

COVID-19 Trends in Tennessee: Summer turns to Fall

Oct. 27, 2020

Since early October, Tennessee has seen a resurgence in reported cases and hospitalizations for COVID-19. Several areas of the state now have their highest number of hospitalized COVID-19 patients to date, while other areas have seen their numbers rise back to levels last observed in late July and early August.

There has also been considerable COVID-19 policy activity at the local and state level. As of this writing, just over half (54%) of Tennesseans are subject to a mask requirement in their county, while the remaining 46% either never faced a masking requirement (31%) or were only subject to a requirement during the summer months (July-September; 15%). In addition, as of September 30, all restrictions on group gatherings and on business capacity and operations were lifted in 89 counties where, collectively, 60% of the state population resides.¹

In light of these trends, this report updates our previous analyses hospitalizations and cellular device mobility to economic points of interest. We also add in new analyses of consumer spending behavior by sector. In doing so, we aim to equip policymakers and Tennesseans with knowledge about how COVID-19 hospitalizations are trending, and what the implications of rising cases may be for the Tennessee economy moving forward.

Masking Requirements and COVID-19 Hospitalizations

In [our August 10th report](#) we included a chart tracking hospitalization trends broken down by differences in local masking requirements. Masks are known to reduce human transmission of the SARS-CoV-2 virus. Consequently, areas with more widespread mask wearing are expected to have fewer transmission events—and thus a “flatter” hospitalization curve—than areas where masking is less common. We would also expect the effects of masks to take some time to unfold: turning “on” or “off” required masking behavior as cases rise and fall would not immediately affect cases and hospitalization growth. Rather, it is the total impact of masking and other virus mitigation behaviors, such as distancing and hand hygiene, that over time reduces viral spread by severing chains of transmission.

In our August report, we categorized each Tennessee hospital based on the percentage of its typical patient population residing in counties with a masking requirement in place as of July 10,

¹ These 89 counties are those without a county public health department. The 6 remaining counties with a public health department include: Davidson, Knox, Hamilton, Madison, Shelby and Sullivan.

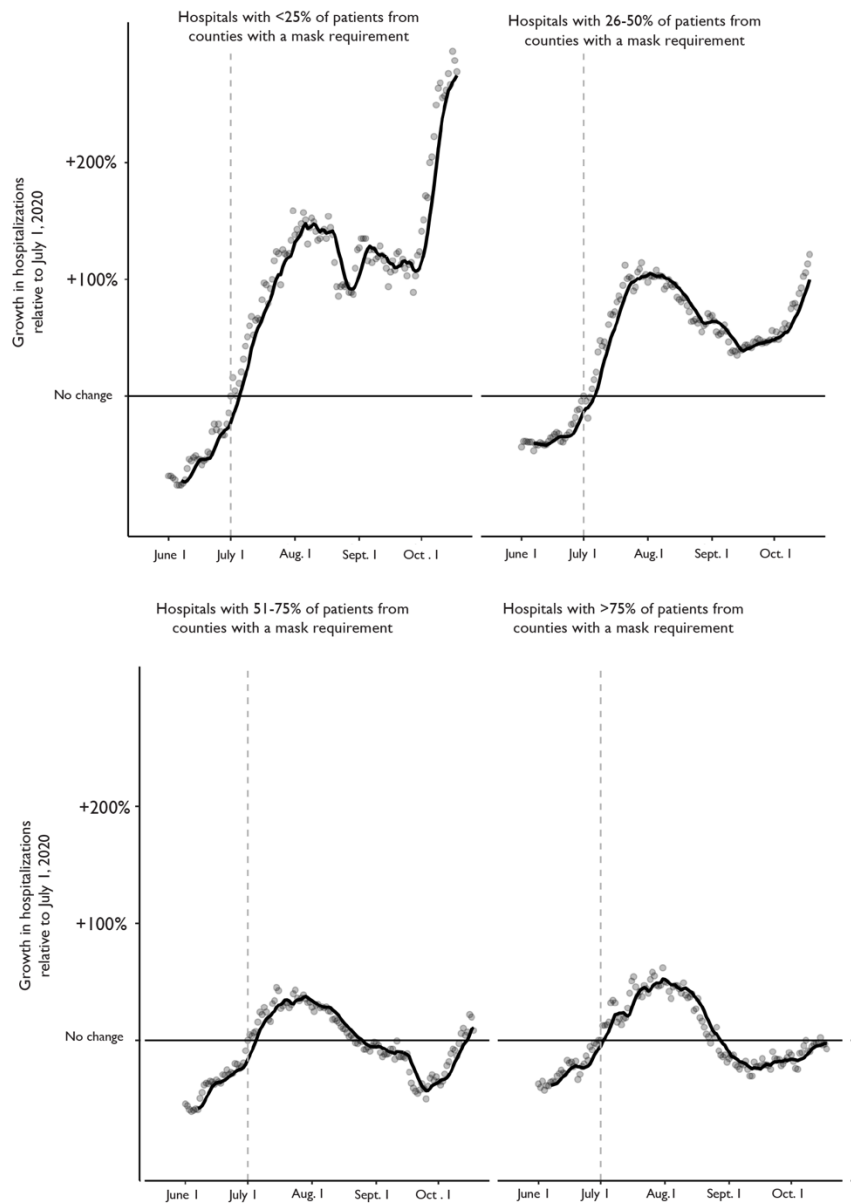
2020.² We have repeated that analysis here, with hospitalization data through Oct. 23 and one additional change in presentation. To facilitate comparisons of growth rates over time and across groups, we indexed COVID-19 hospitalizations for each group based on the total observed on July 1, 2020. Thus, if the <25% category had 100 hospitalized COVID-19 patients on July 1 and 200 on August 10, that group would receive an indexed value of 1.0 on July 1 (100 / 100) and 2.0 (200/100) on August 10 corresponding to a 100% increase in hospitalizations over a one- month time period. This presentation approach allows us to compare rates of growth across categories with varying levels of COVID-19 hospitalizations at the indexing date.

Hospitals that predominantly serve patients from areas without masking requirements (the <25% group) continue to see the highest rate of growth in hospitalizations. As the

Figure 1

Hospitalizations & Mask Requirements

The chart below shows the growth in hospitalizations by hospital type, based on the percentage of patients they treat from counties with mask requirements. Data is through Oct. 20, 2020.



² To construct this measure we used historic hospitalization data to measure “flows” in the number of patients from each ZIP code into different hospitals across the state. Hospitals were then grouped into one of the following categories: <25% of patients from counties with mask requirements, 26-50%, 51-75%, >75%.

percentage of patients residing in mask-requirement counties increases, the growth curve “flattens,” indicating much lower growth in hospitalizations. It is also clear that masking alone is not a silver bullet: since early October nearly every region of the state has seen growth in hospitalizations. Again, however, this growth has been most dramatic in hospitals that draw a large percentage of patients from areas without mask requirements.³

As in our August report, we stress that areas with masking requirements also have seen greater changes in other community behavior (e.g., lower mobility to higher-risk points of interest) and may also have other virus mitigation strategies in place, so the observed relationship is likely not just about masking. Nevertheless, this “flattening” of the hospitalization curve is what public health authorities mean when they discuss the role of behavior change and non-pharmaceutical interventions in limiting the impact of COVID-19 on the health care sector until new therapeutics and a vaccine are available.

Mobility and Consumer Spending in Tennessee

We next turn to analyses of participation in the Tennessee economy, as proxied by measures of cellular mobility to economic points of interest (POIs)⁴ and consumer spending by sector.

An important debate about the economic impact of business restrictions has taken place in Tennessee and nationally. On one hand, restrictions on business operations and capacity could unnecessarily harm the economy if those businesses could operate safely in the midst of a pandemic and if there was sufficient willingness in the community to patronize local establishments. On the other hand, if economic participation ebbs and flows with community infection rates, the impact of restrictions may be more limited. In other words, being “open” does not guarantee business if economic participation dwindles as infections rise in the community. Moreover, the impact on consumer spending may be mixed; rather than decrease spending overall, consumers may simply shift their spending to activities they consider safer (e.g., cooking and eating at home, as opposed to dining out in a restaurant).

Therefore, we analyzed cellular mobility to restaurants and bars—industries targeted through restrictions on business capacity and operations. On Sept. 30, 2020, all business restrictions

³ In late October, several counties re-imposed masking requirements, though it is too early to assess the impact on hospitalization growth. We will examine the impact of these policy changes in future work.

⁴ Mobility measures are based on anonymized and privacy-protected cellular device data from SafeGraph, a data analytics firm, which tracks 40 million smartphone devices. Location movements are recorded in terms of travel among census block groups, which are geographic areas containing between 600 and 3,000 people. More info on our mobility measures is explained in our May 28, 2020 report.

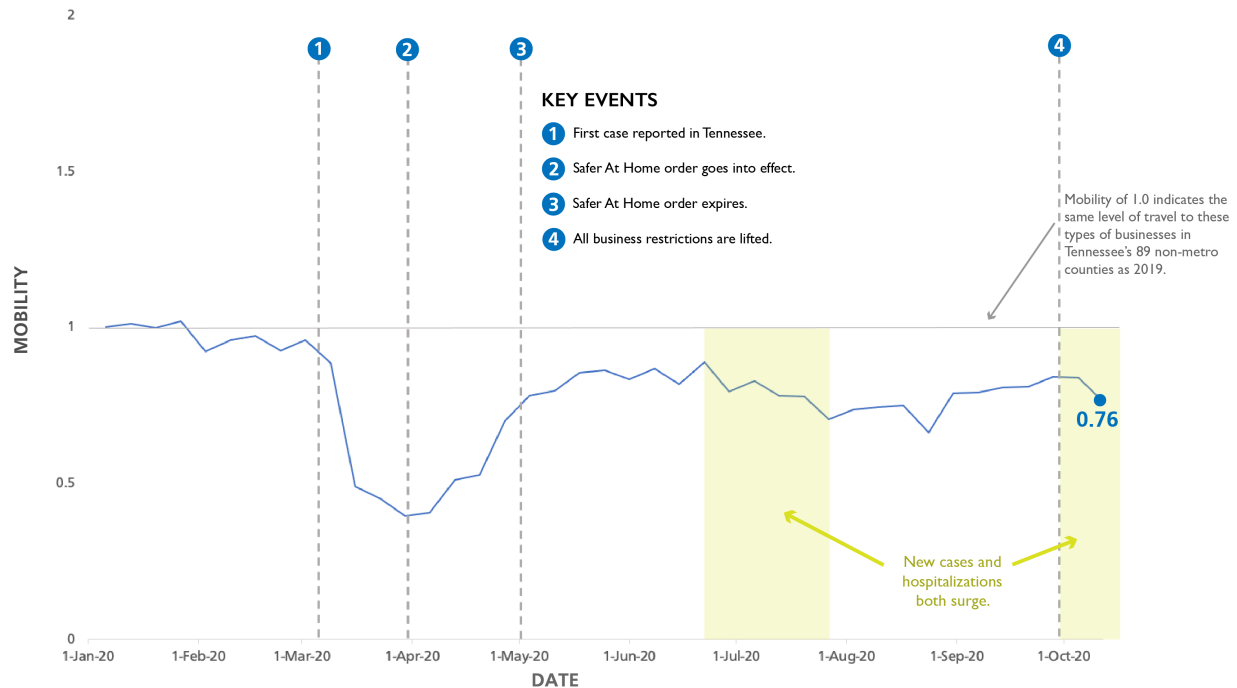
[https://www.vumc.org/health-policy/sites/default/files/Vanderbilt COVID Modeling Report - 0529.pdf](https://www.vumc.org/health-policy/sites/default/files/Vanderbilt%20COVID%20Modeling%20Report%20-%200529.pdf)

were lifted in Tennessee in the 89 (of 95 total) counties that have local health departments under State jurisdiction as opposed to the six that have independent Metro health departments.

Figure 2

Mobility to Restaurants and Bars in Non-Metro Areas

This chart shows the level of consumer travel to specific economic points of interest (restaurants and bars) in Tennessee's 89 non-metro counties compared to the travel to these types of businesses as 2019. A mobility value of 1.0 is the same amount of travel as 2019. Key events in time are highlighted.



If state-imposed restrictions were dampening patronage of these establishments, then we might expect to see mobility to points of interest in these 89 counties rise starting in early October. If, on the other hand, community infection rates are a more important determinant of economic participation, then we might expect to see mobility fall as cases and hospitalizations started to rise in July and August, and then again in early October.

What we are seeing through mid-October is consistent with mobility patterns earlier in the year: mobility patterns track community infection rates more closely than they track the imposition or expiration of official orders. Mobility to bars and restaurants (Figure 2) declined dramatically just after the first COVID-19 case was reported in the state, and before the statewide “safer at home” order was put in place. The mobility index climbed slightly while that order was in place, then stabilized at around 80% of normal levels of mobility by early summer. During the surge in reported cases and hospitalizations in July and August, mobility declined. Starting in early October—after all restrictions on patronage of these establishments were lifted and as cases and hospitalizations again began to rise—mobility once again declined. As of the week of Oct. 21, 2020, mobility to restaurants and bars in these 89 counties remains down

24% from where we would expect it to be to these same establishments during the same week based on 2019 mobility data. Mobility is now lower in these areas than it was in September.

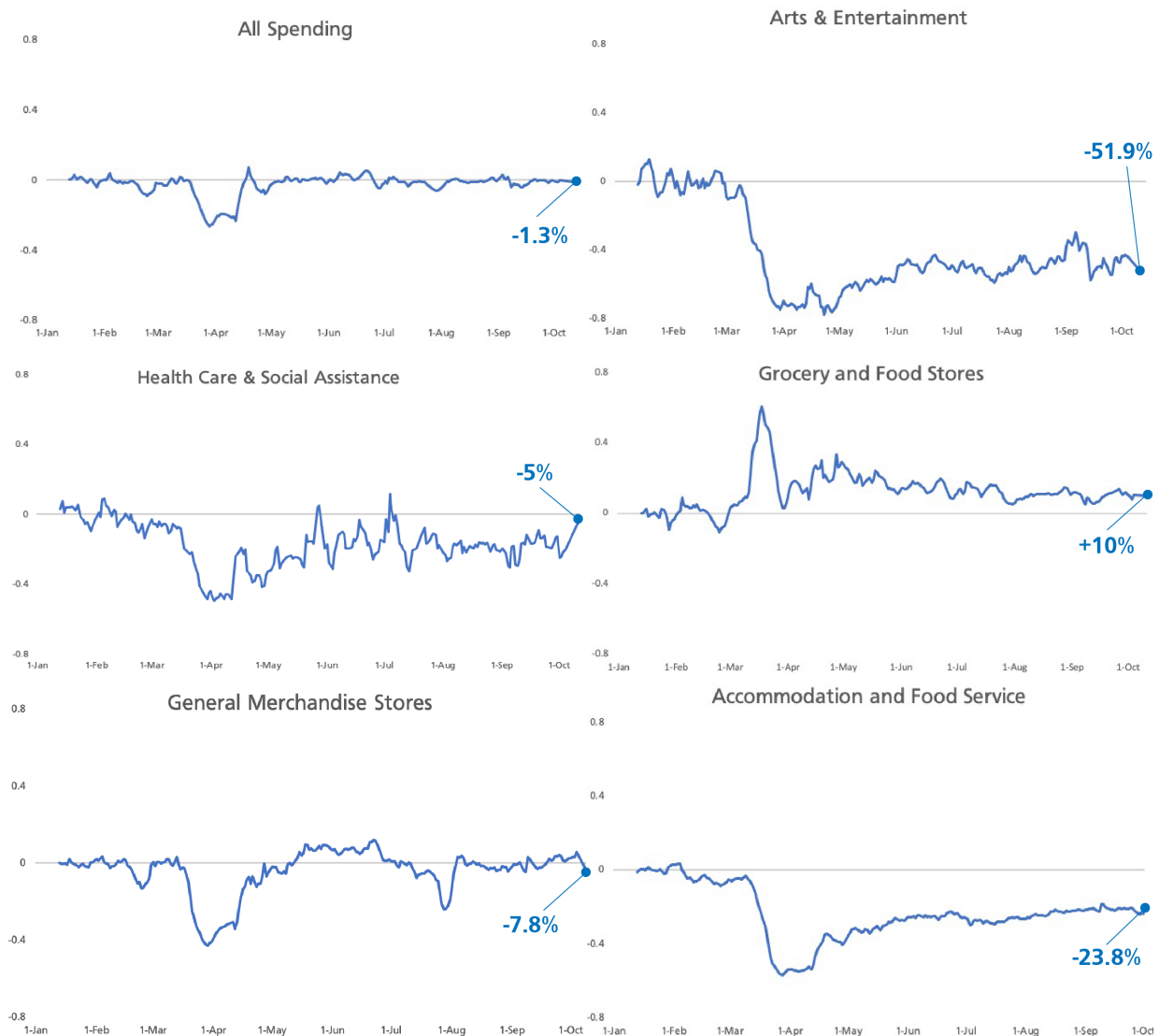
These patterns are mirrored in statewide consumer spending data from Opportunity Insights.⁵ We summarize consumer spending overall and by category in the figures below. Here, we see that overall spending has recovered to just below the levels seen in early 2020. However, the overall spending figure masks important and consequential changes in sectors hard hit by the pandemic. Consumer spending in the “Accommodation and Food Service” sector is down 23.8%, and “Arts, Entertainment and Recreation” is down 51.9%. However, consistent with the hypothesis that consumers shift their spending to “safer” activities in a pandemic, these declines are offset by a 10% increase in spending at grocery and food stores.

⁵ Unfortunately, county-level spending measures by sector are not available at this time, so we were unable to tease apart spending in the 89 counties with local health departments under state jurisdiction.

Figure 3

Consumer Spending By Major Economic Category

The charts below show the level of consumer spending by major economic category over time. The horizontal line reflects spending consistent with the same level as 2019. Data source: Opportunity Insights Economic Tracker, <https://www.tracktherecovery.org/>.



Conclusions

The COVID-19 pandemic in Tennessee is now at its highest point to date in terms of hospitalizations and new cases. The good news is that we have learned a great deal since the beginning of the pandemic. Nearly 80 percent of Tennesseans now report wearing masks in public all or most of the time. Schools are offering options for remote and in-person learning and to date major clusters of COVID-19 have not been traced to school transmission. Tennesseans are not frequenting bars and restaurants at the same rates they did in 2019, which

is consistent with seeking less risk of exposure and with greater space for social distancing in those establishments for those who go there.

At the same time, new cases and hospitalizations are rising in all areas of the state. An important takeaway from this analysis is that areas with virus mitigation strategies—including but not limited to masking requirements—have seen lower growth in hospitalizations since the summer months; hospitals in these areas are in a much better position to serve the entire spectrum of community health needs, not just COVID-19 patients.

Finally, given our results on mobility and spending, a natural question to ask is whether those restrictions are still needed in areas where they are still in place. Throughout the pandemic we have seen a consistent pattern of economic participation mirroring community infection: as cases and hospitalizations rise, consumers' mobility and spending patterns either decline or shift to “safer” activities. It is very clear that the best way to manage the economic fallout is to definitively manage the virus using proven strategies that can break chains of transmission. This requires engagement and collective responsibility among individuals and their elected officials. Only when transmission is reduced will individuals feel comfortable participating in activities that support the local economy as they did before the pandemic. A comprehensive set of interventions—potentially including targeted restrictions that limit indoor contacts coupled with support for affected industries—and certainly including greater mask use, social distancing and hygiene, is most likely to be effective at bringing the virus into better control and consumers back to local businesses. Policies and individual behavior that facilitate letting the virus go unchecked in our communities will not only result in poorer health outcomes, but risks creating unnecessary and costly headwinds for families, businesses, schools, and health care providers across the state.

This report was prepared by John Graves, PhD, associate professor of Health Policy and director of the Center for Health Economic Modeling, Melissa McPheeters, PhD, research professor in the Department of Health Policy and co-director of the Center for Improving the Public's Health Through Informatics, Melinda Buntin, PhD, Mike Curb Professor of Health Policy and Chair, Department of Health Policy. Data analysis and presentation support were provided by Kyle Gavulic, Jake Lowary, Leonce Nshuti, and Zilu Zhou; the team received input from Vanderbilt's Health Policy and Public Health Advisory Panel.