

ABOUT THE PUBLIC HEALTH MADISON & DANE COUNTY RESPIRATORY ILLNESS DASHBOARD

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LANDING PAGE

Weekly Summary

These data are sourced from the Electronic Surveillance System for the Early Notification of Community-Based Epidemics (ESSENCE). ESSENCE is [syndromic surveillance](#) software used by the National Syndromic Surveillance Program (NSSP) of the Centers for Disease Control and Prevention (CDC). Syndromic surveillance is a tool that allows us to have a near real-time pulse on what is impacting the health of the community. The syndromic surveillance data we use from ESSENCE comes from emergency departments located in Dane County. All emergency departments in Dane County report to ESSENCE except for the William S. Middleton Memorial Veterans’ Hospital emergency department. Data from UW Hospitals & Clinics, Meriter, and St. Marys contain emergency department visits only. Data from Stoughton Hospital contain both emergency department visits and urgent care visits. These data will include any person who seeks care from an emergency department within Dane County, even if they don’t reside in Dane County.

The data we present are the weekly percentage of people who: 1) are discharged from an emergency department (ED) and diagnosed with any respiratory illness; 2) are discharged with a COVID-19 diagnosis; 3) are discharged with a flu diagnosis; and/or 4) are discharged with a respiratory syncytial virus (RSV) diagnosis. The data represent the percentage out of all ED visits in a week.

ESSENCE categorizes an ED visit based on the discharge diagnosis. These categories are made up of groupings of discharge diagnosis codes and have been developed by the CDC. For ‘All respiratory illnesses,’ we use the CDC [Broad Acute Respiratory discharge diagnosis definition](#), which includes COVID-19, flu, RSV, and several other respiratory illnesses. There are [detailed definitions](#) of what discharge diagnosis codes are included for COVID-19, flu, and RSV. I j

Levels

To classify the levels of 'All respiratory illnesses' diagnosed in the ED, we analyzed ED visit data from [MMWR week 36 of 2018 through MMWR week 35 of 2023](#). 'All respiratory illnesses' is defined by the CDC [Broad Acute Respiratory discharge diagnosis](#) and includes COVID-19, flu, RSV and many other respiratory illnesses. We split the range of the percent of ED visits resulting in a respiratory illness over this five-year period into five levels (quintiles):

Percent of ED Visits Diagnosed as All Respiratory Illnesses (Levels)

Minimal	Low	Moderate	Substantial	High
≤7.54%	7.55% to 8.64%	8.65% to 10.24%	10.25% to 12.34%	≥12.35%

To classify the level of COVID-19 diagnosed in ED visits, we use the [CDC-established levels and thresholds](#) for COVID-19 ED visits:

Percent of ED visits diagnosed as COVID-19 (Levels)

Minimal	Low	Moderate	Substantial	High
<1.5%	1.5% to 2.9%	3.0% to 4.4%	4.5% to 5.9%	≥6.0%

To classify the levels of flu and RSV diagnosed in the ED, we analyzed ED visit data from three previous respiratory virus seasons: 2018-2019, 2019-2020, and 2022-2023. For flu we included [MMWR weeks 40-20](#), and for RSV we included MMWR weeks 36-20. We split the range of the percent of ED visits resulting in a flu or RSV diagnosis over these time periods into five levels (quintiles):

Percent of ED visits diagnosed as Flu (Levels)

Minimal	Low	Moderate	Substantial	High
<0.014%	0.015% to 0.074%	0.075% to 0.484%	0.485% to 2.44%	≥2.45%

Percent of ED visits diagnosed as RSV (Levels)

Minimal	Low	Moderate	Substantial	High
<0.014%	0.015% to 0.074%	0.075% to 0.24%	0.25% to 0.64%	≥0.65%

All levels are calculated based on the percentage of ED visits resulting in the respiratory illness diagnosis of interest over the most recent seven-day period (from seven days before the date of the dashboard update through the day before the day of the dashboard update).

Trend

The trend is determined by a rolling binomial model fitted to a daily time series of proportions in order to classify the ED visit trajectory for each illness as significantly increasing, significantly decreasing, or

stable. The baseline parameter used is 12 days, and the calculation is made as of the day before the day of the dashboard update. For the purposes of this dashboard, if there were fewer than 10 encounters in the baseline period, the trajectory is considered to be stable. Detailed methodology and code can be found on [CDC's website](#).

First Alert

Our First Alert index contains three data elements: COVID-19 wastewater, school absenteeism, and air samplers.

Wastewater

COVID-19 wastewater data comes from the [DHS COVID-19 Wastewater Dashboard](#). There are two wastewater treatment facilities that are sampled in Dane County: one located in Madison and the other in Oregon. We only include wastewater data from the Madison Wastewater Treatment Facility on our dashboard because it is sampled several times per week, compared to Oregon which is sampled less frequently. Facilities that are sampled regularly have more reliable data and trends.

COVID-19 wastewater data is included under first alert data because it can serve as an early warning of increasing COVID-19 activity in our community. People with COVID-19 shed the virus in their poop. The virus can start shedding even before people have symptoms. The virus that sheds ends up in the wastewater which is sampled and then analyzed. The increase of viral gene copies in wastewater can serve as an [early indicator before a corresponding increase in diagnosed cases](#). Due to the shift in the COVID-19 testing landscape to the use of home tests, tracking confirmed cases of COVID-19 is not as complete as it used to be. Wastewater surveillance has been able to serve as a tool to understand how much COVID-19 is in the community. The COVID-19 wastewater trend displayed on our respiratory dashboard will show data from the same day that the respiratory virus dashboard was updated. For the most up to date COVID-19 wastewater data, and to view the Oregon Wastewater Treatment Facility data, view the "Wastewater data" section on our site below the dashboard. We have embedded the DHS COVID-19 Wastewater Dashboard, and you can click on "Madison" or "Oregon" from the list on the left side to view data for those treatment facilities.

School absences and air samplers

The other source of the First Alert data is the trend of school absences due to illness from the [ORCHARDS research study](#) conducted in the Oregon School District. ORCHARDS stands for the UW Oregon CHild Absenteeism due to Respiratory Disease Study. This study has been monitoring cold and flu symptoms in pre-k through high school students in the Oregon School District since the fall of 2014. By testing students with respiratory illness symptoms, researchers are able to pair these data with illness-related absenteeism patterns to assess the impact of common respiratory illnesses on the school district and the community at large. One [conclusion](#) from the ORCHARDS study has been that an increase in reports of absences due to any illness has been shown to be an early warning sign of influenza impacting the surrounding Dane County community. A spike in school absences due to illness can precede flu detection in the surrounding community by up to ten days. This finding serves as the basis of including this data point as a 'first alert' indicator on our dashboard.

An increase in school absences due to illness is identified when the percent increase in the number of school absences due to illness from the previous week to the most recent week is greater than or equal to 10%, and the p-value based on Poisson regression is less than 0.025. Additionally, there must be a positive flu test from a student participating in the ORCHARDS research study (see "[Positive test results](#)").

[by illness](#)” below), or a positive air sample for flu (see “[Air Samplers](#)” section below) from a school in the Oregon School District, in order for the “Increase expected soon” alert to appear on the dashboard.

OVERALL TRENDS

Percent of all emergency room visits due to COVID-19, flu, or RSV

These data are sourced from the emergency department syndromic surveillance system, ESSENCE (further described in the [Weekly Summary section](#), above).

The data shown is the weekly percentage of people who are discharged from an emergency department and diagnosed with COVID-19, flu, or RSV. The data represent the percentage out of all ED visits in a week. ESSENCE has the ability to categorize an ED visit based on the discharge diagnosis. These categories are made up of groupings of discharge diagnosis codes and have been developed and used by the CDC. The discharge diagnoses included for COVID-19, flu, and RSV are included in this [companion guide](#).

Percent of emergency room visits due to any respiratory illness

For the percent of emergency room visits due to any respiratory illness we use the CDC [Broad Acute Respiratory discharge diagnosis definition](#), which includes COVID-19, flu, RSV and several other respiratory illnesses.

LAB TESTING TRENDS

Percent of tests that are positive by virus

The data on this page come from the [National Respiratory and Enteric Virus Surveillance System](#) (NREVSS). NREVSS is a CDC-run system that collects lab testing data for certain respiratory and enteric viruses from participating labs around the country. The labs participate voluntarily, and on a weekly basis report to the CDC on the number of tests performed and number detected for each of the viruses included in NREVSS. The data we show is the percent of total polymerase chain reaction (PCR) tests each week that were positive for each different respiratory virus.

Note that the factors that drive people to be tested for the different pathogens are different. More severe respiratory illnesses (COVID-19, RSV, and flu) are more likely to cause people to seek care, and therefore they’re more likely to be tested for these three viruses. Illnesses that are typically less severe (hMPV, parainfluenza, and rhino/enterovirus) are tested for less frequently because it is less common for people to seek care. Therefore, the underlying populations tested for the different pathogens are different.

Because lab participation in this reporting network is voluntary, the number of labs in Dane County that consistently report to NREVSS each week varies from 4 to 5.

Additional information about the other viruses included on this page:

- [Human metapneumovirus \(hMPV\)](#)
- [Parainfluenza](#)
- [Rhino- and Enterovirus](#)

SCHOOL ABSENCES

Number of school absences due to any illness

These data represent total school absences due to any illness by week from the UW Oregon Child Absenteeism due to Respiratory Disease Study ([ORCHARDS research study](#)) conducted in the Oregon School District. This study has been monitoring cold and flu symptoms in pre-k through high school students in the Oregon School District since the fall of 2014. Approximately [4,000 students](#) attend school in the Oregon School District.

Students who report having respiratory illness symptoms and choose to participate are tested using a respiratory virus panel, which tests for many respiratory viruses. The number of students tested each week ranged from 0 to over 40 in the 2022-2023 respiratory virus season.

The study also tracks absentee data for each of the seven schools that participate and the reason for each absence. The absences shown in this graph are due to any reported illness. An increase in absences due to any illness can act as an early warning sign for flu impacting the surrounding community by up to ten days, based on a [study](#) conducted by the ORCHARDS team. If a student is absent due to an illness more than one day in a week, they are included in the total count for the week for each day they are absent due to an illness.

Positive test results by illness

This graph shows the positive results from the respiratory virus samples taken from each student that participates in the [ORCHARDS research study](#). The respiratory virus panel performs tests for SARS-CoV-2 (COVID-19), influenza (A and B), rhino-enterovirus, adenovirus, seasonal coronavirus (CoV 229E, CoV HKU1, CoVNL63, and CoV OC43), human metapneumovirus, parainfluenza (1, 2, and 3), and RSV (A and B). If you're interested in learning more about the data, the ORCHARDS team sends out a [newsletter](#) that includes a deep dive into the data collected each week.

AIR SAMPLERS

The air sampling data included on the dashboard is collected by the teams of UW-Madison researchers [Drs. Shelby O'Connor](#) and [Dave O'Connor](#). During the COVID-19 pandemic, air sampling was used as another tool to detect the presence of SARS-CoV-2 (COVID-19) in a variety of real world settings. Aside from detecting SARS-CoV-2, the air samplers have also been used to detect influenza A virus. To our knowledge we are the first public health department in the world with a dashboard that incorporates this type of air sampling data. [Learn more](#) about the impact air samplers have had on not only detecting viruses, but supplementing the efforts to sequence SARS-CoV-2. Learn more [about the team's work](#) and the history of air sampling.

Sixteen continuous air samplers have been deployed in three districts and two independent schools in or near Dane County, with some schools containing more than one sampler. There are nine elementary schools, four middle schools, and three high schools with air samplers (one school is included as both an "elementary" and a "middle" school, as it has two air samplers, each placed in areas more often frequented by either elementary students or middle school students). Air cartridges from the samplers are then collected and tested for SARS-CoV-2 and influenza A virus genetic material.



An air sampler placed in an area with lots of student traffic.



A researcher prepares to collect the air sampler cartridge to bring back to the lab for testing.

The data shown is the percent of air samples that were positive for SARS-CoV-2 and Influenza A virus each week, categorized by elementary, middle, and high schools. If a school spans multiple categories, it was grouped into the youngest of the categories (e.g., a K-8 school would be categorized as elementary). Air sample results are assigned to the last date on which the air cartridge collected air in the school. Each school supports the study by mailing in the air sampler cartridges for analysis. This process can sometimes cause the number of samples tested each week to vary. Samples are not collected during school breaks or closures.

HOSPITALIZATIONS

People hospitalized with COVID-19 by date

“People hospitalized with COVID-19 by date” is shown as a daily trend over time. Each day is a sum of people reported as being hospitalized with a positive COVID-19 test result by individual hospitals in Dane County to a system called EMResource. This number includes patients who don’t live in Dane County. This data system does not provide identifiable data, so we are unable to discern what proportion of patients live in Dane County versus those who don’t, the vaccination status or demographics of the people who are hospitalized, or whether each individual is hospitalized due to COVID-19.

As of late spring 2023, our local hospitals shifted to testing inpatients for COVID-19 when they are suspected of having COVID-19, versus testing all inpatients upon admission. Therefore, under the current policy, most hospitalizations listed here are likely to be due, at least in part, to COVID-19.

People hospitalized with flu by date

“People hospitalized with flu by date” is shown as a daily trend over time. Each day is a sum of people reported as being hospitalized with a positive flu test result by individual hospitals in Dane County to a system called EMResource. This number can include patients who don’t live in Dane County. This data system does not provide identifiable data, so we are unable to discern what proportion of patients live in Dane County versus those who don’t, the vaccination status, or demographics of the people who are hospitalized, or whether each individual is hospitalized for flu. Hospitals have various criteria for testing for flu, although most will generally test upon suspicion of having a respiratory illness. Therefore, most hospitalizations listed here are likely to be due, at least in part, to flu.

DEATH DATA

Percent of all deaths caused by respiratory illness

This graph shows the 14-day average percent of all deaths caused by respiratory illness among people who live in Dane County. This graph does not encompass every possible respiratory illness-related death, but captures deaths where pneumonia, influenza, COVID, or RSV were listed on the death certificate. While the majority of death records for natural deaths (which includes most deaths due to illness) are certified and filed within two weeks of the date of death, death data should be considered preliminary due to reporting delays and potential changes to death data. Death certificates often take significantly longer to finalize when an autopsy is conducted and/or when toxicology testing is completed.

Before COVID-19, pneumonia and/or influenza (P&I) deaths were [tracked by the CDC](#) to better understand and estimate the burden of influenza on mortality. Not all persons who die with influenza are admitted to a hospital prior to their death or are tested for influenza, so death certificate monitoring alone will underestimate the total burden of death due to influenza.

Pneumonia is included because it is a frequent complication of severe influenza. Additionally, increases in flu activity at the community level are associated with increases in pneumonia deaths. Because many COVID-19-related deaths also have pneumonia, COVID-19 deaths were added to P&I to create the PIC (pneumonia, influenza, and/or COVID-19) classification. PIC includes all deaths with pneumonia,

influenza, and/or COVID-19 listed on the death certificate. We have also included RSV deaths in this data, which are very few in number as RSV is also often not listed on the death certificate, but is a disease of importance for us to monitor and helps us identify more respiratory-related deaths.

[Pneumonia deaths excluded](#) are those outside of the ICD-10 codes J10-J18, which would be allergic, eosinophilic, aspiration, meconium, neonatal aspiration, congenital, lipid, rheumatic, and ventilator-associated pneumonia, and pneumonia due to solids and liquid (unless COVID-19, influenza, or RSV is also listed on the death certificate, in which case the death would be included as a death due to respiratory illness).

Number of deaths by date

In this graph, deaths due to COVID-19, flu, RSV, and coinfections are displayed by disease and by month. These deaths are identified through death certificates of people who live in Dane County, where the death certificate lists COVID-19, influenza, or RSV as an underlying cause of death or a significant condition contributing to death. A coinfection means that an individual who died had more than one of COVID-19, flu, or RSV listed on their death certificate. While the majority of death records for natural deaths (which includes most deaths due to illness) are certified and filed within two weeks of the date of death, death data should be considered preliminary due to reporting delays and potential changes to death data. Death certificates often take significantly longer to finalize when an autopsy is conducted and/or when toxicology testing is completed.

Note that this is an undercount of deaths attributable to COVID-19, flu, and RSV. Currently, only pediatric influenza-associated deaths are required to be reported to the health department (pediatric COVID and RSV-associated deaths will become reportable starting November 1, 2023). Deaths likely attributable to influenza, COVID, and RSV may not have those conditions listed on the death certificate because infections are often not confirmed with a test, or people are hospitalized later due to secondary complications like pneumonia, and the virus is no longer detectable.

TAKE ACTION TO PROTECT YOURSELF AND YOUR LOVED ONES

[Learn strategies](#), including vaccination, masking, and improving air quality, to help protect yourself and your loved ones from respiratory illnesses.

FREQUENTLY ASKED QUESTIONS

Why are race and ethnicity data not featured on this dashboard?

There are guidelines from the Wisconsin Department of Health Services that determine when data can be publicly shared. These guidelines are in place to protect privacy and prevent someone from being identifiable, which could be possible if small sets of data are broken down by race, ethnicity, and other demographic characteristics. Please [contact](#) the Wisconsin Department of Health Services for a copy of the data guidelines.

We only have race and ethnicity data for respiratory illnesses from the emergency department dataset (ESSENCE) and death records. For most weeks of data, there are not enough people in the emergency department to break the data down by race and ethnicity without potentially identifying someone. For

example, if you know your co-worker was just in the ED and she is American Indian, you would be able to identify her and her diagnosis if there was only one American Indian person reflected in the data that week. We are actively working on a way to incorporate race data in a way that would align with DHS guidelines, such as combining multiple weeks of data.

How should I use first alert data?

First Alert data is intended to help you plan. Whether that looks like assuring you are up to date on flu, COVID, and RSV vaccinations, donning a mask in public spaces when levels are high, being extra careful while visiting immunocompromised family members, or incorporating flexibility in travel plans that align with surges in community levels of respiratory virus, you are best positioned to know what action makes most sense for you and your family. Keep in mind that these data aren't perfect. Just because we are seeing an increase in first alert data doesn't mean we will see an increase in other data 100% of the time. We intend for these data to be one piece of information among many that you can use to guide your decision-making.

You can find more guidance on how to protect yourself from respiratory illnesses on the [CDC website](#).

Why do you use emergency department data on the homepage?

The emergency department (ED) discharge data from ESSENCE has the most robust data available for COVID-19, flu, and RSV, along with the other respiratory illnesses that we've included on the dashboard. There is also historical data available so that we can compare current data to previous respiratory seasons, which can add context to the severity of each virus. ESSENCE also receives ED data in near real time from the facilities that report, allowing us to get a picture of what the current respiratory illness impact on the community.

What community feedback did you get for this dashboard?

We deeply appreciate the representatives from impacted populations who provided guidance on the dashboard design. We interviewed a library director, childcare professional, long-term care facility staff, school nurse, preschool director, older adults, and hospital infection control staff. We also reviewed feedback from over 30 people who responded to a survey we posted in the last issue of our COVID-19 Data Notes series.

Why did you make this dashboard?

During the Public Health COVID-19 Emergency, there was remarkable interest in the data shared on the Dane County COVID-19 Dashboard, with the dashboard being viewed over half a million times. Our community remains interested in respiratory illnesses. In response, we've pivoted from a [COVID-19-](#)focused dashboard to a broader respiratory illness dashboard. In April 2023, we brought together a collaborative of public health staff, researchers, laboratory experts, healthcare providers, and wastewater professionals to learn how everyone was preparing for respiratory virus season. Each partner robustly monitors a piece of the respiratory virus puzzle. We saw our role as a public health agency in bringing all the data pieces together to present one clear picture of what is happening locally with respiratory illness activity.

In addition to COVID-19, this dashboard will also focus on [Influenza \(flu\)](#) and [Respiratory Syncytial Virus \(RSV\)](#). We are able to include flu and RSV in this dashboard due to the more robust surveillance data available for these two viruses. Recently, both flu and RSV have had unusual timing of peaks of activity compared to the average respiratory illness season. Surges in these viruses, especially now with the

addition of COVID-19, can cause strains on the healthcare system. We believe it is important to monitor trends in all of these respiratory illnesses in order to make sure the community is aware and able to take steps to protect themselves. Our hope is that this respiratory illness dashboard can help people in the community answer questions like, “Is it bad out there? What’s circulating?” and, based on that knowledge, make decisions to protect their health.