Community Respiratory Illness Surveillance Program (CRISP) Situation Report: July 20, 2023 (Reporting Period June 18 – July 15, 2023)

Summary

- COVID-19 activity increased over the past month from an average of 31 positive tests over the previous three weeks to 44 in the most recent surveillance week. Test positivity is 4.6%.
- Respiratory Syncytial Virus (RSV) has reached the point of inactivity with no cases in the most recent reporting period.
- Influenza activity in Saskatchewan decreased gradually over the past four weeks, and has dipped below the inter-seasonal 2% test positivity threshold. Type A accounted for the all the cases.
- Total hospital admissions for respiratory viruses have increased in the recent four weeks (from 187 to 198); the highest proportion of admissions are attributed to viruses other than Influenza, RSV or COVID-19 ('other' respiratory viruses). COVID-19 ICU admissions have increased to 8 in the most recent two weeks.
- Sentinel indicators of respiratory transmission in the community are fluctuating:
    - Weekly visits to the Saskatchewan emergency departments for respiratory-like illness (RLI) decreased to 14.0 per 1,000 this week from 18.1 per 1,000 in the week ending June 24.
    - Calls to HealthLine 811 for respiratory-like illness in the recent four weeks decreased from 50.1 to 32.0 per 1,000 calls in the most recent week.
    - The most commonly detected organism in the sentinel provider program this week was Adenovirus.
    - Throughout the province, COVID-19 wastewater viral load remained low. The trajectory is decreasing in most province areas except for Yorkton, where increasing. The trajectory in Regina, La Ronge, remained stable.

COVID-19

- The number of positive lab tests for COVID-19 increased to 44 in the most recent week. Test positivity increased from 3.0% to 4.6% in the same time period.
- COVID-19 cases are in the 20 to 64 years (47.2%) and 65+ years (52.8%) age groups.
- Four COVID-19 outbreaks were reported in a high-risk setting in the past four weeks.
- XBB sublineages accounted for all SARS-CoV-2 variants detected during the current reporting period; XBB.1.5 and its sublineages (denoted as XBB.1.5*) are the most commonly detected variants (33.3% of the current period), followed by XBB.1.9.1* (25.0%) and XBB.1.16* (19.4%).
- COVID-19 hospitalizations have decreased from 70 for the previous four weeks, to 59 for the most recent four weeks. COVID-19 ICU admissions have increased to a total of 10 in the current month, from 5 reported in the previous month.
- The proportion of staffed inpatient beds occupied by COVID-19 patients is 1.5% for the most recent week.
- Deaths due to COVID-19 remain stable. In the last four weeks, five COVID-19 deaths were reported.
- Having a COVID-19 booster in the last six months (October 1, 2022 – March 31, 2023) reduces the risk of a COVID-19 death over three times compared to unvaccinated individuals and over two times compared to those without a booster dose.

- Of those aged five years and older, 3% have received their latest booster dose in the last six months. With the exception of Regina, all areas of the province have less than 50% of their population up-to-date[1] for COVID-19 vaccines.
- Only 21% (n = 223,531) of individuals aged 12+ years have received a bivalent booster dose.
- Less than half of individuals aged 50+ have had more than one booster dose (47%).

Influenza

- Influenza activity showed a gradual decrease over the past four weeks with sporadic cases in the Saskatoon location. All of the cases in the past week were type A.
- Influenza test positivity fluctuated between 1.1% and 0.2% over the past four weeks. Positivity of 2.0% is the inter-seasonal threshold for influenza.
- Influenza type A cases affected those in the 5-19 and working age groups in the past four weeks.
- No influenza outbreaks in high-risk settings were reported in the past month.
- Influenza hospitalizations have remained stable at six for the previous four weeks, and for the most recent four weeks. Influenza ICU admissions have increased from 0 for the previous four weeks, to one for the most recent four weeks.
- No deaths due to influenza were reported in the past four weeks.
- The influenza immunization campaign launched October 11, 2022. As of March 31, 2023, 27% of the Saskatchewan population have received an influenza vaccine. This is a 9% decrease in doses administered compared to the same time last year and no change from the previous month.

Other Respiratory Viruses[2]

- There was no reported RSV activity in the past four weeks.
- RSV hospitalizations have remained stable at zero for the previous four weeks, and for the most recent four weeks. RSV ICU admissions have decreased from 1 for the previous four weeks, to zero for the most recent four weeks. 'Other' respiratory viruses' hospitalizations have increased from 107 for the previous four weeks, to 132 for the most recent four weeks. 'Other' respiratory viruses ICU admissions have decreased from 23 for the previous four weeks, to 10 for the most recent four weeks.
- 'Other' respiratory virus lab detections fluctuated between 66 and 108 over the past month. The positivity rate averaged 7.9% per week over the past four weeks.
- Two outbreaks were reported from 'other' viruses in high-risk settings over the past four weeks.

[1] *Up-to-date = completed a primary series and at least one additional booster, age 5+ years*

[2] *Parainfluenza viruses 1 – 4 (PIV 1 – 4); Adenovirus (ADV); Rhinovirus (RV); Human Metapneumovirus (HMPV); NOTE: RSV test positivity now exceeds 1% and is reported separately. * Represents all sublineages of Omicron*

Table 1: Viral indicators by surveillance period, June 18 – July 15, 2023

Report date	COVID-19 positive laboratory test	COVID-19 test positivity	COVID-19 outbreaks	Influenza positive laboratory test	Influenza test positivity	Influenza outbreaks	RSV positive laboratory test	RSV test positivity	'Other'[1] positive laboratory test	'Other'[1] test positivity	'Other'[1] outbreaks
July 09 – 15, 2023	44	4.6%	3	3	0.7%	0	0	0.0%	66	6.3%	0
July 02 – 08, 2023	27	2.5%	0	1	0.2%	0	0	0.0%	69	7.2%	0
June 25 – July 01, 2023	34	3.2%	1	4	0.8%	0	0	0.0%	108	10.4%	1
June 18 – 24, 2023	33	3.0%	0	6	1.1%	0	0	0.0%	66	7.9%	1

Notes: [1]*Parainfluenza viruses 1 – 4; Adenovirus; Human Metapneumovirus, seasonal Coronavirus. See Technical Notes for details.*

Table 2: Patient-confirmed respiratory illness by age group, July 09 – 15, 2023

Age group (Years)	COVID-19 case count	Influenza case count	RSV case count	Others case count[1]
0-4	0	0	0	66
5-19	0	1 (33.3%)	0	
20-64	17 (47.2%)	2 (66.7%)	0	
≥65	19 (52.8%)	0	0	
Total	36 (100%)	3 (100%)	0%	66 (100%)

Notes: [1]*Parainfluenza viruses 1 – 4; Adenovirus; Human Metapneumovirus, seasonal Coronavirus; age-specific data is unavailable (N/A) for other respiratory pathogens. Due to the rounding, total percentage may not add to 100%. See Technical Notes for further details.*

Table 3: Sentinel* indicators by surveillance period, June 18– July 15, 2023

Report date	School illness absenteeism >=10%[1]	RLI** ED visits per 1,000[2]	RLI** 811 calls per 1,000	COVID-19 Wastewater indicator[3]	Sentinel provider test positivity	Most commonly detected virus: Sentinel providers
July 09 – 15, 2023	No data	14.0	32.0	Low (n=10)	100% (n=2)	Adenovirus
July 02 – 08, 2023	No data	16.9	44.3	Low (n=8)	50.0% (n=1)	Parainfluenza
June 25 – July 01, 2023	3.1%	15.1	45.1	Low (n=11)	33.3% (n=1)	Parainfluenza
June 18 – 24, 2023	7.4%	18.1	50.1	High (n=1) Moderate High (n=1) Low (n=4)	75.0% (n=3)	Adenovirus

*Notes: *Sentinel surveillance are sampling programs representative of the population; [1]School absenteeism is the proportion of scheduled children who were absent from the class due to illness. The type of illness is not specified. Due to summer vacation, school absenteeism data was not available for the weeks of July 2 to 15. [2]Respiratory-like illness (RLI) are based on reports from ten of thirteen reporting areas for the weeks of June 18 – July 01 and nine of thirteen reporting areas for the weeks of July 02 – July 16 report date. [3]Count of wastewater treatment facilities reporting low, moderate or high levels of viral load causing COVID-19 infection (see Technical Notes for details).*

Table 4: Outcome, health care capacity and immunization coverage indicators by surveillance period, June 18 – July 15, 2023[¥]

Report date	Hospital admissions – COVID-19[1]	ICU admissions – COVID-19	Hospital admissions – Influenza	ICU admissions – Influenza	Hospital admissions – RSV	ICU admissions – RSV	% of staffed inpatient beds occupied by COVID-19 patients[2]	Deaths – COVID-19[3]	Deaths – Influenza[3]	Proportion of population up-to-date – COVID-19 vaccine[4]	Proportion of population immunized for Influenza vaccine[5]
July 09 – 15, 2023	15	5	2	0	0	0	1.5%	1	0	46.3%	27%
July 02 – 08, 2023	17	3	0	0	0	0	1.5%	1	0	46.3%	
June 25 – July 01, 2023	12	0	1	0	0	0	1.9%	1	0	46.3%	
June 18 – 24, 2023	15	2	3	1	0	0	2.1%	2	0	46.3%	

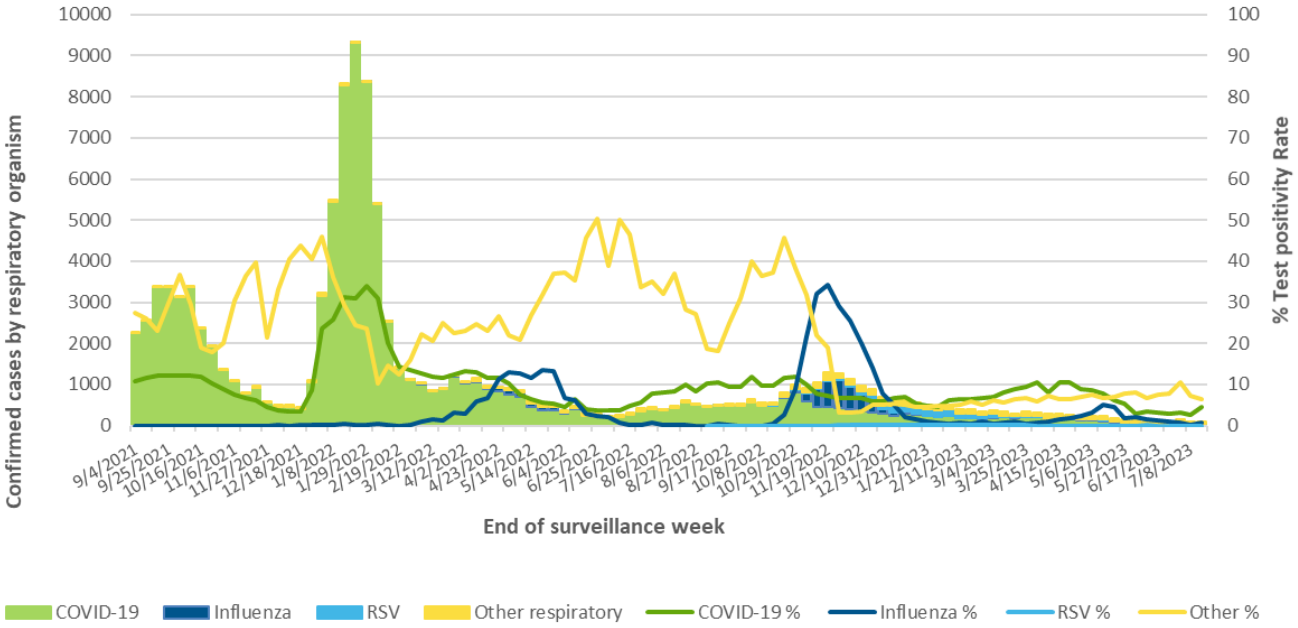
*[¥]Additional information on hospital admission stratified by respiratory organism and age group is provided below in **Figure 5** and **6** respectively. Viral infection may not be the main reason for the admission.*
[3]Five COVID-19 deaths were reported in the past four weeks. *No influenza deaths reported in the last four weeks.*

Cases by respiratory organisms across the age groups

- From June 18 to July 15, 2023 there were 198 respiratory illness cases hospitalized with lab-positive Covid19 (59), influenza (6), RSV (0), other respiratory illnesses (132), and co-infected cases (1). Among the 198 cases, Covid19 lab positives (59), were among age groups of 0-19 (1), 20-59 (11), and ≥60 (47). Influenza lab positives (6) cases were among the age group of 0-19 (1), 20-59 (2) and ≥60 (3). For other respiratory lab positives (132) cases were in the age group of 0-19 (88), 20-59 (16), and ≥60 (28). For Co-infections lab positives (1) cases were in the age group of 0-19 (1).
- From June 18 to July 15, 2023, there were 21 respiratory illness cases admitted to the ICU with lab-positive Covid19 (10), influenza (1), RSV (0), other respiratory illnesses (10) and co-infected cases (0). Among the 21 cases, Covid19 lab positives (10) cases were among the age groups of 20-59(2) and ≥60 (8). Influenza lab positives (1) cases were among the age group of ≥60 (1). For other respiratory lab positives (10) cases were in the age group of 0-19 (8), 20-59 (1) and ≥60 (1).
- ***Notes:***

[1] Because of the delay in date tested result, it affects the total number of Influenza (A/B), RSV and other respiratory virus admissions for a particular day. This lag in data impacts mostly the last couple of days from the day the report is updated. The counts for influenza, RSV, and other respiratory virus-associated hospital and ICU admissions refer to individuals with laboratory or point of care tests positive for influenza, RSV, and other respiratory viruses, respectively, occurring within four days before the admission date AND/OR at any point during the hospital stay. The counts for COVID-19 hospital and ICU admissions refer to individuals with laboratory tests positive for COVID-19 virus, occurring within 21 days before the admission date and/or at any point during the hospital stay or 7 days from the discharge. Episodes of care considers patients total movement within the health system related to their condition. It combines 2 or more admission from 2 or more different facilities, if they are transfers (No break in care). Transfer: Admission to any other hospital within 24 hours of discharge from previous hospital. Co-infected cases: positive for influenza and RSV or, positive for influenza and other respiratory virus or positive for RSV and other respiratory viruses or, positive for COVID-19 and influenza or, positive for COVID-19 and RSV or, Positive for COVID-19 and other resp viruses. Other includes: Parainfluenza 1-4, Adenovirus, Enterovirus, Human Metapneumovirus, Rhinovirus, Seasonal Coronovirus (O43, NL63, 229E, HKU1f.)
[2]7-day average of percentage of acute inpatient beds staffed and in operation that are occupied by COVID-positive patients as of 8AM census
[3] Includes deaths entered into Panorama IOM among lab-confirmed cases. Deaths reported based on the actual date of death. Deaths reported in previous periods subject to change due death reporting data lags
[4]Up-to-date =completed a primary series and at least one additional booster, age 5+ years.
[5]Up-to-date = received a vaccination within the current influenza season, age 6 months+. The most recent rate is as of March 31, 2023. This See Technical Notes for details.

Figure 1: Epidemic curve, respiratory illness by organism and test positivity, August 29, 2021 – July 15, 2023

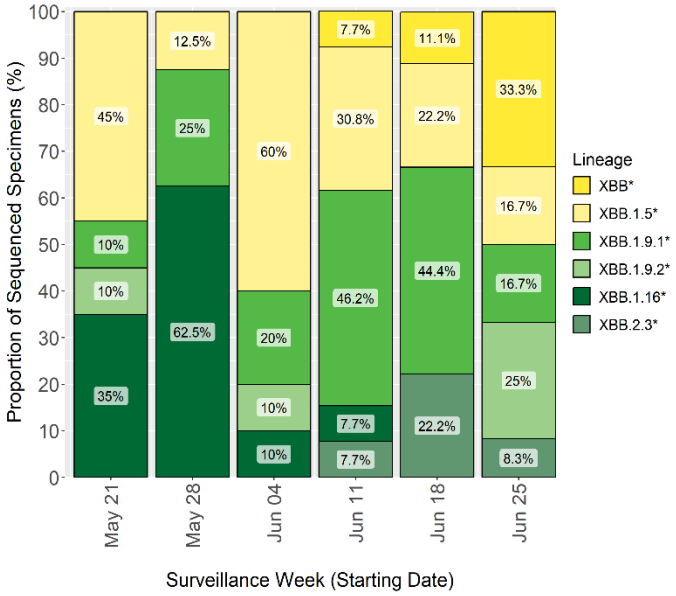


Data sources: Panorama IOM extracted on July 17, 2023 (COVID-19 cases)
Respiratory Virus Detections Surveillance System (influenza and other respiratory) (RRPL extracted July 17, 2023)
As of September 4, 2022, COVID-19 cases include new and reinfections.

For the four weeks of June 18 to July 15, 2023, there were:

- *112 COVID-19 cases (five were 0 to 19 years; 34 were 20 to 59 years; and 73 were 60 years and older).*
- *14 influenza lab detections*
- *No RSV detections*
- *309 other viral lab detections (parainfluenza, adenovirus, human metapneumovirus, rhinovirus, coronavirus)*

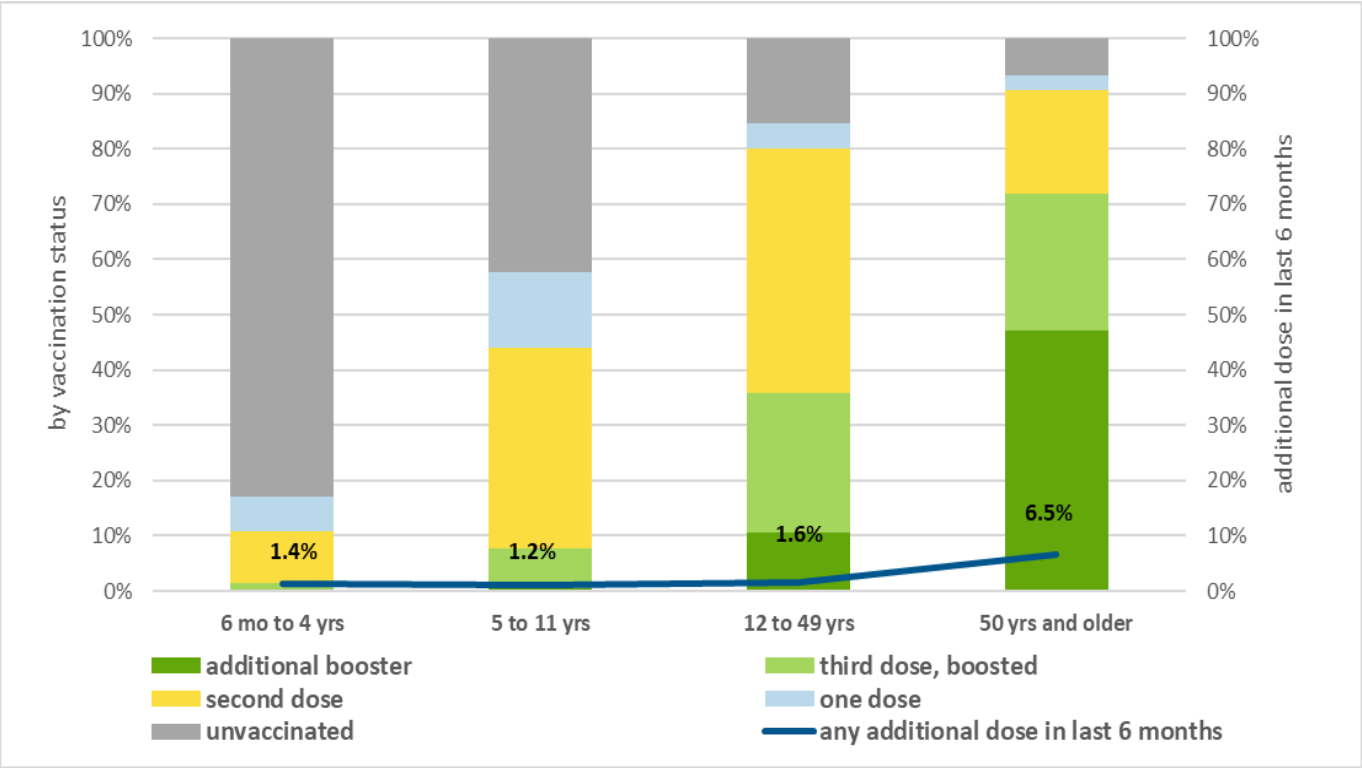
Figure 2: Percentage of SARS-CoV-2 variants by surveillance week starting*, May 21, 2023 – July 1, 2023



Lineage	May 21	May 28	Jun 04	Jun 11	Jun 18	Jun 25
XBB*	0	0	0	1	1	4
XBB.1.5*	9	1	6	4	2	2
XBB.1.9.1*	2	2	2	6	4	2
XBB.1.9.2*	2	0	1	0	0	3
XBB.1.16*	7	5	1	1	0	0
XBB.2.3*	0	0	0	1	2	1
Total	20	8	10	13	9	12

Data Source: *Roy Romanow Provincial Laboratory, Saskatchewan Health Authority, as of July 17, 2023*
The most recent VOC data available from the Provincial database is as of surveillance week ending July 01, 2023
* Surveillance week correspond to specimen collection date.

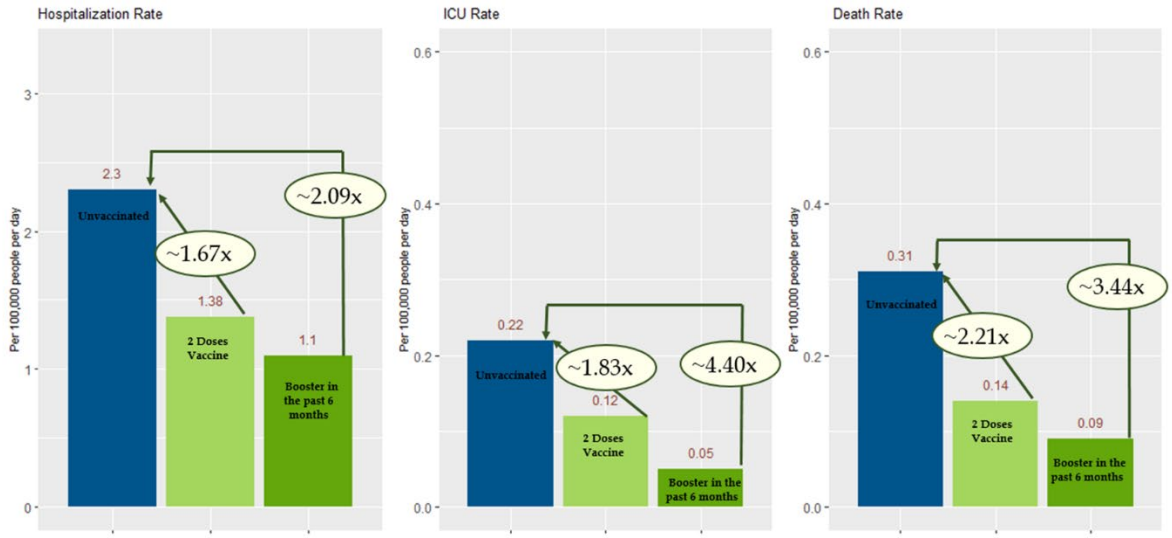
Figure 3: Proportion of residents by age group and COVID-19 vaccination status to July 15, 2023



Data sources: Panorama July 17, 2023; Saskatchewan Covered Population, 12-Nov-2022, Ministry of Health version (2022 Version 2)

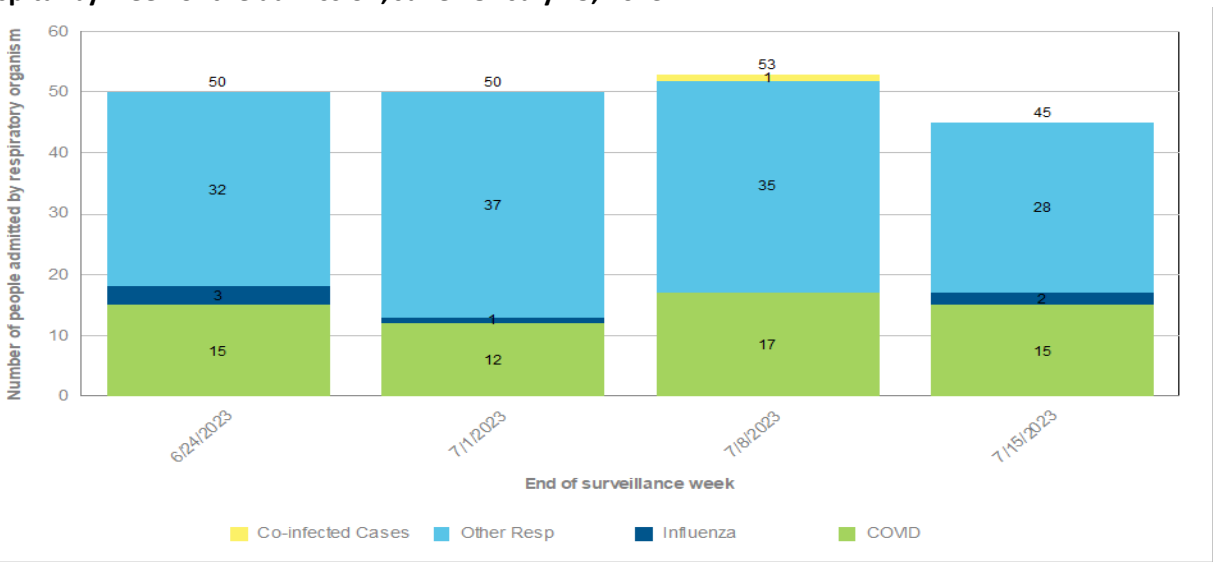
Note: Of those five years and older: 46.3% have completed their series and received a booster dose; 3.3% have received their latest dose in the last six months. Of those 12 years and older, 21.5% (223,531) were administered a Moderna or a Pfizer bivalent. As of July 15, 2023, cumulatively doses administered are as follows: dose 1, n=996,843; dose 2, n=931,879; dose 3, n=536,135; completed plus 2 or more additional doses, n=404,635; total doses=2,869,492.

Figure 4: Booster dose within last 6 months reduces the risk of Hospitalization, ICU admission or Death (age-adjusted rates), October 01, 2022 – March 31, 2023



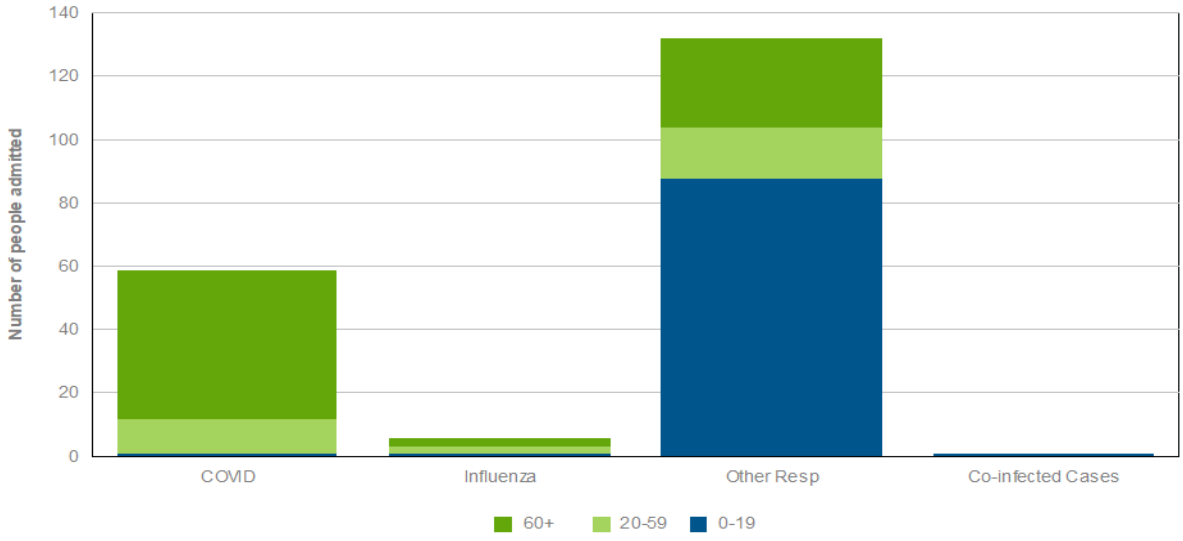
Data Source: *Digital Health Analytics, Saskatchewan Health Authority*
Definitions: *Unvaccinated - Individuals with no record of vaccine received or vaccinated with first dose but less than 21 days from receiving the first dose. Vaccinated with 2 doses - Individuals who have received their second dose for more than 14 days or their third dose is less than 14 days. Booster in the past 6 months - Individuals who have received any booster dose (3rd, 4th, 5th and so on) within the last 6 months. Details on methodology is provided in the Technical notes.*

Figure 5: The number of COVID-19, influenza, RSV, other respiratory viruses and co-infected cases admitted to hospital by week of the admission, June 18– July 15, 2023*



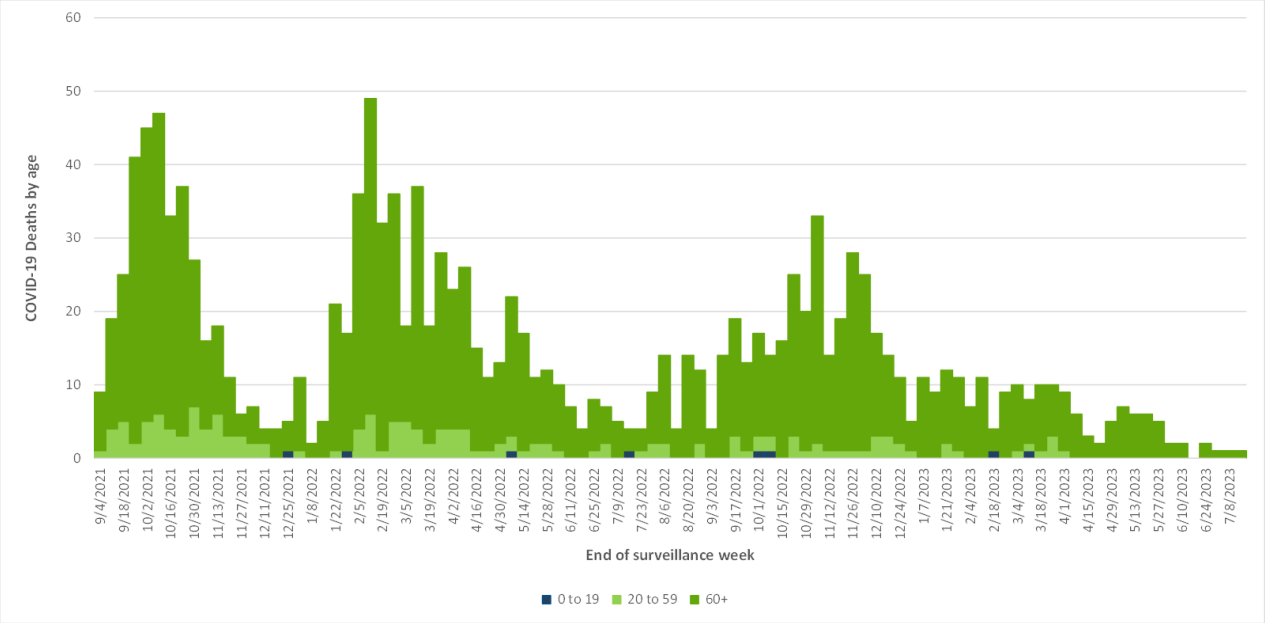
Data sources: *Digital Health Analytics, Saskatchewan Health Authority, Episode of Care methodology (Admission, Discharge, Transfer Database (ADT, RRPL, Panorama); data extracted on July 18, 2023. * Viral infection may not be the main reason for the admission.*
Note: *Because of the delay in date tested result, it affects the total number of COVID 19 admissions for a particular day. This lag in data impacts mostly the last couple of days from the day the report is updated. Includes lab or point of care positive for influenza, RSV, other respiratory viruses, four days prior to date of admission AND/OR at any point during admission. Episode of Care considers patients total movement within the health system related to their condition. It combines 2 or more admissions from 2 or more different facilities, if they are transferred (no break in care). Transfer = admission to any other hospital within 24 hours of discharge from previous hospital. Co-infected cases = positive for Influenza and RSV, or, Influenza and 'other', or, RSV and 'other', or, COVID-19 and Influenza, or, COVID-19 and RSV, or, COVID-19 and 'other'. For the weeks June 18 to July 15, 2023 there were no new RSV hospital admissions.*

Figure 6: The number of COVID-19, influenza, RSV, other respiratory viruses and co-infected cases admitted to hospital by age group, June 18 –July 15, 2023*



Data source: *Digital Health Analytics, Saskatchewan Health Authority, Episode of Care methodology (Admission, Discharge, Transfer Database (ADT, RRPL, Panorama); data extracted on July 18, 2023. * Viral infection may not be the main reason for the admission*
Note: *Because of the delay in date tested result, it affects the total number of COVID 19 admissions for a particular day. This lag in data impacts mostly the last couple of days from the day the report is updated. Includes lab or point of care positive for influenza, RSV, other respiratory viruses, four days prior to date of admission AND/OR at any point during admission. Episode of Care considers patients total movement within the health system related to their condition. It combines 2 or more admissions from 2 or more different facilities, if they are transferred (no break in care). Transfer = admission to any other hospital within 24 hours of discharge from previous hospital. Co-infected cases = positive for Influenza and RSV, or, Influenza and 'other', or, RSV and 'other', or, COVID-19 and Influenza, or, COVID-19 and RSV, or, COVID-19 and 'other'. For the weeks June 18 to July 15, 2023 there were no new RSV hospital admissions.*

Figure 7: COVID-19 deaths by age group and week, September 4, 2021 – July 15, 2023*



Data Source: Panorama July 17, 2023

In the past four weeks, June 18 to July 15, there have been five deaths in COVD-19 cases, all in the 60 years or older group.

** Total COVID-19 deaths from March 2020 to date; n=2,000*

Table 5: Community Respiratory Infection Surveillance Program Indicators by zone, July 09 - 15, 2023

Location	Test positivity – COVID-19[1] (positive lab tests)	Test positivity – Influenza (positive lab tests)	RLI* visits to EDs per 1,000[2]	RLI* 811 calls per 1,000[3]	School illness absenteeism >=10%[4]	Wastewater indicator†	Proportion of population up-to-date vaccination – COVID-19[5]	Proportion of population immunized for Influenza (March 31, 2023)[6]
Far North West (Meadow Lake and area)	7.1% (2)	0.0% (0)	No data	-	No data	Low	24.4%	11%
Far North Central	0.0% (0)	0.0% (0)	No data	-		Low	14.4%	4%
Far North East (La Ronge and area)	0.0% (0)	0.0% (0)	No data	-		Low	25.1%	9%
North West (North Battleford/ Lloydminster and area)	2.1% (1)	0.0% (0)	15.2	19.0		Low	35.7%	19%
North Central (Prince Albert and area)	6.6% (4)	0.0% (0)	4.5	-		Low	40.9%	22%
North East (Melfort and area)	13.3% (4)	0.0% (0)	24.2	34.5		Low	44.1%	26%
Saskatoon	2.7% (7)	3 (3.4%)	18.4	29.1		Low	49.5%	29%
Central West (Kindersley and area)	0.0% (0)	0.0% (0)	No data	-		Low	44.0%	30%
Central East (Yorkton/Melville and area)	9.8% (10)	0.0% (0)	21.1	-		Low	46.0%	26%
Regina	4.7% (5)	0.0% (0)	8.4	30.6		Low	52.2%	29%
South West (Swift Current/Maple Creek and area)	0.0% (0)	0.0% (0)	10.3	31.8		Low	41.0%	27%
South Central (Moose Jaw and area)	6.3% (2)	0.0% (0)	4.6	-		Low	44.5%	27%
South East (Weyburn/Estevan and area)	0.0% (0)	0.0% (0)	31.3	50.6		Low	39.5%	24%
Unknown/Out of Province	3.7% (9)	0.0% (0)	No data	-			-	-
SASKATCHEWAN	**4.6% (44)**	3 (0.7%)	**14.0**	**32.0**			46.3%	**27%**

*Notes: [1]by week of lab detection; effective Oct 30, 2022 includes cases who tested positive more than once >= 90 days apart; ^ [1]For COVID-19 test positivity, all tests reported were performed within the province. *Respiratory-like illness; [2]Based on reports from nine of thirteen reporting areas. [3]811 data available at the six Integrated Service Areas geographical level; [4] Unknown represents the number of students who were absent from the class due to illness with no known geography for the school. School absenteeism is the proportion of scheduled children who were absent from the class due to illness. Due to summer vacation, school absenteeism data was not available for the week of July 9 to 15. The type of illness is not specified.; †SK overall estimate is currently unavailable as this metric tends to overestimate and underestimate WW level due to varied patterns across regions, which is difficult to synchronize with the population size of each region.; [5]Up-to-date = completed a primary series and at least one additional booster, age 5+ years; [6]received a vaccination within the current influenza season, age 6 months+; Does not include doses administered through NITHA or FNIHB, therefore some zones may underestimate coverage.*

Technical Notes

1. Laboratory surveillance: Conducted through epidemiological analyses and Laboratory surveillance: Conducted through epidemiological analyses and positivity rate monitoring (counts and proportion of positive specimens, week of specimen collection, age category, geographical area, etiological type where applicable) of selected respiratory specimens submitted to the provincial laboratory in SK. Whole genome sequencing is conducted to detect changes (emergence of sub-lineages, variant proportion, etc) of clinical and public health importance among circulating respiratory organisms.

2. Sentinel health providers: Comprise a geographical-based network in practices across the province (n = 13 zones) who submit one to two specimens weekly to the Virology Section of the Roy Romanow Provincial Laboratory (RRPL), Saskatchewan Health Authority, from patients presenting with respiratory-like symptoms. Specimens are tested for a wider complement of respiratory organisms to monitor respiratory illness activity in the community. Assessment of co-infection (infected by more than one respiratory virus organism concurrently) occurs through sentinel provider submissions.

3. Wastewater data: Provided by the University of Saskatchewan and University of Regina Wastewater Team. Viral load for each zone was used to determine risk level (Low, Medium, Medium-High, High) using a four-bin system based on 100% of early Omicron peak reported. Locations sampled, includes: Saskatoon, Regina, Lumsden, North Battleford, Prince Albert, Yorkton, Swift Current, Moose Jaw, and Weyburn

4. Data collection from Emergency Departments (ED): Monitoring is done for a twenty-four hour period on at least one-week day (the exact time vary with the ED schedule). The ED reports to local public health services in their area on Wednesday afternoon and public health report to the Ministry of Health on Thursday each week. The count of Respiratory Like Illness (RLI) patients as a proportion of total ED admissions is captured.

5. ED admissions data is captured from hospitals in the province using a standard digital mechanism. Digital Health Services transforms visits for respiratory like illness to rates per 1000 visits for all causes. Hospitals in surveillance areas without this data capture mechanism report the data to the Ministry via local public health offices. This does not preclude monitoring in First Nations health care facilities.

6. HealthLine 811 callers with Respiratory Symptoms (RLI): This count of response protocols collected by HealthLine nurses specific to callers reporting respiratory-like symptoms. HealthLine data is collected for a seven day week, Monday to Sunday. Data is transformed into the rate of callers with respiratory symptoms from each Integrated Service Area (ISA) per 1000 calls from that ISA concerning any type of symptom.

7. A confirmed outbreak: Defined as two or more lab confirmed respiratory virus cases in high-risk settings where transmission is evident or there is a high level of suspicion of transmission. Outbreaks are reported by the week they were reported to the local public health office and not necessarily in the week that the outbreak began. For this report outbreaks in high risk settings comprise long term care facilities, personal care homes and group homes

8. COVID hospitalized admissions is the number of C-19 positive cases that during the surveillance week were admitted as an inpatient to an acute care facility. This includes patients with C-19 related illness, incidental COVID infection, and patients under investigation. COVID ICU admissions is the number of C-19 positive cases that during the surveillance week were admitted to an ICU location in SK. This includes both infectious and non-infectious cases.

9. Influenza, RSV and other respiratory virus admissions: Delays in testing results affect the total number of Influenza, RSV and other respiratory virus admissions for a particular day. This lag in data has the greatest impact on the two days prior to when the report is updated. Counts include individuals who are laboratory positive for influenza, RSV, and other respiratory viruses, within four days prior to date of admission AND/OR at any point during the hospital stay. Episode of Care considers patients' total movement within the health system related to their condition. It combines 2 or more admissions from 2 or more different facilities, if they are transfers (i.e., no break in care). Transfer: Admission to any other hospital within 24 hours of discharge from previous hospital. Co-infected Cases = if positive for Influenza and RSV or, positive for Influenza and Other Respiratory viruses or, positive for RSV and Other respiratory viruses or, positive for Covid-19 and Influenza or, positive for Covid-19 and RSV or, positive for Covid-19 and Other Respiratory viruses.

10. Variant of concern (VOC): VOCs are SARS-CoV-2 viruses that have undergone genetic modification or mutation causing altered virus infectivity, replication and pathogenicity. As a result it can alter host immune response. The Roy Romanow Provincial Laboratory (RRPL) tests for and monitors COVID-19 variants of concern (VOCs) in Saskatchewan. Confirmation of VOC linages is done by conducting whole genome sequencing (WGS) at RRPL or the National Microbiology Laboratory. one to two weeks to complete WGS. Data sources for VOCs analysis include testing data from the RRPL, and epidemiological information from Panorama. Where geographical zone is missing in RRPL or Panorama data, the Saskatchewan postal code file is used to identify cases' geographical information.

    VOC lineages BA.1, BA.2, BA.2.75, CH.1.1, BA.5, BQ.1, BQ.1.1, XBB, XBB.1.5, XBB.1.9.1, XBB.1.9.2, XBB.1.16, XBB.2.3, and XBF are all classified under the WHO label of "Omicron". Lineages that are not explicitly indicated in the analysis are aggregated under their corresponding parent lineage. Percentages are shown when a lineage or variant group constitutes 5% or more of total specimens evaluated for a given surveillance week.

11. COVID-19 cases: Effective September 4, 2022,COVID-19 cases are based on lab detection and include cases who tested positive more than once 90 days, or further, apart. Prior to this, cases include, only, first time cases reported and entered into Panorama.

12. COVID-19 Deaths: Includes deaths entered into Panorama IOM among laboratory confirmed cases. Deaths are reported based on the actual date of death. Deaths in previous periods may be adjusted from previous reports due to data lag

13. COVID-19 Immunizations: Up-to-date (UTD) COVID-19 vaccination is the proportion of people having completed a primary series and one booster for ages five and older divided by the eligible population found in the Saskatchewan Covered Population, 12-Nov-2022 Ministry of Health version (2022 Version 2). Though vaccinated children six months to four years of age may be technically UTD, this specific definition does not apply to them. In addition, UTD in last six months is calculated by the proportion of people having received one or more boosters within the previous six months.

14. Influenza immunizations: UTD Influenza vaccination is the proportion of people, six months and older, having one influenza dose this season divided by the eligible population found in the Saskatchewan Covered Population, 12-Nov-2022 Ministry of Health version (2022 Version 2). Vaccination for the current influenza season officially began October 11, 2022. Some doses were administered prior to the start date.

15. Staffed Inpatient beds: Weekly average COVID Occupancy is a 7-Day average percentage of acute inpatient beds staffed and in operation COVID positive patients occupy. The full calculation of this metric is: Average COVID occupance=$\sum$(8am covid census) ÷ $\sum$(8am beds staffed and in operation) × 100%. Where "bed staffed and in operation = "Planned beds" + "Surge Beds" - "Closed" and $\sum$(…) indicates summation over 7-day period from Sunday to Saturday. 8am COVID census is taken from the ADT patient registration, which is fed to the provincial data-mart and archived hourly. 8am planned bed, surge beds, and closed beds is compiled via data feeds from APF (Saskatoon & Regina) and the provincial bed edits interface (INH &IRH).

16. Rate of COVID-19 hospitalization (ICU or Death) were calculated by summing the daily number of hospitalizations (ICUs or Deaths) for the period by vaccine status (numerator) divided by the mid period population by respective vaccine status (denominator), multiplied by 100,000. This estimate is further divided by the number of days to obtain the daily rate. Denominator for individuals in the Booster in the past 6-months group are all Saskatchewan residents who have had their booster dose within the last 6 months. To eliminate bias of age all rates are adjusted by age. Direct standardization method is employed using the Saskatchewan population as the standard population. Age at first dose used in the rate calculation. Individuals with unknown age are excluded from age-specific analyses. Estimates of relative risk (i.e. rate ratios) is obtained by comparing vaccinated with 2 doses (Any Booster dose) and unvaccinated. Risk estimates may differ from other reports due to differing methodologies. Relative risk estimates methodology is described elsewhere. See Namrata Bains. *Standardization of Rates* (March 2009).