# COVID-19 in North Carolina

Update on the COVID-19 Pandemic in North Carolina: November 2020

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## Overview

This brief describes the current situation regarding the COVID-19 pandemic in North Carolina as we enter the holiday season.<sup>1</sup> We outline some important good news and also highlight several causes of increasing concern. On the positive side, during this holiday week, we can be thankful that North Carolina hospitals are not currently overwhelmed by demand for services as is <u>occurring</u> in some other parts of the country. We believe this is in large measure attributable to early attention and ongoing vigilance by state, local, and health care leaders, as well as the public's individual and collective actions. Other good news includes the likelihood that COVID-19 vaccine distribution may begin in the coming months.

However, as COVID-19 deaths <u>surpass 5,000 statewide</u>, there are clear reasons to believe the situation in North Carolina is worsening. This includes a recent and rapid increase in COVID-19 cases<sup>2</sup> throughout the state, high positivity ratios in all regions, and coming seasonal travel and indoor gatherings. The aspects of bad news described in this brief lead us to be more pessimistic about the next 4 to 8 weeks in North Carolina than we have been about prior periods.

The <u>current situation in the Midwest</u>, in particular, underscores just how fragile our current conditions could be. As we enter this holiday season, we believe it remains very important to maintain a sharp focus on reducing the significant risks that COVID-19 continues to pose to the public's health and the state's economy and overall well being. The data presented in this brief support a call on our leaders and the general public to avoid complacency in responding to COVID-19, with special vigilance needed over the next months.

## Key Factors Shaping COVID-19 Trends in North Carolina

## **Good News**

- Preparedness: Early in the pandemic, North Carolina implemented <u>numerous policies</u> designed to contain the spread of the virus. States now experiencing the largest per capita COVID-19 case growth and most significant demands on hospitals and health care professionals appear to be those that did not enact significant virus containment policies earlier in the pandemic. Early and ongoing attention to COVID-19 in North Carolina has likely yielded benefits here relative to other states, such as buying much-needed time to plan a major public health response and calibrate health care capacity.
- Immediate hospital capacity: Though new COVID-19 cases are on the rise, as of Thanksgiving week, North Carolina hospitals have sufficient bed capacity to treat currently infected people in the near term.<sup>3</sup> As described below, however, this good news could be temporary.

While North Carolina's hospitals are not presently "<u>over-</u> <u>whelmed</u>" as many are in some other states (especially in the Upper Midwest and Plains States), conditions here have the potential to worsen in the coming weeks (see "Bad News" below).

Clinical and scientific developments: Nationally, recent announcements indicate that progress is being made in the development of vaccines for COVID-19. As experts evaluate these newly-emerging vaccines, health care and policy leaders in North Carolina are planning for large-scale vaccine distribution to ensure that people and communities benefit as quickly and safely as possible. Of course, vaccines are only effective if people use them. Beyond the challenges of developing and then distributing novel vaccines, a key question is the degree to which the public will accept new vaccines once they are authorized by the U.S. Food and Drug and Administration.

<sup>1</sup> For this brief, we use data furnished through a data use agreement with the North Carolina Department of Health and Human Services. The authors of this brief conducted this work independently, on a volunteer basis. The findings and conclusions in this brief are those of the authors and do not necessarily represent the views of the North Carolina Department of Health and Human Services, Division of Public Health, or the authors' institutions.

<sup>2</sup> Note that all references to COVID-19 "cases" in this brief refer to laboratoryconfirmed cases, not the higher total number of underlying infections in the population, including those that are unobserved/undiagnosed.

<sup>3</sup> We are aware of limited cases of smaller hospitals in North Carolina reaching capacity, though these capacity constraints were temporary.

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#### **Bad News**

## Hospitalizations (and deaths) lag behind cases:

A large increase in diagnosed cases (such as we've seen recently) precedes corresponding upticks in hospitalizations and deaths by several weeks. Although individual timelines vary, a rough estimate of the <u>course</u> of an infection that results in death might be as follows: on day one, a person is exposed to and infected by the virus. Almost a week later, symptoms begin. A week after that, hospitalization is needed, with death occurring after a week and a half spent in the hospital.

Hence, hospitalizations and deaths are "lagging" (not "leading") indicators — they happen well after cases are identified. It may be another month or more before we observe the effects of currently rising case counts on hospitalizations and deaths.

Even if case growth were to suddenly stop today, the outlook in North Carolina is already likely to worsen in the coming weeks as the dynamics of recent case growth play out (see Exhibit 2).

#### Workforce pressures:

Health care leaders in North Carolina and around the country are expressing <u>growing concerns</u> about workforce shortages, particularly among nurses. According to data <u>released this week</u>, more than 1,000 hospitals across the United States are "critically" short on staff, including facilities in North Carolina.

Staffing issues are not just a problem for acute care settings; long-term care facilities with chronic workforce shortages are facing increasing attrition due to staff fatigue. Burnout, from the combination of infection risk, physical fatigue, and mental exhaustion, remains a <u>serious concern</u>. These challenges are particularly severe in rural communities.<sup>4</sup>

Health care employers must continue to plan not only to surge the workforce as hotspots emerge but also to sustain the health and well-being of health professionals on the front lines. North Carolina's current positivity ratio suggests that case growth is not merely a function of more people being tested; it also indicates ongoing and rapid spread of the virus throughout the state.

Thanksgiving travel: Despite cautions issued about travel and gatherings by the U.S. <u>Centers for Disease</u> <u>Control and Prevention</u> (CDC) and <u>NC DHHS</u>, millions of people across the country are expected to hit the road and gather with friends and family over Thanksgiving week. It is likely that holiday-related travel and gatherings will seed a large number of new cases that will emerge in public health statistics in December.

Winter weather: Beyond Thanksgiving gatherings, as the weather turns colder, more people will be confined indoors over the coming months. Evidence has emerged that the spread of the virus largely occurs in gatherings which can become "<u>superspreader</u>" events. Putting these factors together, the spread of COVID-19 (and the associated effects on hospitalizations and deaths) is projected to increase in the weeks ahead, particularly if increasingly-utilized indoor spaces are poorly ventilated and/or crowded.

Ongoing need to address important national pandemic priorities: More generally, eight months into the COVID-19 pandemic, several key priorities still need to be addressed on a national scale, including those in the areas of testing, personal protective equipment (PPE), data and surveillance, and the general discouragement of gatherings that , as noted above, have the potential to become "superspreader" events.

Positivity trends: The percentage of all coronavirus tests performed in North Carolina that yield positive results (i.e., the "positivity ratio") has been hovering near 8 percent recently. While this is better than the <u>national</u> <u>average</u>, which has been closer to 10 percent recently, North Carolina public health officials have repeatedly indicated that they would like to see the positivity ratio drop below and stay under 5 percent in the context of widespread testing.

<sup>&</sup>lt;sup>4</sup> Shortages are so critical in <u>North Dakota</u> that asymptomatic health care workers who have tested positive for COVID-19 are continuing to care for patients despite the risk to themselves and their patients.

## **Bottom Line: Key Factors in North Carolina**

In summary, as of mid-November, COVID-19 case volumes continue to increase rapidly in North Carolina, and positivity ratios are much higher than ideal throughout the state. In the very short term, we appear to have the hospital capacity and (for the most part) the health care professionals needed to manage this increase for the next several weeks, but concerns are rising. While the current <u>"catastrophic" experiences</u> in other states do not presently characterize North Carolina's experience, the situation can change quickly. We must continue to take North Carolina's recently rising case growth seriously given both the downstream consequences of known rising cases and the many compounding factors outlined above.

Of course, the kind of ongoing vigilance that is needed by the public (e.g., ongoing physical distancing, mask wearing, avoidance of large group interactions) is inconvenient and in some cases can be very costly and difficult to sustain over the long term. That said, there does appear to be some light at the end of the tunnel as vaccine distribution can start soon. But the COVID-19 situation in North Carolina is likely to deteriorate further before it gets better and before vaccines are widely available to the general population. It is also important to recognize that availability of vaccination may not immediately nor permanently solve the crisis.

## Summary of Recent Trends in the Data

For purposes of public health planning and response, the State has historically divided North Carolina's 100 counties into seven Public Health Regional Surveillance Team (PHRST) regions, which we characterize here using the largest city (e.g. "Charlotte" and "Wilmington") or set of cities (e.g., "Triangle" and "Triad") in each region.

The map in Exhibit 1 (below) displays and defines each of the PHRST regions.



Exhibit 1 Public Health Regional Surveillance Team (PHRST) Regions

Exhibit 2 (next page) summarizes updated trends in COVID-19 data statewide and by PHRST region from the week beginning on September 6th to the week beginning on November 8th.

Note that, due to methodological differences and data restrictions, values presented in the Exhibit may differ from similar metrics shown elsewhere.

## Key Trend Takeaways:

- 1 Significant case growth is seen in all regions and statewide. The daily case rates have at least doubled in most regions since Labor Day, with some regions (Triangle, Triad, and Charlotte) seeing almost a tripling in rates over the last 8 weeks.
- 2 Increasing or sustained high positivity ratios seen across all regions. Two regions (Wilmington and Fayetteville) have positivity ratios above 10 percent, with another (Triad) at 9.9 percent. Only one region (Greenville) has not seen an increase, and it has sustained a positivity ratio above 8 percent.
- **3** Increases in hospital use per capita seen in some regions, with the Triad and Charlotte regions in particular seeing marked increases.
- 4 In some regions, increases in cases seen per available acute and ICU bed. This indicates more intense pressure on the health care system.

As the number of cases per available bed increases, there are fewer beds to absorb the surge in cases. Some regions (Wilmington, Fayetteville, and the Triangle) have seen a marked increase in the cases per available acute bed over the last few weeks; Wilmington has also seen an increase in cases per available ICU bed, as have the Triad and Charlotte.



**bit 2** Regional summaries of recent COVID-19 trends, from the week beginning September 6th to the week beginning November 8th



## **Definitions & Data Sources for Metrics in Exhibit 2**

#### Daily New Cases per Million Pop.

Newly detected daily cases in the week per million population. (Data Source: NC-COVID, NC DHHS)

## Positivity Ratio

Percentage of all cases reported that week that were positive. Note that not all negative tests may be reported. (Data Source: NC-COVID, NC DHHS)

## COVID-19 in Hosp. per 100K Pop.

Number of people in the hospital for COVID-19 on the final day of the week, expressed per 100,000 population. (Data Source: MedSurge, NC DHHS)

## Cases per Available Acute Bed

Number of cases in the prior two weeks per the number of acute care beds available for patients on the final day of the week. See "Technical Discussion" at right for further description. (Data Source: NC-COVID & MedSurge, NC DHHS)

## COVID-19 in ICU per 100K Pop.

Number of people in a hospital Intensive Care Unit (ICU) for COVID-19 on the final day of the week, expressed per 100,000 population. (Data Source: MedSurge, NC DHHS)

#### Cases per Available ICU Bed

Number of cases in prior two weeks per ICU beds available for patients on the final day of the week. See "Technical Discussion" below for further description. (Data Source: NC-COVID & MedSurge, NC DHHS)

## Daily Deaths per Million Pop.

Number of daily deaths reported in the week, expressed per million population. (Data Source: New York Times GitHub)

**Note:** The CDC recently adjusted its definition of COVID-19-related hospitalizations, affecting counts beginning on November 12th. The statewide effect was roughly a 150-bed (about 12%) increase in hospitalization count. This methodological adjustment is a contributing — but not the sole — factor explaining the sharp increase seen in the last week of hospitalizations in some regions.

## **Technical Discussion**

Most of these metrics are relatively commonly used. We express several of them on a per-capita basis to allow for comparability across regions.

In previous briefs (in particular, <u>Brief 2</u> and <u>Brief 4</u>), we have assessed current hospital capacity as "weeks until hospital capacity is met given recent growth in hospitalizations." In this brief, we made a methodological change due to the November 12th adjustment in how the CDC measures COVID-19 hospitalizations (described in "Note" at left).

Given that definition change, we assess hospital capacity in this brief as "previous two weeks' cases per available bed." This method allows hospital capacity to be assessed relatively intuitively.

- Suppose, for example, that 1 in 10 persons diagnosed with COVID-19 require hospitalization.
  - If a region had three recent COVID-19 cases per available hospital bed, there would be plenty of hospital capacity in that region.
  - But if a region had, say, 20 recent cases per available hospital bed, then the number of beds needed (at the 1:10 ratio) would outpace the available capacity.

Take the Wilmington region — it has roughly one ICU bed for every 8,200 population, while the Triangle has one ICU bed for roughly every 3,500 population. Saying, then, that "half of Wilmington's ICU beds are used" does not incorporate the fact that there are fewer ICU beds per person to begin with. Likewise, a per-capita metric for hospital capacity does not account for the fact that a region with 10 available ICU beds and 50,000 population will be in a very different situation if there are 30 cases than if there are 3,000 cases. Thus, we use the previous two weeks' new cases as a measure of the potential short-term future demand for ICU beds.

Of course, the reality is far more complex than this simple illustration. Other factors that determine adequacy of hospital capacity include the average length of stay in the hospital, the timing from diagnosis to hospitalization, and the ability of the health care system to "surge" additional beds, equipment, and workforce. But at a basic level, the "cases per bed" metrics we use here provide a general measure of the potential near future demand on the health care system statewide and by region: it incorporates both potential future need (through recent cases) and available hospital supply (through currently available beds).

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