The Omicron wave in Newfoundland and Labrador

Dr. Amy Hurford

Memorial University of Newfoundland and Labrador, Canadian Network for Modelling Infectious Disease, Mathematics for Public Health, One Health Modelling Network for Emerging Infections

COVID-19 trends

Summary Trends in COVID-19 cases during the Omicron wave may be difficult to interpret in Newfoundland and Labrador due to a decrease in testing under the provincial system after February 2022 (Figure 3, middle panel). I use an analysis that considers the number of tests performed to estimate total active cases (both reported and unreported, Figure 1). This analysis suggests that in early March 2022, COVID-19 prevalence in Newfoundland and Labrador may have exceeded the previous high of early January 2022. While the approach used has sensitivities and assumptions (i.e., the purple shaded region in Figure 1), this trend to high levels of total active cases (both reported and unreported) in March 2022 is consistent with reported high levels of hospital occupancy and deaths in Newfoundland and Labrador at the same time (Figure 2).

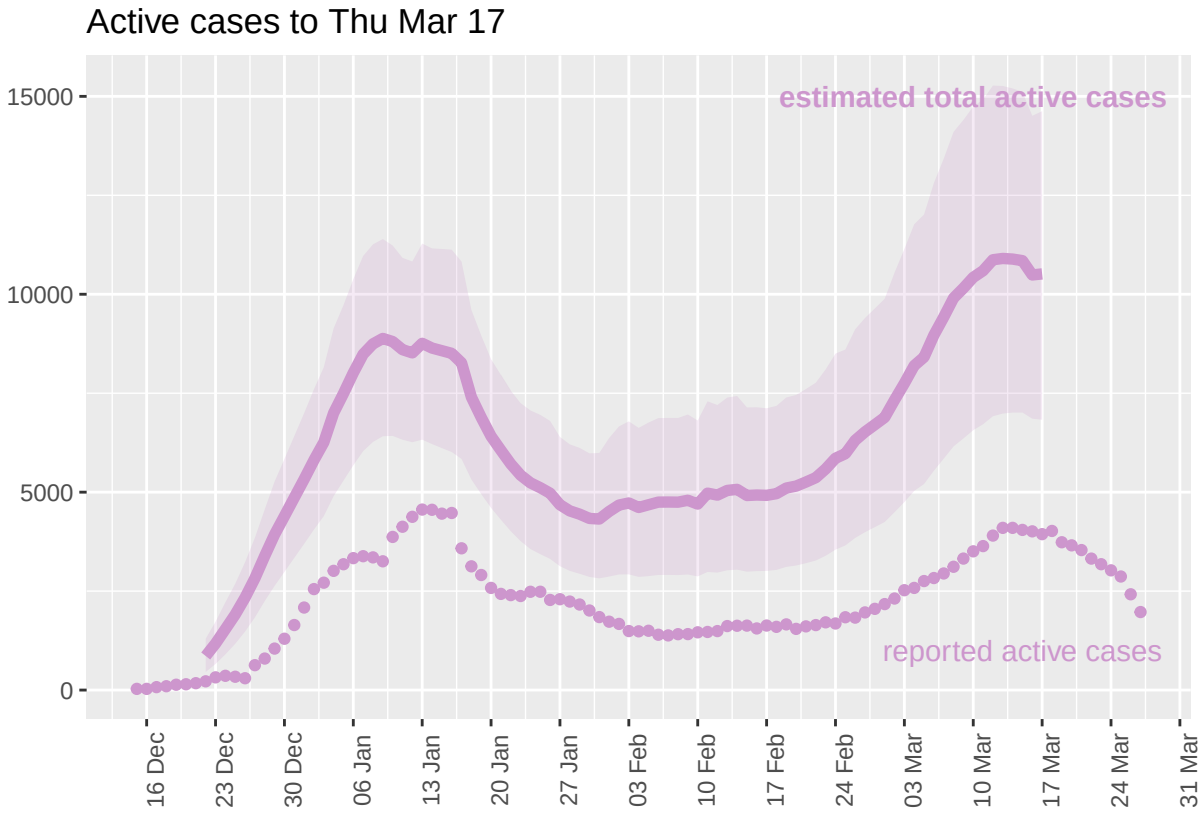

Figure 1. In early March 2022, total active COVID-19 cases in Newfoundland and Labrador may have exceeded their previous peak in January 2022. Total active cases (both reported and unreported - purple shading) are estimated considering both the daily number of tests and the reported number of new cases (see Methods). Reported active cases (purple dots) are the total number of new cases reported on the date given and all 6 days prior. Data source: PHAC. While fewer new cases are reported in March 2022 (Figure 3, upper panel), fewer tests are performed (Figure 3, middle panel). The method to estimate total active cases can weight reported cases more or less heavily. The purple line is the most likely weighting and the shaded regions show upper and lower estimates. Under the lower estimate, total active cases in March 2022 exceeds the previous peak in January 2022 later, indicating sensitivity of relative infection prevalence to this estimate.

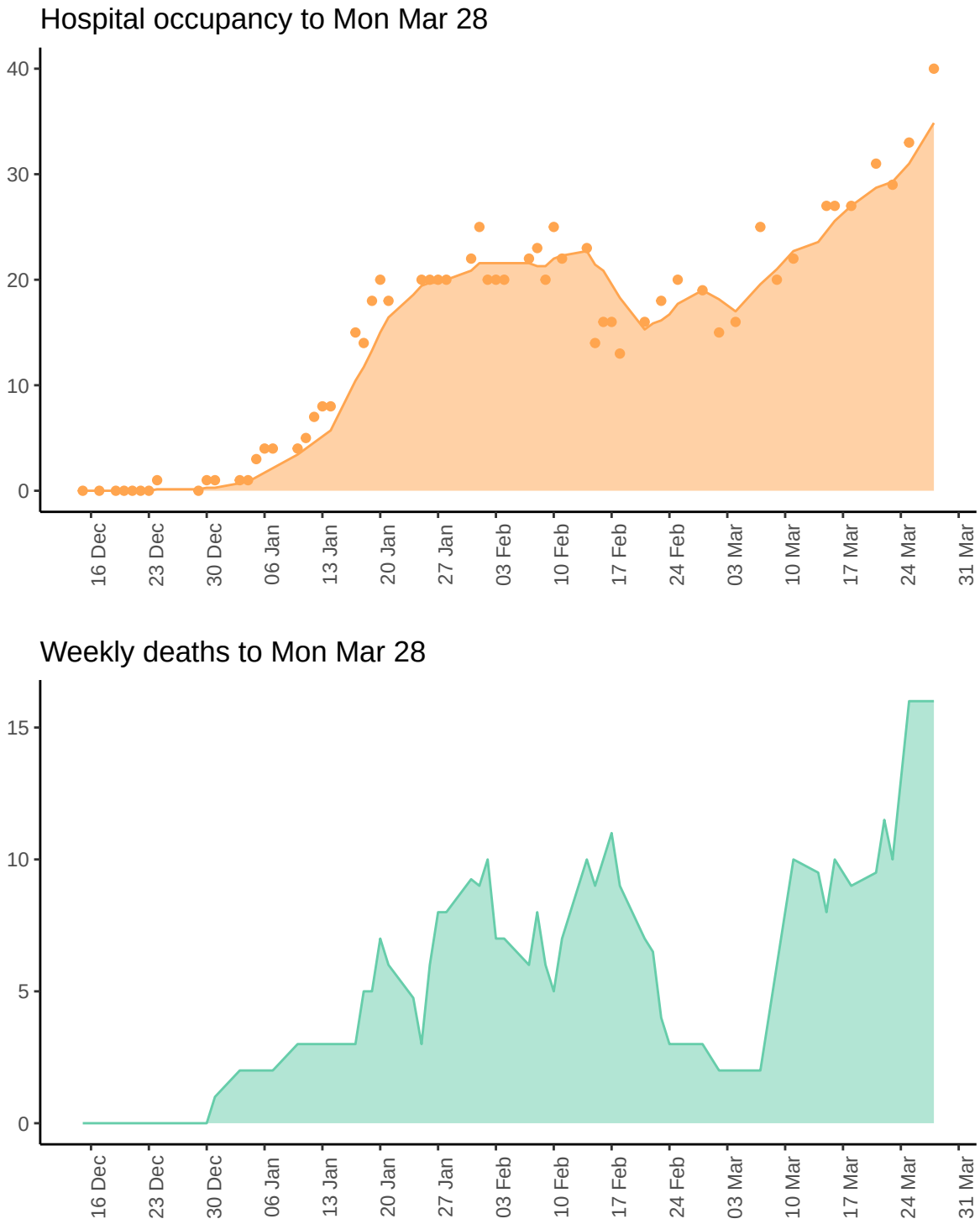

Figure 2. Trends in hospital occupancy and deaths are consistent with the estimated total active cases in Figure 1. Upper panel: Hospital occupancy for individuals admitted for COVID-19 (7-day average - tan shading; data - tan dots). Data source: NL data hub Lower panel: Weekly deaths due to COVID-19 (7-day average - green shading). Due to irregular intervals of reporting, the data for weekly deaths are not shown (i.e., no green dots in the lower panel). Data source: NL data hub

Source data

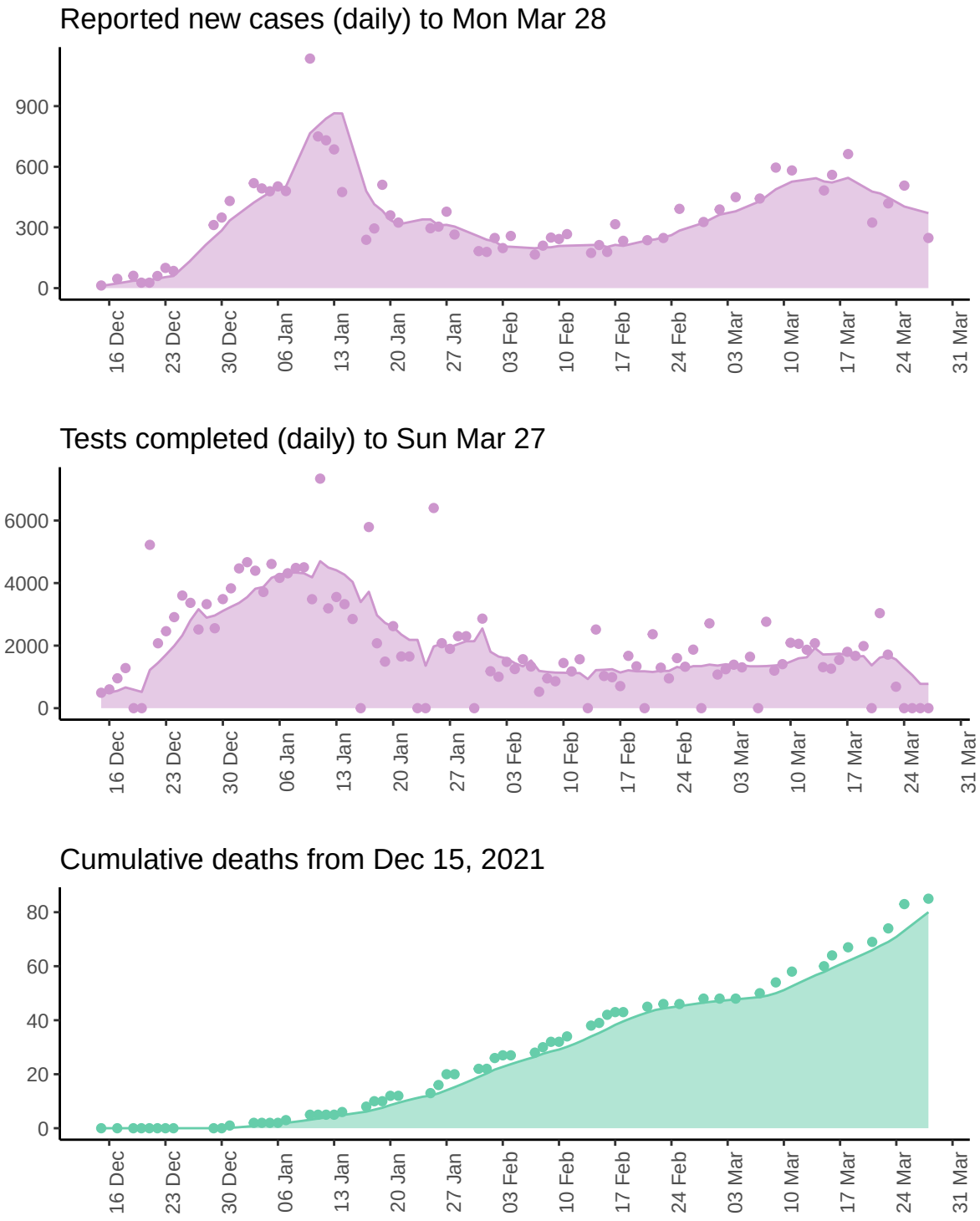

Figure 3. Data used for Figures 1 and 2. Reported new cases (daily; upper panel - purple) and tests (daily; middle panel - purple) are used to estimate the total active cases (Figure 1, upper panel). Cumulative deaths since December 15, 2021 (lower panel - green), is an alternative visualization of the same data shown in the lower panel of Figure 2 to verify accuracy. Dots are data and shading shows a 7-day average. The data source for the upper and lower panel is the NL data hub and for

the middle panel is PHAC.

The local context

On March 14, 2022, Newfoundland and Labrador repealed the public health state of emergency order, lifting most public health measures, and introducing a new data reporting website. On January 7, 2022, and March 17, 2022, PCR eligibility changes were announced. There was a significant shift around late January when rapid antigen tests and testing programs first became widely available to the public. Positive rapid antigen test results can be reported via the provincial COVID assessment and reporting tool.

What data are used for this analysis?

Data after March 11 are manually tracked from the data hub. Data prior to March 11 were downloaded from the NL government website. The last 10 entries of data are:

```
##          date cases hosp.occ new.deaths
## 1  2022-03-19   449       NA          0
## 2  2022-03-20   449       NA          0
## 3  2022-03-21   324       31          2
## 4  2022-03-22   267       NA          0
## 5  2022-03-23   419       29          5
## 6  2022-03-24   454       NA          0
## 7  2022-03-25   507       33          9
## 8  2022-03-26   370       NA          0
## 9  2022-03-27   539       NA          0
## 10 2022-03-28   248       40          2
```

The last 10 days of data from PHAC are:

```
##          date cases tests
## 1  2022-03-14   443  1311
## 2  2022-03-15   483  1262
## 3  2022-03-16   560  1546
## 4  2022-03-17   609  1802
## 5  2022-03-18   663  1672
## 6  2022-03-19   449  1985
## 7  2022-03-20   162  1519
## 8  2022-03-21   162  1519
## 9  2022-03-22   267  1713
## 10 2022-03-23   419   686
```

Useful resources

[1] Factors affecting hospitalization risk in NL.

[2] Estimated fraction of Omicron cases in NL that result in death.

[3] COVID-19 trends in NL might also be determined from wastewater surviellence.

Methods

Geometric mean method I estimate the prevalence of unreported cases 7 days ago as approximately the geometric mean ($n = 0.54$) of the per capita reported new cases (14-day rolling average), and the proportion of tests that are positive (14-day rolling average; see Chui and Ndeffo-Mbah (2021) for details). The value of n is 0.54 ($n = 0.5$ is the geometric mean) and the lower and upper estimates are 0.46 and 0.67 (see Table 2 of Chui and Ndeffo-Mbah (2021))