

Influenza End of Season Report

2022-23

Virginia Department of Health

Division of Surveillance and Investigation

Respiratory Disease Program



INFLUENZA SEASON 2022-23

TABLE OF CONTENTS

Introduction	3
2022-23 Flu Season	3
Influenza-like-Illness (ILI)	3
Other Respiratory Viruses.....	6
Confirmatory Lab Reports.....	8
Outbreak Surveillance.....	9
Influenza Associated Deaths.....	10
FluSurv-NET.....	12
Wastewater Surveillance	13
Results.....	13
Vaccination Data.....	14
Sentinel Surveillance.....	16
Conclusion.....	18
References	18

Introduction

The Virginia Department of Health (VDH) monitors the trends and intensity of influenza (flu) activity year-round for public health surveillance. Influenza surveillance involves monitoring a variety of data sources, including syndromic surveillance, outbreak surveillance, laboratory surveillance, hospital surveillance, wastewater surveillance and sentinel surveillance. These data are evaluated together to understand a more complete picture of influenza activity in Virginia as well as immunity against influenza in the community.

Nationally, it is hard to know the exact number of people who have been sick and affected by influenza because influenza is not a reportable disease in most areas of the United States. However, CDC estimates the burden of influenza based on varieties of metrics including the number of people who have been sick, seen a healthcare provider, been hospitalized, or died as a result of flu within a certain timeframe etc. In Virginia, during the 2022-23 flu season, influenza-like illnesses (ILI) were back to the pre-pandemic level with some unusual patterns as the season started quite earlier than usual. Notably, that the early increase in ILI activity decreased just as quickly as it ascended. Also, ILI stalled above the national baseline for several weeks.

According to CDC's preliminary in-season burden estimate, nationally influenza has caused an estimated 27-54 million flu illness, 12-26 million flu-related medical visits, 290,000- 650,000 flu-related hospitalization, and 19,000-58,000 flu deaths during the 2022-23 season (from October 1, 2022 through April 30, 2023). This report is intended to summarize the 2022-23 flu season in Virginia with a comparison to national level.

2022-23 Flu Season

Influenza-like-Illness (ILI)

An influenza-like illness (ILI) is defined as fever of 100°F or greater and a cough and/or sore throat. Visits to emergency departments (ED) and urgent care centers (UCC) that are for an ILI are presented as a percent of total visits to estimate the timing and relative burden of the flu. These data represent illnesses that result in a medical visit.

In Virginia during the 2022-23 flu season, ILI peaked sharply during MMWR week 44 (October 30th through November 5th, 2022) and stayed high until MMWR week 47 (November 27th through December 3rd, 2022) when it started to decline sharply (Figure 1). ILI peaked early compared to previous 5 seasons and at its peak, Virginia reported 9.2% of the total visits to ED and UCC were due to ILI. This peak in ILI was four times higher compared to the same time during the previous five flu seasons.

Nationally we saw the same trend (Figure 2). ILI started to increase sharply to reach the peak during the MMWR week 47 (November 27th through December 3rd, 2022) and after reaching the peak it declined sharply but stayed above the national ILI baseline for a couple of weeks before finally going below baseline.

Figure 1: Percent of Medical Visits for ILI by Flu Season in Virginia

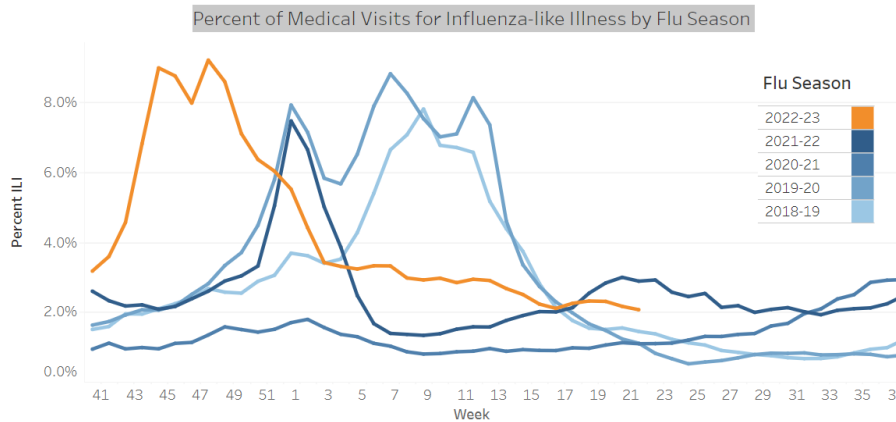
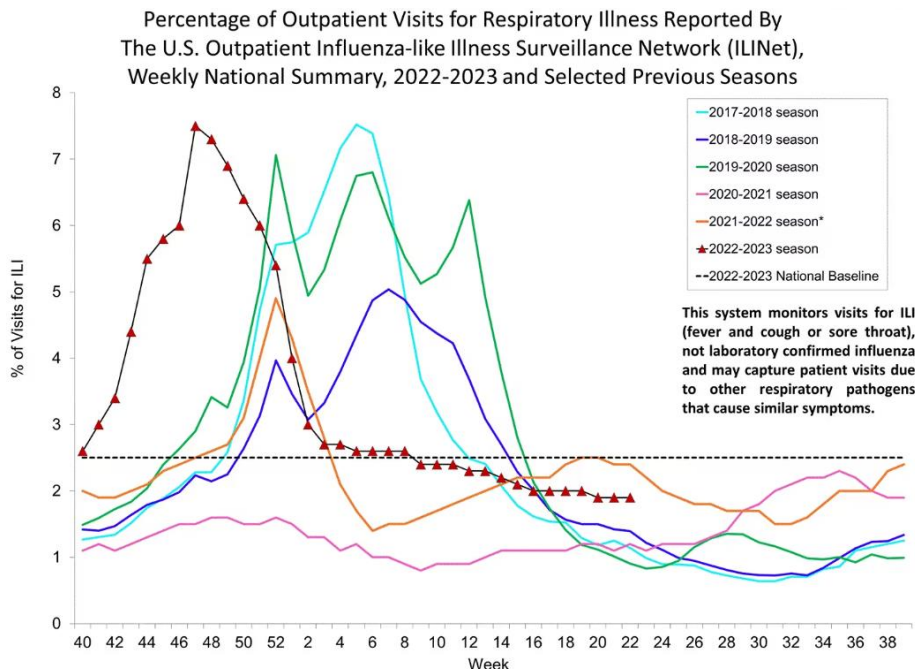


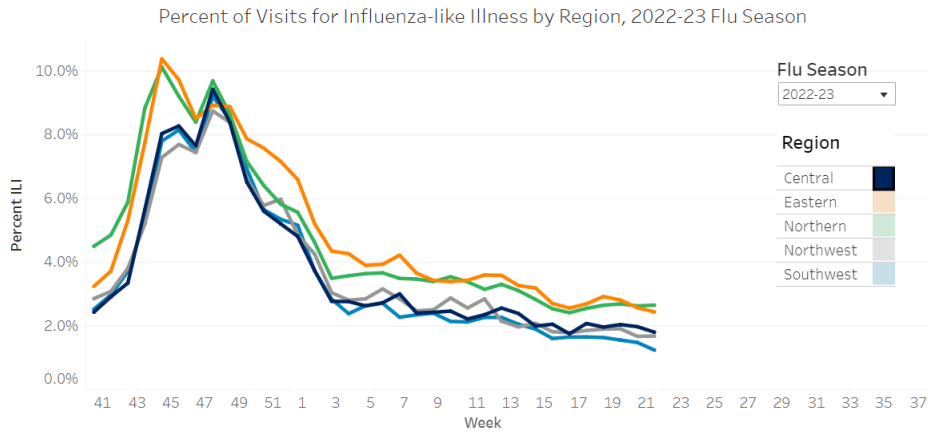
Figure 2: Percentage of Outpatient Visits for Respiratory Illness in the U.S. reported by ILINet, CDC



The percent of visits for ILI peaked during MMWR week 47 (November 27th through December 3rd, 2022) at the Central, Northwest, and Southwest regions in Virginia with 9.4% ,8.7%, 9.2% respectively (Figure 3). Eastern region and Northern region peaked during MMWR 44 (October

30th through November 5th, 2022) at 10.4% and 10.1% respectively. Eastern region had the highest percentage of ILI visits.

Figure 3: Percent of Visits for ILI by Region, Virginia



According to CDC, the percent of ILI peaked at MMWR week 47(November 27th through December 3rd, 2022) for age groups 0-4 and 5-24 at 17.4% and 12.7% respectively. However, for persons aged 25-65+, the percent of ILI peaked at week 48 (December 4th through December 10th, 2022) (Figure 5). In Virginia, the percent of visits for ILI peaked at MMWR week 48 for persons within the 19-65+ age group (Figure 4). The largest proportion of visits among the 0-4 years old was observed in MMWR week 45 (November 5th through November 12th, 2022) with 23.5% of total visits and MMWR week 47 with 19.7% for persons in the 5-18 years age group.

Figure 4: Percent of Visits for ILI by Age Group, Virginia

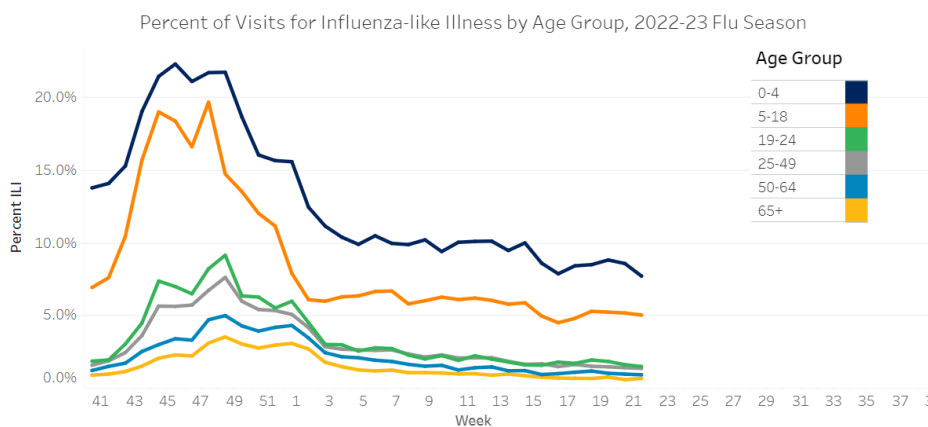
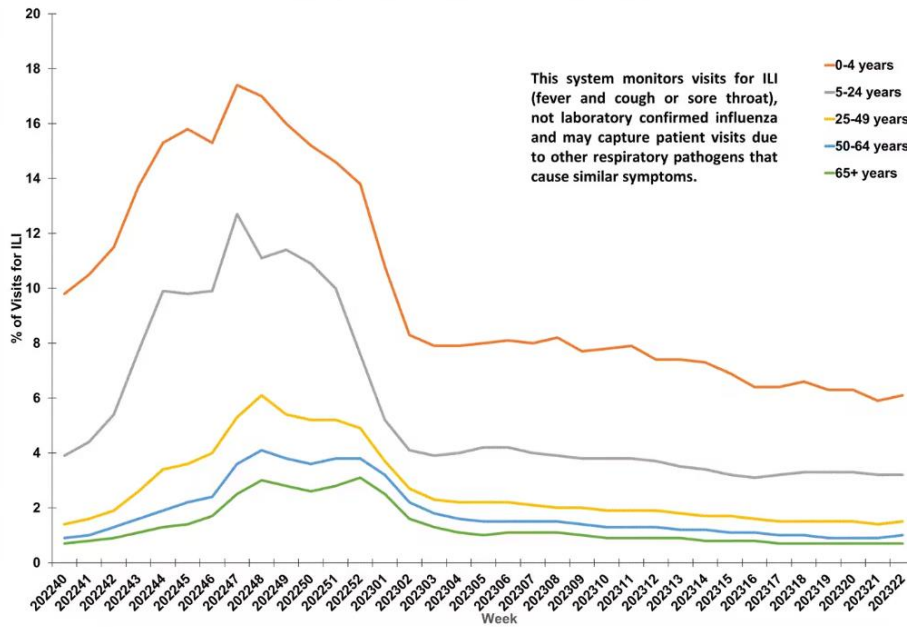


Figure 5: Outpatient Respiratory Illness Visits by Age Group reported by ILINet providers, CDC

Percentage of Outpatient Visits for Respiratory Illness by Age Group
 Reported by the U.S. Outpatient Influenza-like Illness Surveillance Network (ILINet),
 Weekly National Summary, October 2, 2022-June 3, 2023

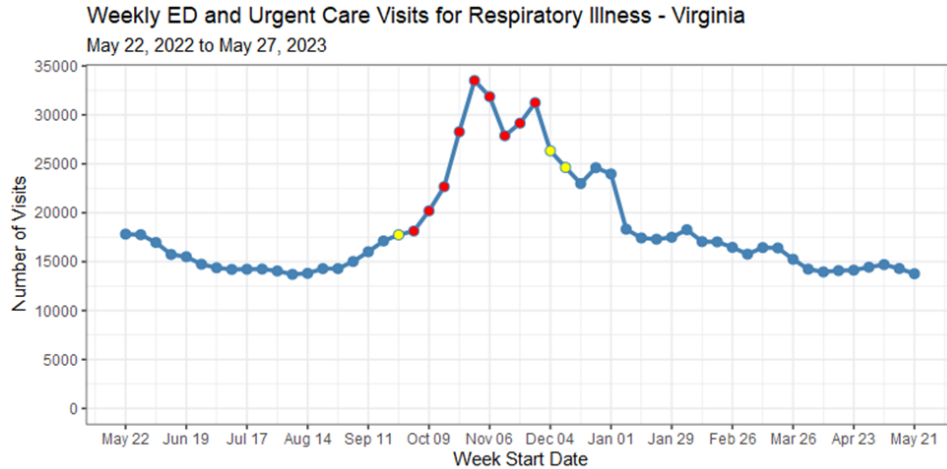


Other Respiratory Viruses

VDH receives data from participating EDs and UCCs through the syndromic surveillance system. The data includes patient demographics along with visit related data, for example, chief complaint, and discharge diagnosis. VDH uses chief complaint and discharge diagnosis to identify visits of interest for different disease conditions. This allows public health to monitor disease trends in real time.

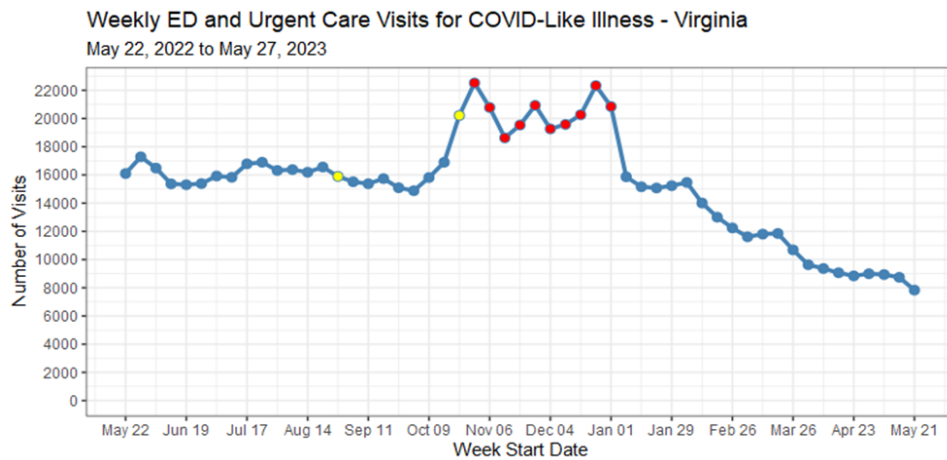
Overall respiratory illness is defined as ED and UCC visits with any respiratory symptom (e.g., cough, difficulty breathing, wheezing) in the chief complaint. In Virginia, the overall respiratory illness peaked during the late October and early November and was not significantly elevated in the syndromic surveillance system since mid-December 2022.

Figure 6: ED and UCC visits for overall respiratory illness, Virginia



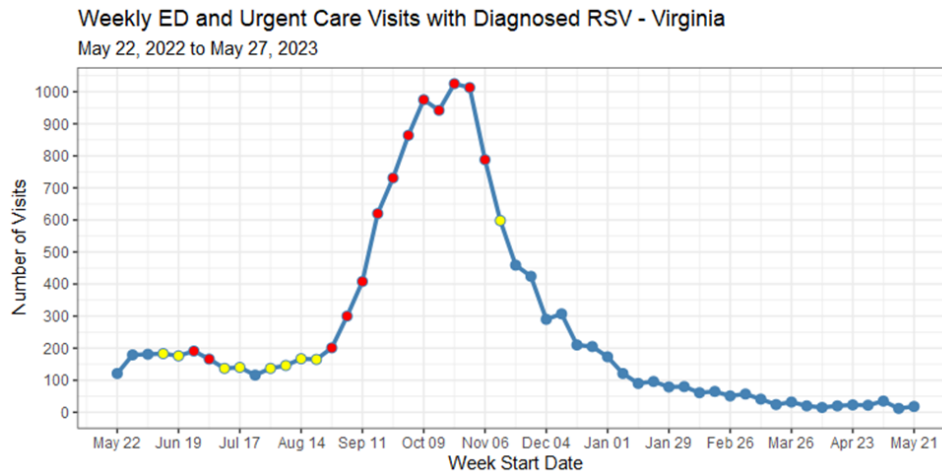
The COVID-like illness (CLI) is defined as ED visits noting symptoms of fever and respiratory complaint (e.g., fever with cough, shortness of breath, or difficulty breathing), loss of taste or smell, those with a coronavirus or severe respiratory diagnosis, or visits that mention COVID-19 as the reason for visit (e.g., COVID-19 screening, exposure, or testing). Virginia observed significant increase in CLI visits in the syndromic surveillance system starting in mid-October through early January, when it started to decline sharply and continued to decline until the end of the flu season.

Figure 7: ED and UCC visits for COVID-like illness (CLI), Virginia



Or this report, respiratory syncytial virus (RSV) is defined as ED and UCC visits that include RSV in the discharge diagnosis. It is important to note that the data do not represent confirmed cases, but they can assist with understanding the burden on healthcare systems and the community. Virginia observed early RSV activity like flu and RSV peaked earlier than usual in November 2022 (Figure 7). RSV was not significantly elevated since mid-November in Virginia’s syndromic surveillance system.

Figure 8: ED and UCC visits for respiratory syncytial virus (RSV), Virginia



Confirmatory Lab Reports

In Virginia only the flu labs confirmed by reverse transcriptase polymerase chain reaction (RT-PCR), viral culture, and antigen tests by direct fluorescent antibody (DFA) test are reportable. Rapid antigen tests are not reportable in Virginia and so the lab surveillance does not capture all the flu infection in Virginia. Influenza viruses can be further subtyped (i.e., A(H1) or A(H3)) or broken down by lineages (i.e., B-Victoria or B-Yamagata). The laboratory data are useful in identifying new strains of the virus, understanding the seasonal vaccine's effectiveness, and selecting components for the next season's vaccine.

The predominant virus circulating during the 2022-23 flu season was Influenza A (26,632, 99% of the total lab reported). This was an unusually mild season for influenza B, with only 259 (1.0%) labs during the 2022-23 flu season. Majority of the Influenza A specimens this season were not subtyped (24,663, 92%). Those specimens that were subtyped were A(H1) (629, 2%) and A(H3) (1340, 5%).

The predominant subtype for the season differed by region. About 80% of the reported infections were Influenza A, however, the subtype is unavailable meaning that a predominant strain cannot be identified. Among the subtyped influenza positive labs, the central and northern region saw primarily A(H3) while Eastern saw primarily A(H1). Nationally, some states saw more A(H3) and some states having H1N1(09 strain), however, there was no A(H1).

Figure 9: Confirmatory Laboratory Reports by Subtype and Region, Virginia

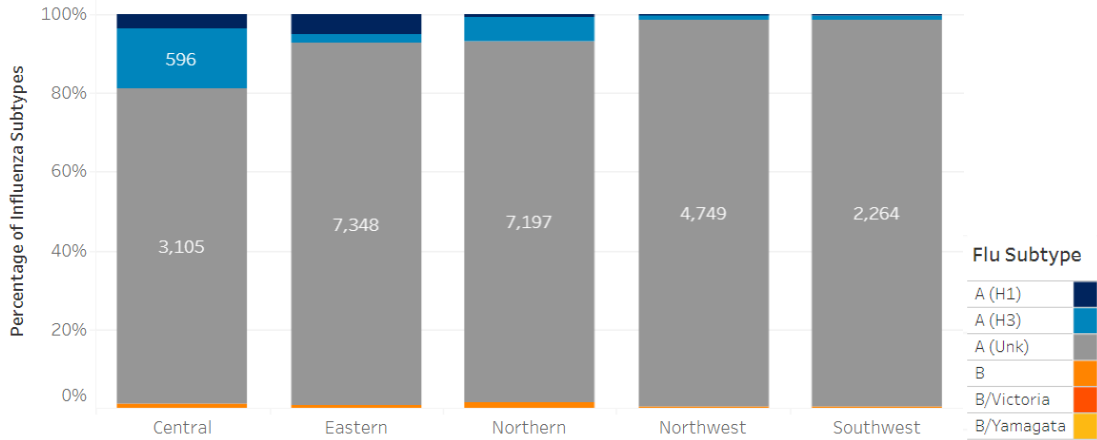
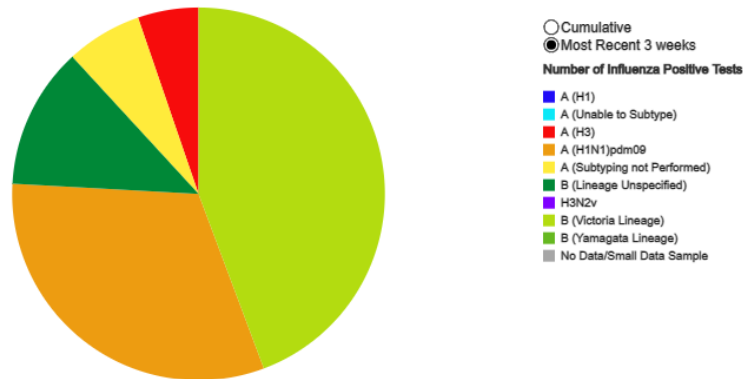


Figure 10: Influenza Positive Tests by Subtype-U.S., 2022-23 Season



Influenza Positive Tests Reported to CDC by Public Health Laboratories, National Summary, 2022-23 Season, week ending May 20, 2023
 Reported by: U.S. WHO/NREVSS Collaborating Laboratories and ILINet



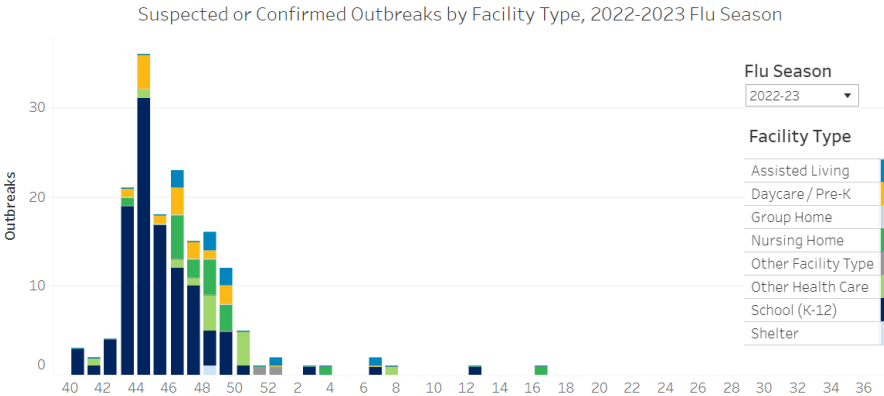
Outbreak Surveillance

Outbreaks of communicable disease in certain licensed facilities are reportable to the Virginia Department of Health, provisioning VDH to investigate and provide recommendations for controlling the spread of disease in communal settings like schools and nursing homes.

There were 165 flu outbreaks reported to VDH during the 2022-23 season (Figure 10). Most of the outbreaks were observed in K-12 school settings (110 outbreaks, 66.7%), followed by nursing homes (17 outbreaks, 10.3%), other healthcare (13 outbreaks, 7.9%) daycare or pre-kindergarten (14 outbreaks, 8.5%), assisted living (8 outbreaks, 4.8%), other facilities (2 outbreaks, 1.2%), and

shelter (1 outbreak, 0.6%). Early in the season, most of the outbreaks were reported from the K-12 school setting and in the later part of the season the outbreaks were reported from other group settings. The number of outbreaks peaked during MMWR week 44(October 30th through November 5th, 2022), and then gradually decreased.

Figure 11: Suspected or Confirmed influenza Outbreaks by Facility Type, Virginia

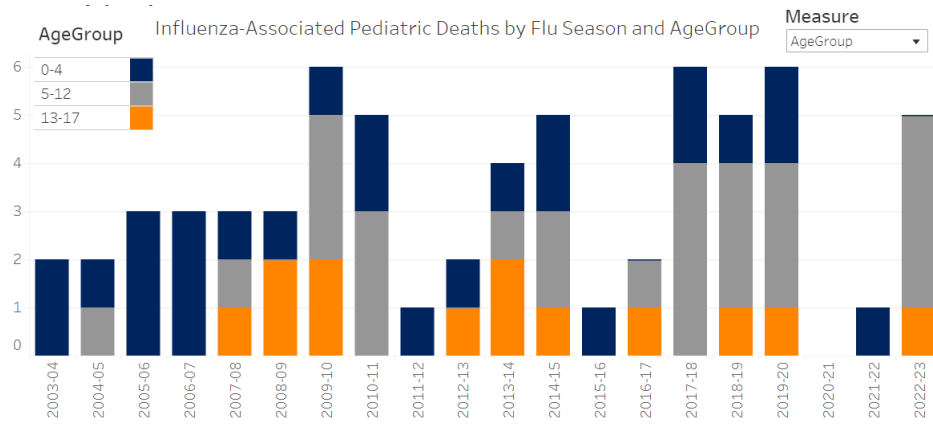


Influenza Associated Deaths

Influenza associated deaths are captured through two different sources. Influenza-associated deaths in children less than 18 are individually reportable in Virginia and are investigated and reported by the local health departments (LHDs). Flu associated deaths in adults are recorded in the vital records data. All death certificates (pediatric) and adult are sent to the National Center for Health Statistics (NCHS) to be coded with a cause of death. Data on adult deaths due to pneumonia, influenza, and/or COVID-19 together with reported cases of influenza-associated pediatric deaths are used to estimate the mortality burden due to flu.

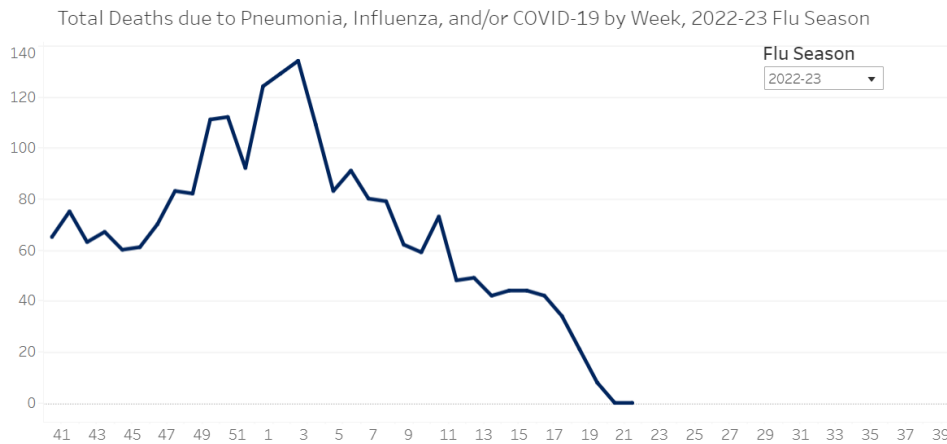
Five influenza-associated pediatric deaths were reported in Virginia during the 2022-23 season. Four of them were reported in the 5-12 years age group and one was reported in the 13-17 years age group. All the regions except Central reported at least one pediatric death associated with influenza during the 2022-23 flu season.

Figure 12: Influenza-Associated Pediatric Deaths by Flu Season and Age Group, Virginia



Influenza infection generally causes a self-limiting illness, but serious complications can occur. Pneumonia is used to help estimate deaths as it is the most common complication. During the 2022-23 flu season, there were 1,908 deaths in Virginia due to pneumonia, influenza and/or COVID-19(PIC).

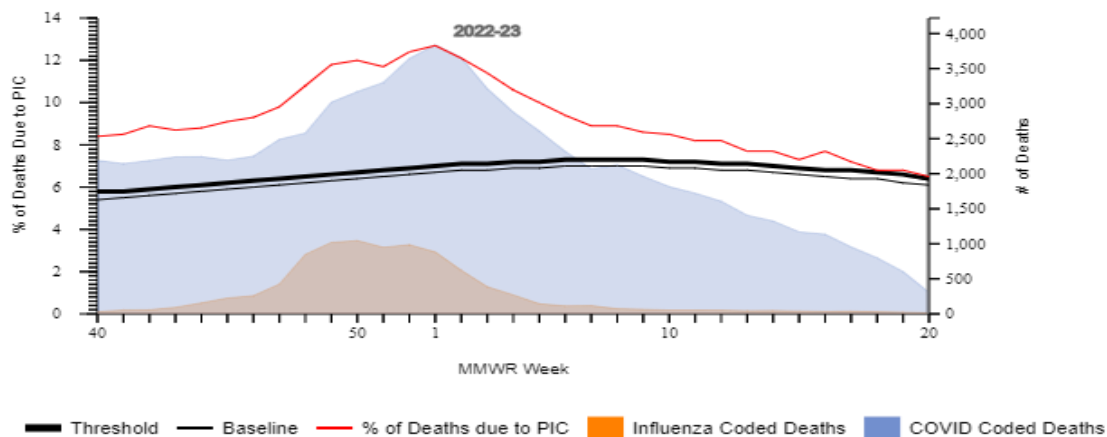
Figure 13: Total deaths due to Pneumonia, Influenza, and/or COVID-19, Virginia



Excess deaths continue to be above the “epidemic threshold” in the U.S. The goal is to have the threshold line (Figure 14) shift up as we gradually move out of the pandemic phase. Nationally, the number of deaths peaked during the first week of the season (October 2nd through October 8th,2022) with 882 influenza deaths and 3837 COVID deaths. The percent of deaths due to PIC was 12.7%. At the end of the influenza season (MMWR 20,2023, i.e., May 14th through 20th, 2023), there were 15 and 304 influenza and COVID coded deaths respectively. Furthermore, there was a 22.6% decrease in the percent of death from MMWR 40 (October 2nd, 2022 (8.4%)) to MMWR 20 (May 20th, 2023 (6.5%)).

Figure 14: Percentage of all deaths due to pneumonia, influenza, and/or COVID-19

Percentage of all deaths due to pneumonia, influenza, and COVID-19, National Summary



FluSurv-NET

The Influenza Hospitalization Surveillance Network (FluSurv-NET) is a population-based surveillance system that collects data on laboratory-confirmed influenza-associated hospitalizations among children and adults through a network of acute care hospitals in 14 states. FluSurv-NET is one of CDC's sources for important data on hospitalization rates associated with flu. It provides demographic and clinical information including age, sex and underlying medical conditions among persons hospitalized with flu. Data gathered are used to estimate age, racial/ethnic and sex-specific hospitalization rates on a weekly basis and to describe characteristics of persons hospitalized with influenza illness.

Cases are identified by reviewing hospital, laboratory, and admission databases and infection control logs for patients hospitalized during the influenza season with a documented positive influenza test (i.e., viral culture, direct/indirect fluorescent antibody assay (DFA/IFA), reverse transcription-polymerase chain reaction (RT-PCR), or a rapid influenza diagnostic test (RIDT). Laboratory-confirmation is dependent on clinician-ordered influenza testing. Therefore, the rates provided are likely to be underestimated as influenza-related hospitalizations can be missed due to test availability and provider or facility testing practices.

VDH is participating as a pilot state for FluSurv-NET in Virginia. Through this project, VDH hopes to attain increased understanding of influenza transmission patterns in the state, as well as better track and analyze instances that lead to hospitalization. VDH will conduct an analysis that will provide an increased understanding of the risk factors associated with hospitalization and inform evidence-based practices that are needed to reduce the burden of influenza morbidity and mortality in Virginia.

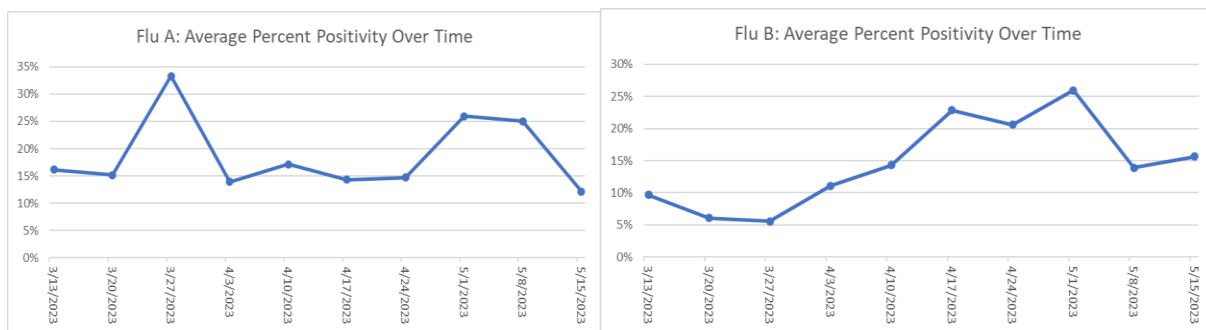
Wastewater Surveillance

The VDH WWS Sentinel Monitoring Program began weekly wastewater flu sampling starting on 3/13/23 and continuing to date (last sample: 5/15/23). In each week, between 27 to 36 samples were sent to Hampton Roads Sanitation District for influenza A & B concentration analysis. Of the 336 samples tested, Influenza A was detected in 63 samples (18.8%) and Influenza B was detected in 48 samples (14.3%), however, no detected viral concentrations were above the limit of detection. As a result, all analyses conducted were qualitative only. The ubiquitous low viral concentrations represent a limitation of the dataset.

For Influenza A, the average percent positivity for all tested sites each week ranged between 12% and 33%. The highest percent positivity was found for the sample collection date of 3/27/23.

For Influenza B, the average percent positivity for all tested sites each week ranged between 6% and 26%. The highest percent positivity was found for the sample collection date of 5/01/23.

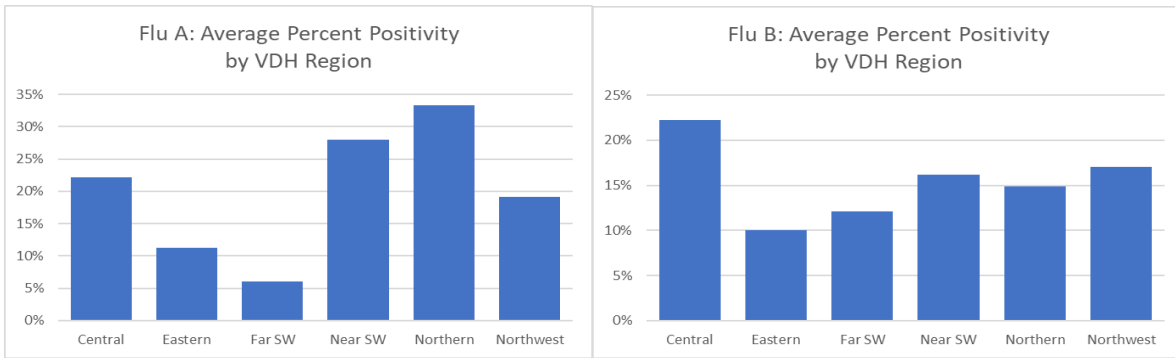
Figure 15: Average percent positivity over time (Flu A and Flu B)



For Influenza A, the VDH region with highest average percent positivity included the Northern sites, while the least positive included the Far Southwest sites.

For Influenza B, the VDH region with highest average percent positivity included the Central sites, while the least positive included the Eastern sites.

Figure 16: Average percent positivity by VDH region (Flu A and Flu B)



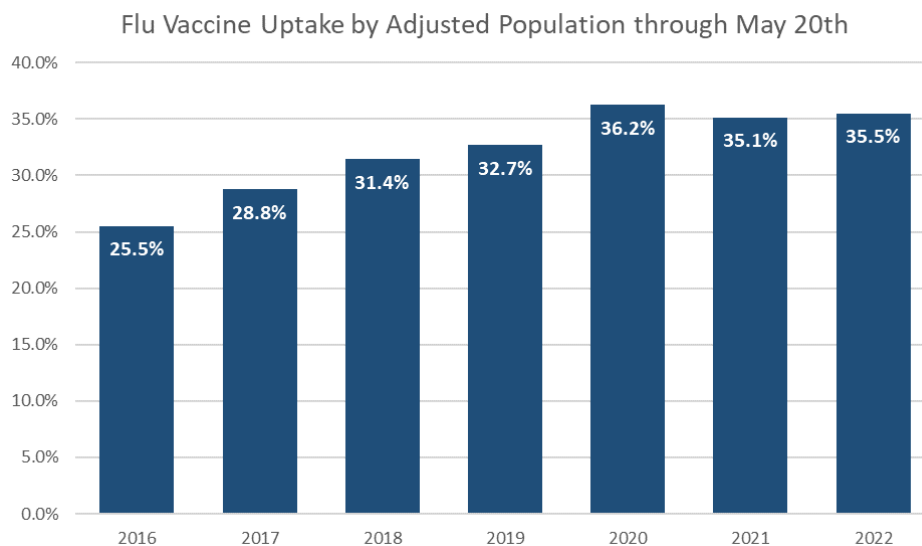
Of note when interpreting this data -- the served sewer shed populations of the sampling sites (and the VDH regions generally) are very different. Due to inherent variabilities in each site's sewer system and the associated population pools, the recommended way of interpreting shifts in viral concentrations is to observe each site uniquely. Data should be collected over a long period of time and used in conjunction with other public health metrics.

Vaccination Data

The Virginia Immunization Information System (VIIS) is the statewide registry that providers are required* to report vaccines administered in Virginia. As of May 20th, 3,074,933 influenza vaccines have been recorded in VIIS. That represents 35.5% of the overall population in Virginia. This is consistent with the vaccination activity we have seen in VIIS the previous few years.

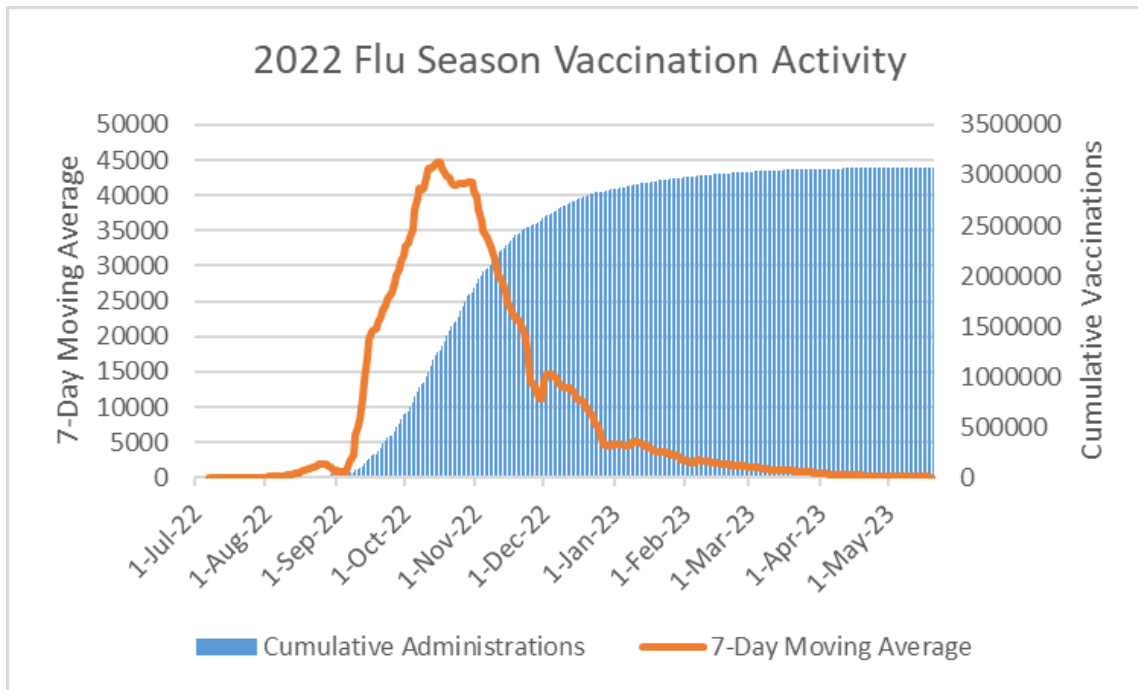
**It is important to note that the requirement to report to VIIS went into effect January 1, 2022 in Virginia. Prior to that date, providers reported to the system voluntarily.*

Figure 17: Flu vaccine uptake by Adjusted Population through May, Virginia



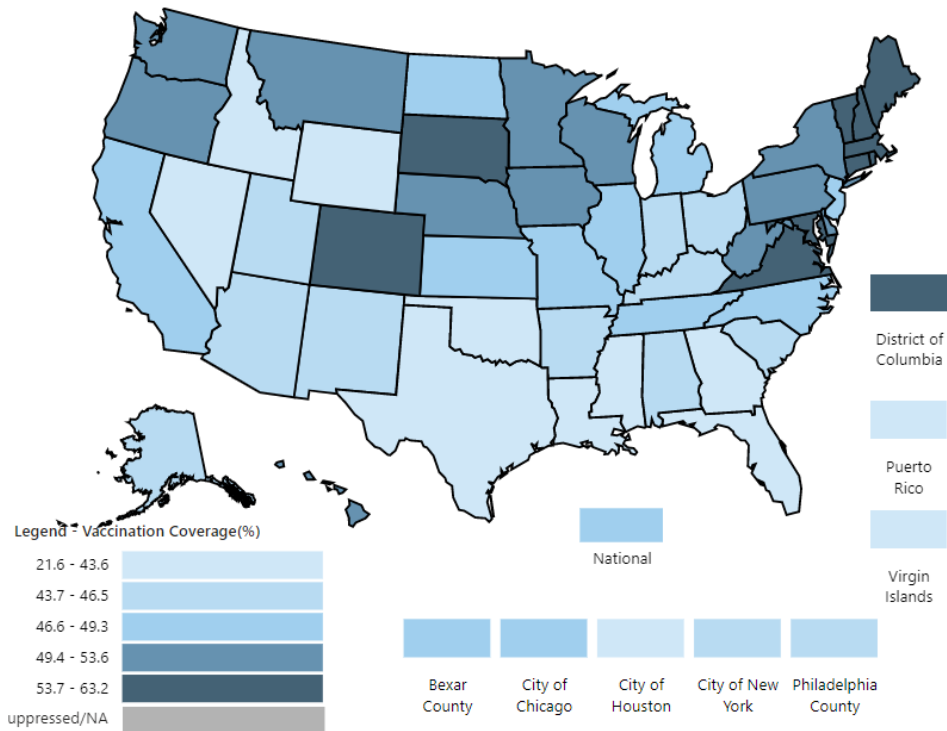
The peak period for vaccinations in the 2022-2023 Flu Season was September through October 2022 with most vaccinations occurring during that period. The 7-day moving average of vaccinations began to decline in November 2022 and we have continued to see that decrease through May 20th of this year.

Figure 18: 2022 Flu Season Vaccination Activity, Virginia



According to the CDC’s latest FluVaxView data, which is sourced from survey data, Virginia’s flu vaccination rate is 55.9% which is higher than the national rate of 47.4%. This is higher than what is reflected in VIIS as we suspect some vaccine providers are not currently reporting to VIIS. The map below shows adult (18+) flu vaccination coverage according to the most recent survey data and demonstrates how Virginia is outperforming most of its neighbors and most states nationwide.

Figure 19: Flu vaccination coverage by Jurisdictions – U.S.



Sentinel Surveillance

VDH tracks influenza (flu) activity in Virginia through several surveillance activities. The Influenza Sentinel Surveillance Program (SSP) is one of such activities that is based on establishing network of providers that voluntarily submit weekly specimens for testing from patients presenting with ILI symptoms at participating UCCs. Influenza sentinel surveillance program depends on the collaboration between the provider, LHDs, DCLS and VDH-Central Office for success.

Providers were recruited and onboarded from four of the five regions: including Southwest, Central, Eastern and Northwest. However, two of the regions (Central and Northwest) were unable to continue participation. In the 2022-23 flu season, a weekly report was sent out to providers; a weekly check-in with the providers was adopted; and a monthly touch base meeting was scheduled for providers to discuss their concerns, address questions and offer suggestions for the program. The Flu-SC2 assay was utilized by DCLS for the initial testing of the sentinel surveillance specimens collected and submitted by the providers. This allowed for testing of both COVID-19 and flu simultaneously. The specimens were tested for flu and further characterized to identify the type and subtype of any positive flu results. However, if the specimen tests negative to either flu or COVID, no additional testing was performed.

Data was derived from the Virginia Electronic Disease Surveillance System (VEDSS) for the 2022-23 influenza season (MMWR Week 40, 2022 to MMWR Week 20, 2023). The data is defined as specimens collected from patients who meet the ILI definition, with a collection date of greater

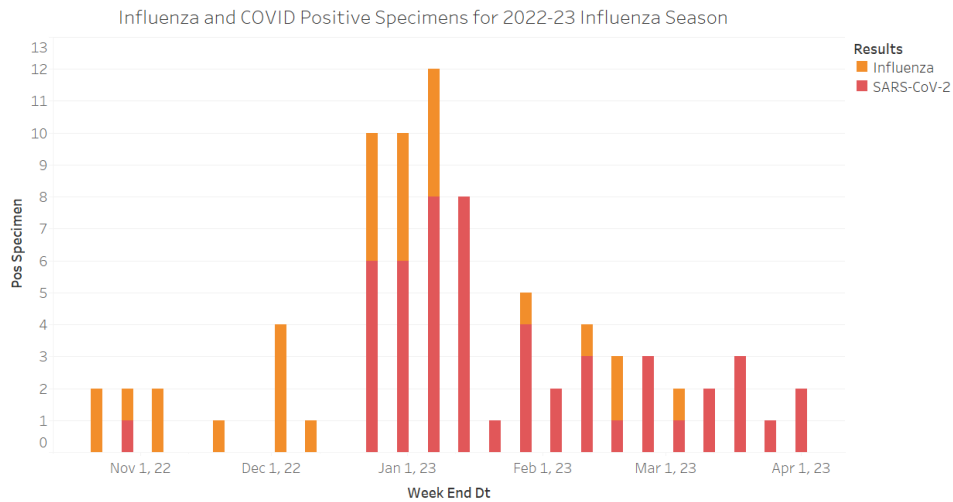
than or equal to October 1st, 2022, an outbreak ID of RES989FluSentinel and the reporting lab of DCLS. The data was analyzed using the SQL Server.

For the 2022-23 Influenza season, there were 320 specimens submitted who met the ILI criteria. Among the patients who met the ILI criteria at the participating urgent care facilities, 29(9%) were positive for influenza and 53(17%) were positive for COVID-19. The Eastern region submitted the highest number of specimens throughout the season. Most of the ILI specimens were received from patients aged 25-49 and the least number of specimens submitted were for those in the 0-4 age group as pediatric patients were not involved with the 2022-23 influenza season.

Table 1: Summary of Specimens submitted by Providers

Region	Provider Location	Total Number of Specimen Received	Number of Flu Positive Specimen with Subtype	Number of COVID Positive Specimen
Eastern	Gloucester	95	3	15
	Newport News	127	11	25
	Yorktown	43	3	5
Southwest	Abingdon	24	4	6
	Norton	15	1	1
Northwest	Harrisonburg	16	7	1

Figure 20: Influenza and COVID-19 Positive labs 2022-23



The plot of sum of Pos Specimen for Week End Dt. Color shows details about Results. The view is filtered on Results, which keeps Influenza and SARS-CoV-2.

Conclusion

The 2022-23 flu season had a high activity which was earlier than usual with Influenza A being the predominant virus circulating in Virginia. More Influenza B positive labs were observed during the end of the season. Of the samples tested for wastewater surveillance, Influenza A and Influenza B were detected at 19% and 14% respectively. The burden of morbidity and mortality in Virginia was low. Although, it was a moderate season, Influenza has a major impact on the health of Virginians. Among those who met the ILI criteria at urgent care facilities, 29 (9%) were positive for influenza and 53 (17%) were positive for COVID-19. In Virginia, there were 165 outbreaks associated with influenza with the highest proportion being amongst K-12 facilities.

CDC estimates that during the 2022-23 flu season in the US, 27 million-54 million people got sick with the flu, 12 million-26 million visited a doctor for their illness, 300,000-650,000 were hospitalized for flu, and 19,00-58,000 died from flu and its complications. Vaccination was off to a great start in the months of September and October, although there was a decline in the following month, 35.5 % of Virginian residents were vaccinated for the flu season.

Determining the appropriate vaccine component and understanding the burden of influenza in Virginia is imperative. VDH will continue influenza surveillance by collecting data on laboratory-confirmed cases, influenza-associated hospitalizations among children and adults; and onboard more facilities to participate in the sentinel surveillance program. There are several measures that are effective in preventing and controlling the spread of flu in the population. Vaccination is the best way to protect the health and prevent flu related serious complications.

References

- <https://www.cdc.gov/flu/about/burden/preliminary-in-season-estimates.htm>
- <https://www.cdc.gov/flu/fluview/dashboard/vaccination-dashboard.html>
- <https://gis.cdc.gov/grasp/fluview/fluportaldashboard.html>
- <https://gis.cdc.gov/GRASP/Fluview/mortality.html>
- [COVID-19 in Wastewater – Environmental Health Services \(virginia.gov\)](#)
- <https://vdhweb.vdh.virginia.gov/environmental-health-services/onsite-services/sars-cov-2-in-wastewater/>