QUESTION: Does proof-of-vaccination policy increase vaccine uptake? If so, by how much? If increased, is it sustained?

Methodological note: Implemented interrupted time-series analysis with two pre-set interventions: September 16 and October 1, 2021, in Stata™ version 17.0. These dates coincide with the announcement of the proof-of-vaccination policy in Saskatchewan and its implementation, respectively. Time period of interest: September 1 to October 24, 2021. Each data point is the 7-day moving average of number of doses reported being administered. First dose and second dose were treated separately. The location of recipient of the vaccine dose and age were variables considered.

Key Takeaways

• Overall, in Saskatchewan, the proof-of-vaccination policy had a significant effect in doses of vaccines administered, both first and second doses, following the proof of vaccination policy announcement on September 16, 2021. However, the uptake of only second dose vaccines significantly increased following the policy implementation on October 1, 2021.

• Notably, however, the steady increase in uptake of first dose vaccines following announcement of policy appear not to have been sustained in the weeks following the policy implementation. The first dose vaccine uptake having peaked around the date of policy implementation and steadily decreasing in the time following.

• The uptake of second dose vaccine—having reached just under 2000 daily, on average, at the date of policy implementation—have held steady and continued at that pace in the weeks following.

The effects of vaccine policy were different by COVID-19 reporting zones.

• Saskatoon and Regina mirrored the overall Saskatchewan pattern; however, the second dose uptake in Regina appears to be falling in the weeks following implementation of the policy.

• Far North, North, Central and South zones also mirrored the overall Saskatchewan pattern for the impact of vaccine policy for first dose uptake. However, in the Far North and Central zones, the second dose uptake continued to increase (as opposed to holding steady, as was for Saskatchewan overall) following the implementation of the policy on October 1.

The effects of vaccine policy were also different by age-groups, compared to the overall pattern for Saskatchewan, particularly in the youngest eligible group, 12-17 years.

• For the 12-17 age group, there were significant increases in vaccine uptake, both first and second dose, immediately following the policy announcement but non-significant change in uptake was seen at policy implementation. Following the date of proof-of-vaccine implementation, first and second dose uptake plateaued somewhat; however, unlike for other groups, didn’t show a notable decrease.
For the next two age groups, 18-39 and 40-59, first dose vaccine uptake appears to have hardly been affected by the vaccine policy implementation date, showing no immediate significant change. For both age groups, however, the first dose uptake decreased significantly during the weeks following implementation of policy, compared to pre-implementation uptake. The second dose uptake, however, showed holding steady at the peak rate of uptake which was around October 1st.

For the older age group, 60+, the vaccine policy announcement was not impactful for dose uptake, but the implementation of policy was—especially for first dose. In this age group, the trend in uptake of second dose was not significantly impacted by the vaccination policy. However, there was a bump in overall second dose vaccine uptake immediately following the implementation.

**CHARTS: Saskatchewan COVID-19 vaccination rates and proof of vaccination policies**

<table>
<thead>
<tr>
<th>By Zone</th>
<th>By Age Group</th>
</tr>
</thead>
<tbody>
<tr>
<td>1. Saskatchewan (overall)</td>
<td>8. 12-17 years</td>
</tr>
<tr>
<td>2. Saskatoon</td>
<td>9. 18-39 years</td>
</tr>
<tr>
<td>3. Regina</td>
<td>10. 40-59 years</td>
</tr>
<tr>
<td>4. Far North</td>
<td>11. ≥60 years</td>
</tr>
<tr>
<td>5. North</td>
<td></td>
</tr>
<tr>
<td>6. Central</td>
<td></td>
</tr>
<tr>
<td>7. South</td>
<td></td>
</tr>
</tbody>
</table>
1. Saskatchewan (Overall): COVID-19 vaccination rates and proof of vaccination policies interventions: proof of vaccination policy announcement (September 16, 2021) and implementation (October 1, 2021) dose counts are 7 day moving average, lag 1

Partial vaccination (1st dose)

Full vaccination (2nd dose)
2. Saskatoon: COVID-19 vaccination rates and proof of vaccination policies

interventions: proof of vaccination policy announcement (September 16, 2021) and implementation (October 1, 2021)
dose counts are 7 day moving average, lag 1

Partial vaccination (1st dose)

Proof-of-vaccine requirement: Saskatoon

Announcement (Sep 16, 2021)  Implementation (Oct 1, 2021)

Pre-intervention slope = -2.7, p = 0.111
Slope (announcement phase) = 21.2, p < 0.001
Slope (implementation phase) = -12.1, p < 0.001

Dose counts are 7-day averages, lags 3

Full vaccination (2nd dose)

Proof-of-vaccine requirement: Saskatoon

Announcement (Sep 16, 2021)  Implementation (Oct 1, 2021)

Pre-intervention slope = -7.3, p = 0.027
Slope (announcement phase) = 10.8, p < 0.001
Slope (implementation phase) = -2.4, p = 0.001

Dose counts are 7-day moving averages, lag 1
3. Regina: COVID-19 vaccination rates and proof of vaccination policies

Interventions: proof of vaccination policy announcement (September 16, 2021) and implementation (October 1, 2021) dose counts are 7 day moving average, lag 1

Partial vaccination (1st dose)

Proof-of-vaccine requirement: Regina

Announcement (Sep 16, 2021)  Implementation (Oct 1, 2021)

Immediate change
Level=50.5, p=0.104

Immediate change
Level= 24.1, p=0.023

Changes in slope= 14.2, p<0.001

Changes in slope= -23.7, p<0.001

Date

Pre-intervention slope= -0.7, p=0.263
Slope (announcement phase)= 13.5, p<0.001
Slope (implementation phase)= -10.2, P<0.001

Full vaccination (2nd dose)

Proof-of-vaccine requirement: Regina

Announcement (Sep 16, 2021)  Implementation (Oct 1, 2021)

Immediate change
Level= 88, p<0.001

Immediate change
Level= 38.4, p<0.005

Changes in slope= 8.8, p<0.001

Changes in slope= -8.8, p<0.001

Date

Pre-intervention slope= -3.6, p=0.026
Slope (announcement phase)= 5.2, p<0.001
Slope (implementation phase)= -3.6, p=0.0003

Dose counts are 7-day averages, lag(2)
4. Far North: COVID-19 vaccination rates and proof of vaccination policies

interventions: proof of vaccination policy announcement (September 16, 2021) and implementation (October 1, 2021) dose counts are 7-day moving average, lag 1

Partial vaccination (1st dose)

Proof-of-vaccine requirement: Far North

Announcement (Sep 16, 2021) Implementation (Oct 1, 2021)

Number of doses administered (first dose)

Dose counts are 7-day averages, lag 1

Pre-intervention slope = -0.04, p = 0.975
Slope (announcement phase) = 5.1, p = 0.0002
Slope (implementation phase) = -4.3, p < 0.001

Full vaccination (2nd dose)

Proof-of-vaccine requirement: Far North

Announcement (Sep 16, 2021) Implementation (Oct 1, 2021)

Number of doses administered (second dose)

Dose counts are 7-day averages, lag 1

Pre-intervention slope = -1.0, p = 0.414
Slope (announcement phase) = 1.9, p = 0.0016
Slope (implementation phase) = 0.9, p = 0.0984
5. North: COVID-19 vaccination rates and proof of vaccination policies
interventions: proof of vaccination policy announcement (September 16, 2021) and implementation (October 1, 2021) dose counts are 7 day moving average, lag 1

Partial vaccination (1st dose)

Full vaccination (2nd dose)
6. Central: COVID-19 vaccination rates and proof of vaccination policies
interventions: proof of vaccination policy announcement (September 16, 2021) and implementation (October 1, 2021) dose counts are 7 day moving average, lag 1

Partial vaccination (1st dose)

Full vaccination (2nd dose)
7. South: COVID-19 vaccination rates and proof of vaccination policies
interventions: proof of vaccination policy announcement (September 16, 2021) and implementation (October 1, 2021) dose counts are 7 day moving average, lag 1

Partial vaccination (1st dose)

Proof-of-vaccine requirement: South
Announcement (Sep 16, 2021) Implementation (Oct 1, 2021)

Number of doses administered (first dose) vs Date

- Immediate change: Level = -31.0, p = 0.284
- Changes in slope: 24, p < 0.001
- Changes in slope: -35, p < 0.001

Pre-intervention slope = -0.5, p = 0.177
Slope (announcement phase) = 23.6, p < 0.001
Slope (implementation phase) = -11.5, p < 0.001

Dose counts are 7-day averages, lag(1)

Full vaccination (2nd dose)

Proof-of-vaccine requirement: South
Announcement (Sep 16, 2021) Implementation (Oct 1, 2021)

Number of doses administered (first dose) vs Date

- Immediate change: Level = -31.0, p = 0.284
- Changes in slope: 24, p < 0.001
- Changes in slope: -35, p < 0.001

Pre-intervention slope = -0.5, p = 0.177
Slope (announcement phase) = 23.6, p < 0.001
Slope (implementation phase) = -11.5, p < 0.001

Dose counts are 7-day averages, lag(1)
8. Age group 12-17 years: COVID-19 vaccination rates and proof of vaccination policies interventions: proof of vaccination policy announcement (September 16, 2021) and implementation (October 1, 2021) dose counts are 7 day moving average, lag 1

Partial vaccination (1st dose)

<table>
<thead>
<tr>
<th>Date</th>
<th>Number of doses administered (first dose)</th>
</tr>
</thead>
<tbody>
<tr>
<td>Announcement (Sep 16, 2021)</td>
<td></td>
</tr>
<tr>
<td>Implementation (Oct 1, 2021)</td>
<td></td>
</tr>
</tbody>
</table>

Pre-intervention slope = -3.9, p = 0.003
Slope (announcement phase) = 14.0, p < 0.001
Slope (implementation phase) = -2.0, p = 0.005

Full vaccination (2nd dose)

<table>
<thead>
<tr>
<th>Date</th>
<th>Number of doses administered (second dose)</th>
</tr>
</thead>
<tbody>
<tr>
<td>Announcement (Sep 16, 2021)</td>
<td></td>
</tr>
<tr>
<td>Implementation (Oct 1, 2021)</td>
<td></td>
</tr>
</tbody>
</table>

Pre-intervention slope = -5.5, p = 0.048
Slope (announcement phase) = 6.5, p < 0.001
Slope (implementation phase) = 3.0, p = 0.068

Dose counts are 7-day moving averages, lag(2)
9. Age group 18-39 years: COVID-19 vaccination rates and proof of vaccination policies

Interventions: proof of vaccination policy announcement (September 16, 2021) and implementation (October 1, 2021) dose counts are 7 day moving average, lag 1

**Partial vaccination (1st dose)**

**Full vaccination (2nd dose)**
10. Age group 40-59 years: COVID-19 vaccination rates and proof of vaccination policies
interventions: proof of vaccination policy announcement (September 16, 2021) and implementation (October 1, 2021) dose counts are 7 day moving average, lag 1

Partial vaccination (1st dose)

Full vaccination (2nd dose)
11. Age group ≥60 years: COVID-19 vaccination rates and proof of vaccination policies interventions: proof of vaccination policy announcement (September 16, 2021) and implementation (October 1, 2021) dose counts are 7 day moving average, lag 1

**Partial vaccination (1\textsuperscript{st} dose)**

![Graph showing partial vaccination data for age group ≥60 years]

**Full vaccination (2\textsuperscript{nd} dose)**

![Graph showing full vaccination data for age group ≥60 years]
For more Social Contours and COVID-19 Saskatchewan project:
https://spheru.ca/covid-19/socialcontours/covid-19-results.php

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For more information on the project visit: https://spheru.ca/covid-19/socialcontours/covid-19.php or email social.contouring@usask.ca