IDEA model fits to daily Canadian COVID-19 data

16-Jun-2020
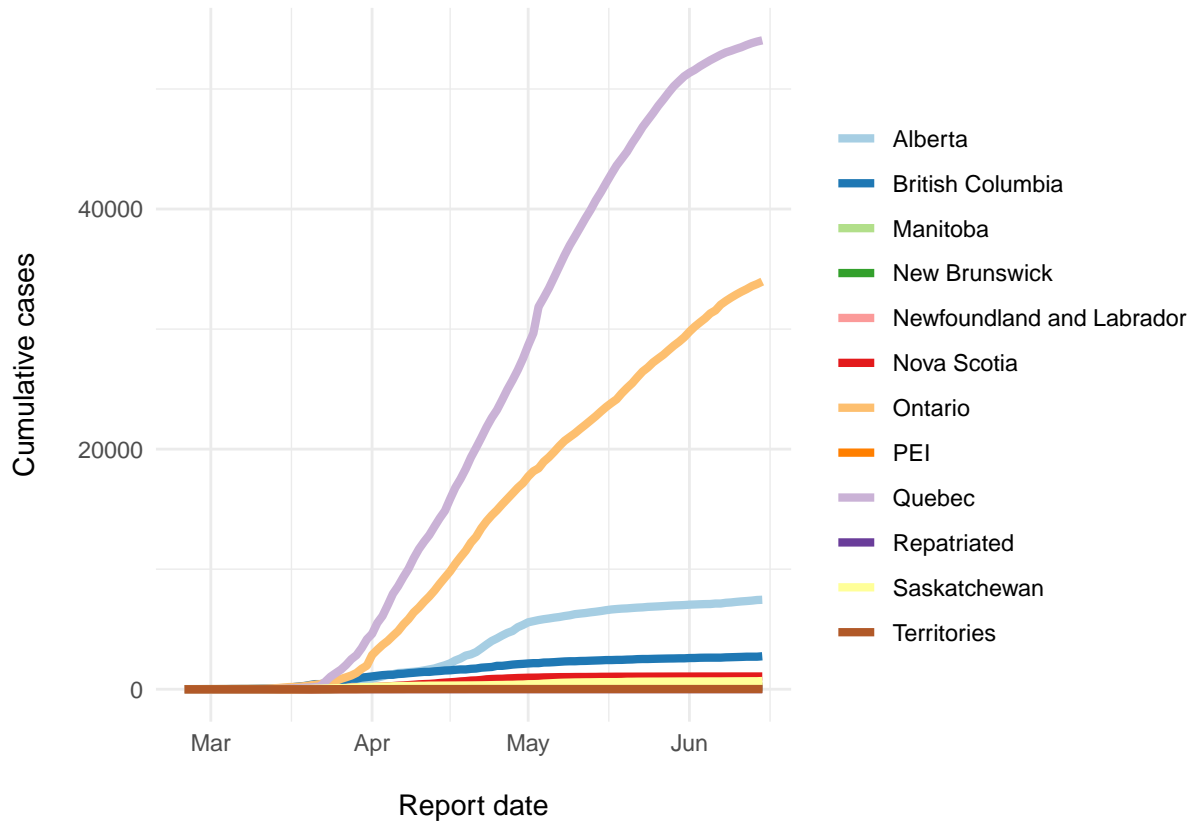

Figure 1: Cumulative cases

Overview

Daily fits to reported case counts are presented for provinces/regions reporting substantial COVID-19 activity using the IDEA model. This report was run on 2020-06-16 05:10:29. Forecasts are based on reported case data up to 2020-06-15. Data are collected by the COVID-19 Canada Open Data Working Group.

For each province, we show the model fit to incident and cumulative cases. We also include a daily estimate of the discount factor (d). The metric provides a measure of the degree of control that is occurring. A larger value is better - it suggests more control and therefore slowing epidemic growth. The value of d is estimated every day, using all of the case data up to the date of estimation. When estimates of d are stable (no large swings), this suggests that the model estimates are reliable. Large swings in estimates of d over time suggest unstable model estimates and less confidence in the forecasts – this may indicate that a new outbreak wave is coming or a change in case definition or testing criteria (as was seen in Quebec). A decline in d corresponds to worsening control.

The effective reproduction number (R_t) is calculated over time. Our goal is for this value to be less than 1. A value <1 indicates that each old case is making less than one new case on average and the epidemic is under control. Note that we're estimating R_t using the reported case data. Ideally, we'd want to use onset or

transmission dates but since we're using publicly-reported, aggregate data across jurisdictions with different reporting lags, we're not attempting to adjust the data. The method used is described here.

Table 1: Estimated effective reproductive numbers and 95% confidence intervals

Region	Rt	95% confidence interval
Canada	0.66	0.44-0.85
Alberta	0.98	0.22-1.67
British Columbia	1.36	0.11-2.44
Manitoba	1.00	0-4.53
New Brunswick	0.33	0-2.85
Newfoundland and Labrador	0.56	0-3.33
Nova Scotia	1.00	0-4.62
Ontario	0.56	0.27-0.84
Quebec	0.63	0.26-0.98
Saskatchewan	2.88	0.61-4.93
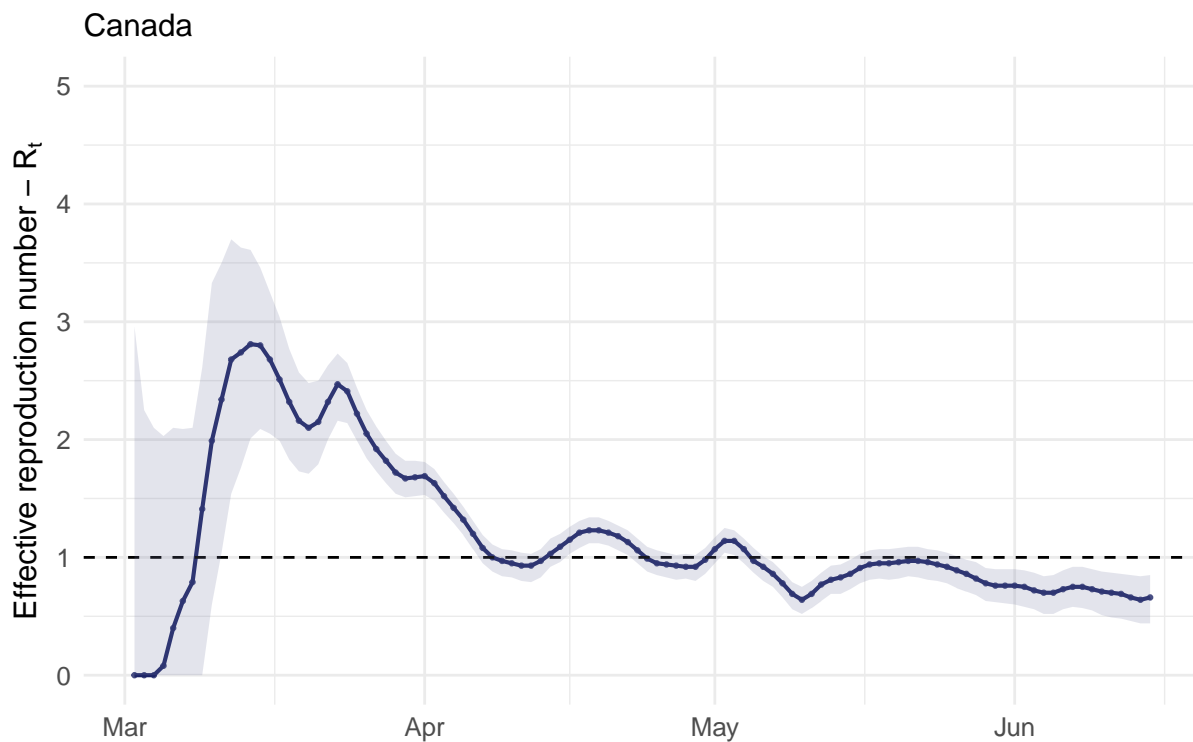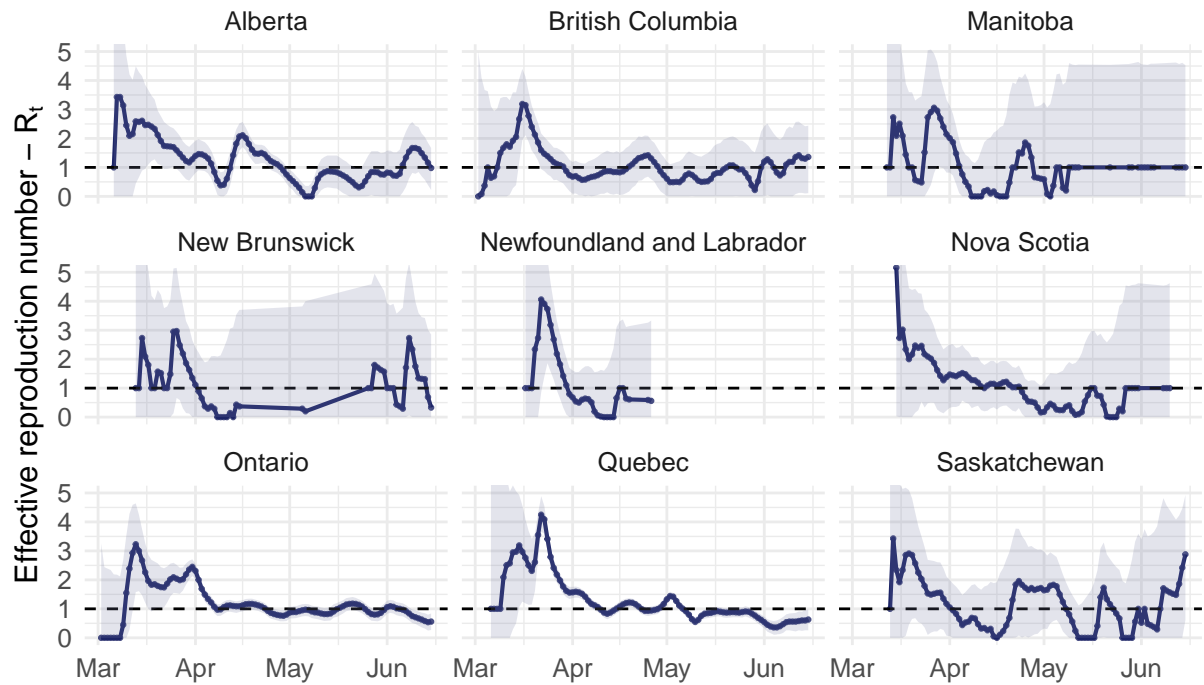
Canada

Figure 2: Alternate method for estimating effective reproductive number
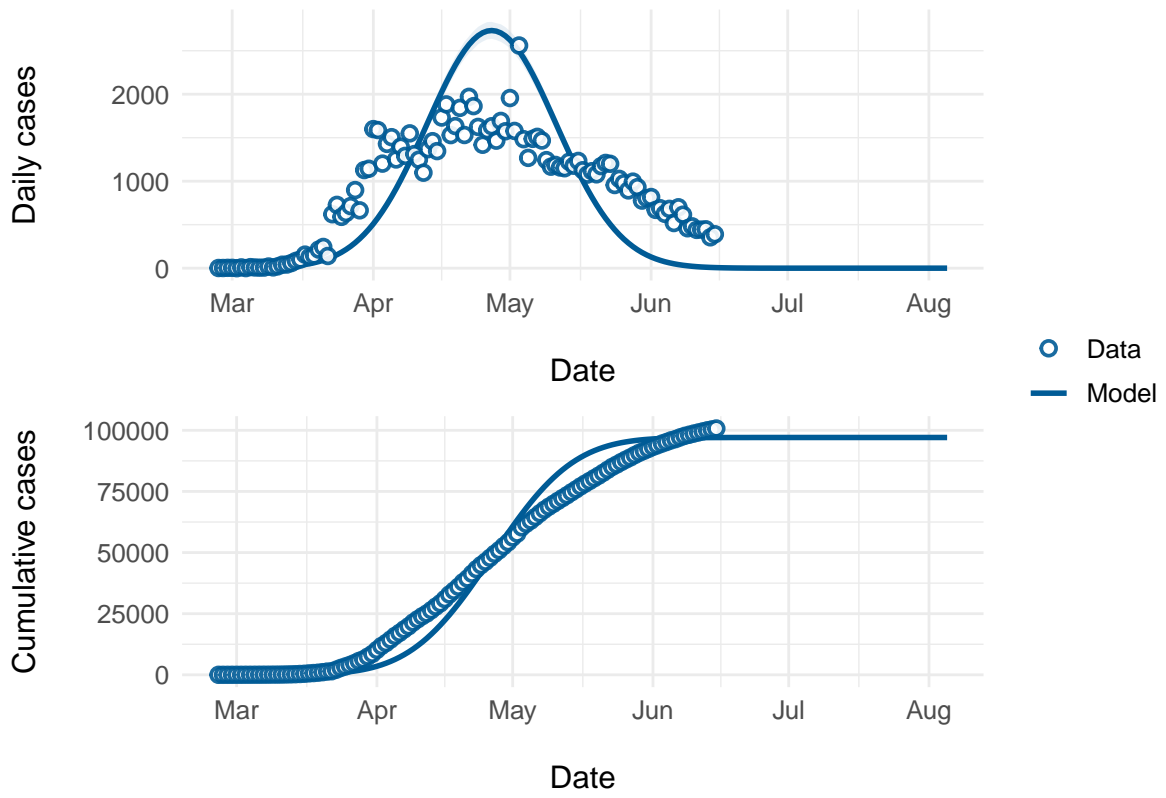
Figure 3: Canada
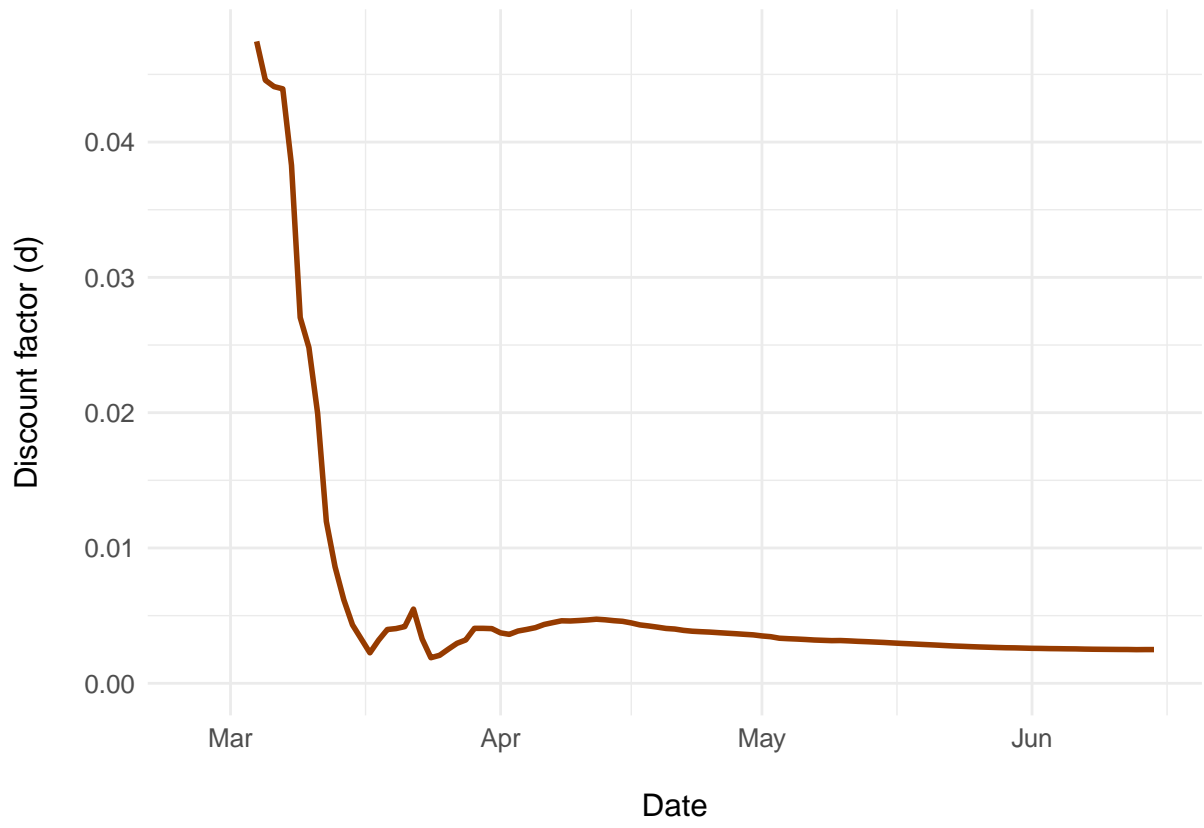
Figure 4: Discount factor - Canada
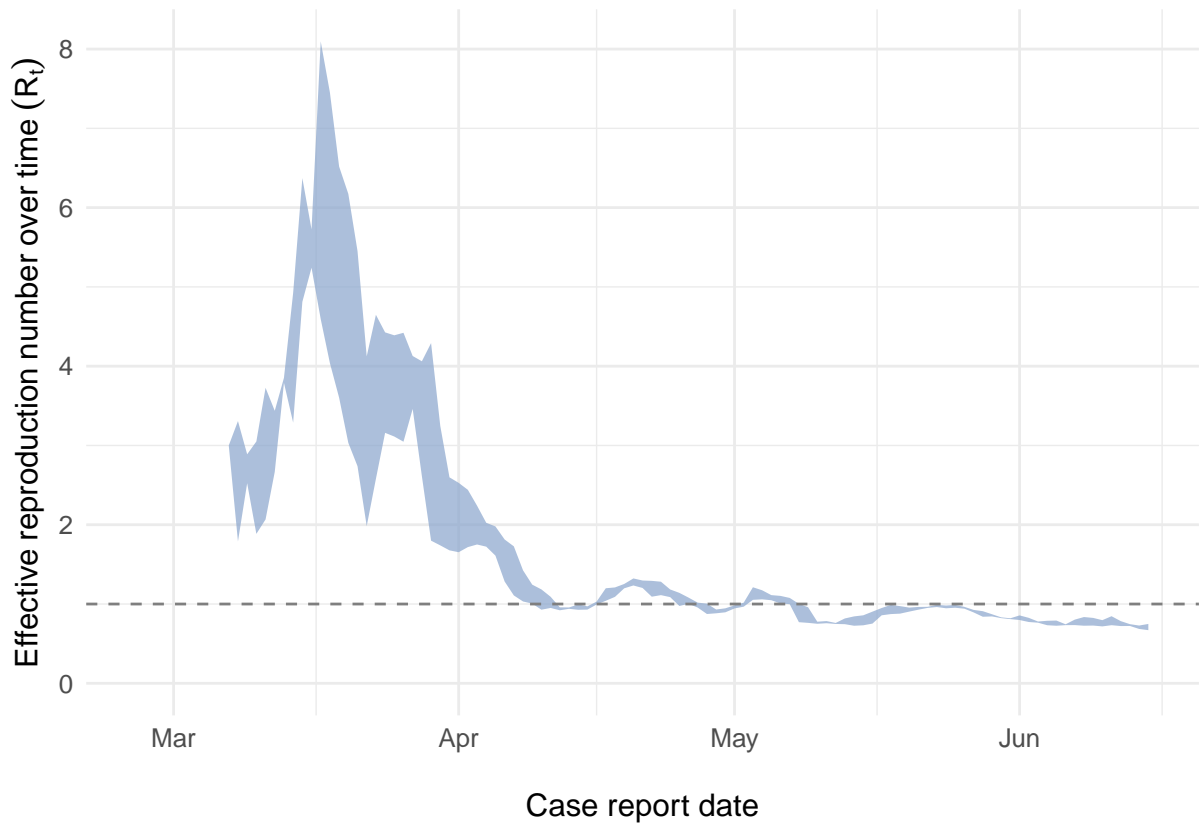
Figure 5: Effective reproductive number - Canada
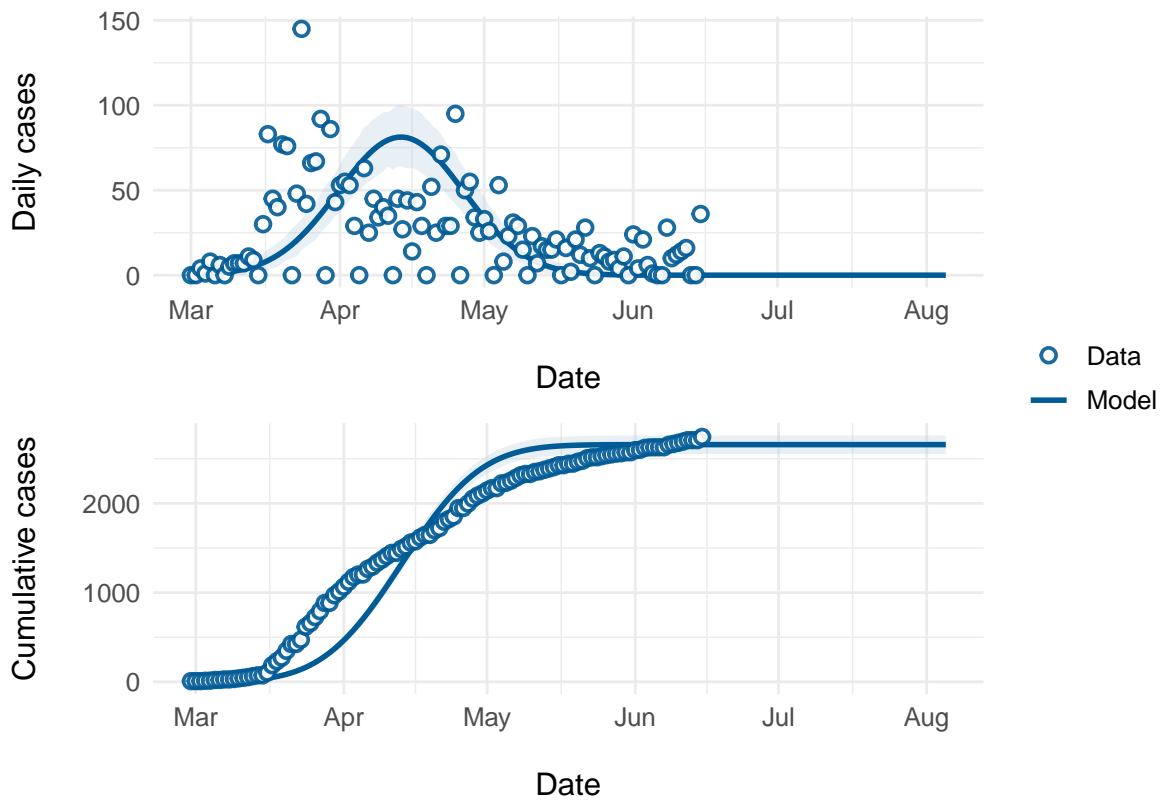
Figure 6: British Columbia
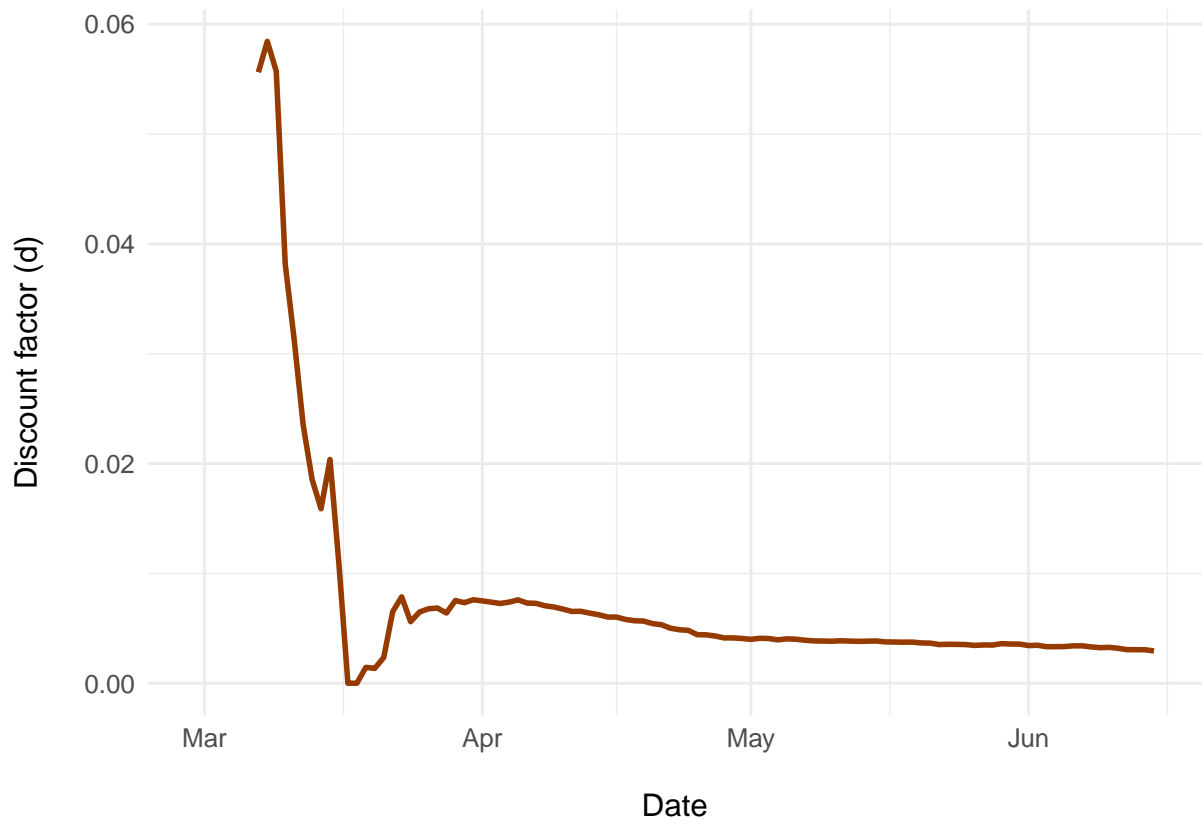
Figure 7: Discount factor - British Columbia
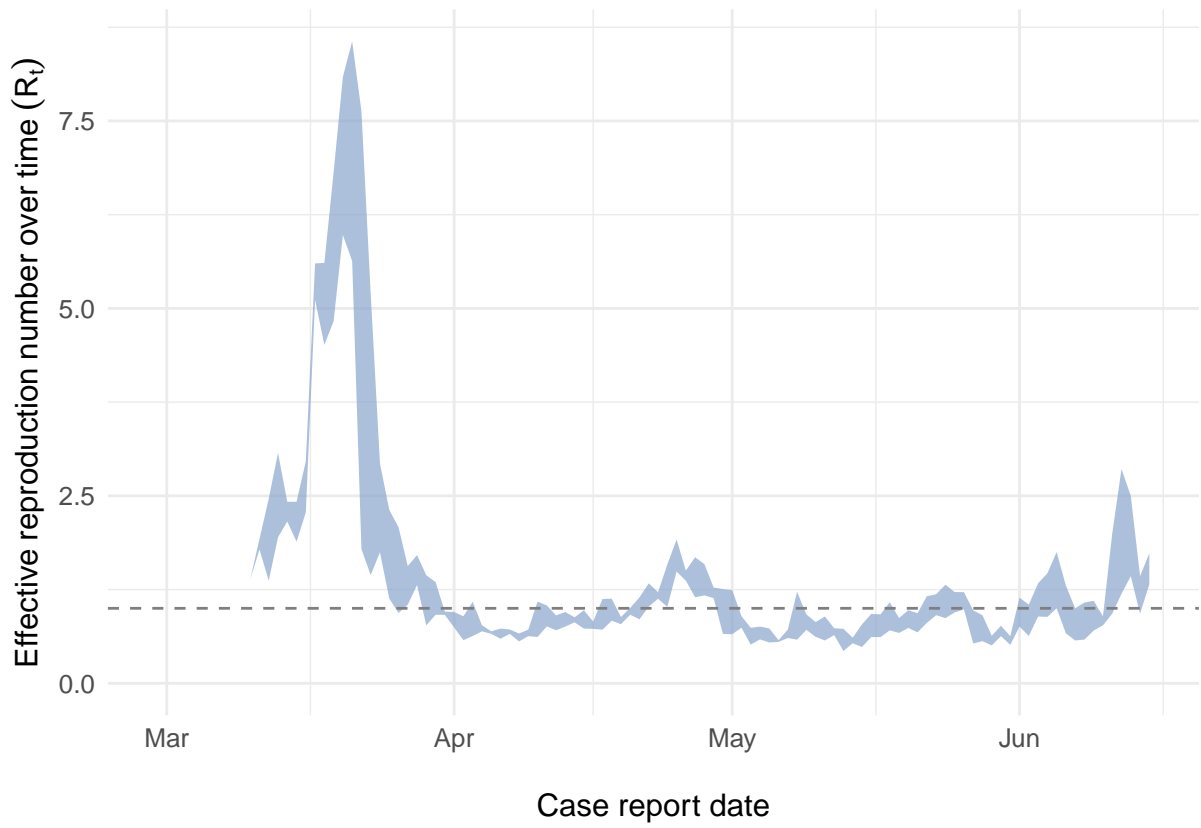
Figure 8: Effective reproductive number - British Columbia
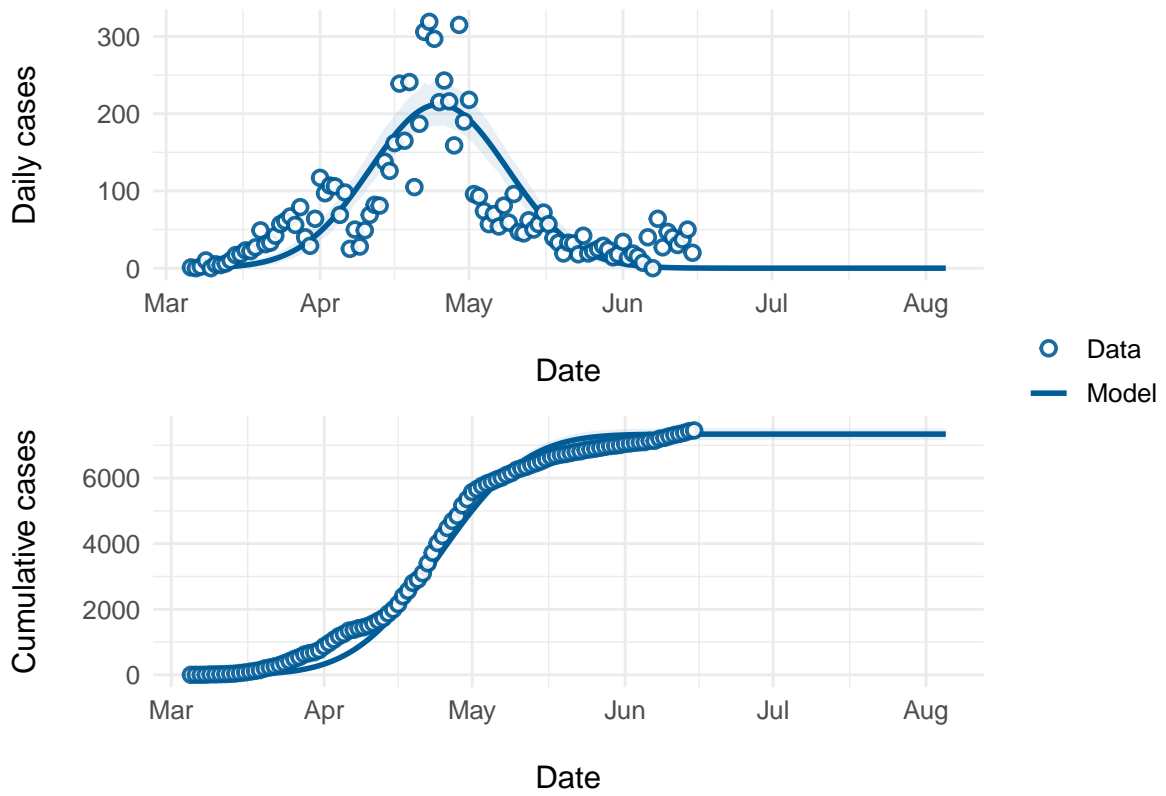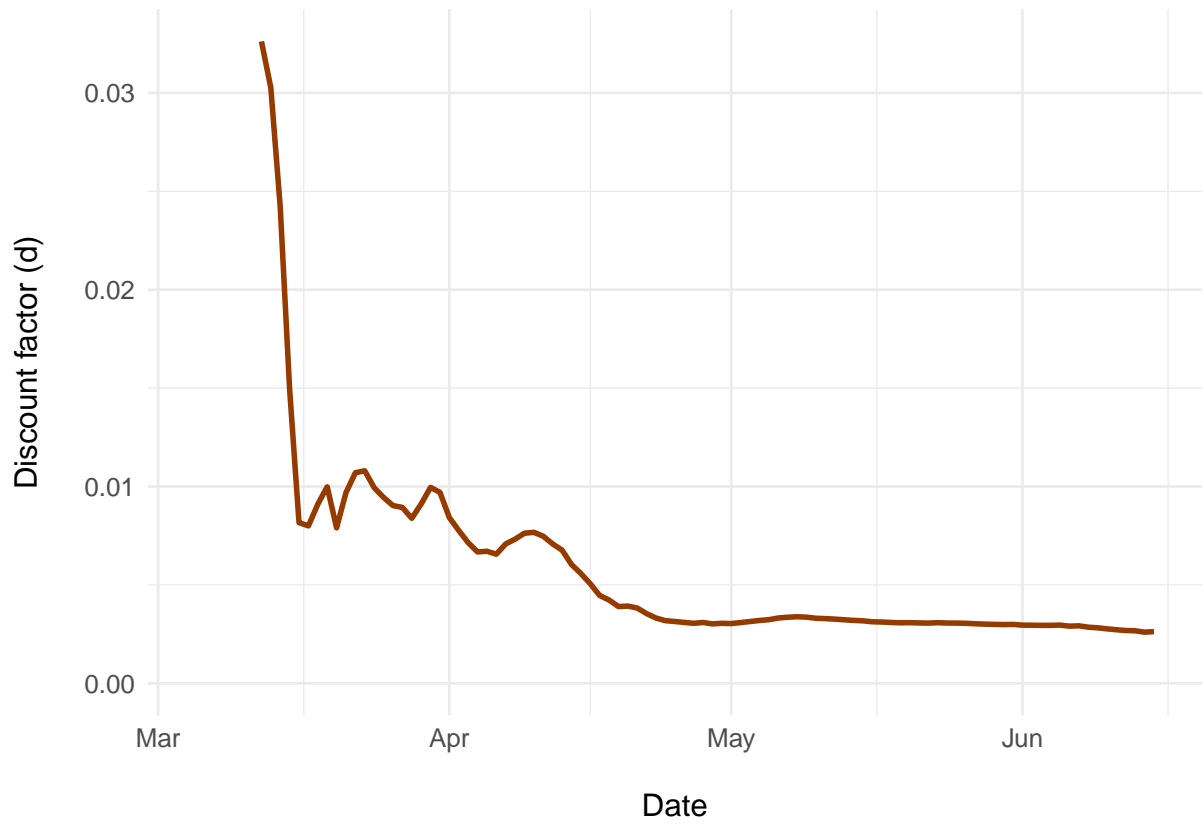
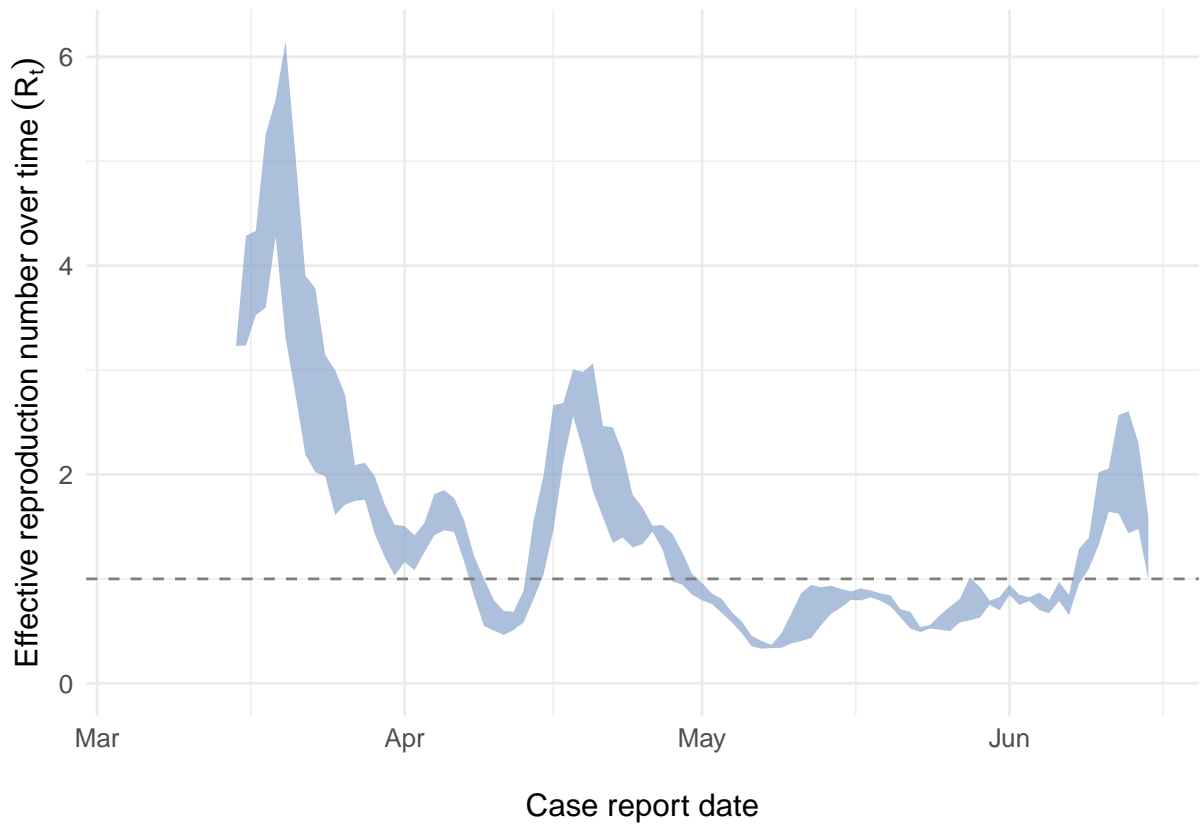Figure 9: Alberta

Figure 10: Discount factor - Alberta

Figure 11: Effective reproductive number - Alberta
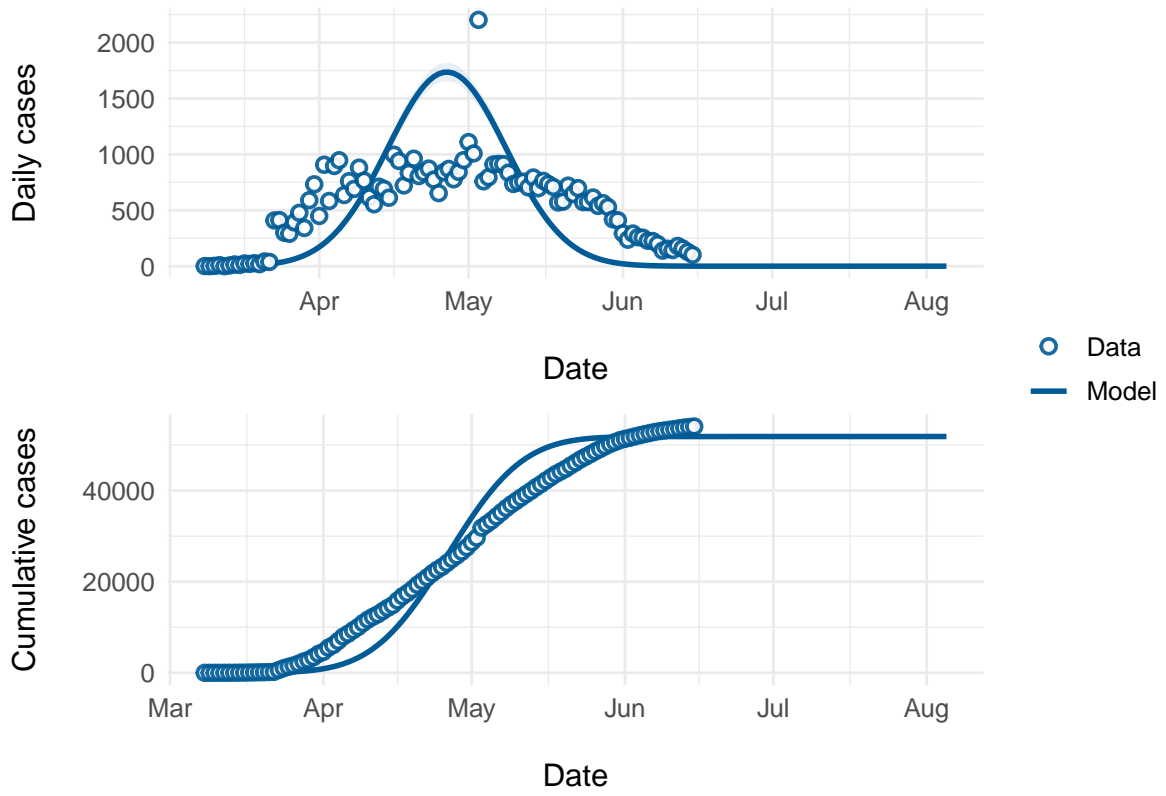
Figure 12: Quebec
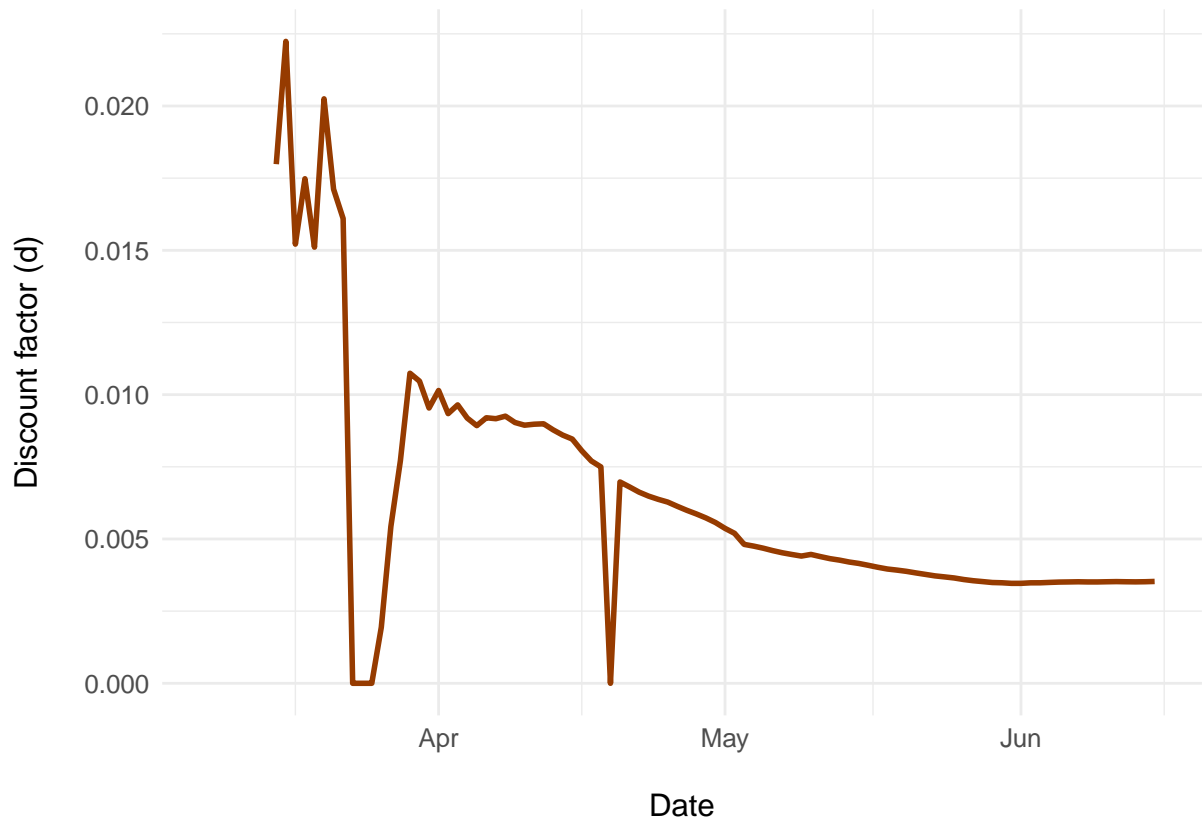
Figure 13: Discount factor - Quebec
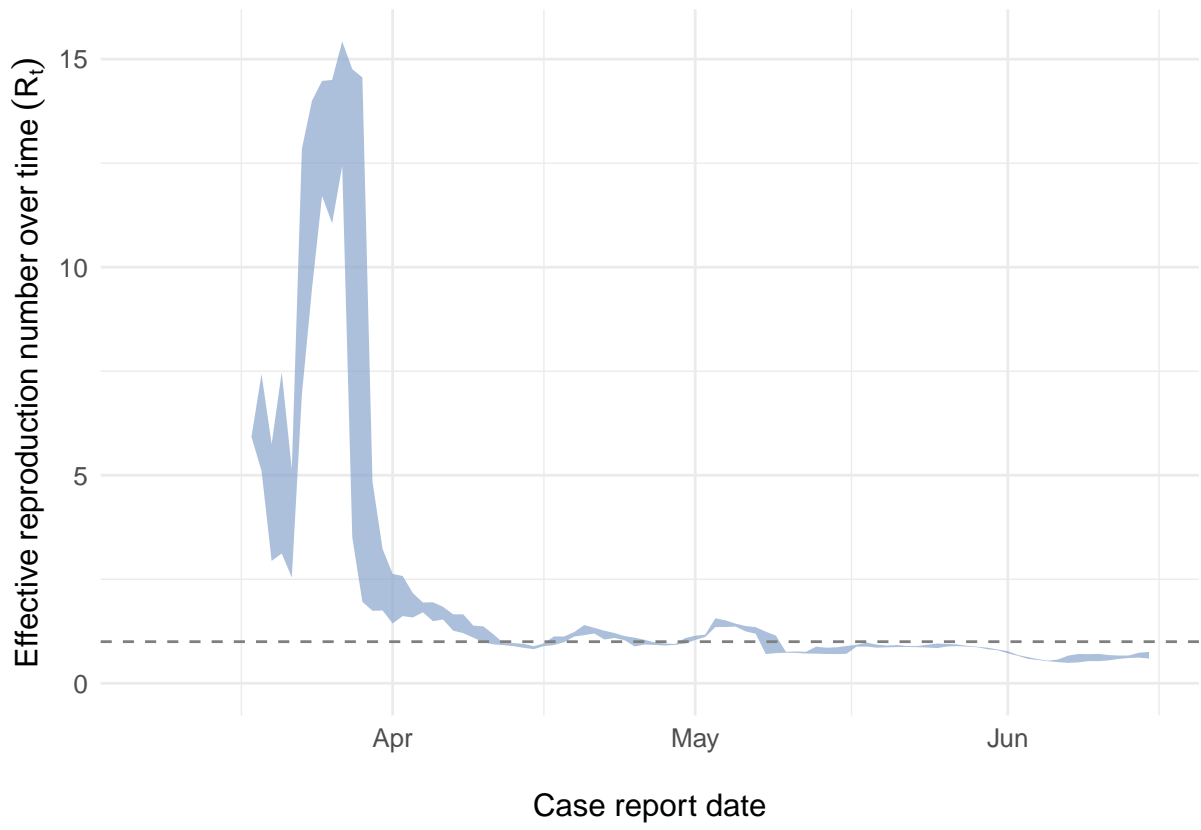
Figure 14: Effective reproductive number - Quebec
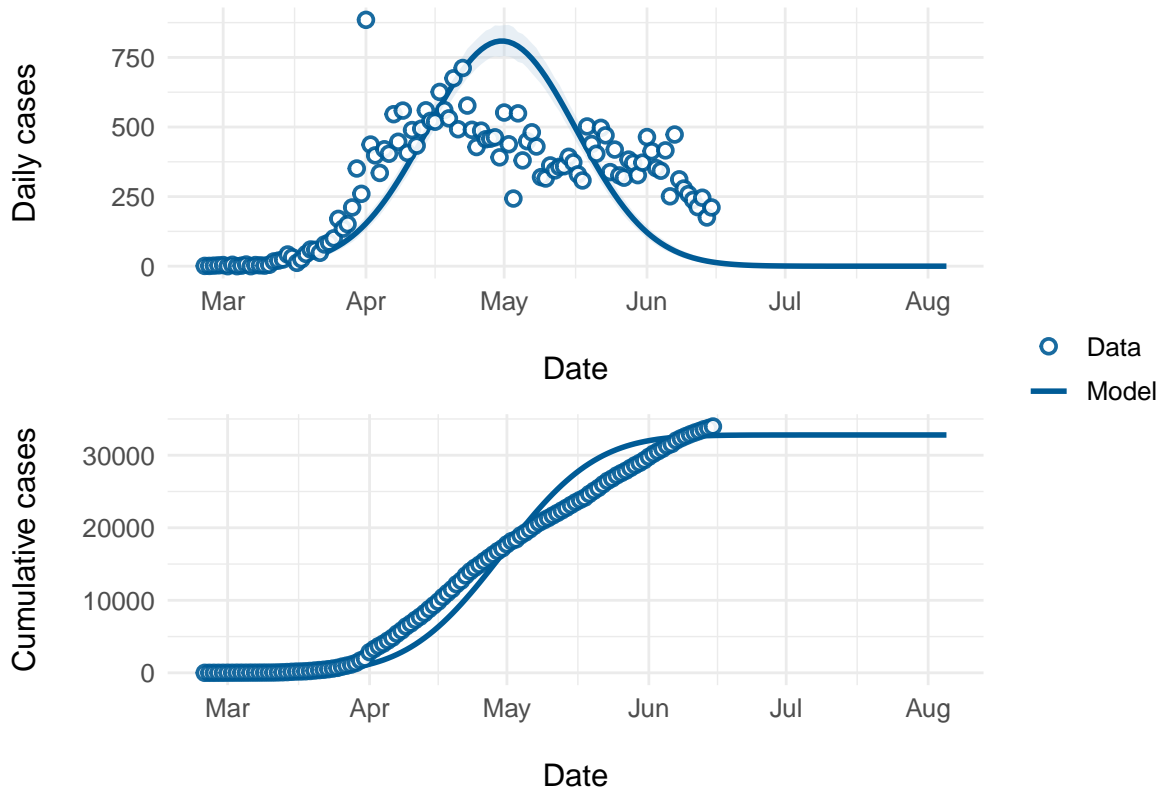
Figure 15: Ontario
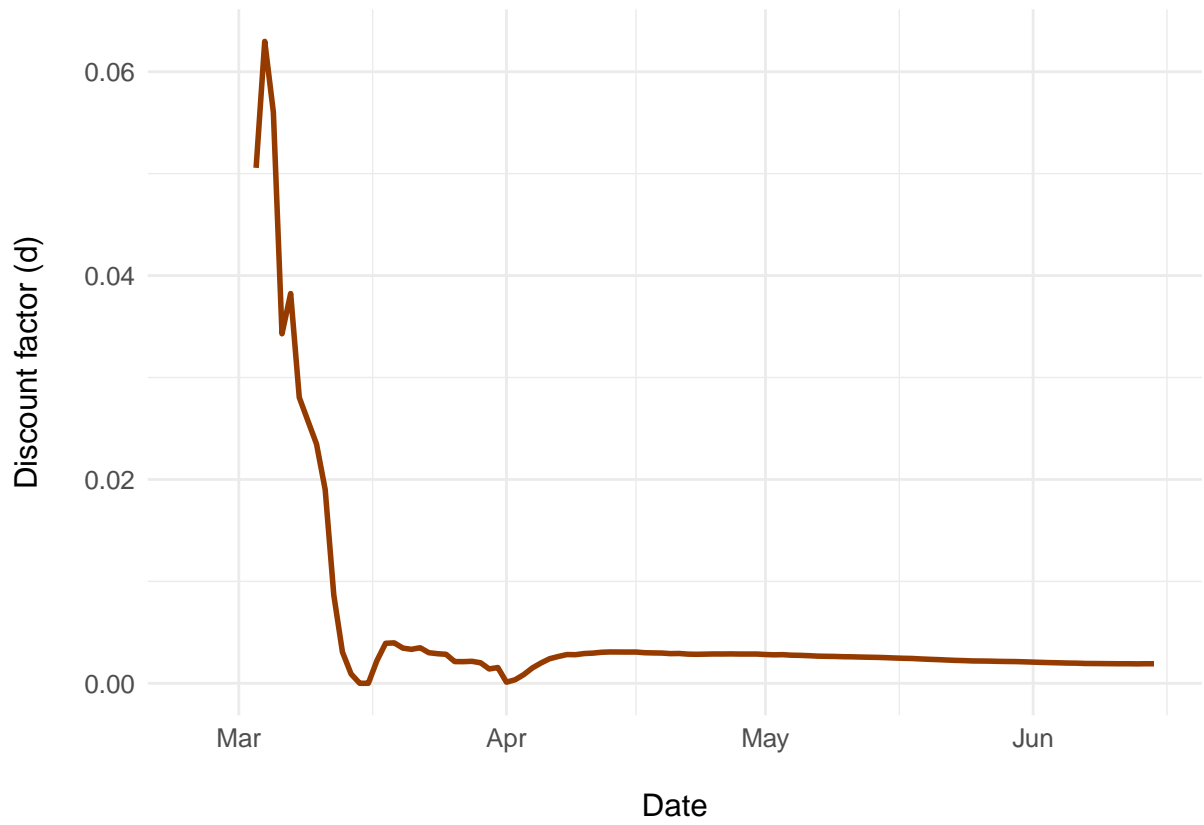
Figure 16: Discount factor - Ontario
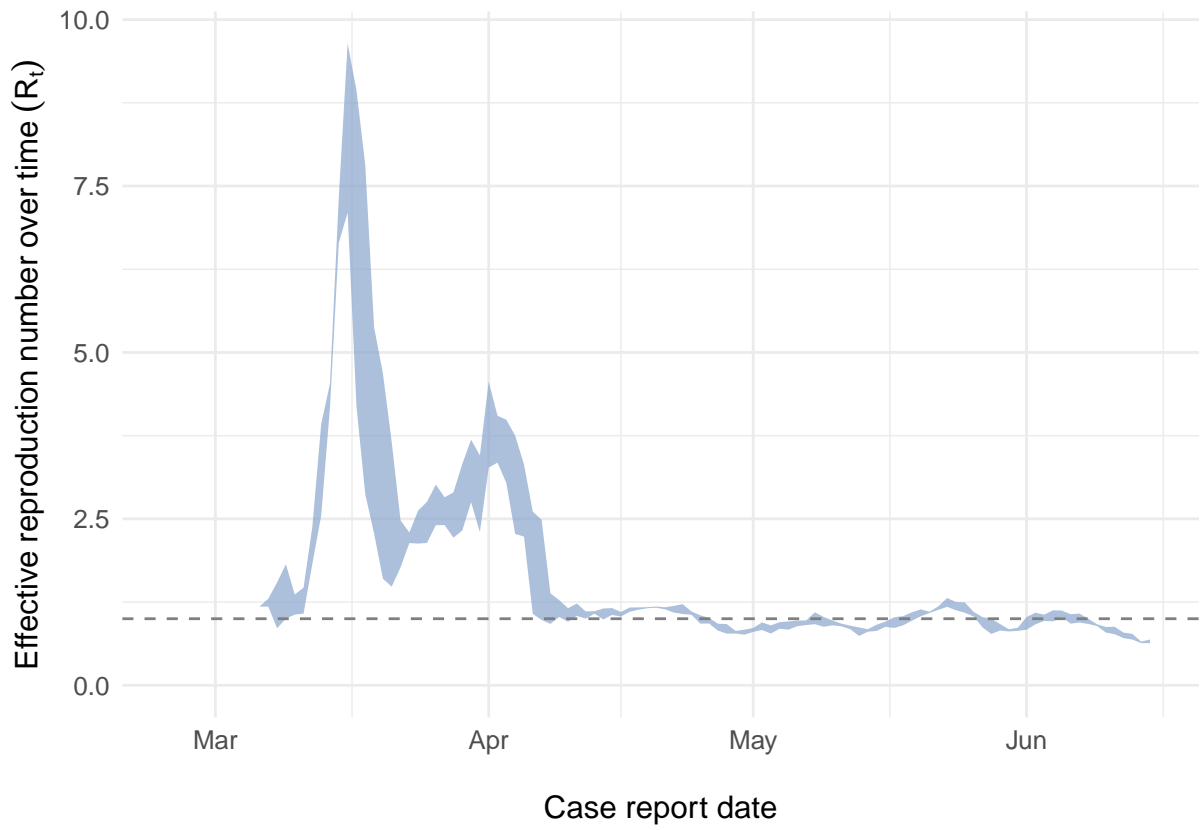
Figure 17: Effective reproductive number - Ontario
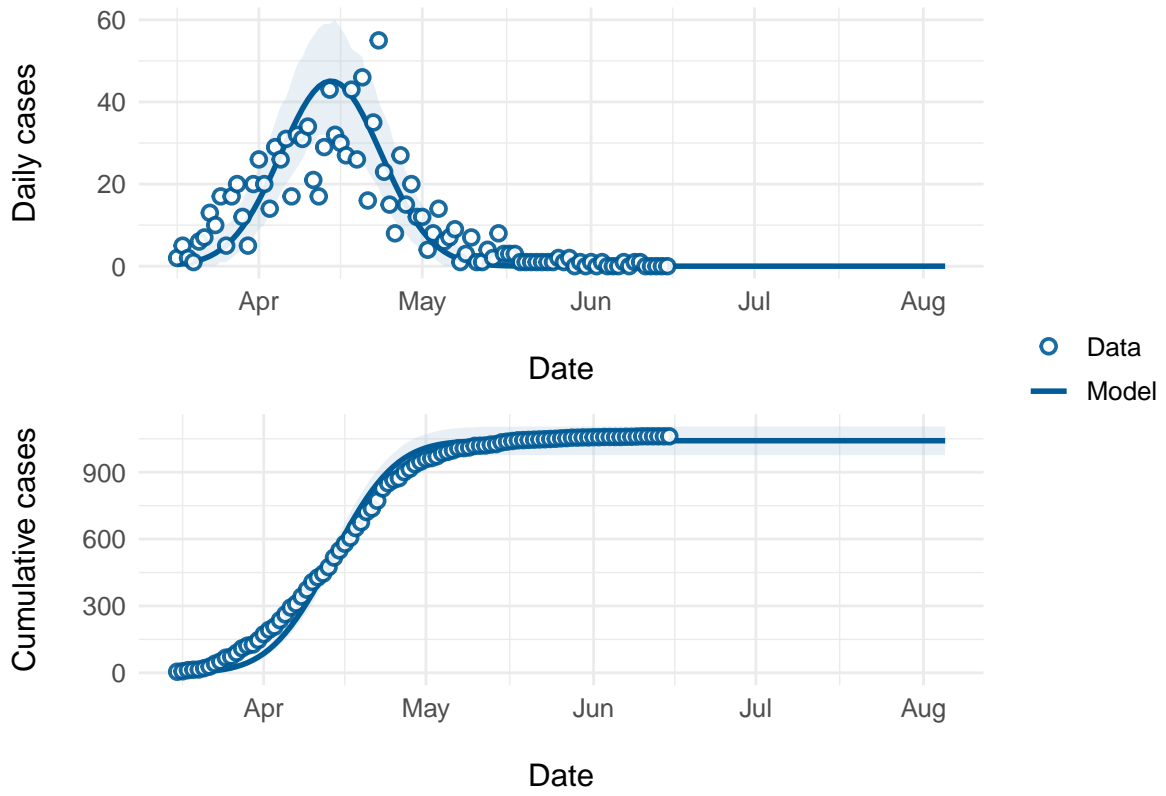
Figure 18: Nova Scotia
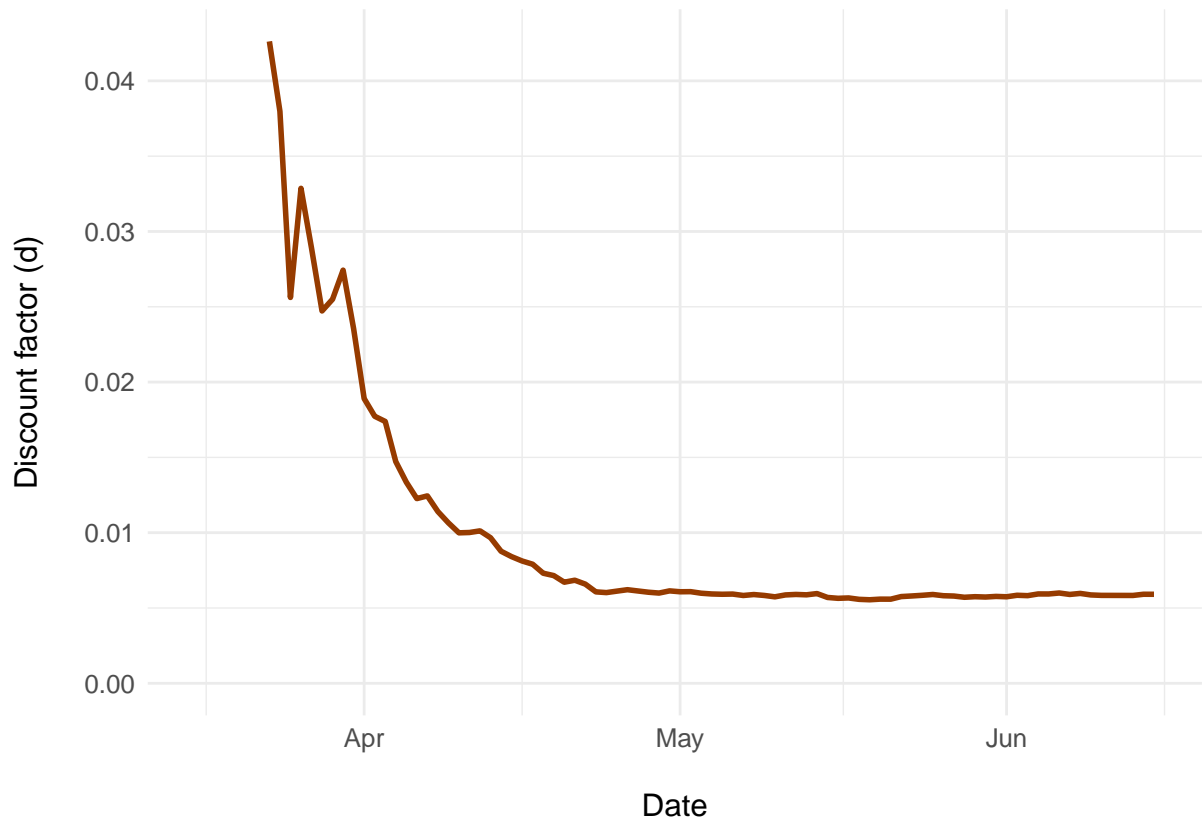
Figure 19: Discount factor - Nova Scotia
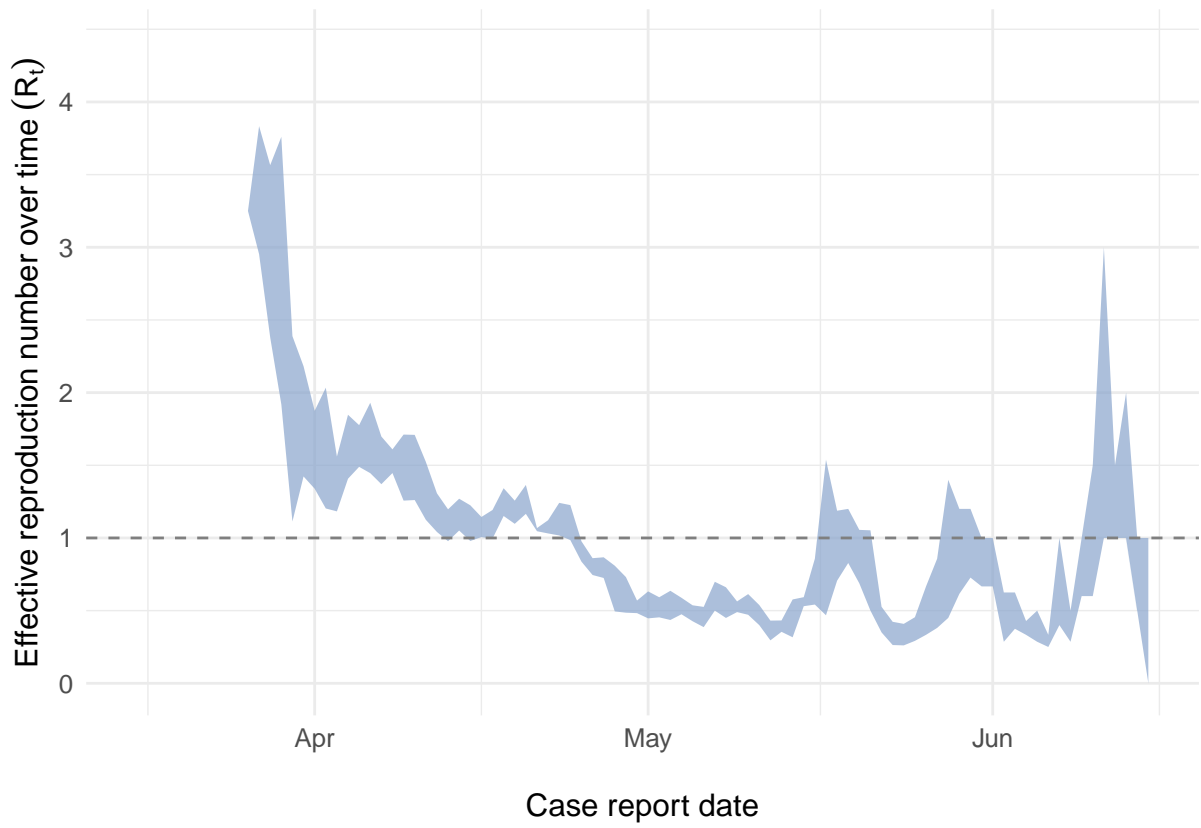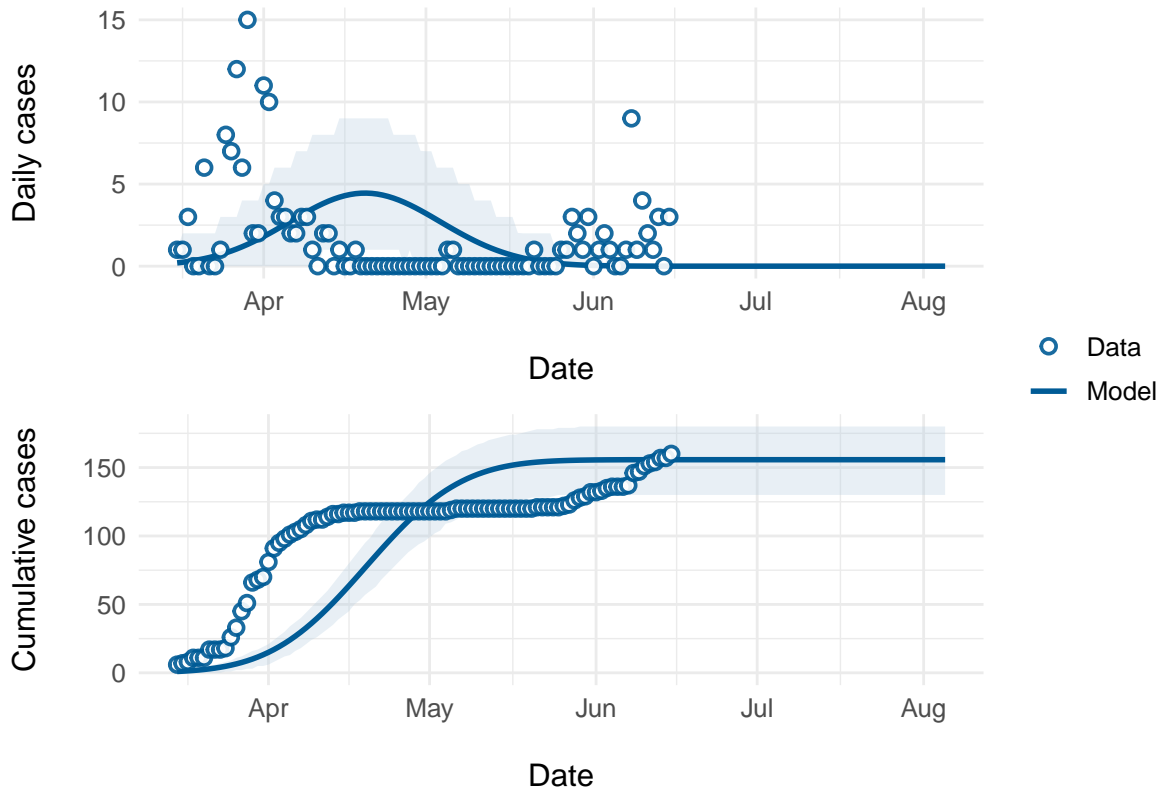
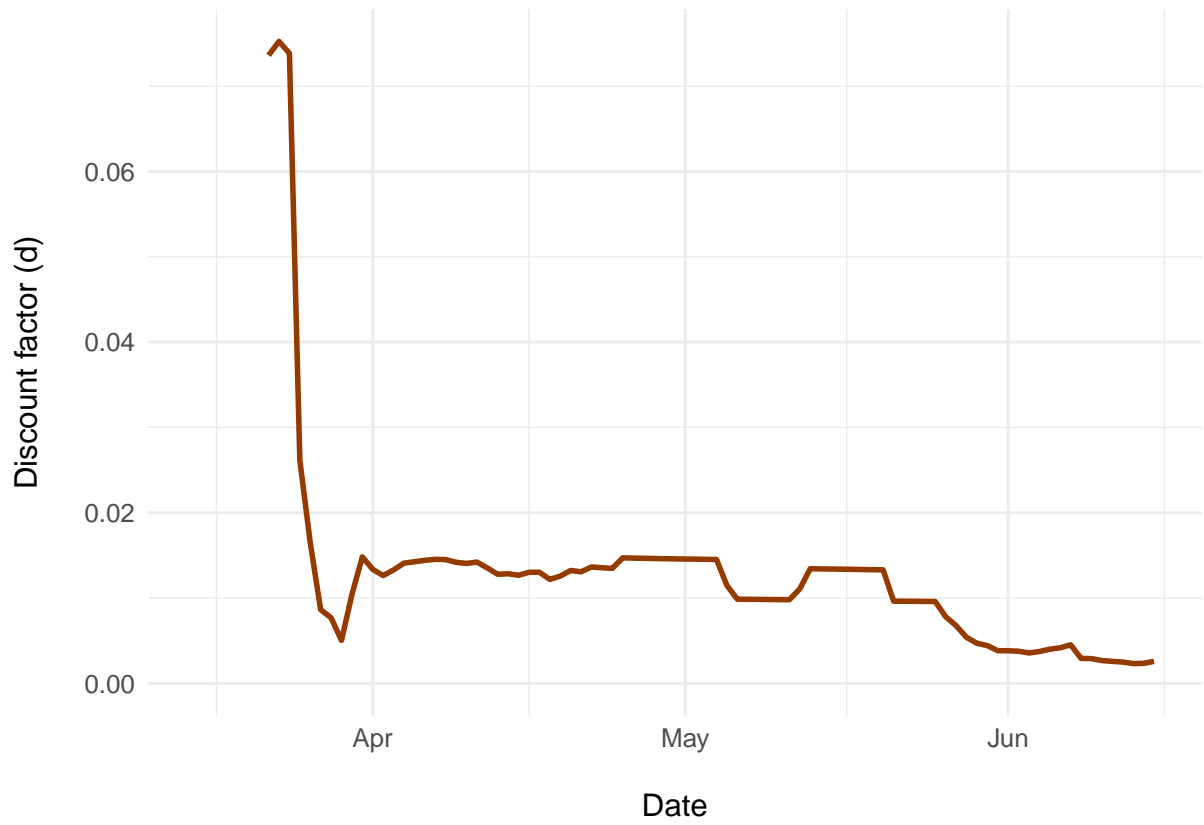Figure 20: Effective reproductive number - Nova Scotia

Figure 21: New Brunswick

Figure 22: Discount factor - New Brunswick

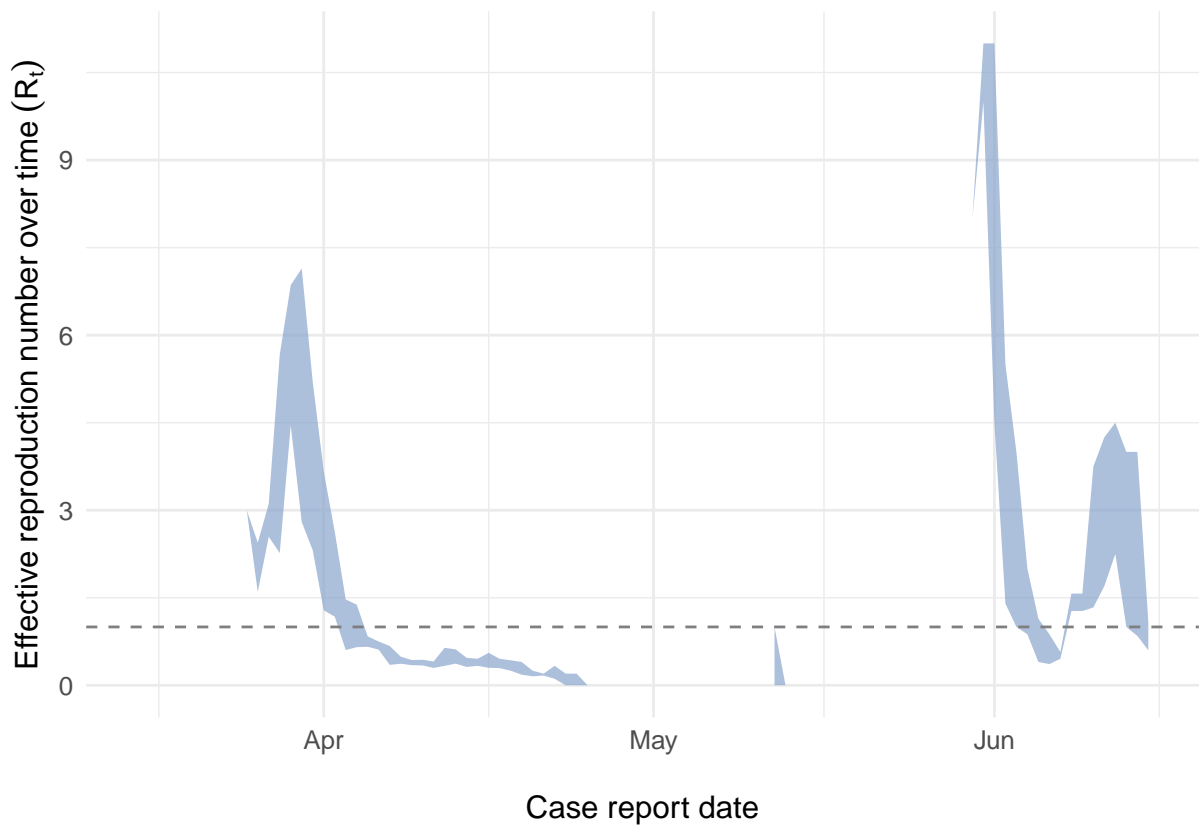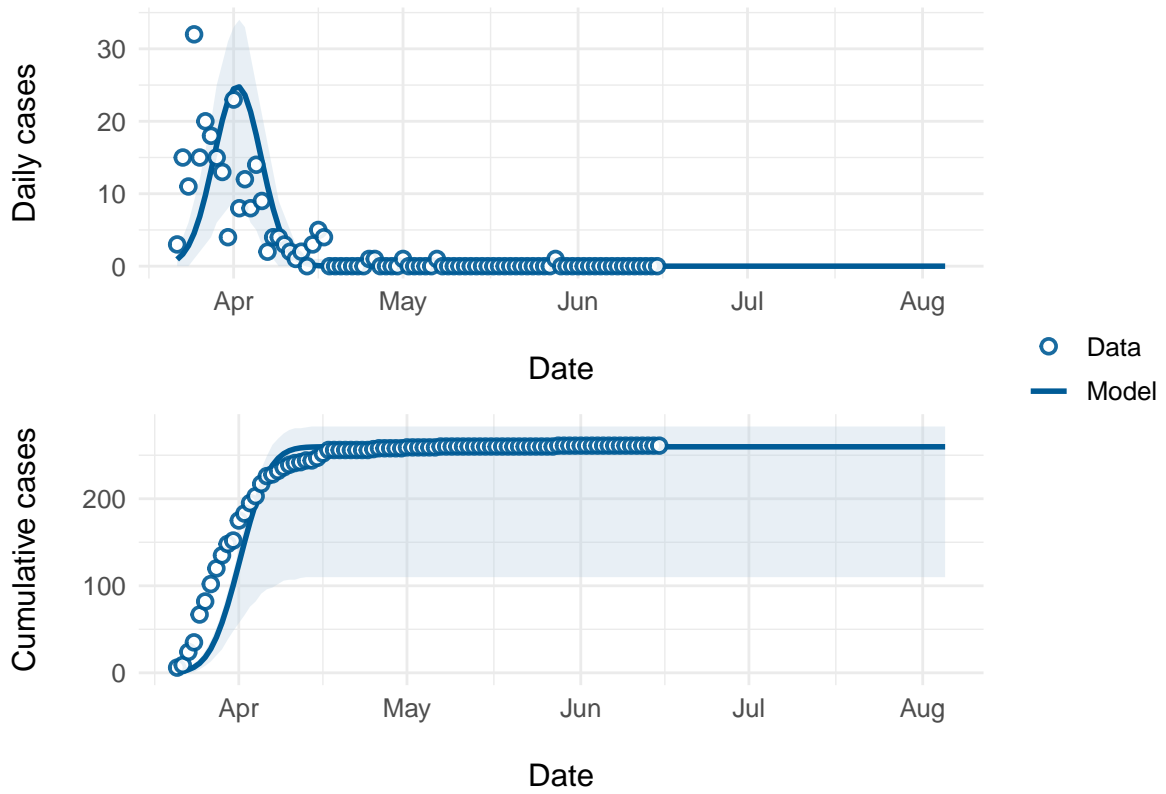Figure 23: Effective reproductive number - New Brunswick
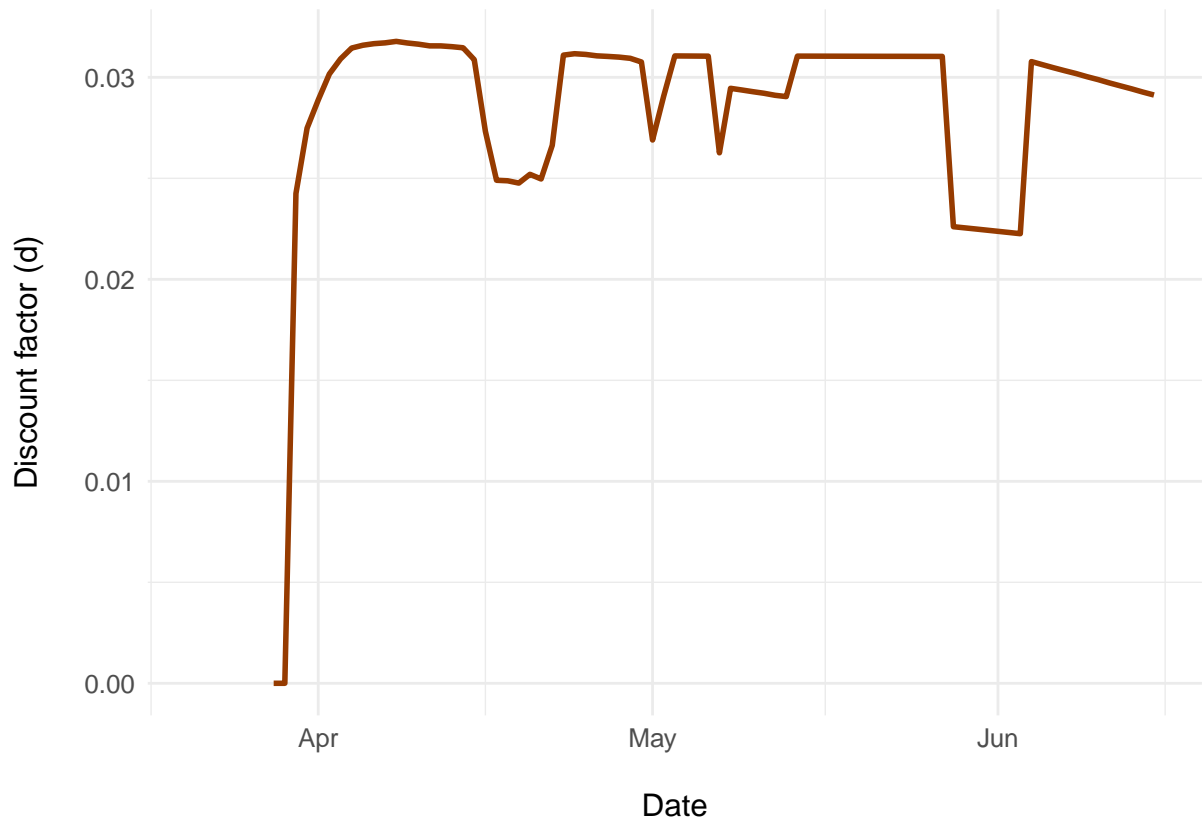
Figure 24: Newfoundland and Labrador

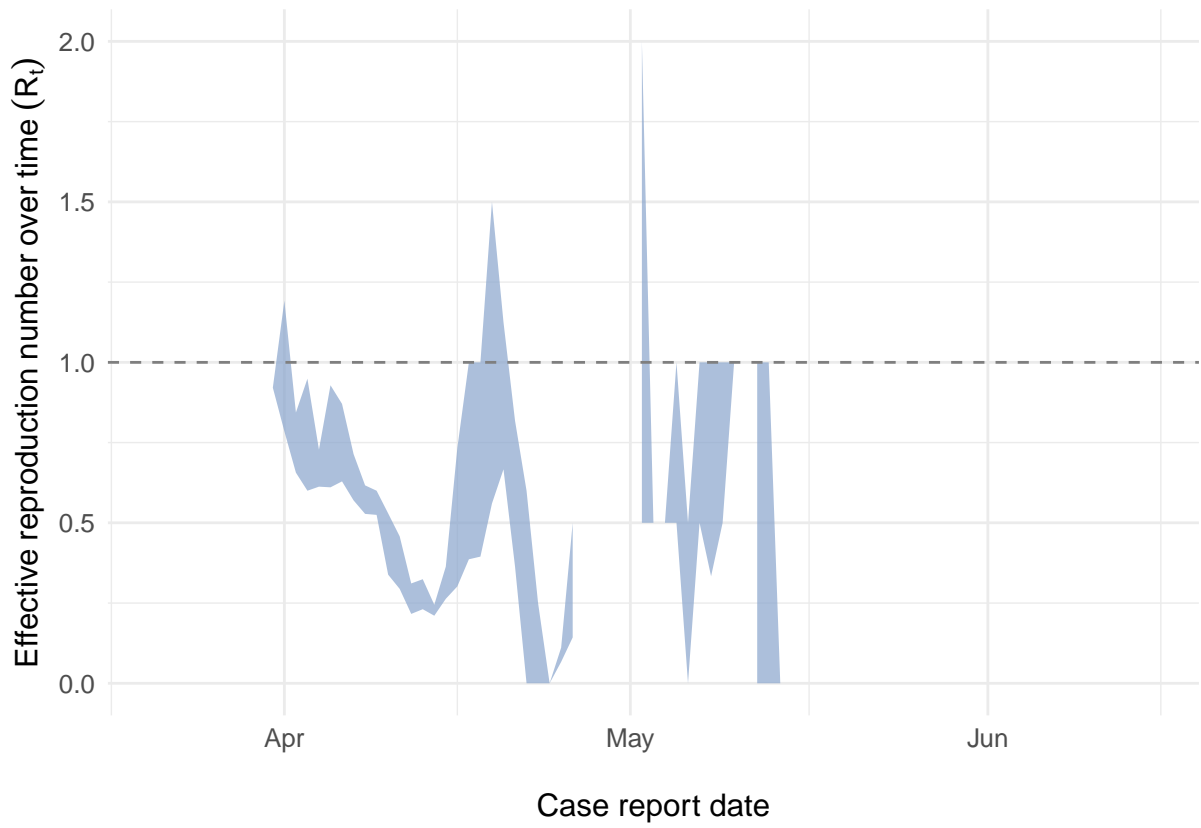Figure 25: Discount factor - Newfoundland and Labrador

Figure 26: Effective reproductive number - Newfoundland and Labrador
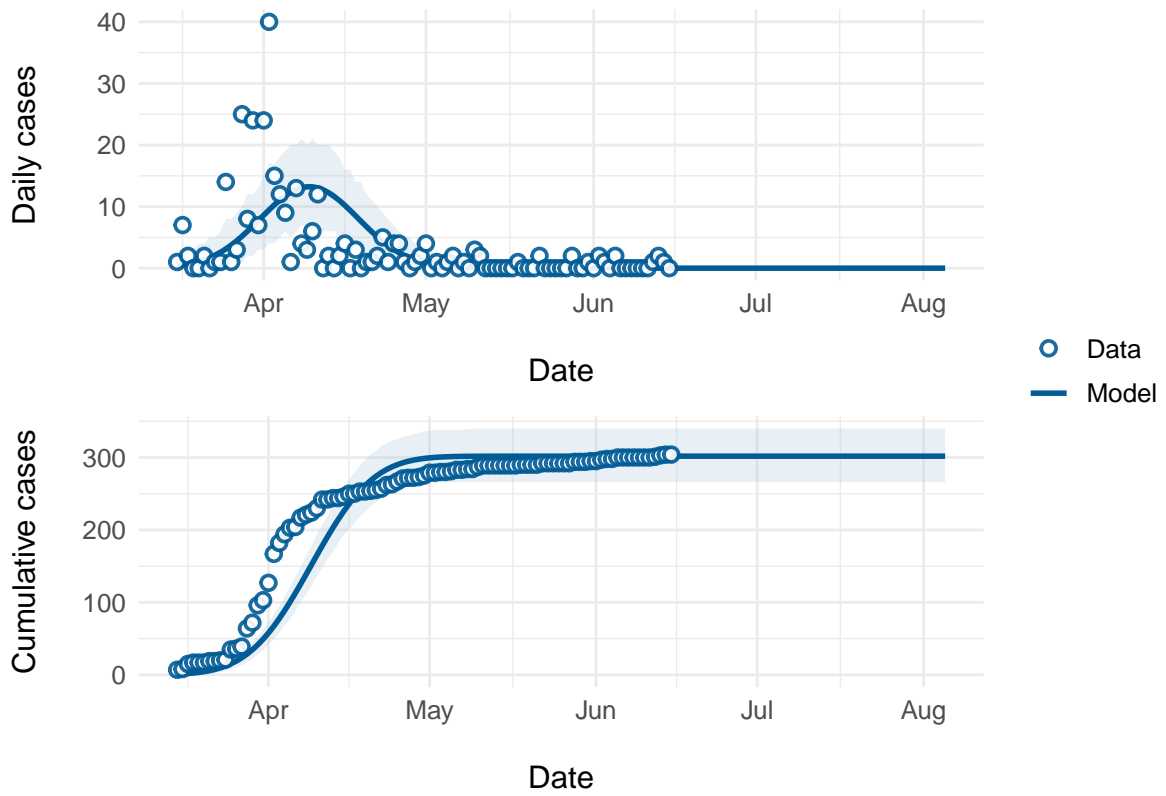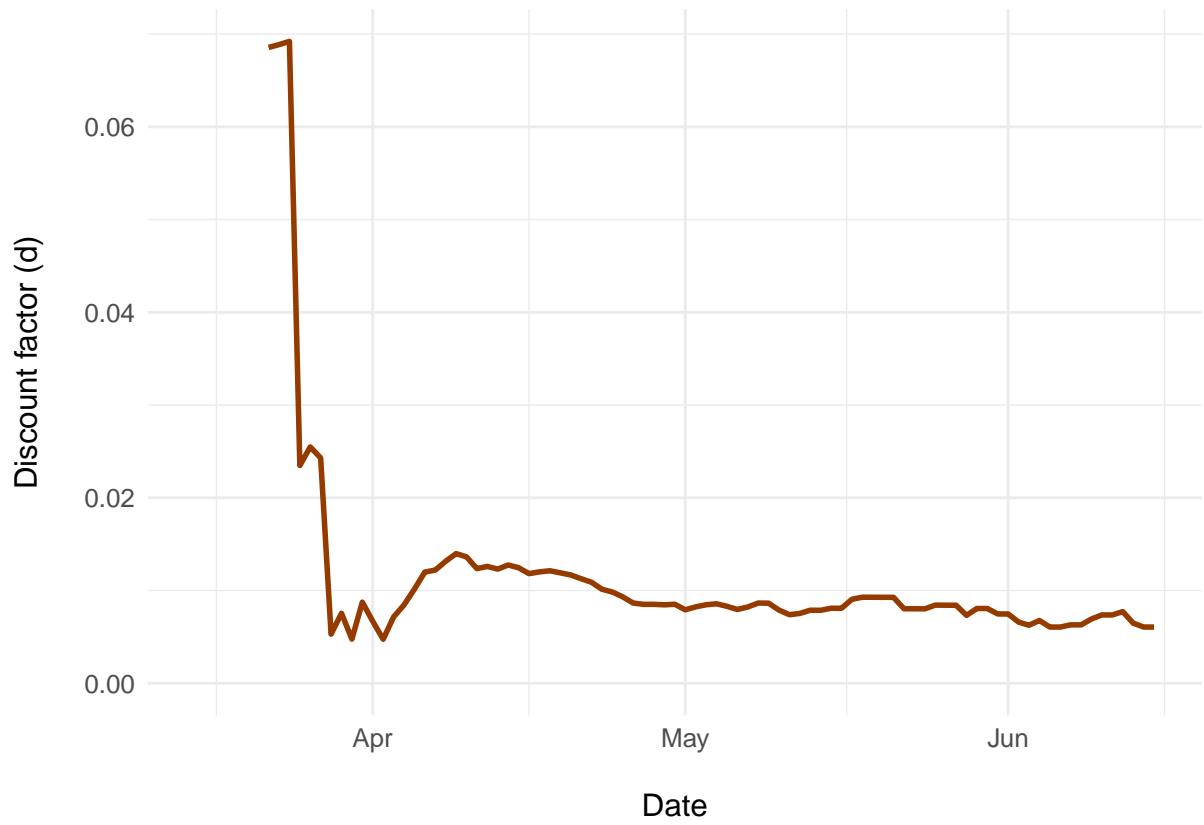
Figure 27: Manitoba
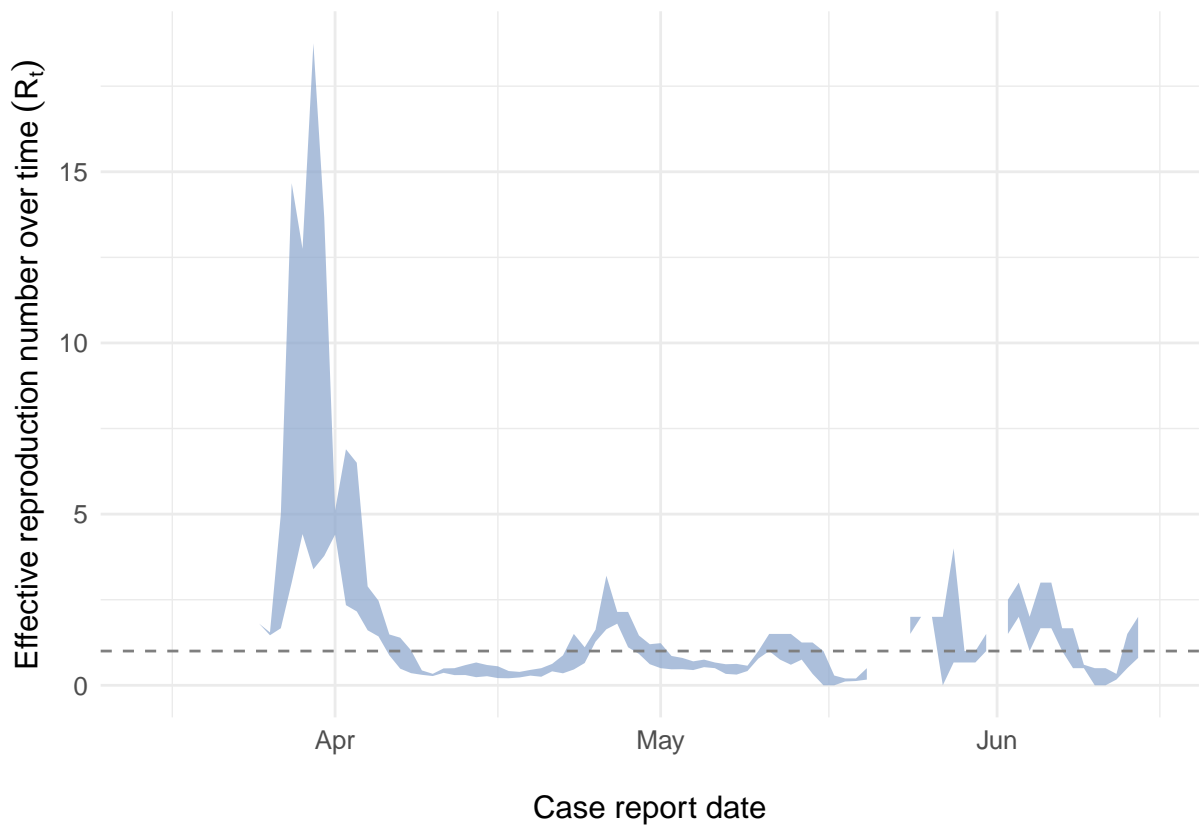
Figure 28: Discount factor - Manitoba

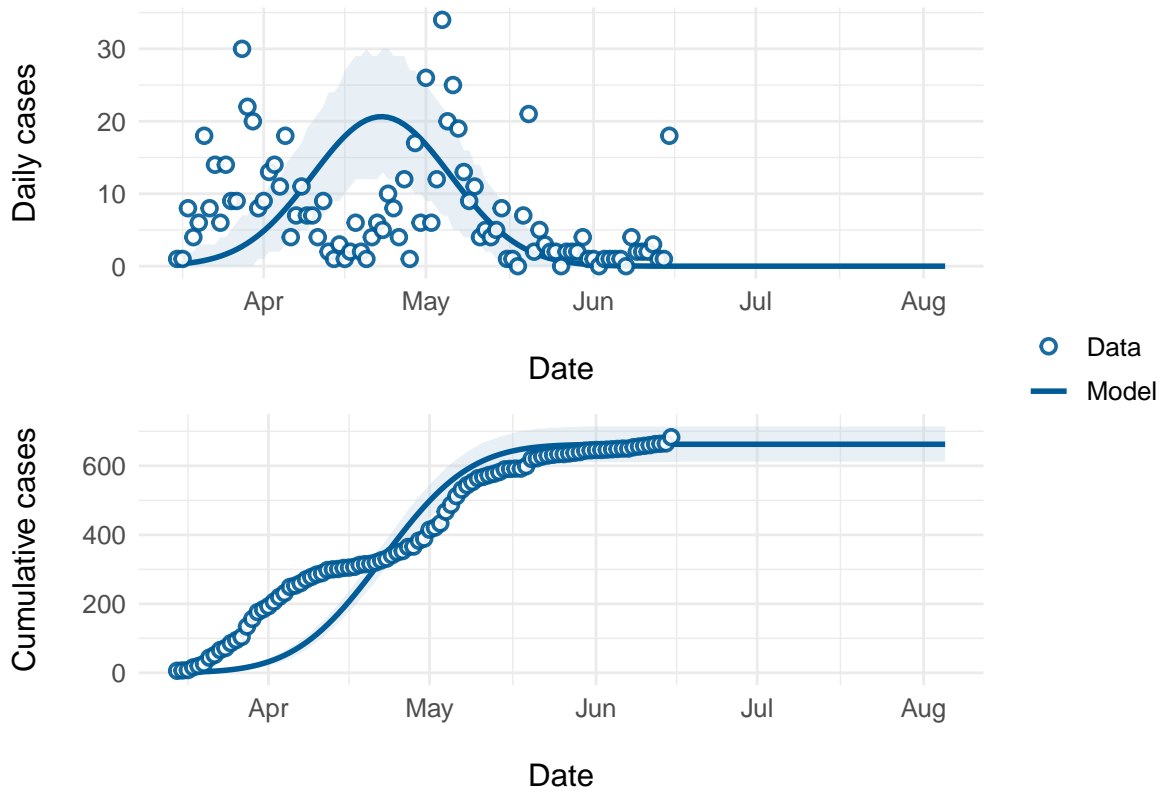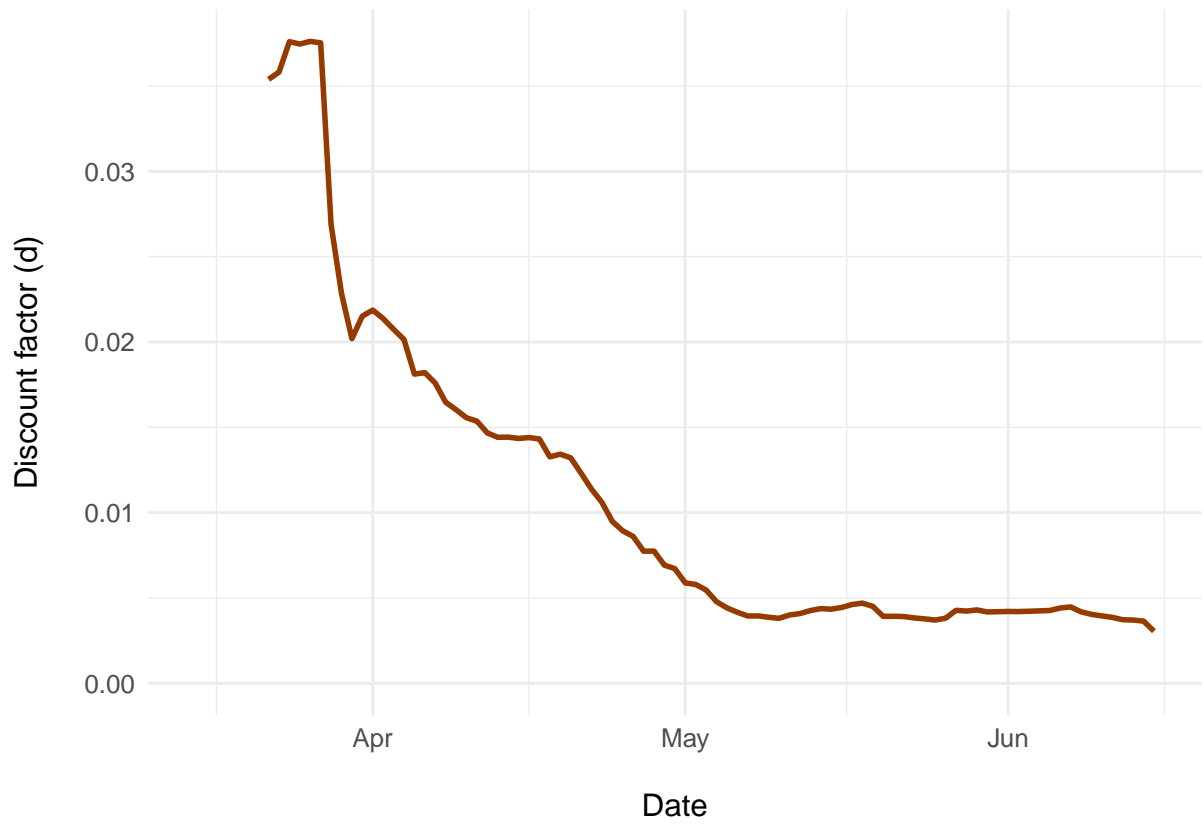Figure 29: Effective reproductive number - Manitoba
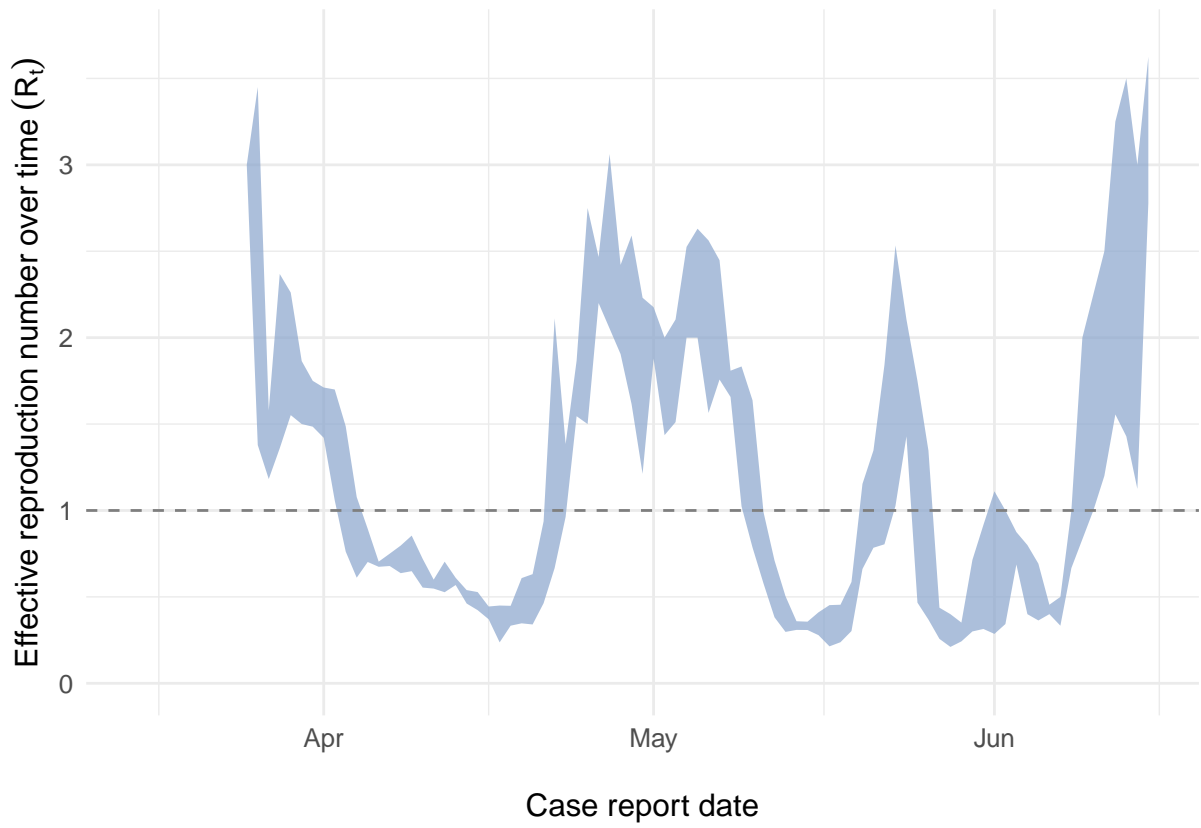
Figure 30: Saskatchewan

Figure 31: Discount factor - Saskatchewan

Figure 32: Effective reproductive number - Saskatchewan