research (CDC WONDER): Underlying Cause of Death <https://wonder.cdc.gov/ucd-icd10.html> | 2018 | <https://www.cdc.gov/nchs/data/dvs/Part9InstructionManual2017.pdf> (Crude and age-adjusted rates per 100,000)**Heart Disease:**Diseases of heart (I00-I09,I11,I13,I20-I51) Acute rheumatic fever and chronic rheumatic heart diseases (I00-I09) Hypertensive heart disease (I11) Hypertensive heart and renal disease (I13) Ischemic heart diseases (I20-I25) Acute myocardial infarction (I21-I22) Other acute ischemic heart diseases (I24) Other forms of chronic ischemic heart disease (I20,I25) Atherosclerotic cardiovascular disease, so described (I25.0) All other forms of chronic ischemic heart disease (I20,I25.1-I25.9) Other heart diseases (I26-I51) Acute and subacute endocarditis (I33) Diseases of pericardium and acute myocarditis (I30-I31,I40) Heart failure (I50) All other forms of heart disease (I26-I28,I34-I38,I42-I49,I51) **Chronic Respiratory Disease**Chronic lower respiratory diseases (J40-J47) Bronchitis, not specified as acute or chronic (J40)Chronic Bronchitis (J41-J42) Emphysema (J43) Other chronic obstructive pulmonary disease (J44)Asthma (J45-J46) Bronchiectasis (J47)**Diabetes**Diabetes mellitus (E10-E14) **Influenza**Influenza (J09-J11) **Pneumonia**Pneumonia (J12-J18) | heart\_crude\_rate\_m heart\_age\_adjus\_rate\_m resp\_crude\_rate\_m resp\_age\_adjus\_rate\_m diabetes\_crude\_rate\_m diabetes\_age\_adjus\_rate\_m flu\_crude\_rate\_m flu\_age\_adjus\_rate\_m pneumonia\_crude\_rate\_m pneumonia\_age\_adjus\_rate\_m |
| Excess Mortality | CDC National Center for Health Statistics<https://www.cdc.gov/nchs/nvss/vsrr/covid_weekly/index.htm#StateCountyData> | Cu |  | To be added to dataset |

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| **COVID-19** |
| **Measure** | **Source** | **Most Recent Year Available** | **Technical Notes** |
| COVID-19 Cases | Colorado Department of Public Health and Environment <https://covid19.colorado.gov/covid-19-data>CDPHE COVID19 County-Level Open Data Repositoryhttps://data-cdphe.opendata.arcgis.com/datasets/cdphe-covid19-county-level-open-data-repository | CurrentUpdated Weekly | Total casesCumulative per 100,000 population Past 7-day count Past 7-day rate per 100,000 populationPast 14-day count Past 14-day rate per 100,000 population | tot\_COVID\_casescovid\_cumu\_case\_rate\_100000COVID\_7\_day\_casescovid\_past\_7d\_case\_rate\_100000 COVID\_14\_day\_casescovid\_past\_14d\_case\_rate\_100000 |
| COVID-19 Hospitalizations | Total hospitalizationsCumulative per 100,000 population Past 7-day count Past 7-day rate per 100,000 populationPast 14-day count Past 14-day rate per 100,000 population | tot\_COVID\_hospcovid\_cumu\_hosp\_rate\_100000COVID\_7\_day\_hospcovid\_past\_7d\_hosp\_rate\_100000 COVID\_14\_day\_hospcovid\_past\_14d\_hosp\_rate\_100000 |
| COVID-19 Deaths | Total DeathsCumulative per 100,000 population Past 14-day count Past 14-day rate per 100,000 population | tot\_COVID\_deathscovid\_cumu\_death\_rate\_100000COVID\_14\_day\_deathscovid\_past\_14d\_death\_rate\_100000 |
| COVID-19 Testing | Cumulative per 100,000 population Past 7-day count Past 7-day count and rate per 100,000 populationPast 14-day countPast 14-day count and rate per 100,000 population*Includes only tests from labs that participate in electronic lab reporting: PCR and serology.**Individuals with serology-positive tests are not included in daily case counts until they are confirmed to have had COVID-like symptoms.* | covid\_test\_rate\_100000 COVID\_7\_day\_test covid\_past\_7d\_test\_rate\_100000 COVID\_14\_day\_test covid\_past\_14d\_test\_rate\_100000 |
| Positivity Rate |  |  | Past 7-day positivity ratePast 14-day positivity rate**Formula:****Positivity Rate (% Positive) =** Positive PCR Tests + Positive Serology Tests) / (Total PCR Tests + Total Serology Tests) | covid\_7\_day\_pos\_ratecovid\_14\_day\_pos\_rate |
| COVID-19 Vulnerability | (for calculating index) Hospital Cost Utilization Project: State Inpatient Database <https://www.hcup-us.ahrq.gov/sidoverview.jsp>CIVHC (Center for Improving Value in Health Care) - <https://www.civhc.org/get-data/co-apcd-overview/>  | 2017 | <https://www.medrxiv.org/content/10.1101/2020.03.16.20036723v2.full.pdf><https://www.nber.org/papers/w27294><https://www.medrxiv.org/content/10.1101/2020.05.05.20092262v1><https://www.hcup-us.ahrq.gov/toolssoftware/ccsr/ccs_refined.jsp#archives1><https://www.hcup-us.ahrq.gov/toolssoftware/ccsr/ccsr_archive.jsp#ccsr> | Waiting for meeting with CIVHC on 07/22 to see if we can use recent claims data to calculate this index. This means we will be able to use COVID-19 as a diagnosis, instead of proxy conditions (e.g., flu, acute respiratory disease, etc).This will be added in the next iteration of the dataset. |
| Flu Immunization Rate (adults) | Colorado Department of Public Health and Environment (CDPHE): CO Behavioral Risk Factor Surveillance System (2014-17)<https://data-cdphe.opendata.arcgis.com/datasets/67162a5356d4438aa0f099ca7c43bac0_14> County Health Rankings <https://www.countyhealthrankings.org/explore-health-rankings/rankings-data-documentation>  | 2017 | CDPHE – influenza immunization rate estimates for adults 18+ | flu\_vac\_adult\_rate |
| Child and Teen Immunization Rate | CDPHE <https://www.colorado.gov/pacific/cdphe/ciiscountylevel>  | 2019 |  | TBD |

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| **Cellular Phone Data (Mobility Data)** |
| **Measure** | **Source** | **Most Recent Year Available** | **Technical Notes** |
| Human Mobility | SafeGraph (Provided by IRVOL team) | CurrentUpdated Weekly (for website) | County-level human mobility data:relative\_mobilitystay\_at\_home\_index | Ranges from 0 (everyone is home all the time) to 100 (pre-COVID levels of staying at home) to theoretically infinitely high, though in practice it rarely goes over 200.Ranges from -100 (no one is ever home) to 0 (pre-COVID levels) to 100 (everyone is home all the time).Future mobility indices to be included: exposure risk and visitation to businesses |