COVID-19: Modelling Update

November 19, 2020

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Role of Modelling

- Modelling cannot predict what will happen.
- It tells us what could happen over the next six months, based on actions taken.
- It supports decision makers by comparing the potential impact of public health measures and behaviour changes.
- <u>Goal</u>: to make the best policy decisions based on public health information, keeping economic activity stable, children in school, and not exceeding the health system's capacity to care for both COVID-19 and non-COVID-19 patients.
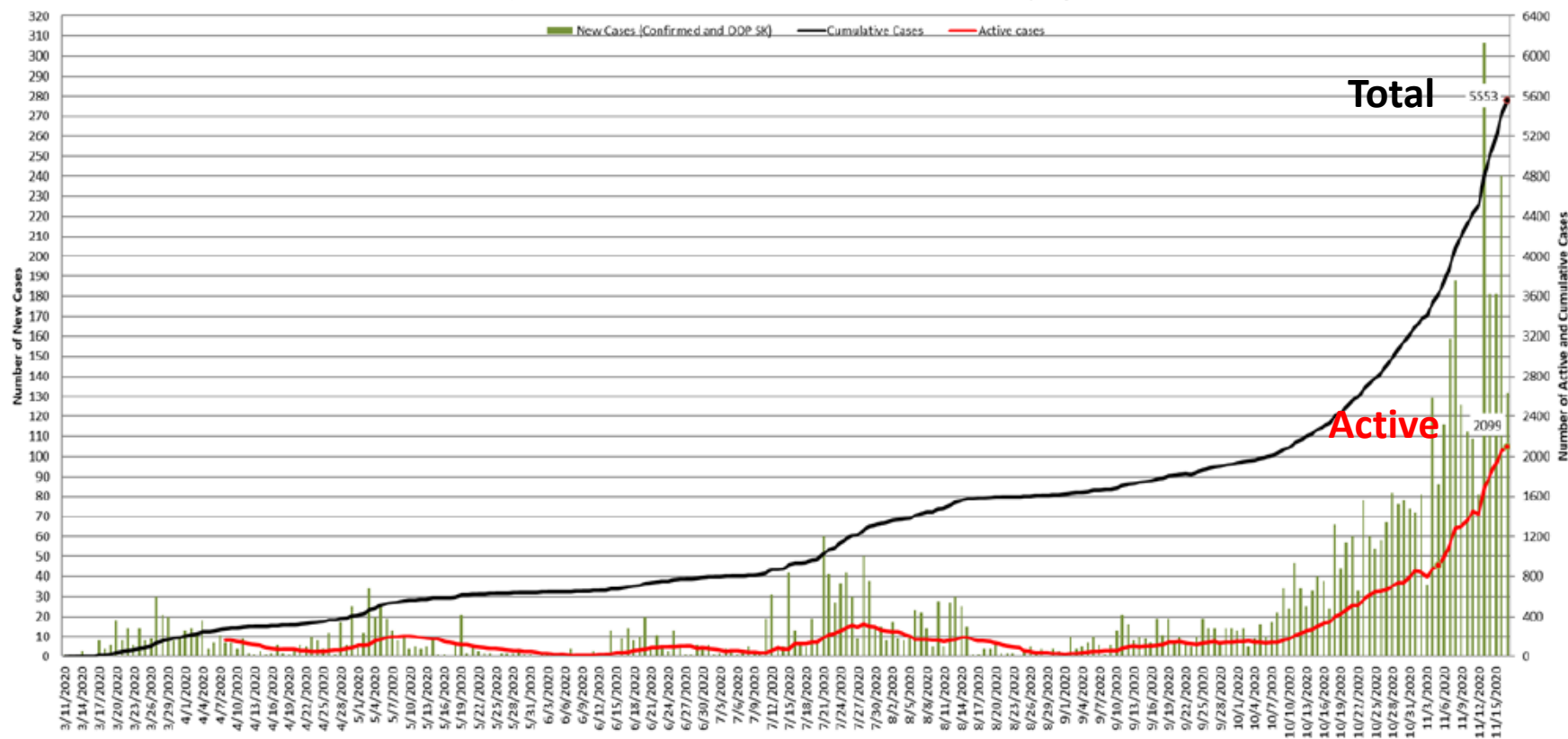
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Assessing our Situation: COVID- 19 Indicators
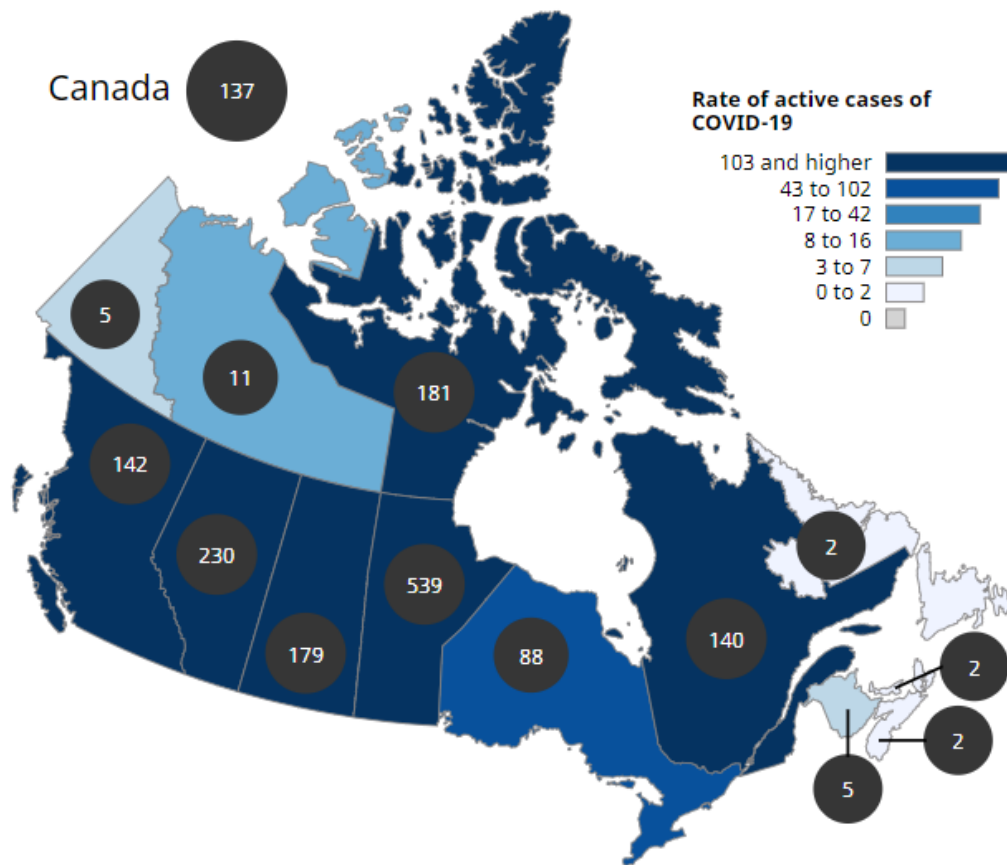
Saskatchewan's Epidemic Curve
Mar 11 – Nov 18, 2020 (5,553 cases)

Number of New, Active and Cumulative COVID-19 Cases in Saskatchewan by Reported Test Date

Source: PHB notifications and RRPL Daily Test Count Table

COVID-19 Active Cases per 100,000 (Nov 18 2020)

Canada 137

Rate of active cases of COVID-19

- 103 and higher
- 43 to 102
- 17 to 42
- 8 to 16
- 3 to 7
- 0 to 2
- 0

The rate of active cases of COVID-19 in **Saskatchewan** was **179 per 100,000 population** as of November 18, 2020.

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(map values: 5, 11, 181, 142, 230, 539, 140, 179, 88, 2, 2, 2, 5)
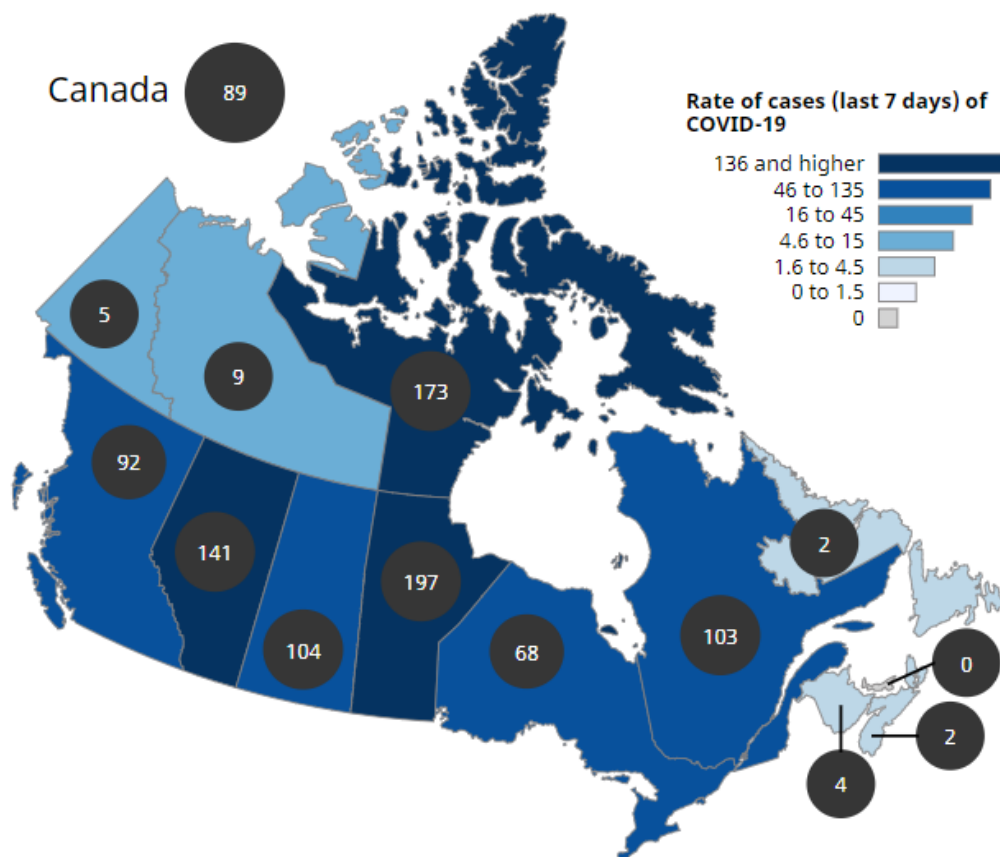
To date:

- **5,553 total cases**
- **2,099 active cases**
- **229 in hospital, 67 in ICU**
- **32 deaths (0.6% fatality rate)**

Source: Public Health Agency of Canada, Nov 18, 2020 https:https://health-infobase.canada.ca/covid-19/epidemiological-summary-covid-19-cases.html?stat=rate&measure=total_last7#a2

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COVID-19 Rate per 100,000, Last 7 Days (to Nov 18, 2020)

Canada 89

Rate of cases (last 7 days) of COVID-19

- 136 and higher
- 46 to 135
- 16 to 45
- 4.6 to 15
- 1.6 to 4.5
- 0 to 1.5
- 0

The rate of cases (last 7 days) of COVID-19 in **Saskatchewan** was **104 per 100,000 population** as of November 18, 2020.

Map values: 5, 9, 173, 92, 141, 197, 104, 68, 103, 2, 0, 2, 4

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Rate of cases (last 7 days) — axis: 100, 90, 80, 70, 60, 50, 40, 30, 20, 10, 0
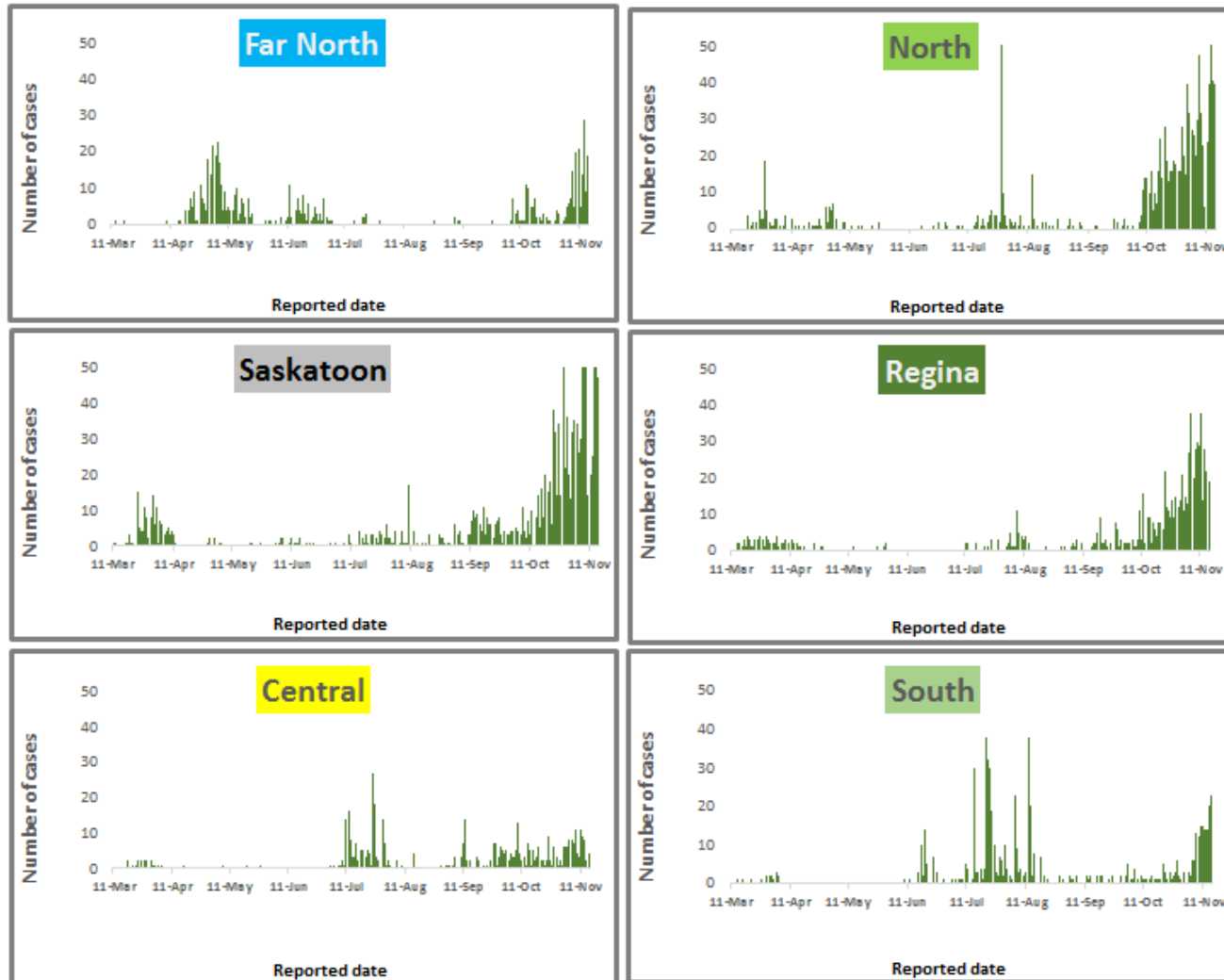Reporting date: Apr 01, May 01, Jun 01, Jul 01, Aug 01, Sep 01, Oct 01, Nov 01

In the last seven days:

- **1,231 cases (+645)**
- **14.5/100,000 avg new case rate**
- **25 new hospitalizations 8 new ICUs**
- **3 deaths**

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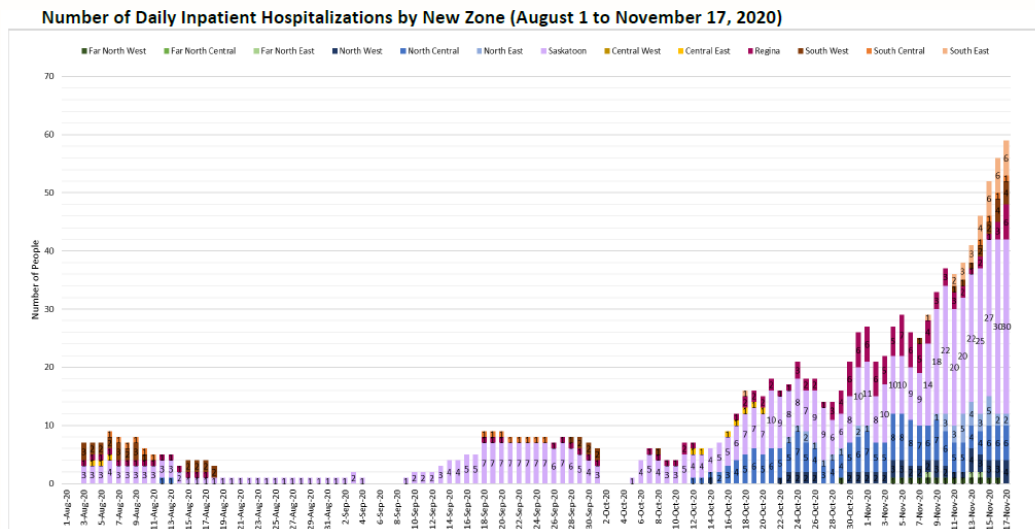# Area Epidemic Curves, Feb 21– Nov 15

COVID-19 Hospital, ICU and Deaths by Age Groups (to Nov 18, 2020)

Number of hospitalizations, ICU and deaths (to date), SK 2020

Age group	# cases ever hospitalized	# cases ever in ICU	# of deaths
0-19	6	1	0
20-39	27	3	2
40-59	74	29	3
60-79	80	29	17
80+	42	5	10
Total	**229**	**67**	**32**

Nov 18 hospitalizations

	Total	ICU	inpatients
19 and under	1		1
20 to 39	6		6
40 to 59	17	7	10
60 to 79	27	9	18
80+	25	1	24
Total	76	17	59

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COVID-19 Hospital and ICU Case Census, Aug 1 – Nov 17

Hospitalization

Number of Daily Inpatient Hospitalizations by New Zone (August 1 to November 17, 2020)

ICU

Number of Daily ICU Admissions by New Zone (August 1 to November 17, 2020)

In-patient hospitalization and ICU counts are **trending upward significantly** since the beginning of October

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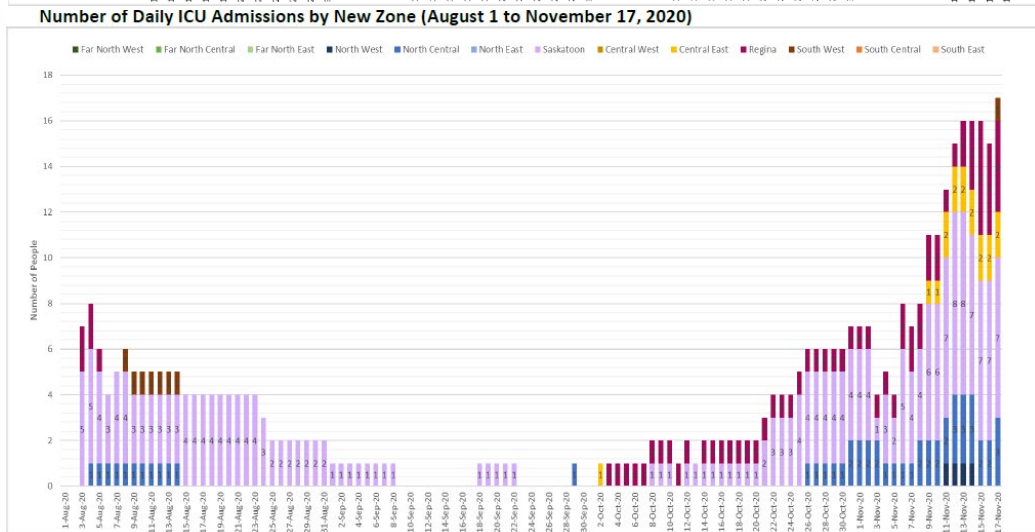
COVID-19 Exposures by Type
(to Nov 15, 2020)

	Cases Nov 9-15, 2020	Total Cases to Date
Health Care Workers	16	148
International Travel	1	154
Domestic Travel	0	112
Health Care Setting	0	44
Congregational/Communal Living Setting	1	681
Mass Gatherings	1	240
Workplace	8	193
Household Exposure	3	842
Social Exposure	6	238
Public Facilties	7	175
School/Daycare	7	28
Unknown	4	285
Pending	1,062	2,190

Note: total case totals are more than the reported total of cases as HCWs may be counted in other exposure categories also, depending on exposure.

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COVID-19 Cases with Unknown and Pending Exposure (to Nov 15, 2020)

Number of cases with exposure unknown, pending and no identified exposure, Oct 1 - Nov 15, 2020

| Month	Week #	Unknown	No identified exposure	Pending	Total
October	40		1		1
	41		29	4	33
	42		28	44	72
	43	3	68	67	138
	44		93	117	210
November	45	3	131	232	366
	46	25	150	561	736
	47	3	26	146	175
Total		**34**	**526**	**1171**	**1731**

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COVID-19 Outbreaks (Oct 14 – Nov 18)

Description (excludes schools and child care)	Confirmed Outbreak
Assisted Living/Home Care	5
Group Home	3
Shelter	1
LTC Facilty	5
Health Facilty	2
Communal Living	1
Community	9
Workplace (non-retail)	14
Post-secondary Institution	1
Place of Worship	3
Events (Party, Wedding, Funerals)	6
Bingo	1
Retail	6
Gym	4
Restaurant/Bar	10
Sport	8

16 new outbreaks reported week of Nov 9 – 15:
- Nine community, four schools, three in other settings

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Provincial COVID-19 Testing

Summary of Tests Performed per Day for COVID-19 (July 1 – November 14, 2020)
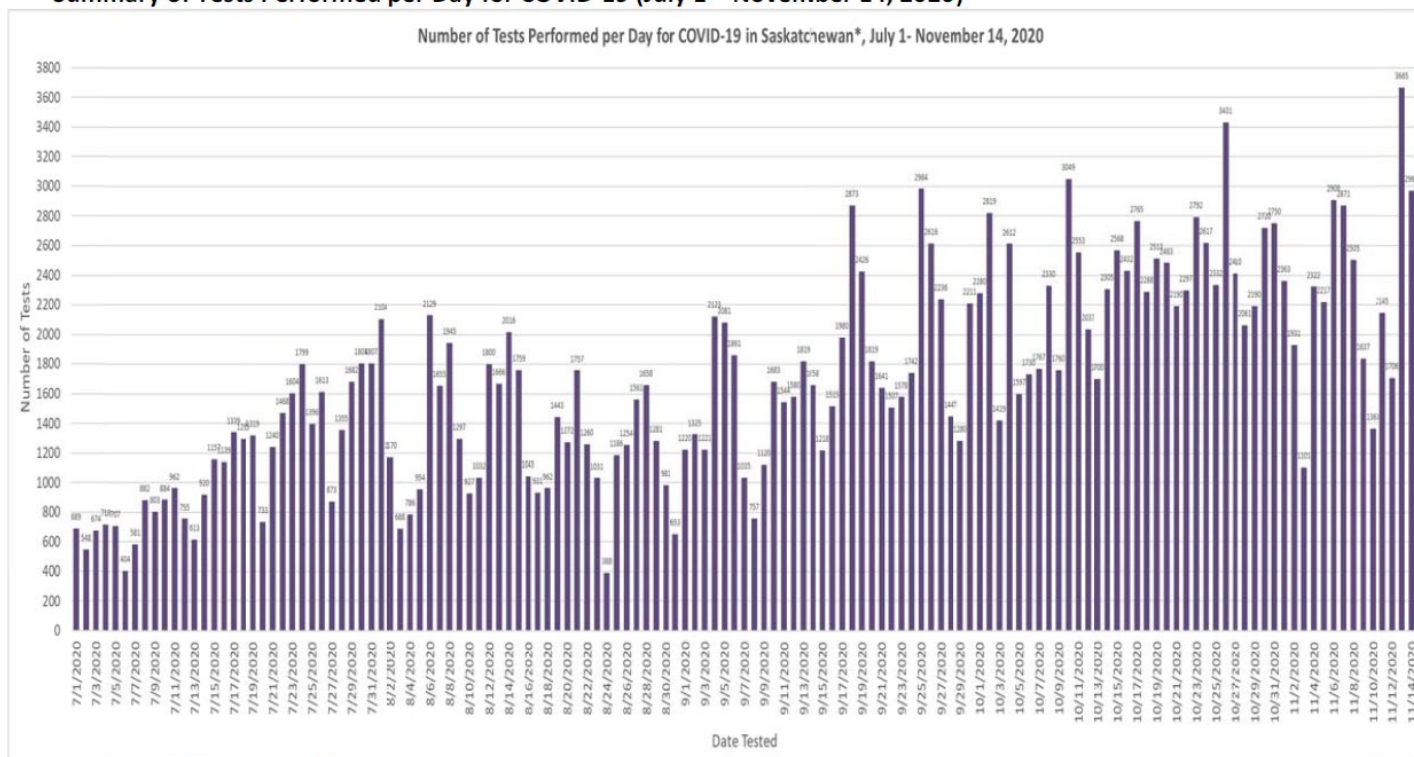
Source: RRPL Daily Test Count Table

**Available with daily dashboard posting at Saskatchewan.ca/covid19**

Indicator Summary (Nov 11 -17, 2020)

	7 Day Average (Nov 11-17)		
Zone	Daily new case rate per 100,000	Daily active case rate per 100,000	Daily test positivity (%)
Far North West	27.7	313.8	6.6
Far North Central	214.7	1,207.5	12.3
Far North East	35.4	266.3	14.1
North West	15.6	178.1	6.2
North Central	16.9	243.3	7.2
North East	22.0	189.6	9.0
Saskatoon	17.5	160.5	8.9
Central West	8.0	42.8	4.3
Central East	3.9	77.2	2.3
Regina	8.7	122.4	4.2
South West	13.0	73.7	8.0
South Central	12.9	84.3	5.5
South East	9.6	80.1	4.9
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Note: 38 active cases have pending residence locations

Effective Reproduction Numbers
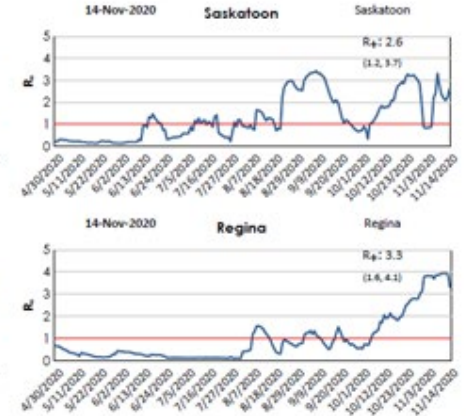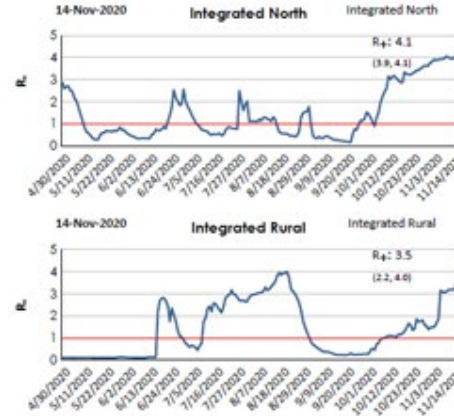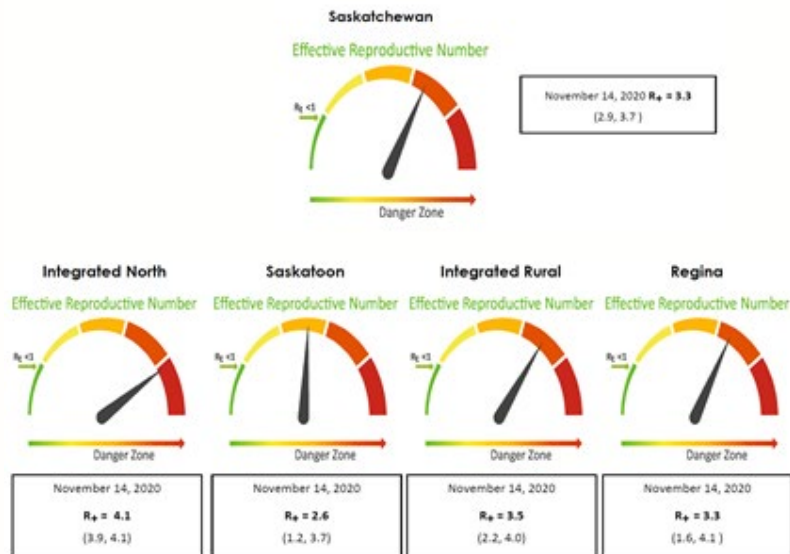
COVID-19 Modelling Update Scenarios

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Why model?

- Modelling provides an understanding of where we may be heading on COVID-19 transmission and what needs to be done to reduce the negative impact on individuals and the health system.

- Six month projections and 14 day forecasts allow us to plan and prepare our hospitals, care settings and human resources to meet the needs of future surges.

- Following the implementation of a measure, it takes 7-10 days to see changes in cases, then another week to see alteration in hospitalizations, and yet another week after that for ICU admissions to change (four weeks from behaviour change).

- The speed at which changes occur depends upon the intervention implemented, the size of the intervention, and the degree of uptake by the population.
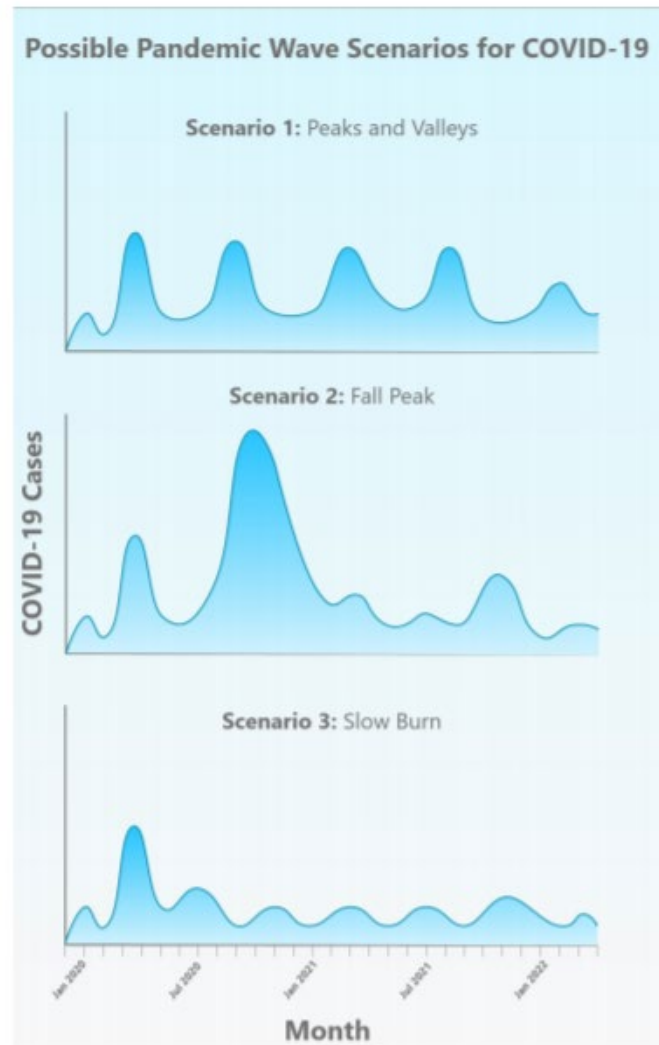
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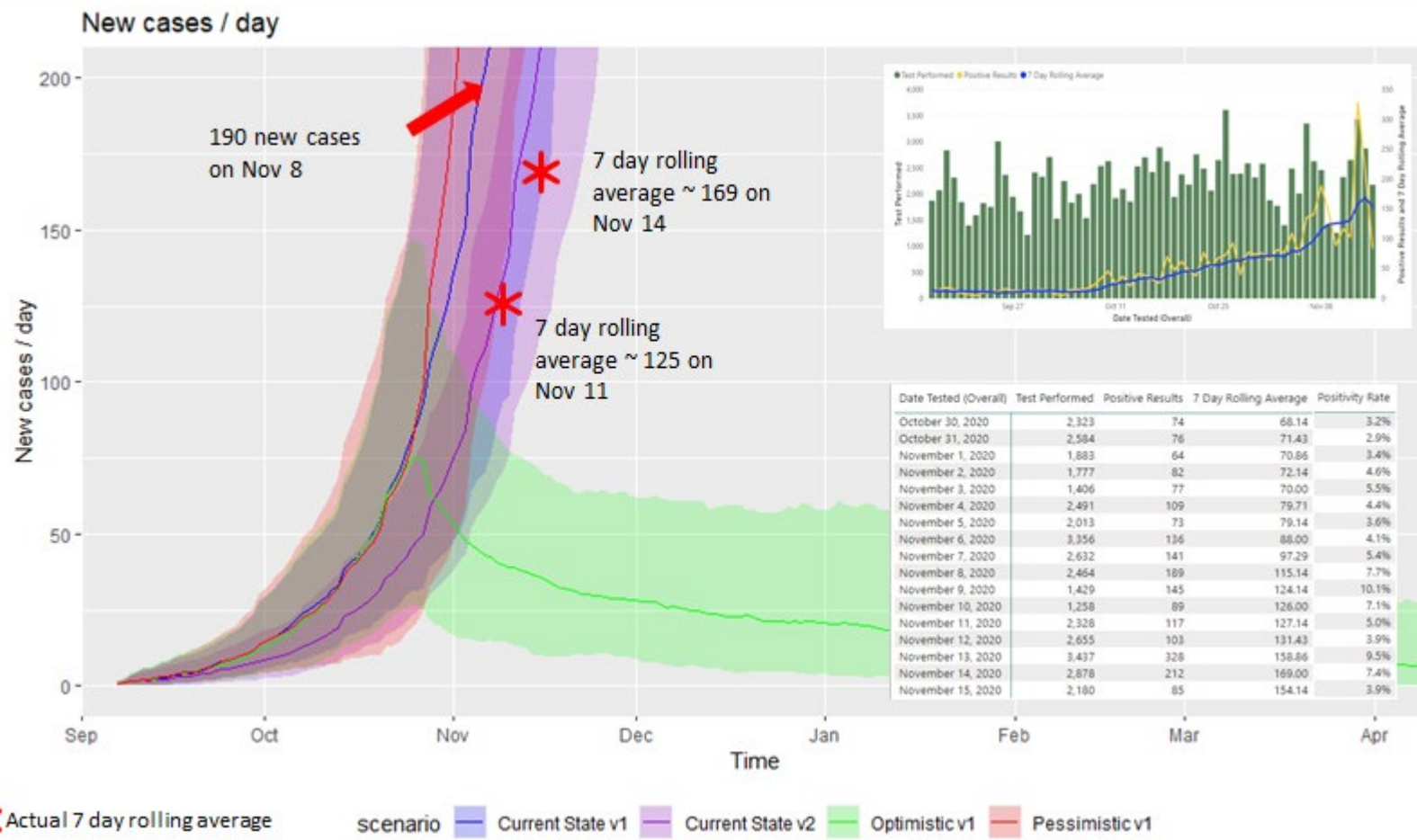# Pandemic Wave Scenarios

Figure 1

Modelling Scenarios

Four Scenarios -- Planning Assumptions

	Optimistic	Estimated Current State v2	Estimated Current State v1	Pessimistic
Mask Adoption	60%	30%	30%	20%
Fraction of population engaging in private weekly gatherings	20%	35% - up to age 60 17.5% - over 60	35%	50%
Size of weekly social gatherings	5	10	10	20
Age defined behaviour	All ages similar	60+ year age group more cautious	All ages similar	All ages similar
% working from home	50%	20%	20%	10%
Restaurant / bar use	¼ historic	½ historic	½ historic	historic
Frequency of grocery store visits	Weekly	Twice weekly	Twice weekly	Twice weekly

Model assumes schools and businesses are open and there continues to mixing occurring at home, work, schools, hospitals and long term care homes.
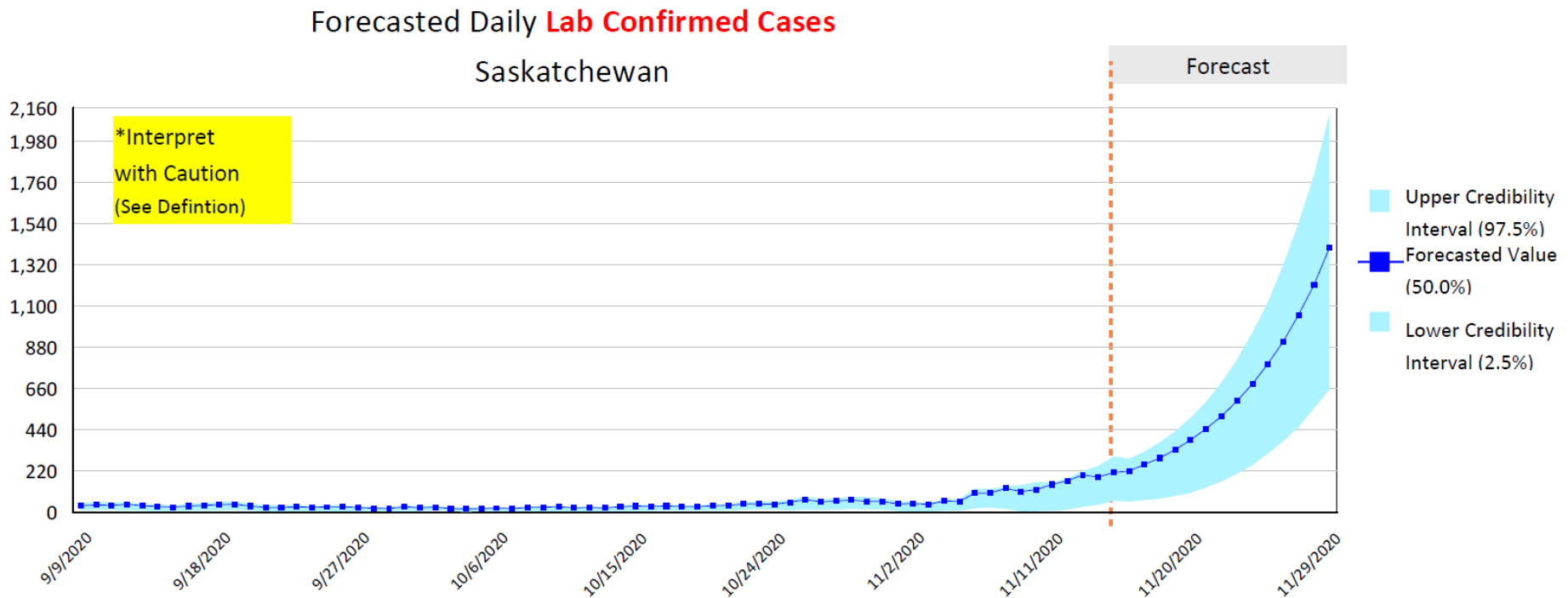
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Applying the Scenarios

COVID-19 patients only (Peak values, except where cumulative) All values given for the new scenarios use a model time horizon of *6 months*	Planning Scenario (Spring 2020) (25% reduction in overall mixing) Model time horizon *18 months*	Optimistic Scenario (60% mask adoption, 20% population engaging in weekly gatherings of 5 people, 50% working from home, restaurant/ bar use at a quarter of historic, groceries once a week)	Estimate of Current State Scenario v2 (30% mask adoption, 35% of <60 yo age population and 17.5% of >60 yo population engaging in weekly gatherings of 10 people. Age group > 60 years old more cautious behaviour. 20% working from home, restaurant/ bar use half historic, groceries twice a week)	Estimate of Current State Scenario v1 (30% mask adoption, 35% population engaging in weekly gatherings of 10 people, all age groups have similar behaviour, 20% working from home, restaurant/ bar use half historic, groceries twice a week)	Pessimistic Scenario (20% mask adoption, 50% population engaging in weekly gatherings of 20 people, 10% working from home, restaurant/ bar use at historic, groceries twice a week)
New cases per day	2,175	76	3,970	5,020	8,390
Cumulative total cases across 6 months	N/A	4,830	304,000	341,000	469,000
Hospital admissions / day	190	5	261	400	677
Hospital census	1,736	29	1,600	2,480	4,190
ICU admissions / day (new patients needing ventilator)	60	2	78	132	222
ICU and ventilator census	412	9	469	808	1,330
Cumulative total deaths across 6 months	8,370 (over 18 months)	34	2,140	3,190	4,800

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Modelling Compared to Actual Situation

14 Day Forecast of Lab Confirmed Cases (to Nov 29, 2020)

Forecasted Daily **Lab Confirmed Cases**

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Forecast

*Interpret with Caution (See Defintion)

Upper Credibility Interval (97.5%)

Forecasted Value (50.0%)

Lower Credibility Interval (2.5%)

14 Day Forecast of Acute Hospital Admissions (to Nov 29, 2020)

Forecasted Daily Acute Hospital Admissions
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Forecast

* These graphs show new admissions per day, not cumulative and not census

Upper Credibility Interval (97.5%)
Forecasted Value (50.0%)
Lower Credibility Interval (2.5%)

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Modelling Scenarios

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Public Health Action: Measures Make the Difference

Everyone plays their part.

The actions taken by the people of Saskatchewan collectively will determine the outcomes.

Simple measures reduce the risk of infection:

- **Mask whenever you are away from your home**
- **Physically distance**
- **Reduce close contacts and non-essential travel**
- **Outdoors is better than indoors**
- **Washing hand/sanitizing often**
- **Abide by the public health guidelines in every public space**

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