



MHA COVID-19 Regional Dashboard Documentation

Date Revised: 3/31/2021

Introduction: The Missouri Hospital Association’s COVID-19 Regional Dashboard is an interactive tool designed to provide near real-time situational awareness on the impact of the novel SARS-CoV-2 coronavirus in Missouri using multiple data sources. The dashboard is designed to appeal to multiple audiences in both public and private sectors by providing information on sub-state-level variation for several key measures related to the epidemiology of the pandemic throughout Missouri’s regions and counties. The content provides decision support to hospitals, government officials, public health and business owners on local and statewide mitigation policies using the latest available data.

The content of this dashboard is available through partnerships with the Missouri Department of Health and Senior Services, the Washington University Institute for Public Health, and the U.S. Department of Health and Human Services.

For optimal performance, this dashboard should be viewed in currently supported Google Chrome, Microsoft Edge or Firefox (may require disabled pop-up blockers) internet browsers.

Date	Summary of Changes
10/6/20	Inclusion of the Influenza Monitoring Module
10/14/20	To minimize the risk of double counting COVID-19 cases and associated outcomes, HIDI will now use a commercial Master Patient Identifier algorithm from Novetta Entity Analytics applied to testing data from DHSS to identify unique case counts.
10/14/20	Reporting of new cases, deaths, testing and positivity rates changed from the most recent Tuesday to the most recent Saturday to allow for the lag between test date and returned results.
10/21/20	Due to an increase in hospitalized COVID patients, LEMMA model projections and estimated reproductive rates are now available in the Northeast Region.
10/21/20	Due to significant enhancements in the methods used to identify unique cases made by DHSS, HIDI temporarily suspended the use of the Novetta Master Patient Identifier algorithm.
10/21/20	The Daily Statewide Snapshot tab now includes trended data on inpatient bed and ICU availability. NOTE: periods of extreme variation coincide with changes in HHS reporting guidelines and should be interpreted with caution.
11/4/20	The statewide effective reproductive rate (Re) is now weighted by the relative population of each region.
3/31/21	Partners at the Washington University Institute for Public Health developed a second iteration of the Local Epidemiological Modeling for Management and Action compartmental model used to estimate regional effective reproductive rates and projected hospitalizations. LEMMA 2.0 includes controls for age-stratified vaccination rates to account for decreasing susceptibility derived from vaccine-induced protection in Missouri’s population.
3/31/21	Due to the end of influenza season and continued low levels of activity detected in both ESSENCE and EMResource data, the Influenza Monitoring tab in both the regional MHA dashboard and hospital-specific dashboards on HIDI Analytic Advantage were discontinued this week.

Description of Modules:

Overview Tab: This section provides a summary of the epidemiological characteristics of COVID-19 throughout Missouri’s communities. In addition to the overall prevalence of the disease, key indicators, such as the effective reproductive rate and hospitalizations, are critical in understanding the current severity and spread of COVID-19 across regions. Other leading indicators, such as cellular phone mobility to retail and recreation locations, and testing positivity rates, are included to convey a sense of possible future trends on key outcomes such as new cases, hospitalizations and COVID-19-related mortality.

Data Sources: Data on COVID-19 Cases, deaths and positivity rates are sourced from DHSS EpiTrax (previously WebSurv) and global testing syndromic surveillance systems.ⁱ Cumulative cases are presented as a rate per 100,000 residents using American Community Survey data from the U.S. Census Bureau.ⁱⁱ Hospitalization data are gathered from HHS Protect using self-reported information from Missouri hospitals to the TeleTracking system (previously the National Healthcare Safety Network).ⁱⁱⁱ Regional hospitalizations are based on the physical location of the treating hospital, not the residential location of the patient. Effective reproductive rates and projected hospitalizations are provided by the Washington University Institute for Public Health’s Local Epidemiological Modeling for Management and Action (LEMMA) Model.^{iv} The effective reproductive rate reflects the underlying trend for the region over the past few weeks; it is informed by the most recent data but is not meant to be considered today’s rate. Using the recent trend rate, we can provide projections that are both timely and stable. Mobility data for recreation and retail are gathered from Google Community Mobility Reports^v with regional weighting and forecast models developed by researchers at the Hospital Industry Data Institute.

Update Schedule and Data Periodicity: The Overview Tab will be updated weekly on Wednesdays, pending stability of included data sources. Due to scarcity of certain testing supplies and lag time between test administration and result dates, DHSS data are typically lagged to depict cases and positivity rates for the previous week (Sunday-Saturday). Occasionally, DHSS data will be lagged further to ensure stability in new cases and positivity rates. Cumulative cases and deaths reflect data from March 1, 2020, through the most recent week available. LEMMA model estimates of the effective reproductive rate and projected hospitalizations are based on data submitted by Missouri hospitals to TeleTracking during the most recent week.

Data Availability by Geography:

State	Total Cases per 100,000; Positivity Rate; Cumulative Cases and Deaths by Week, Effective Reproductive Rate
Region	All
County	Total Cases per 100,000; Positivity Rate; Cumulative Cases and Deaths by Week

Testing & Hospital Capacity Tab: This section provides a summary of current hospital capacity and readiness to respond to potential surges, in addition to the latest testing volumes and positivity rates against recommended targets. Hospital capacity is presented in terms of total inpatient beds, intensive care units and ventilator capacity against phase-dependent guidance from the Centers for Disease Control and Prevention, in addition to standing supplies of critical personal protective equipment needed to safely treat COVID-19 patients. For inpatient beds and ICUs, the CDC recommends less than 80% occupancy during phase I, less than 75% during phase II and less than 70% during phase III.^{vi} The



recommended availability of mechanical ventilators of at least 22.66 per 100,000 residents is based on recent research from GlobalData.^{vii} Guidance on daily testing volume of at least 159 tests per 100,000 residents (9,723 per day statewide) and positivity rates below 10% are provided by the Harvard Global Health Institute.^{viii}

Data Sources: Hospital inpatient bed, ICU, ventilator and PPE data are gathered from HHS Protect using self-reported information from Missouri hospitals to the TeleTracking system (previously NHSN).ⁱⁱ Testing and positivity rates are gathered from the DHSS EpiTrax (previously WebSurv) and global testing syndromic surveillance systems.

Update Schedule and Data Periodicity: The Testing & Hospital Capacity Tab will be updated weekly on Wednesdays, pending stability of included data sources. Due to scarcity of certain testing supplies and lag time between test administration and result dates, DHSS data are typically lagged to depict cases and positivity rates for the previous week (Sunday-Saturday). Occasionally, DHSS data will be lagged further to ensure stability in new cases and positivity rates. Hospital capacity and PPE data reflect the most recent week (Sunday-Saturday).

Data Availability by Geography:

State	All
Region	All
County	Average Daily Tests & Target Daily Test by Week; New Cases and Positivity Rate by Week

Outbreaks Tab: This section assists users in better understanding historic and currently active facility-based outbreaks or clusters of COVID-19. Current data do not provide information on the type of facility involved in outbreaks, such as long-term care facilities, schools or places of employment. While MHA is working with staff at DHSS to provide this information, data on the primary age groups of cases associated with outbreaks are included to convey the probable location of each unique Outbreak ID.

Data Sources: All data are gathered from the DHSS EpiTrax (previously WebSurv) syndromic surveillance system.ⁱ

Update Schedule and Data Periodicity: The Outbreaks Tab will be updated weekly on Wednesdays, pending stability of included data sources. Due to scarcity of certain testing supplies and lag time between test administration and result dates, DHSS data are typically lagged to depict cases and positivity rates for the previous week (Sunday-Saturday). Occasionally, DHSS data will be lagged further to ensure stability in new cases and positivity rates.

Data Availability by Geography:

State	All
Region	All
County	Not available

Demographics Tab: This section provides a summary of the disparate impact of COVID-19 on different populations in Missouri. Understanding racial disparities and shifts in the age distribution of new COVID-19 cases is critical for targeted public health interventions, outreach and communication



strategies. For example, data showing the prevalence of COVID-19 among Black and African American Missourians being 2.7 times the rate for white Missourians and mortality rates 3.7 times as high inform policy and advocacy to reduce COVID-19-related disparities. Similarly, the shifting age distribution of confirmed cases toward younger Missourians is informative for schools’ reopening and public messaging.

Data Sources: All data are gathered from the DHSS EpiTrax (previously WebSurv) syndromic surveillance system.ⁱ

Update Schedule and Data Periodicity: The Demographics Tab will be updated weekly on Wednesdays, pending stability of included data sources. Due to scarcity of certain testing supplies and lag time between test administration and result dates, DHSS data are typically lagged to depict cases and positivity rates for the previous week (Sunday-Saturday). Occasionally, DHSS data will be lagged further to ensure stability in new cases and positivity rates.

Data Availability by Geography:

State	All
Region	All
County	Not available

Hospital Claims Tab: This section provides a summary of COVID-19 hospitalizations using administrative claims data submitted by Missouri hospitals with a U07.1, 2019-nCoV Acute Respiratory Disease diagnosis code in any position on the discharge record. Compared to daily data submitted to TeleTracking, hospital claims data include greater detail on individual patients hospitalized for COVID-19, including demographic information, location of residence, length of stay, levels of care and discharge disposition. While these data are significantly lagged due to reporting frequency and cleansing requirements, they are helpful in monitoring trends in clinical effectiveness in addition to patient characteristics. Data cells with fewer than 11 observations are withheld to protect patient anonymity.

Data Sources: All data are gathered from HIDI’s Inpatient and Outpatient Discharge Databases.

Update Schedule and Data Periodicity: The Hospital Claims Tab will be partially updated approximately 45 days following the end of each month and fully updated following the close of each federal fiscal year quarter (October-September). Inter-quarter months (such as April and May) are based on approximately 90% of Missouri hospitals that have opted for monthly claims reporting cycles.

Data Availability by Geography:

State	All
Region	All
County	All for counties with sufficient data

Daily Statewide Snapshot Tab: This section provides a daily summary of statewide COVID-19 hospital resource use and availability. This report replaces the legacy statewide daily dashboard produced in static formats.



Data Sources: All data are gathered from HHS Protect using self-reported information from Missouri hospitals to the TeleTracking system (previously NHSN).ⁱⁱ

Update Schedule and Data Periodicity: The Daily Statewide Snapshot Tab will be updated daily to reflect submissions to TeleTracking from three days prior, pending stability of included data sources.

Data Availability by Geography:

State	All
Region	Not available
County	Not available

Influenza Monitoring Tab: This section is designed to monitor hospital operational impacts associated with increased volumes of patients with influenza or influenza-like illnesses (ILI) in addition to patients presenting with COVID-19-like illnesses (CLI). As hospitals adjust to treating patients with COVID-19, it is important to also surveil the added strain associated with normal cold and flu season volumes.

Data Sources: All data on hospital impact, emergency department status and ILI status are generated with a daily EMResource survey of Missouri hospitals. Daily ED visits for ILI and CLI data are sourced from the DHSS Electronic Surveillance System for the Early Notification of Community-based Epidemics (ESSENCE) syndromic surveillance system.^{ix} Inpatient and Outpatient ED ILI Encounter data are gathered from HIDI’s Inpatient and Outpatient Discharge Databases. Vaccination coverage data are gathered from the U.S. Centers for Disease Control and Prevention’s FluVaxView Influenza Season Vaccination Coverage Reports.^x

Update Schedule and Data Periodicity: The Influenza Monitoring Tab will be updated weekly on Wednesdays, pending stability of included data sources.

Data Availability by Geography:

State	All
Region	All except CDC vaccination coverage data
County	ESSENCE syndromic surveillance and hospital encounter data

Frequently Asked Questions:

- Q: How can I see specific values for each data point included in the COVID-19 Regional Dashboard?

A: All data features are hover-over-enabled to reveal specific values for each data point.
- Q: How often will the COVID-19 Regional Dashboard be updated?

A: Due to differences in the availability of each data source used in the COVID-19 Regional Dashboard, content is updated on different frequencies. In general, most content will be updated on a weekly basis. Complete information on data sources and updates are included in the documentation above.
- Q: How can I print a hard copy of the COVID-19 Regional Dashboard?

A: Exporting the dashboard to a pdf is enabled at the bottom left of each tab through a Microsoft Azure application. The reports may take a few minutes to generate, pending user bandwidth.

4. Q: What is the effective reproductive rate?

A: In general terms, the effective reproductive rate, or R_e , is the estimated number of additional infections associated with each COVID-19 case. R_e values above 1.0 are considered unsustainable in flattening the transmission curve or spread of the virus. Reproductive rates and projected COVID-19 hospitalizations included in the dashboard are modeled by the Institute for Public Health at Washington University in St. Louis. R_e calculations consider individuals with potential immunity, as well as communitywide preventative measures such as social distancing policies. Missouri's model uses a standard SEIR (susceptible, exposed, infectious, recovered) compartmental structure that is based upon the LEMMA tool, developed by experts from the University of Massachusetts, Amherst; University of California, Berkeley; University of California, San Francisco; and Washington University St. Louis. The model focuses on COVID-19 hospitalized cases to directly address the question of hospital capacity and provide a more accurate picture of COVID-19's impact on the health care system (<https://publichealth.wustl.edu/modeling-tool-informs-local-epidemiological-projections/>).

5. Q: Why are testing positivity rates so important?

A: Positivity rates, or the percent of total tests with a confirmed positive result, are key indicators of emerging hotspots and mitigation effectiveness. Positivity rates over 10% are considered indicative of uncontained spread of the virus (<https://www.npr.org/sections/health-shots/2020/06/30/883703403/as-coronavirus-surges-how-much-testing-does-your-state-need-to-subdue-the-virus>).

6. Q: What do the Outbreak IDs in the Outbreak Tab depict?

A: The IDs are deidentified representations of actual facilities, such as nursing homes, child care, schools, correctional facilities, meat processing plants or factories. While it is important to maintain the anonymity of specific facilities associated with outbreaks, MHA is working with DHSS to acquire descriptive categories for each Outbreak ID. In the absence of these descriptors, the dashboards will report average age of the cases associated with each outbreak facility.

7. Q: Why are certain measures only available at the state and regional levels?

A: Reporting at the county level depends on the sample size (such as number of cases) and data generation processes (such as manual entry by hospitals). Data reported at the county level have been evaluated as reliable in terms of representativeness and adequacy in the number of observations. Other measures are aggregated at state and regional levels to ensure validity and temporal reliability.

8. Q: Is it possible to download the underlying data?

A: Yes, you can export all data by hovering over the exhibit of interest, clicking on the "More options" menu, and selecting "Export data".

References:

- ⁱ Missouri Department of Health and Senior Services. WebSurv. Available at <https://clphs.health.mo.gov/ehcdp/websurv/>
- ⁱⁱ U.S. Census Bureau. American Community Survey. Available at <https://www.census.gov/programs-surveys/acs>
- ⁱⁱⁱ U.S. Department of Health and Human Services. (2020, July 20). HHS Protect: Frequently Asked Questions. Available at <https://www.hhs.gov/about/news/2020/07/20/hhs-protect-frequently-asked-questions.html>
- ^{iv} Geng, E. (2020, May 17). *Modeling Tool Informs Local Epidemiological Projections*. Washington University Institute for Public Health. Available at <https://publichealth.wustl.edu/modeling-tool-informs-local-epidemiological-projections/>
- ^v Google. (2020, August 8). COVID-19 Community Mobility Reports. Available at <https://www.google.com/covid19/mobility/>
- ^{vi} Centers for Disease Control and Prevention. (2020, May). *CDC Activities and Initiatives Supporting the COVID-19 Response and the President's Plan for Opening American Up Again*. Available at <https://www.cdc.gov/coronavirus/2019-ncov/downloads/php/CDC-Activities-Initiatives-for-COVID-19-Response.pdf>
- ^{vii} Parker, T. (2020, March 25). *880,000 More Ventilators Needed to Cope with Coronavirus Outbreak, Says Analyst*. NS Medical Devices. Available at <https://www.nsmedicaldevices.com/analysis/coronavirus-ventilators-global-demand/>
- ^{viii} Jha, A., Jacobson, B., Friedhoff, S. & Tsai, T. (2020, May 7). *HGHI and NPR Publish New State Testing Targets*. Harvard Global Health Institute. Available at <https://globalepidemics.org/2020/05/07/hghi-projected-tests-needed-may15/>
- ^{ix} Missouri Department of Health and Senior Services. ESSENCE. Available at <https://health.mo.gov/data/essence/>
- ^x U.S. Centers for Disease Control and Prevention. FluVaxView Influenza Season Vaccination Coverage Reports, Cumulative monthly influenza vaccination coverage estimates for persons 6 months and older by state, HHS region, and the United States, National Immunization Survey-Flu (NIS-Flu) and Behavioral Risk Factor Surveillance System (BRFSS), (2015-2016 through 2019-2020 Seasons). Available at <https://www.cdc.gov/flu/fluview/reportshtml/reporti1920/reporti/index.html>