

# Real-World Data Dashboard Integrating Public Health & EHR Data For Identifying COVID-19 Vaccination Gaps In The U.S.

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## OBJECTIVES

To describe the design and application of a real-world data dashboard (dashboard) for illustrating COVID-19 vaccination patterns and disparities. The dashboard was designed as an interactive resource to inform progress on current (Fall 2021) vaccination targets:

- 1) Primary immunization gap
- 2) Booster eligibility (time since vaccination and/or patient characteristics)
- 3) 3rd dose prioritization (i.e., among immunocompromised)

## METHODS

### Data Sources

EHR clinical data were sourced from the Veradigm Health Insight Ambulatory EHR (HIAE) Database which includes physician practices located in all 50 states and Washington DC. Public data related to COVID-19 were sourced from the White House COVID-19 Team Community Profile Report and population counts for states and counties are from US Census Bureau 2019 demographic estimates.

### Analysis

In the HIAE data COVID-19 vaccines were identified via CPT/CVX codes and comorbidities were identified via ICD9/ICD10 codes. EHR data included all patients with a documented health care encounter during the period December 2020 to September 2021.

Census data is used to describe vaccination uptake as a proportion of the total population by state and region. Measures displayed include the Fully Vaccinated Rate and the Partially Vaccinated Rate. Fully vaccinated is defined based on CDC timing intervals specific to each vaccine and partially vaccinated are all those with a vaccination that are not fully vaccinated.

## DESIGN & RESULTS

### DESIGN

EHR data is used to describe variation in vaccine rates within a state or region. Variation among subgroups within geographic areas is described using a 5-point relative vaccination uptake scale, calculated as (1: < 0.5x, 2: 0.50 to 0.75x, 3: 0.76 to 1.25x, 4: 1.26 to 2.0, and 5: >2x the geographic area) (Table 1).

TABLE 1: Relative Vaccination Uptake Scale

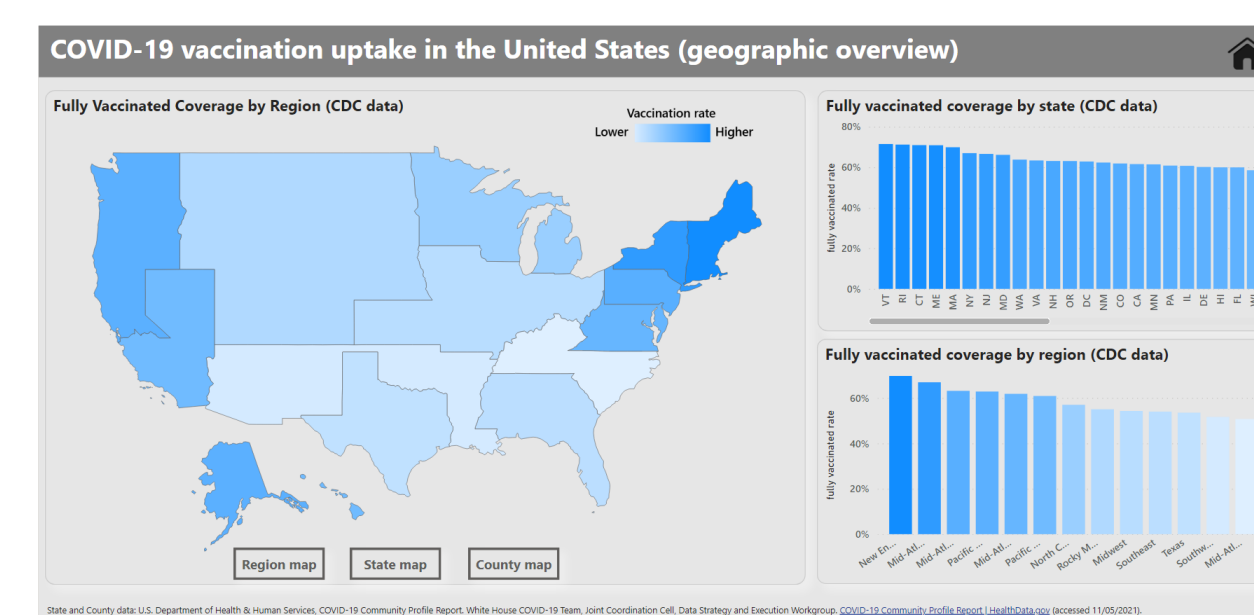
Relative Rate Group	Subgroup rate compared to region
5	Higher >2x
4	Somewhat higher 1.26 to 2.00x
3	Similar 0.76 to 1.25x
2	Somewhat lower 0.50 to 0.75x
1	Lower <.5x

### Geography

For reference, CDC data is presented for states and counties and is also aggregated to 13 state-based Regions (Figure 1).

EHR data is presented for the 13 Regions, states and zip code areas aggregated to the first 3 digits of the zip code (e.g., “481”).

FIGURE 1: Public Data Geography



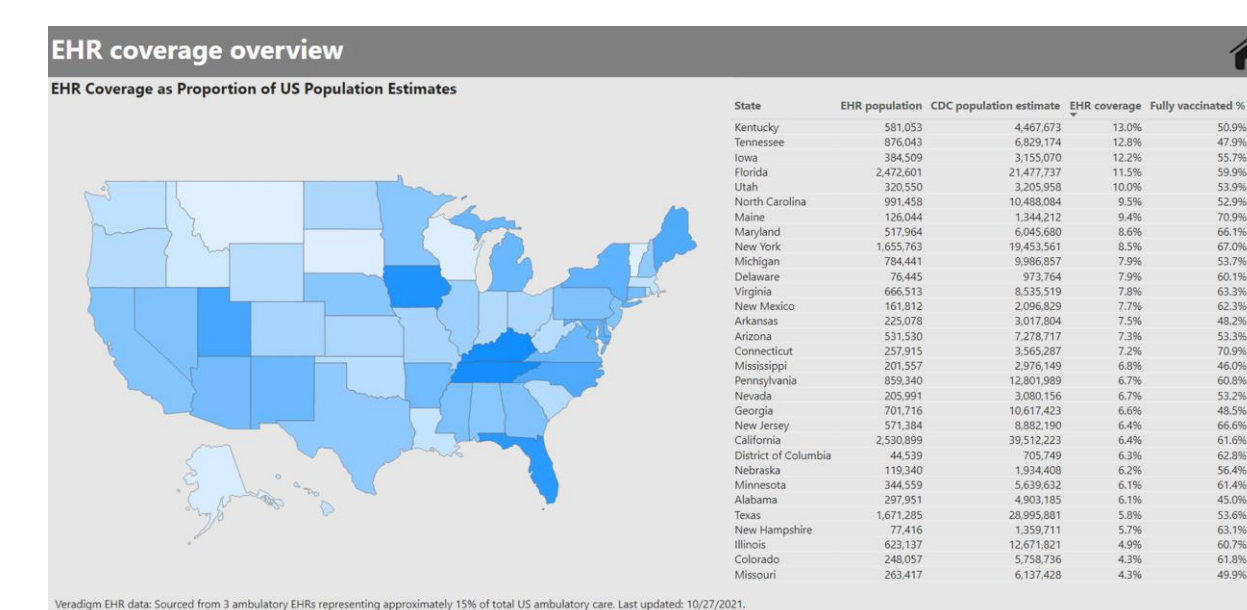
### Presentation

Graphic and tabular data displays for 13 geographic regions highlight differences for 21 selected patient demographic and clinical characteristics including immunocompromised (IC) and those with 7 underlying health conditions.

### RESULTS

EHR data included 21.6M patients with a documented health care encounter between December 2020 and September 2021. Using US Census population data as a denominator, the proportion covered by the EHR patient population ranged from 1.2 (Montana and Vermont) to 13% (Kentucky) by state (Figure 2).

FIGURE 2: EHR Coverage as Proportion of State Population



### Patient Characteristics

#### Demographics

A majority of EHR patients are female (56.9%) as women may seek healthcare, on average, more often than men. EHR patients have an age distribution of 5.5% age 12-17, 63.3% age 18-64, and 31.3% age 65+, where persons 65+ are over-represented compared to the general population, as older individuals are more likely to seek health care services.

#### Comorbid Conditions & Immunocompromised

Vaccine coverage increased with age among all patients including IC with relative vaccine gaps greater in younger patients. Comorbidities were common (Obesity 40.0%, cardiovascular disease (CVD) 32%, Diabetes 11%, and IC 10%). Booster eligibility timing, based on initial booster recommendation for patients 65+ or with a comorbidity, was similar by gender (Female 86%, male 85%) and lower in blacks (78.7%) and Hispanics (76.4%). Overall, considerable variation was observed in vaccination coverage and booster eligibility across the 20 subgroups both between and within the 13 regions evaluated.

### VISUAL DISPLAYS: Tabular

The tabular view shows Regions (Figure 3) and is an interactive matrix where rows can be expanded to display subcomponents, in this case states in a Region (Figure 4).

FIGURE 3: Vaccine Uptake Within Region: Age & Gender

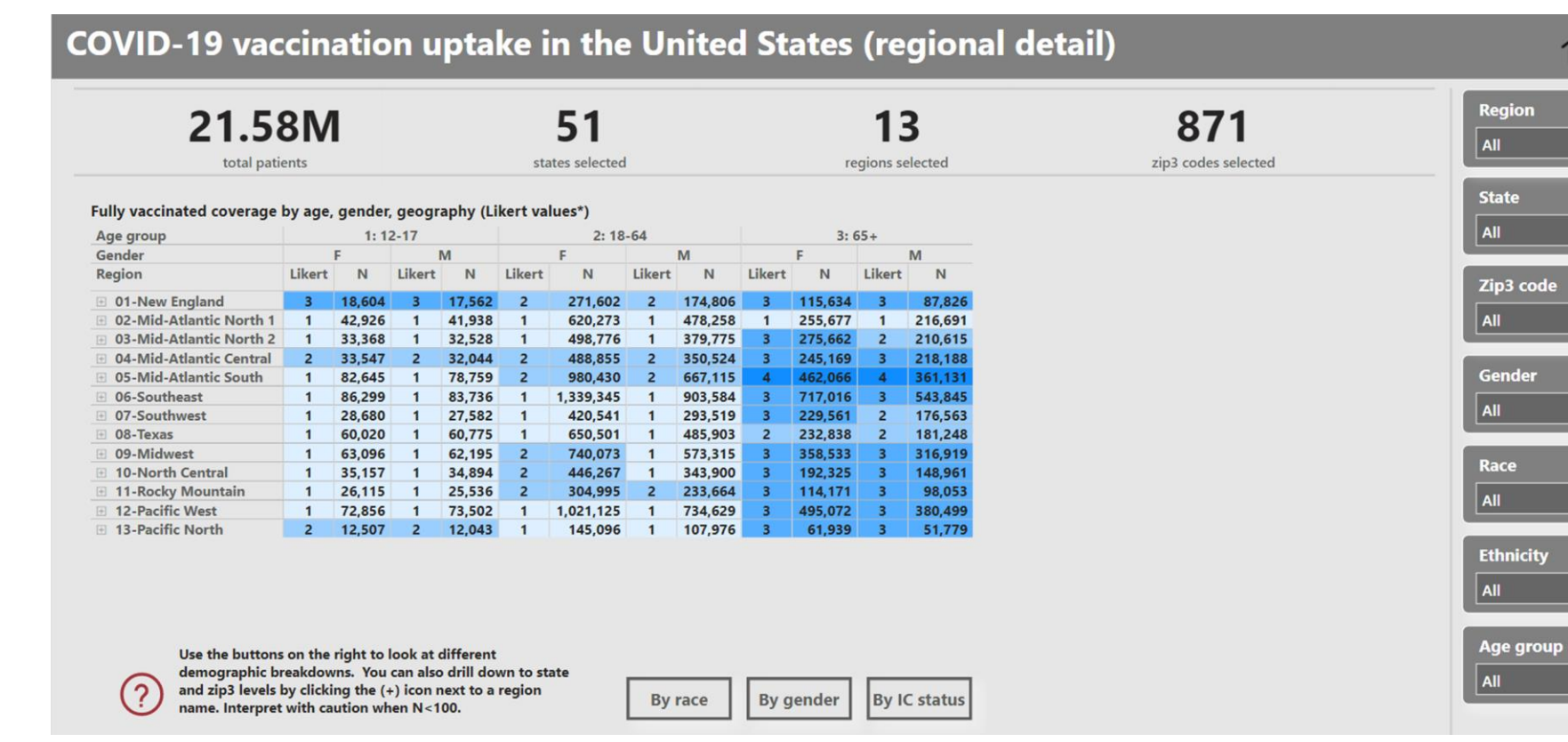
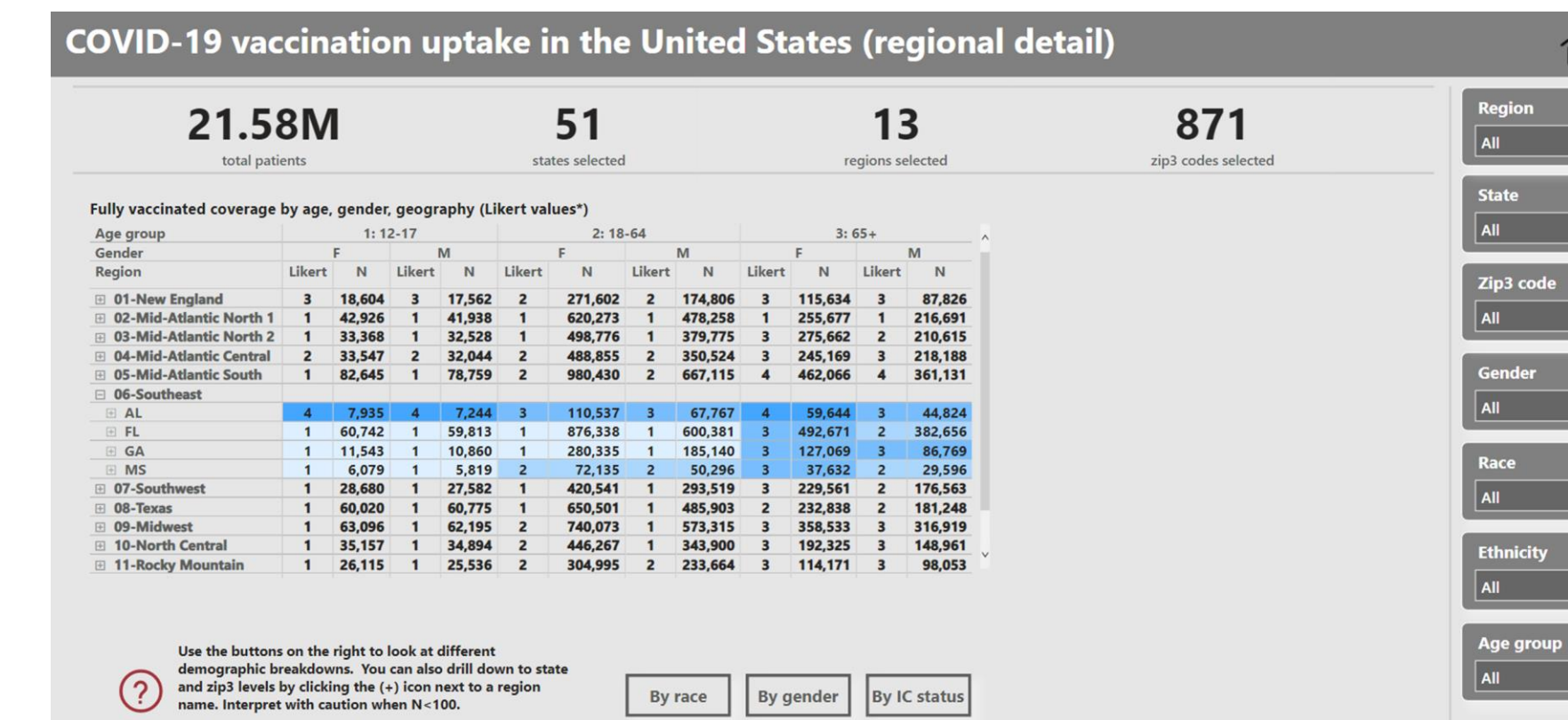


Figure 4: Vaccine Uptake Within Region: Expanded View



## CONCLUSION

The addition of comorbidity and immunocompromised status information from a national EHR allows for evaluation of vaccine uptake based on detailed clinical data that are not routinely available in many public health vaccination monitoring systems. This information complements public health data to provide additional clinical insights on COVID-19 vaccination administration to inform timely response during an evolving pandemic.

### VISUAL DISPLAYS: Graphic

The graphic view utilizes a variety of chart types to display information within a Region for demographics & comorbidities, vaccine uptake (Figure 5) and booster eligibility (Figure 6).

Figure 5: Vaccination Uptake Subgroups

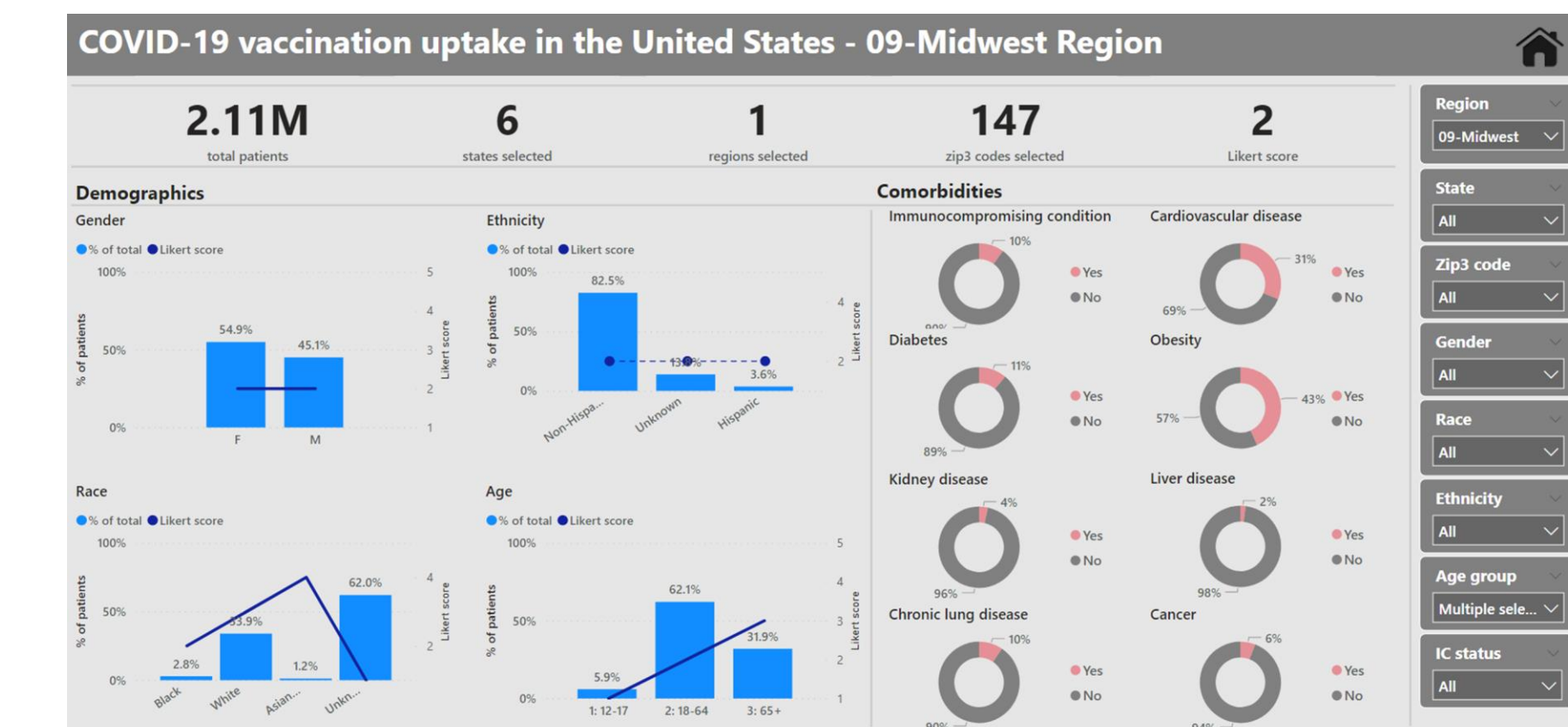
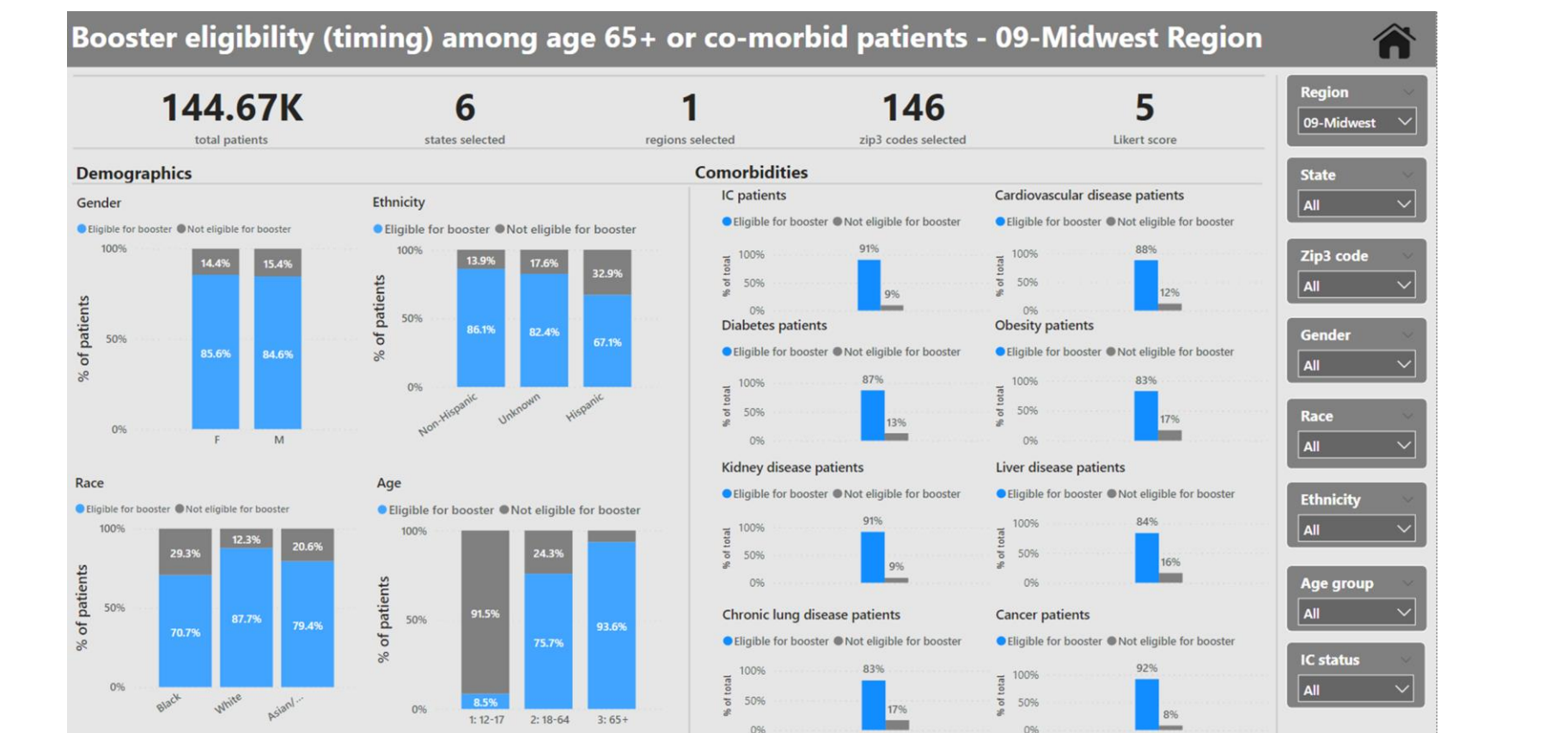


Figure 6: Booster Eligibility Subgroups



## REFERENCES

White House COVID-19 Team. COVID-19 community profile report. 2020. HealthData.gov. <https://healthdata.gov/Health/COVID-19-Community-Profile-Report/gqxm-d9w9>.

