State of Missouri COVID-19 Response Vaccine Distribution Analysis

September 22, 2021
Executive Summary | Key Insights

STATEWIDE METRICS

- Total cases across the state increased ~20% week over week but are still down from last month's highs
- Region E case rate hotspots continue to proliferate and intensify near the junction of US 60 and I-55
- Regions A and B saw marked reductions by 31% and 91%, respectively, in case rate hotspots over the past week
- Compared to 4 weeks ago, 18+ vaccine initiations have decreased by half; 12-17 initiations have reduced by a third

CASE RATE AND VACCINE UPTAKE TRENDS

- Using geographically weighted regression, the following factors were found to influence vaccination across the state:
  - Living in a mobile home, working more hours per week, living in substandard housing, and living in households with children are associated with lower vaccination rates
  - Having a bachelor's degree and living in areas with higher population density are associated with higher vaccination rates

FACTORS INFLUENCING VACCINATION RATES

- In preparation for eventual under 12 vaccine eligibility, population sizing was conducted for the under 14* population
- The estimated Missouri population under 14 is 1,144,331, constituting 19% of Missouri's total population
- The distribution of the under 14 population is relatively uneven across the State – with concentrations found mostly in major urban areas, similar to the overall population

UNDER 14 POPULATION SIZING*

*Due to data availability from American Community Survey (ACS), there is not an under 12 age bucket – under 14 was used as a proxy.

Note: Data on vaccinations include 1st round Moderna & Pfizer vaccinations and J&J vaccinations, are based on residence of the 18+ individual vaccinated (unless otherwise stated) and are from 9/16/21 – provided by the State of Missouri. COVID-19 case rate data is a change analysis of rates (cases per 100k) using data from 9/02/21 and 9/16/21 – provided by the State of Missouri. Methodology, data sources, and limitations are available in the Appendix.
15-Day COVID-19 Case Rate Hotspots at the Census Tract Level

For the time period between 9/1/21 and 9/16/21, the change in COVID-19 case rate (per 100,000) is displayed on the left and case rate hotspots (areas with statistically significant changes in case rates in comparison to surrounding areas) are displayed on the right.

15-Day Case Rate Change
State of Missouri - 09/16/21

15-Day Case Rate Change Hotspots
State of Missouri - 09/16/21

Note: Data normalized by population (per 100,000 residents) per Census Tract. COVID-19 case rate data provided by the State of Missouri as of 9/16/21. Previous 2-week change view provided in the Appendix, along with the number of hotspots per region, and the methodology, data sources, and limitations.

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In Region E, 86% of case rate hotspots (19 of 22) are in close proximity to I-55 and US-60 – an increase from last week. The Lake of the Ozarks region is experiencing a second case rate hotspot recurrence with 2 hotspots last week and 3 this week.

Total case rate hotspots slightly decreased (-2) over the past week, mostly in Regions A and B.
For the time period between 9/1/21 and 9/16/21, case rate hotspots (areas with statistically significant changes in case rates in comparison to surrounding areas) are displayed on the left for Kansas City and on the right for St. Louis.

Case rate hotspots decreased from last week in the core of Kansas City (7 within I-435) and St. Louis (4 inside I-270). The surge in cases in Wentzville and St. Peters (outside St. Louis) has persisted for 4 weeks running.

Kansas City's number of case rate hotspots within the vulnerable section of the SE I-435 corridor (according to the COVID-19 Vulnerability Index), has decreased the last 3 weeks.

Note: Data normalized by population (per 100,000 residents) per Census Tract. COVID-19 case rate data provided by the State of Missouri as of 9/16/21. Previous 2-week change view provided in the Appendix, along with the number of hotspots per region, and the methodology, data sources, and limitations.

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Regional Change in COVID-19 Case Rates | Last 5 Weeks

The visualization and table below display the evolution of weekly case rate changes by Region over the past 5 weeks.

![Image](image-url)

The visualization and table below display the evolution of weekly case rate changes by Region over the past 5 weeks.

**Total cases** across the state increased ~20% **week over week** but are still down from last month's highs. Region E experienced the **largest percentage increase** in cases (28%); Region C experienced the **largest numeric increase** in cases (~800).

There is greater variation in case rate trends at the **county level** with some indicating a plateau and while others continuing to see increases.

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*Note: Case data provided by the State of Missouri (MHA). Differences in x-axis scale may occur due to timing of data delivery (e.g., due to a holiday). Methodology, data sources, and limitations are available in the Appendix.*
Darker shades in the map on the left indicate Census Tracts with larger vaccination gaps, with regional drill downs for Kansas City and St. Louis provided on the right.

Areas with the largest vaccination gaps continue to align with the more populated areas across Missouri – typically surrounding urban areas.

**Vaccination Gap Quintiles (#)**
- 0 – 899
- 903 – 1,318
- 1,320 – 1,807
- 1,808 – 2,366
- 2,369 – 6,282

**Vaccination Gap Quintiles (#)**
- H
- B
- A
- F
- C
- I
- D
- G
- E

**Note:** Data on vaccinations include 1st round Moderna & Pfizer vaccinations and J&J vaccinations, are based on residence of the 18+ individual vaccinated (unless otherwise stated) and are from 9/16/2021. Census Tracts appearing transparent do not contain data due to having a population <6. Methodology, data sources, and limitations are available in the Appendix. Full data set provided in corresponding Excel file.
Darker shades on the map on the left indicate Census Tracts with higher percentages of residents who have initiated vaccination – with regional drill downs for Kansas City and St. Louis labeled to the right.

**PERCENT WITH 1 DOSE (%)**

- **Kansas City**
  - 2.5% (126K)
  - Est. Amount of 18+ Population that has Received Dose 1 but not Dose 2

- **St. Louis**

Census Tracts with the lowest percent vaccinated are concentrated in more rural areas in Regions B, D, I, & G.

**Note:** Data on vaccinations include 1st round Moderna & Pfizer vaccinations and J&J vaccinations, are based on residence of the 18+ individual vaccinated (unless otherwise stated) and are from 9/16/2021. Census Tracts appearing transparent do not contain data due to having a population <6. Methodology, data sources, and limitations are available in the Appendix. Full data set provided in corresponding Excel file.
12-17 Population | Remaining Unvaccinated

Darker shades on the map on the left indicate counties with larger vaccination gaps with regional drill downs for Kansas City and St. Louis labeled to the right.

VACCINATION GAP (#)

<table>
<thead>
<tr>
<th>Quintiles (#)</th>
<th>0 – 107</th>
<th>108 – 165</th>
<th>166 – 233</th>
<th>234 – 323</th>
<th>324 – 788</th>
</tr>
</thead>
</table>

Similar trends persist for the 12-17 as with the 18+ population – **more populated/urban areas have the largest number of unvaccinated**

Note: Data on vaccinated individuals are based on 1st round Moderna & Pfizer vaccinations and J&J vaccinations, based on the residence of the individual vaccinated, and as of 09/16/2021. All vaccinations tagged to the “<18” age group were assumed to be between ages 12-17. Census Tracts appearing transparent do not contain data due to having a population <6. Methodology, data sources, and limitations are available in the Appendix. Full data set provided in corresponding Excel file.
Darker shades on the map on the left indicate counties with higher percentages of residents who have initiated vaccination – with regional drill downs for Kansas City and St. Louis labeled to the right.

**PERCENT WITH 1 DOSE (%)**

Urban areas tend to have higher rates of vaccine uptake, although the stark divide is more apparent in the 12-17 cohort than 18+

Census Tracts in the southern/southwestern portion of St. Louis are progressing well in vaccination for the 12-17 cohort.

**Note:** Data on vaccinated individuals are based on 1st round Moderna & Pfizer vaccinations and J&J vaccinations, based on the residence of the individual vaccinated, and as of 9/16/2021. All vaccinations tagged to the “<18” age group were assumed to be between ages 12-17. Census Tracts appearing transparent do not contain data due to having a population <6. Methodology, data sources, and limitations are available in the Appendix. Full data set provided in corresponding Excel file.
The visualization and table below display weekly and cumulative vaccination rates at the regional level. Week 36 (9/5 – 9/11) is the most recent complete week.

**5-Week Additional Percent of 18+ Population Vaccinated by Region**

Compared to four weeks earlier, **18+ vaccine initiations** have decreased by half; **12-17 initiations** have been reduced to a third. **Each Region** saw a decrease in vaccine initiations; **Region E** vaccinated the largest proportion of its 18+ population but had the largest percentage drop.

**Regional Vaccination Summary**

<table>
<thead>
<tr>
<th>Region</th>
<th>18+ Cumulative % Vax</th>
<th>18+ % Vax Previous Week (MMWR 35 to 36)</th>
<th>12-17 Cumulative % Vax</th>
<th>12-17 % Vax Previous Week (MMWR 35 to 36)</th>
</tr>
</thead>
<tbody>
<tr>
<td>A</td>
<td>54.4%</td>
<td>0.5%</td>
<td>44.9%</td>
<td>0.8%</td>
</tr>
<tr>
<td>B</td>
<td>45.2%</td>
<td>0.3%</td>
<td>17.2%</td>
<td>0.3%</td>
</tr>
<tr>
<td>C</td>
<td>60.0%</td>
<td>0.4%</td>
<td>49.9%</td>
<td>0.7%</td>
</tr>
<tr>
<td>D</td>
<td>50.8%</td>
<td>0.4%</td>
<td>30.8%</td>
<td>0.4%</td>
</tr>
<tr>
<td>E</td>
<td>48.8%</td>
<td>0.5%</td>
<td>20.1%</td>
<td>0.7%</td>
</tr>
<tr>
<td>F</td>
<td>61.0%</td>
<td>0.4%</td>
<td>37.6%</td>
<td>0.7%</td>
</tr>
<tr>
<td>G</td>
<td>43.8%</td>
<td>0.3%</td>
<td>16.1%</td>
<td>0.2%</td>
</tr>
<tr>
<td>H</td>
<td>53.0%</td>
<td>0.4%</td>
<td>26.0%</td>
<td>0.5%</td>
</tr>
<tr>
<td>I</td>
<td>41.9%</td>
<td>0.4%</td>
<td>22.9%</td>
<td>0.4%</td>
</tr>
<tr>
<td>State Average</td>
<td>55.5%</td>
<td>0.4%</td>
<td>40.4%</td>
<td>0.6%</td>
</tr>
</tbody>
</table>

Bolded percentages indicate the highest and lowest cumulative % vaccinated.

**Note:** All weeks are calendar weeks, defined by SMV using MMWR week, where Week 36 is 9/5 – 9/11. Data on vaccinations include 1st round Moderna & Pfizer vaccinations and J&J vaccinations, are based on residence of the 18+ individuals vaccinated, and are from 9/16/2021. J&J vaccinations are coded as both dose 1 and dose 2. Methodology, data sources, and limitations are available in the Appendix.
Vaccination uptake hotspots for 09/10 - 09/16 are displayed below in red. These vaccine uptake hotspots represent the communities that far exceeded the State average for the dates indicated.

**Vaccine Uptake Hotspot Analysis**

**State of Missouri - 09/16/21**

Vaccine uptake hotspots are mainly in **St. Louis and Kansas City suburbs** and **smaller regional urban centers** (Columbia/ Jefferson City, Cape Girardeau, Park Hills/Farmington, Poplar Bluff, Sikeston, Warrensburg, and Waynesville)

They continue to be **linked to major transportation routes** (I-44, I-70, I-55, US 60, US 63)

**Note:** Data on vaccinated individuals include 1st round Moderna & Pfizer vaccinations and J&J vaccinations across all ages, and indicate the residence of the individual vaccinated, as of 9/16/21. Methodology, data sources, and limitations are available in the Appendix. Italicized locations are new locations to the running documentation of vaccine uptake hotspots.

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Vaccination uptake deserts are displayed in shades of blue from 9/10 - 9/16, indicating Census Tracts where the weekly vaccine uptake is significantly lower than State and/or regional averages.

**Suburban and commuting communities along I-70, I-55 and I-44 continue to drive vaccination uptake**

The **St. Louis Metro** region has the **highest concentration** of vaccine uptake deserts & regional high uptake outliers throughout the entire State.

### Region # Vaccine Deserts with < 70% Vaccinated

<table>
<thead>
<tr>
<th>Region</th>
<th># Vaccine Deserts</th>
</tr>
</thead>
<tbody>
<tr>
<td>A</td>
<td>44</td>
</tr>
<tr>
<td>B</td>
<td>3</td>
</tr>
<tr>
<td>C</td>
<td>94</td>
</tr>
<tr>
<td>D</td>
<td>12</td>
</tr>
<tr>
<td>E</td>
<td>9</td>
</tr>
<tr>
<td>F</td>
<td>21</td>
</tr>
<tr>
<td>G</td>
<td>1</td>
</tr>
<tr>
<td>H</td>
<td>6</td>
</tr>
<tr>
<td>I</td>
<td>2</td>
</tr>
</tbody>
</table>

**Key**
- Statewide Uptake Leaders
- Local Uptake Leaders
- Local Uptake Desert
- Statewide Uptake Desert

See appendix for more detail on how to interpret these maps.

**Note:** Data on vaccinated individuals include 1st round Moderna & Pfizer vaccinations and J&J vaccinations across all ages, and indicate the residence of the individual vaccinated, as of 9/16/21. Methodology, data sources, and limitations are available in the Appendix.

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To support comparison between Regions and a deeper understanding of analyses throughout this report, the table below provides information on COVID-19 cases, cumulative vaccine uptake across age groups, and recent vaccine uptake trends at the regional level.

*Last week reported a 7-day change in COVID-19 Case Burden which has been updated this week to reflect a 15-Day change. Due to a holiday, data was provided a day early making this window 15 days rather than 14.

**Note:** Data on vaccinated individuals are based on 1st round Moderna & Pfizer vaccinations and J&J vaccinations, based on the residence of the individual (18+) vaccinated, and as of 9/16/21. COVID-19 case rate provided by the State of Missouri as of 9/16/21. Methodology, data sources, and limitations are available in the Appendix.

<table>
<thead>
<tr>
<th>Region</th>
<th>Cumulative COVID-19 Case Burden (# per 100k)</th>
<th>15-Day Change in COVID-19 Case Burden (%)</th>
<th>COVID-19 Case Rate Hotspots (#)</th>
<th>18+ Cumulative Vax (%)</th>
<th>18+ Vax Previous Week (%)</th>
<th>12-17 Cumulative Vax (%)</th>
<th>12-17 Vax Previous Week (%)</th>
<th>Vaccine Uptake Deserts (#)</th>
<th>Vaccine Uptake Hotspots (#)</th>
</tr>
</thead>
<tbody>
<tr>
<td>A</td>
<td>10,674</td>
<td>4.1%</td>
<td>18</td>
<td>54.4%</td>
<td>0.5%</td>
<td>44.9%</td>
<td>0.8%</td>
<td>33</td>
<td>16</td>
</tr>
<tr>
<td>B</td>
<td>9,577</td>
<td>2.4%</td>
<td>1</td>
<td>45.2%</td>
<td>0.3%</td>
<td>17.2%</td>
<td>0.3%</td>
<td>37</td>
<td>0</td>
</tr>
<tr>
<td>C</td>
<td>10,147</td>
<td>3.9%</td>
<td>28</td>
<td>60.0%</td>
<td>0.4%</td>
<td>49.9%</td>
<td>0.7%</td>
<td>216</td>
<td>16</td>
</tr>
<tr>
<td>D</td>
<td>11,366</td>
<td>2.1%</td>
<td>4</td>
<td>50.8%</td>
<td>0.4%</td>
<td>30.8%</td>
<td>0.4%</td>
<td>55</td>
<td>5</td>
</tr>
<tr>
<td>E</td>
<td>11,658</td>
<td>6.6%</td>
<td>22</td>
<td>48.8%</td>
<td>0.5%</td>
<td>20.1%</td>
<td>0.7%</td>
<td>6</td>
<td>5</td>
</tr>
<tr>
<td>F</td>
<td>12,269</td>
<td>3.0%</td>
<td>9</td>
<td>61.0%</td>
<td>0.4%</td>
<td>37.6%</td>
<td>0.7%</td>
<td>7</td>
<td>7</td>
</tr>
<tr>
<td>G</td>
<td>9,426</td>
<td>3.5%</td>
<td>1</td>
<td>43.8%</td>
<td>0.3%</td>
<td>16.1%</td>
<td>0.2%</td>
<td>5</td>
<td>0</td>
</tr>
<tr>
<td>H</td>
<td>10,578</td>
<td>3.2%</td>
<td>0</td>
<td>53.0%</td>
<td>0.4%</td>
<td>26.0%</td>
<td>0.5%</td>
<td>14</td>
<td>3</td>
</tr>
<tr>
<td>I</td>
<td>10,376</td>
<td>3.4%</td>
<td>1</td>
<td>41.9%</td>
<td>0.4%</td>
<td>22.9%</td>
<td>0.4%</td>
<td>4</td>
<td>0</td>
</tr>
</tbody>
</table>
Factors Influencing Vaccination Rates
The following variables (or characteristics) were found to influence vaccination uniformly across the state. The darker the red, the higher the explanatory power is at each Census Tract.

- Overall Statewide Explanatory Power: **66.5%**
- Local Explanatory Power: **Up to 84%**

**Influencing Lower Vaccination:**
- Percent living in a mobile home
- Mean hours worked per week
- Percent living in substandard housing
- Percent of households with children

**Influencing Higher Vaccination:**
- Percent with a bachelor’s degree
- Population density
The following variables (or characteristics) were found to influence vaccination within each Region in Missouri.

### Influencing Lower Vaccination

<table>
<thead>
<tr>
<th>A</th>
<th>B</th>
<th>C</th>
<th>D</th>
<th>E</th>
<th>F</th>
<th>G</th>
<th>H</th>
<th>I</th>
</tr>
</thead>
<tbody>
<tr>
<td>Percent Veteran</td>
<td>Labor Force Participation Rate</td>
<td>Percent Veteran</td>
<td>Percent Veteran</td>
<td>Percent Veteran</td>
<td>Percent Veteran</td>
<td>Percent Veteran</td>
<td>Percent Veteran</td>
<td>Labor Force Participation Rate</td>
</tr>
<tr>
<td>Percent Homeowner</td>
<td>Percent Veteran</td>
<td>Percent Homeowner</td>
<td>Percent Homeowner</td>
<td>Percent Black</td>
<td>Percent Black</td>
<td>Percent Homeowner</td>
<td>Percent Veteran</td>
<td>Percent of Households Receiving Transfer Payments</td>
</tr>
<tr>
<td>Percent Black</td>
<td>Percent Homeowner</td>
<td>Percent Black</td>
<td>Percent Black</td>
<td>Percent Black</td>
<td>Percent Black</td>
<td>Percent Black</td>
<td>Percent Black</td>
<td>Percent Veteran</td>
</tr>
</tbody>
</table>

### Influencing Higher Vaccination

<table>
<thead>
<tr>
<th>A</th>
<th>B</th>
<th>C</th>
<th>D</th>
<th>E</th>
<th>F</th>
<th>G</th>
<th>H</th>
<th>I</th>
</tr>
</thead>
<tbody>
<tr>
<td>Percent with Disability</td>
<td>Percent Born Abroad</td>
<td>Percent Born Abroad</td>
<td>Two Week Case Lag</td>
<td>Percent Homeowner</td>
<td>Male/Female Ratio</td>
<td>Two Week Case Lag</td>
<td>Percent Homeowner</td>
<td>Percent Born Abroad</td>
</tr>
<tr>
<td>Percent Born Abroad</td>
<td>Median Household Income</td>
<td>Male/Female Ratio</td>
<td>Two Week Case Lag</td>
<td>Percent Homeowner</td>
<td>Male/Female Ratio</td>
<td>Percent Born Abroad</td>
<td>Percent Employed in Construction</td>
<td>Median Household Income</td>
</tr>
<tr>
<td>Median Household Income</td>
<td>Percent Born Abroad</td>
<td>Two Week Case Lag</td>
<td>Percent Employed in Finance, Insurance, and Real Estate</td>
<td>Male/Female Ratio</td>
<td>Percent Employed in Finance, Insurance, and Real Estate</td>
<td>Male/Female Ratio</td>
<td>Percent Employed in Finance, Insurance, and Real Estate</td>
<td>Two Week Case Lag</td>
</tr>
</tbody>
</table>

*For internal use only by State of Missouri. Output based on available data (08/24/2021).*
Under 14 Population Sizing
State of Missouri

1,144,331
Estimated Total Under 14 Population (#)

19%
Estimated Percent of Missouri’s Total Population

UNDER 5
~371k est. people across Missouri

5 to 9
~380k est. people across Missouri

10 to 14
~393k est. people across Missouri

*Despite new eligibility guidance focusing on the under 12 population, due to data availability from American Community Survey (ACS), there is not an under 12 age bucket – under 14 was used as a proxy.
The distribution of the under 14 population* is relatively uneven across the State – with concentrations lying mostly in major urban areas, similar to the overall population.

*Despite new eligibility guidance focusing on the under 12 population, due to data availability from American Community Survey (ACS), there is not an under 12 age bucket – under 14 was used as a proxy.
Appendix
14-Day COVID-19 Case Rate Hotspots at the Census Tract Level

The change in COVID-19 case rate (per 100,000) is displayed on the left and case rate hotspots (areas with statistically significant changes in case rates in comparison to surrounding areas) are displayed on the right.

Total case rate hotspots slightly increased (+4) over the past week, mostly in Regions C and E.

32 of 86 (37%) statewide case rate hotspots are either contained or within 35 miles of Region E (an increase from last week).

In Region E, 73% of case rate hotspots (16 of 22) are in close proximity to I-55 and US-60.

Note: Data normalized by population (per 100,000 residents) per Census Tract. COVID-19 case rate data provided by the State of Missouri as of 9/9/21. Previous 2-week change view provided in the Appendix, along with the number of hotspots per region, and the methodology, data sources, and limitations.
How to Interpret Vaccine Uptake Desert Maps

The example below is a guide for how to interpret vaccine uptake deserts and high uptake zones. Illustrative data is from 9/02 – 9/09

Statewide Uptake Desert

Vaccine deserts are clusters of census tracts with statistically lower vaccine uptake compared to the statewide average.

Local Uptake Desert

Regional uptake deserts are areas of low uptake surrounded by areas of high uptake. Regional uptake deserts are statistical outliers with lower than statewide average uptake and significantly different than neighboring communities.

Statewide Uptake Leader

Statewide uptake leaders are groupings of census tracts that have vaccination rates that are statistically significantly higher than the statewide average.

Local Uptake Leader

Regional uptake leaders are areas of high uptake surrounded by areas of low uptake. Regional uptake leaders are statistical outliers with higher than statewide average uptake and significantly different than neighboring communities.

Note: Data on vaccinated individuals include 1st round Moderna & Pfizer vaccinations and J&J vaccinations across all ages, and indicate the residence of the individual vaccinated, as of 9/9/21. Methodology, data sources, and limitations are available in the Appendix.
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Content may be used to complement local efforts already taking place in your State and to assist with providing a level of granularity and frequency of updates that are not available in public datasets.

Information presented is illustrative of a sample of analyses and capabilities that may be available to you to support COVID-19 response and recovery efforts in Missouri.

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