Background

The Medicare Part D Opioid Prescribing Mapping Tool is an online interactive mapping tool that presents geographic comparisons of the opioid prescribing rate at the state, county, and ZIP code levels. This mapping tool allows the user to see both the number and percentage of de-identified Medicare Part D opioid claims at the local level and better understand how this critical issue impacts communities nationwide.

Opioid prescribing rates are derived using data from Medicare Part D claims prescribed by health care providers. The mapping tool presents data for the most recent data year as well as one- and five-year change rates. For example, the release of 2019 data included changes in rates from 2018 to 2019 and changes in rates from 2014 to 2019. The underlying data tables are available for each calendar year, 2013 through the most recent data year. The mapping tool does not include beneficiary information.

Methods

The measures presented in this mapping tool are aggregated from the Part D Prescriber Summary¹ table, prior to any redactions and suppression reflected in the public version. The Part D Prescriber Summary table contains information at the prescriber-level (i.e. one summary record per NPI) and includes overall as well as sub-group summaries (e.g. opioids) of drug utilization, drug costs, and beneficiary counts.

In order to keep consistent reporting across the levels of geography, we develop a ZIP code reference table to determine the prescriber's state, county, and Rural-Urban Area Commuting (RUCA) codes. The ZIP code associated with the Part D prescriber, as reported in National Plan & Provider Enumeration System (NPPES) is used to determine the FIPS state and county and the census-tract based Rural-Urban Area Commuting (RUCA) Codes. For additional information on the methods used in developing the reference table, see Appendix A, "ZIP Code Reference Table Methodology".

The list of opioids included in the Opioid Prescribing Mapping Tool is generated using the Medicare Part D Overutilization Monitoring System (OMS), which can change from year to year. Opioid claims for each calendar year are identified using the OMS opioid list updated each year.²

The county-level Hot Spots and Outliers maps were created using an exploratory spatial data analysis technique known as local indicator of spatial association (LISA). The LISA map identifies significant spatial clustering (sometimes referred to as hot spots) of similar values around a specific location as well as pockets of dissimilar locations or outliers. The LISA analysis was implemented using the Find Outliers

¹ <u>https://data.cms.gov/provider-summary-by-type-of-service/medicare-part-d-prescribers/medicare-part-d-prescribers-by-provider</u>

² For additional information on Medicare Part D OMS please see <u>https://www.cms.gov/Medicare/Prescription-Drug-Coverage/PrescriptionDrugCovContra/RxUtilization.html.</u>

tool in www.ArcGIS.com. A hot spot (shown in red on the map) reflects a high rate cluster of counties and is defined as a county with a rate that is near other counties with high rates. Conversely, a low rate cluster (shown in dark blue on the map) of counties is defined as a county with a low rate that is near other counties with low rates. Counties that are high rate outliers (shown in pink on the map) reflect a county with a high rate that is near counties with low rates. Conversely, a county that is a low rate outlier (shown in light blue on the map) reflects a county with a low rate that is near counties with high rates. Counties that are shown in white reflect counties with rates that are not statistically significant from the rates of nearby counties.

Data Limitations

In order to protect the privacy of Medicare beneficiaries, imputation and suppression are applied to the Opioid Prescribing Mapping Tool data. Opioid claim counts between 1 and 10 in the prescriber level source data are first imputed prior to aggregating to the ZIP code, state and national levels. Then at each aggregated geographic level, any derived opioid claim counts between 1 and 10 are primary suppressed (replaced with missing values). Secondary suppression is applied in cases where a single subgroup category is primary suppressed. For example, if the opioid claim count for given *rural* geographic area is primary suppressed but the associated *urban* geographic opioid claim count is not primary suppressed, then the urban geographic area must be secondary suppressed to prevent disclosure of the rural suppressed value. Secondary suppression prevents backing into a primary suppressed value by using the values from the other opioid claim counts such as total opioid claim count. The totals for Part D prescribers, opioid claims and overall claims will vary slightly across the state, county, and ZIP code-level data due to the *restrictions* applied at each geographic summary level (see restrictions noted within the "Metrics" section of this document).

The information presented in this mapping tool does not indicate the quality or appropriateness of care provided by individual physicians or in a given geographic region. For instance, high opioid prescribing for beneficiaries with cancer, palliative care and end of life care may be appropriate. In addition, opioids such as Methadone, may be prescribed for pain management as well as part of drug addiction detoxification and maintenance program. The mapping tool does not distinguish the various reasons for opioid prescribing.

Finally, the number of claims reflect prescriptions that have been filled by the beneficiary. The mapping tool does not measure whether a beneficiary took the medication.

How to Use the Mapping Tool

The Medicare Part D Opioid Prescribing Mapping Tool is designed to allow the user to explore opioid prescribing rates, changes in rates, rates across rural and urban areas, and "hot spots" at the state, county, and ZIP code-levels. The user can navigate around the map by clicking and dragging to a point of interest, as well as zoom in to explore lower levels of geography (counties or ZIP code areas) or zoom out to explore higher levels of geography (states). Zooming in or out can be done by scrolling the mouse wheel, typing the "+" or "-" keys on the keyboard, or by clicking the "+" or "-" buttons on the mapping

tool. The user can obtain more information about a particular place by clicking on the map, where a pop-up box displays opioid prescribing rates at the current and higher levels of geography, as well as the number of opioid claims, overall claims, and Part D prescribers in that area. For the maps that display rates across rural/urban areas, the user can click on the pop-up box and then move the slider bar to compare rural opioid prescribing rates to urban opioid prescribing rates. Rural opioid prescribing rates are shown to the left of the slider bar and urban opioid prescribing rates are shown to the right of the slider bar. The web browsers that currently support the mapping tool include: Edge, Firefox, Chrome, Safari, iOS Safari, Chrome for Android.

The data for the mapping tool can be downloaded <u>here</u>.

CMS is obligated by the federal Privacy Act, 5 U.S.C. Section. 552a and the HIPAA Privacy Rule, 45 C.F.R Parts 160 and 164, to protect the privacy of individual beneficiaries and other persons. All direct identifiers have been removed from this data file.

Appendix A ZIP Code Reference Table Methodology

The ZIP code reference table contains a crosswalk between ZIP codes and FIPS state and county codes, FIPS-based geographic data elements (e.g., Core Based Statistical Areas), census-tract based Rural-Urban Area Commuting (RUCA) codes, and ZIP-code based health care regions (i.e., Dartmouth Atlas Hospital Referral Regions and Hospital Service Areas).

To construct the crosswalk between ZIP and FIPS state and county codes, we use the U.S. Department of Housing and Urban Development (HUD) ZIP-FIPS crosswalks.³ The HUD crosswalks report the proportion of a ZIP code's addresses that are contained within a particular FIPS code by quarter. We take these quarterly crosswalks and create an annual file that contains the last-best quarterly record for each ZIP-FIPS code combination within the year. Since ZIP codes can span multiple counties, the annual crosswalk contains multiple ZIP-FIPS value combinations. We use the ZIP-FIPS address proportions to assign a ZIP code to a single FIPS code by selecting the FIPS code that has the highest proportion of all the ZIP code's addresses. We then merge on FIPS-based geographic data elements to the ZIP reference table by FIPS.

We use a similar process to link ZIP codes to RUCA codes. RUCA codes classify U.S. census tracts using measures of population density, urbanization, and daily commuting.⁴ Researchers often use these codes to designate geographic areas as either urban or rural based on their commuting patterns to metropolitan and micropolitan areas. To link RUCAs to ZIP codes, we use the HUD ZIP-census tract crosswalks (ZIP-TRACT). As with the ZIP-FIPS crosswalks, the ZIP-TRACT crosswalks report the proportion of a ZIP code's addresses that exist in a given census tract by quarter. We use a similar process of identifying the census tract with the highest proportion of a ZIP code's addresses to create a unique ZIP-census tract combination for the reference table. We then merge RUCA codes onto the ZIP reference table by census tract.

While the HUD crosswalks are the main data source for the ZIP code reference table, we do perform additional edits to correct and enhance these data. Some records in the HUD ZIP-FIPS crosswalk contain FIPS values that are out of date. We correct these FIPS values using the closest annual ZIP-FIPS crosswalk file with correct FIPS values for the ZIP code. Additionally, some ZIP-TRACT quarterly crosswalks exclude ZIP codes that appear in the ZIP-FIPS crosswalk for the same year. While ZIP codes can change over time, we would not expect the presence of ZIP codes to differ between the two crosswalks within a given year, particularly since census tracts only change with the decennial census. To correct this discrepancy, we impute ZIP-TRACT crosswalk records from the closest annual ZIP-TRACT crosswalk file that contains the missing ZIP codes. Lastly, since we use the ZIP reference table to assign geographic data elements to health care providers based on their ZIP code, we supplement the ZIP crosswalk reference table with business ZIP codes that appear in the U.S Census County Business Patterns (CBP) data.⁵ These ZIP codes represent codes for business campuses that may not appear in databases of general ZIP codes.

³ <u>https://www.huduser.gov/portal/datasets/usps_crosswalk.html</u>

⁴ <u>https://www.ers.usda.gov/data-products/rural-urban-commuting-area-codes.aspx</u>

⁵ https://www.census.gov/programs-surveys/cbp/data.html