

Health Trends Across Communities in Minnesota: a Statewide Dashboard Leveraging the OMOP CDM to Monitor the Prevalence of Health Conditions

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Background

The Minnesota Electronic Health Record Consortium (Minnesota EHR Consortium) is a partnership of researchers, health care professionals, local public health agencies, state agencies, and 11 large health systems that provide care to over 90% of residents across the state of Minnesota.^{1,2} To facilitate data sharing across the Minnesota EHR Consortium, each of the 11 participating health systems received funding to adopt and implement the Observational Medical Outcomes Partnership Common Data Model (OMOP CDM) beginning in 2022. In partnership with public health departments and health plans, the Minnesota EHR Consortium began the Health Trends Across Communities in Minnesota (HTAC-MN) project in 2023 with the goal of leveraging the OMOP CDM across the network of 11 health systems to develop a statewide dashboard that could help address gaps in traditional public health surveillance and support statewide and community health monitoring, promote health equity, and improve the health of communities across Minnesota. In March 2024, the HTAC-MN Dashboard was successfully launched on a public-facing website. As of September 2024, the HTAC-MN Dashboard includes prevalence data for over 30 community-prioritized health conditions.

Methods

In collaboration with public health partners, 31 health conditions were prioritized for inclusion in the HTAC-MN Dashboard after being reviewed for availability/completeness in the EHR, public health significance, potential for action, lack of existing data, emergence of condition, and alignment with current public health priorities. The health conditions include: alcohol use, anxiety, asthma, bipolar disorder, cannabis use, chronic kidney disease, cocaine use, chronic obstructive pulmonary disease, obstetrical deliveries (among women ages 12-54), depression, type 2 diabetes, firearm injury and recovery, hallucinogens, acute myocardial infarction, ischemic heart disease, heart failure, hyperlipidemia, hypertension, inhalants, lung cancer, maternal opioid use, obesity, opioid use, peripheral vascular disease, post-traumatic stress disorder, psychostimulant use, psychotic disorder, sedative use, severe maternal morbidity, stroke, and suicidal ideation or recent attempt.

For each of the priority health conditions selected for inclusion, an OMOP CDM concept set was created using OMOP concepts mapped from existing ICD-9-CM/ICD-10-CM diagnosis code sets. HTAC-MN builds

upon the existing distributed data infrastructure developed by the Minnesota EHR Consortium^{2,3} in which the 11 participating health systems are provided with centrally managed R scripts, configuration files, deduplication files, and concept sets programmed to extract standardized summary-level tables from each system’s internal OMOP database. Only summary counts stratified by year, condition, demographic categories, and geography are shared externally; patient-level data always stays within each health system’s secure OMOP database. Census tract level counts were made possible due to a coordinated effort by participating health systems to add a custom census tract column to the LOCATION table. Prevalence was defined using a lookback period including patients who had at least one visit at a participating health system within the last 3 years and received a diagnosis related to one of the 31 health conditions within the last 5 years. The summary-level tables from each of the 11 health systems were then centrally merged for incorporation into the statewide dashboard, which was developed using Power BI (Microsoft Corp).⁴

Results

The HTAC-MN Dashboard is publicly available and provides prevalence estimates for 31 community-prioritized conditions that can be stratified by year (2020-2023), age, sex, race/ethnicity, special population status (i.e., incarceration, homelessness, Medicaid), and mapped at the census tract level. Among the total patients included in the dashboard in 2023 (N = 5,627,400), 53.0% were female, 47.0% were male, 20.8% were ages 0-17, and 79.2% were ages 18 and older. By race/ethnicity, 69.3% were white, 9.1% were Black/African American, 5.9% were Hispanic/Latino, 5.1% were Asian/Pacific Islander, 1.0% were American Indian/Native American, and the remaining were other/unknown/missing race/ethnicity (see Figure 1).

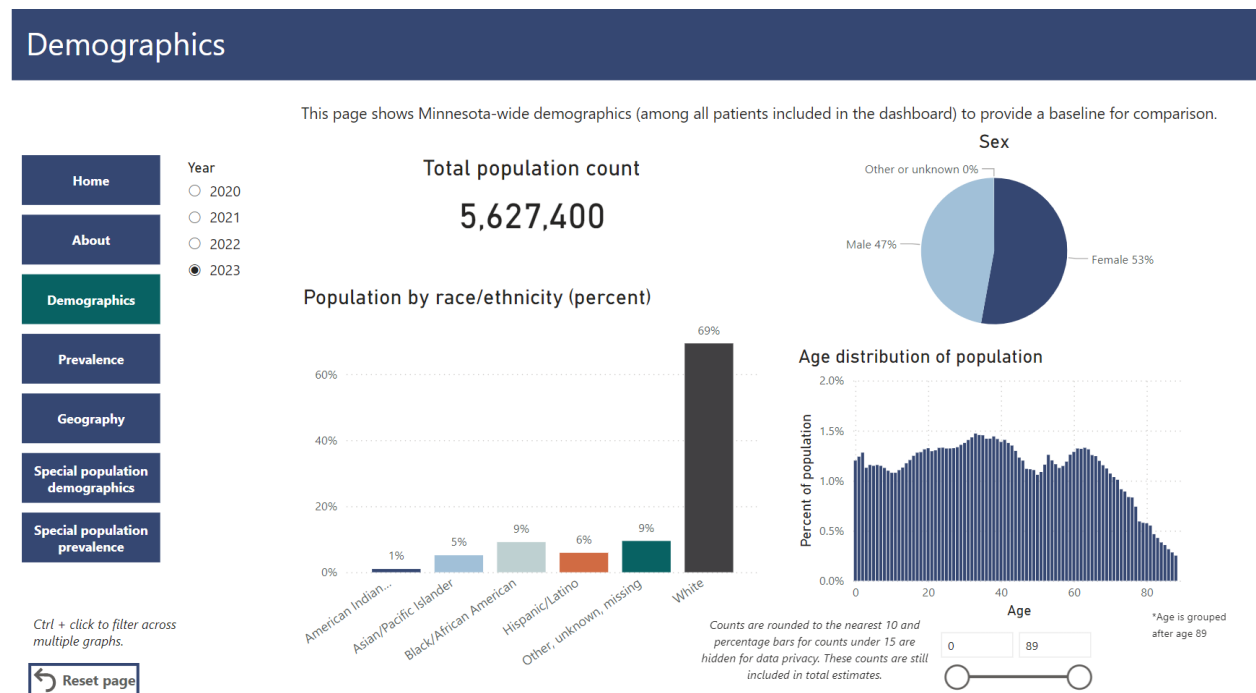


Figure 1. HTAC-MN Dashboard – Screenshot of 2023 Demographics

The prevalence data available for hypertension provides an example of what is available in the HTAC-MN Dashboard for each condition. In 2023, 18.8% (N = 1,069,370) of the patient population with at least one visit at a participating health system in the prior 3 years (2021-2023) had received a diagnosis of hypertension within the prior 5 years (2019-2023) (see Figure 2). The overall prevalence of hypertension was 20% for males and 18% for females. Adjusted for age and sex, 24% of the Black/African American population and 22% of the American Indian/Native American population had a diagnosis of hypertension compared to 19% of the White population. The prevalence of hypertension increased steadily by age as shown in the “Percent of age group with condition” chart in the bottom right corner of Figure 2 below. Filtering the dashboard for the population age 65 and older, prevalence of hypertension is 52.2% (not shown).

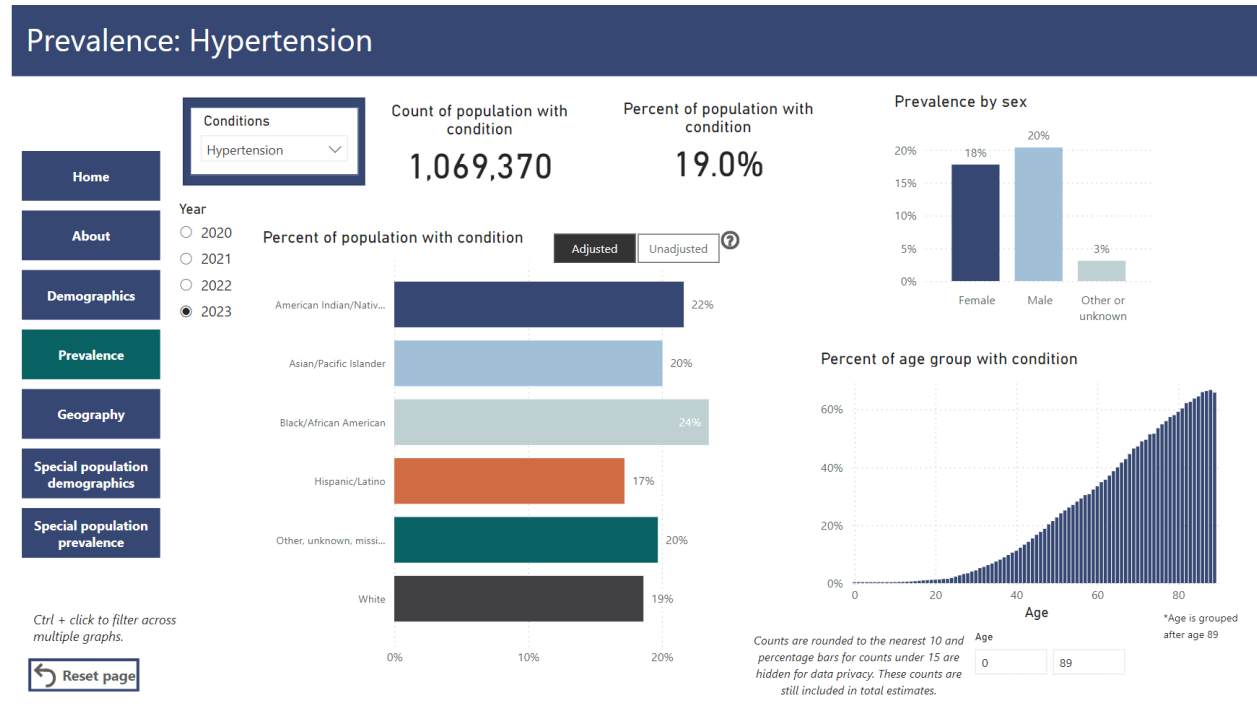


Figure 2. HTAC-MN Dashboard – Screenshot of 2023 Prevalence of Hypertension

The prevalence data in the HTAC-MN Dashboard are also available at the census tract level through an interactive map (see Figure 3). Users can see where conditions are most prevalent across the state through a heatmap and search by region and social vulnerability index. The geography dashboard page also provides comparisons showing how prevalence for a selected area compares to the overall state across race/ethnicity, sex, and age. Note: prevalence for the selected area and Minnesota are the same in Figure 3 because no region or location filters were selected. Prevalence rates for the selected area show as separate columns when filters are selected.

Geography: Hypertension prevalence

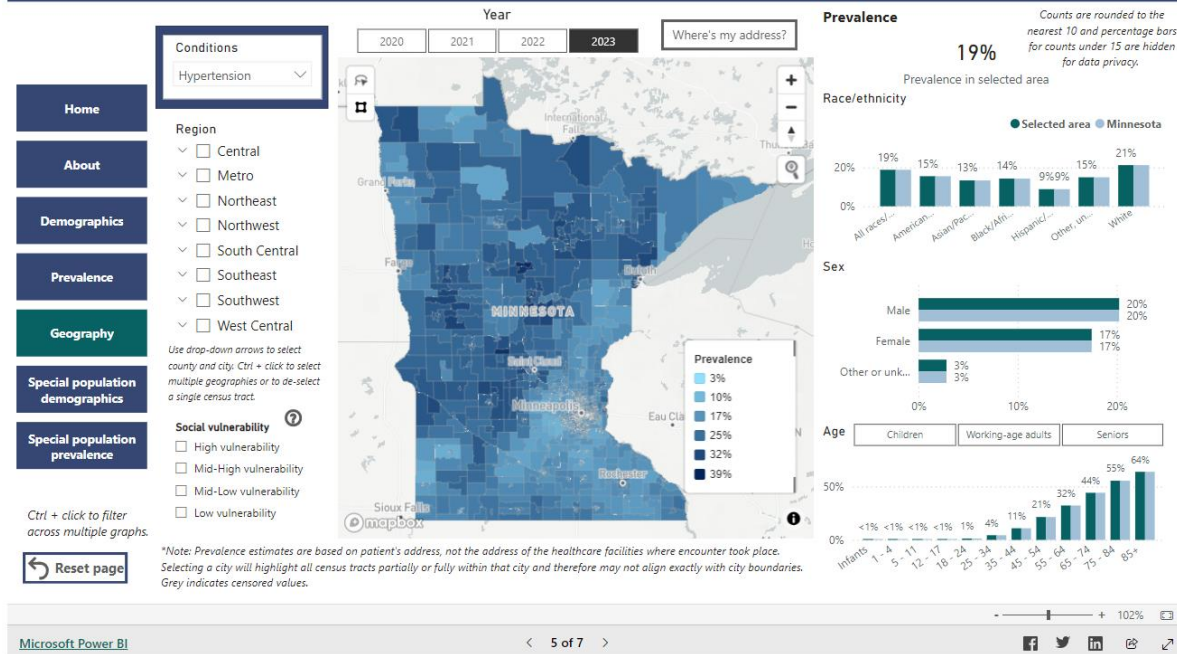


Figure 3. HTAC-MN Dashboard – Screenshot of 2023 Prevalence of Hypertension by Census Tract

Conclusion

The HTAC-MN Dashboard is a comprehensive resource that leverages an existing statewide data-sharing collaboration (the Minnesota EHR Consortium) and the OMOP CDM to facilitate the use of summary EHR data for tracking a wide variety of health conditions at the census tract level. The HTAC-MN project lays the groundwork for Minnesota to monitor community health needs and outcomes over time, develop and evaluate policies at the local and state level, and target efforts to advance health equity across the state.

References

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