Scientists, doctors and other experts use data to indicate how COVID-19 is affecting a population of people. Indicators measure various aspects of a virus such as looking forward at how it might spread, tracking hospital capacity to treat infected people, and evaluating the proportion of people who have recovered from the virus. Early, intermediate and lagging indicators work together to provide helpful insight into COVID-19.

### Early Indicators

**Reproductive Number ($R_0$)**:
Number of people infected by one sick person. Number changes as behaviour changes or immunity develops. If $R_0$ is higher than 1, the number of cases increases exponentially. If $R_0$ is lower than 1, the disease will eventually stop spreading.

**Positivity Rate**: Two main measures that may vary from one data source to another:
- **Person-based measure**: calculated as percentage of people who test positive divided by total number of people tested (used by the Medical College of Wisconsin due to data availability).
- **Test-based measure**: calculated as percentage of tests completed that are confirmed positive.

**Case Rate**: Total number of cases per 100,000 Wisconsin residents in the last two weeks.
- Low case rate is less than or equal to 10 cases per 100,000 people.
- Moderate case rate is greater than 10, but less than or equal to 50 cases per 100,000 people.
- Moderately High case rate is greater than 50, but less than or equal to 100 cases per 100,000 people.
- High case rate is greater than 100 cases per 100,000 people.

(Sources: cdc.gov, hhs.gov)
INTERMEDIATE INDICATORS:

Non-surge capacity of hospital & ICU beds & ventilators:
Hospital and equipment capacity for normal, day-to-day hospital needs

Hospitalizations/ICU use:
Number of COVID-19 patients who have been hospitalized or admitted to the ICU

LAGGING INDICATORS:

Deaths:
Deaths per day caused by COVID-19
Deaths per week caused by COVID-19

Other death-related definitions:

Case Fatality Rate: proportion of deaths from COVID-19 compared to the total number of people diagnosed with the virus

Infection Fatality Rate: proportion of deaths from COVID-19 compared to all infected individuals. Differs from Case Fatality rate in that it tries to account for undiagnosed and asymptomatic cases

Mortality Rate: Deaths caused by COVID-19 in a population over a period of time

LIMITING FACTORS:

In relation to the management of COVID-19, a limiting factor is a variable that causes a noticeable change in response to the virus.

PPE (Personal Protective Equipment): needed to provide all medical care, including for COVID-19

Testing Capacity: number of tests able to be performed per day in Wisconsin.
Limited by availability of supplies (reagents and swabs) and number of tests that can be analyzed in a certain period of time

Hospital Capacity: number of hospital beds available to treat COVID-19 patients as well other ill or injured patients. Hospital capacity under 15% is considered critical

(Sources: cdc.gov, hhs.gov)