Covid-19 Modelling Results, as at 11 April 2020

1. Total Confirmed Cases

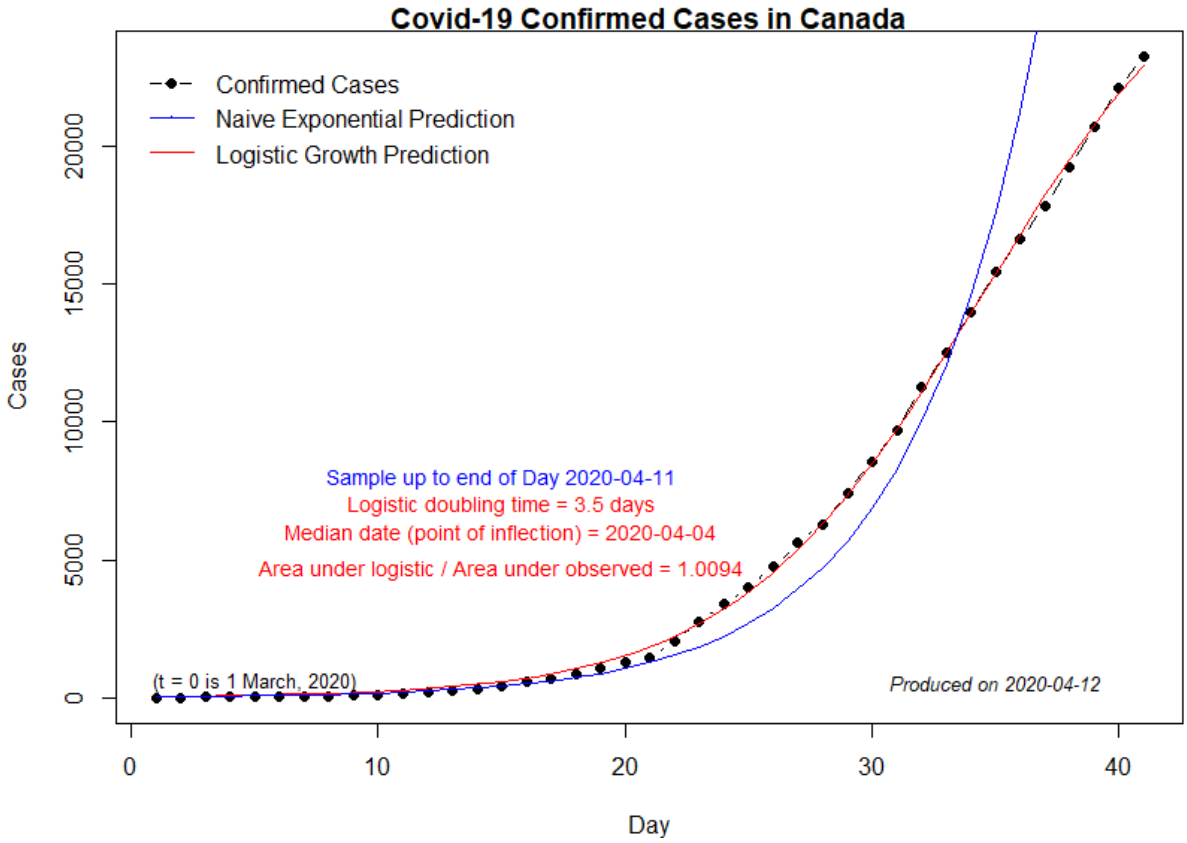
My R code for Covid-19 modelling is at

https://raw.githubusercontent.com/DaveGiles1949/r-code/master/Canadian_Covid-19_Cases.R

The code will automatically download the latest data from my github account.

The chart below shows results based on *data from 2 March to 11 April inclusive*.

The Logistic model produces an "S-shaped" growth curve. One *disadvantage* is that this S-shape is symmetric about its point of inflection.

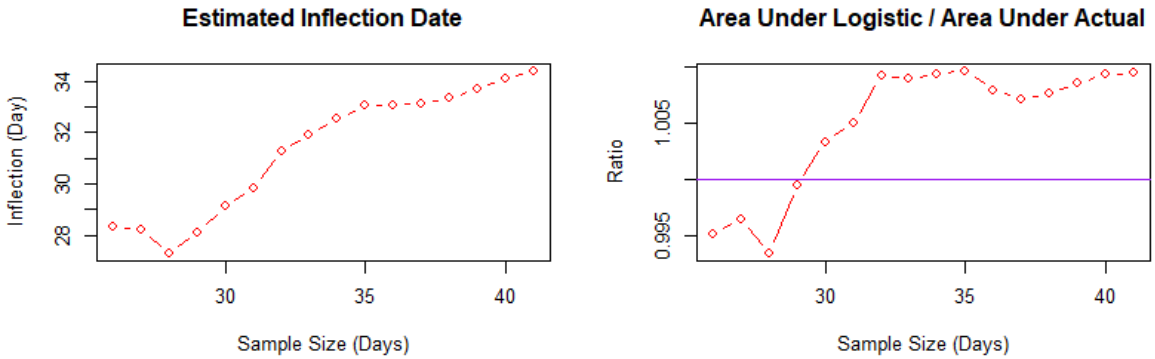


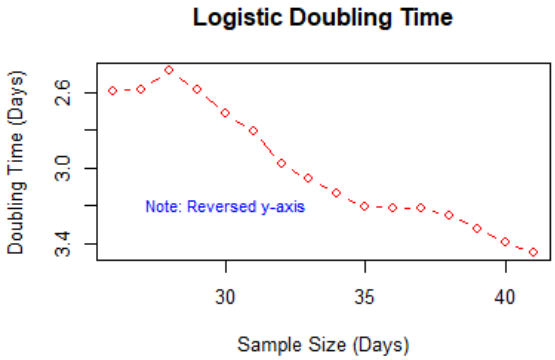
It's also interesting to see how the results change over time as more data become available.

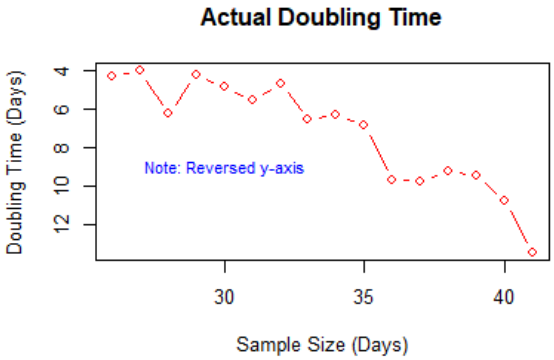
This is summarized in the next set of charts, which are based on successive samples, each starting on 2 March, ending after 26, 27, …., 41 days. The last sample is the full sample used to get the chart above.

The second chart indicates the on-going "good fit" of the Logistic model to the observed data. A ratio value greater than 1.0 indicates that the model is over-predicting the actual data over the full sample range. A value of 1.0 would be "ideal", in a loose overall sense.

Both the observed and estimated "doubling times" for new cases have improved substantially. (Note the reverse axis on the last two charts, and the fact that a longer doubling time is better than a short one.)







The following plot shows the projections for total confirmed cases of Covid-19 based on the latest version of the Logistic model. The projections go to 7 days beyond the end of the latest sample.

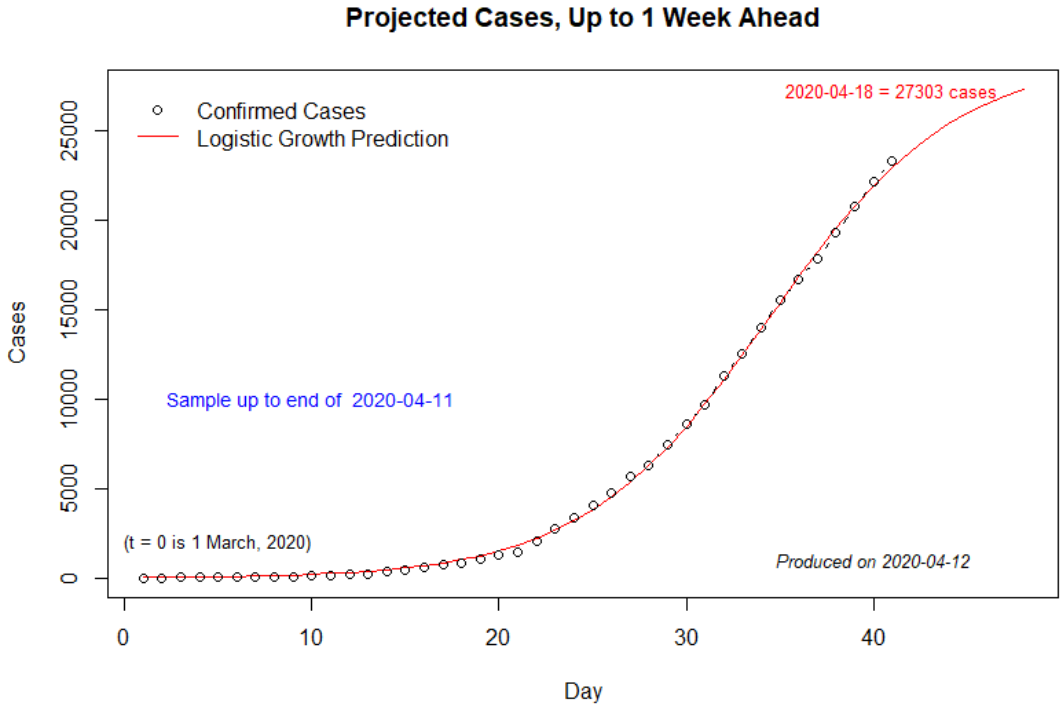


Table 1: Projected Covid-19 Cases in Canada

(Projections are in Blue; Actual Values are in Brackets)

Sample end (projection made): 08 April

09 Apr	*10 Apr*	*11 Apr*	*12 Apr*	*13 Apr*	*14 Apr*	*15 Apr*
20162	21096	21916	22627	23236	23753	24188
[20765]	[22148]	[23318]				

Sample end (projection made): 09 April

10 Apr	*11 Apr*	*12 Apr*	*13 Apr*	*14 Apr*	*15 Apr*	*16 Apr*
21445	22339	23122	23798	24377	24868	25282
[22148]	[23318]					

Sample end (projection made): 10 April

11 Apr	*12 Apr*	*13 Apr*	*14 Apr*	*15 Apr*	*16 Apr*	*17 Apr*
22724	23582	24331	24977	25531	26000	26396
[23318]						

Sample end (projection made): 11 April

12 Apr	*13 Apr*	*14 Apr*	*15 Apr*	*16 Apr*	*17 Apr*	*18 Apr*
23883	24687	25385	25987	26500	26936	27303

2. Total Number of Deaths

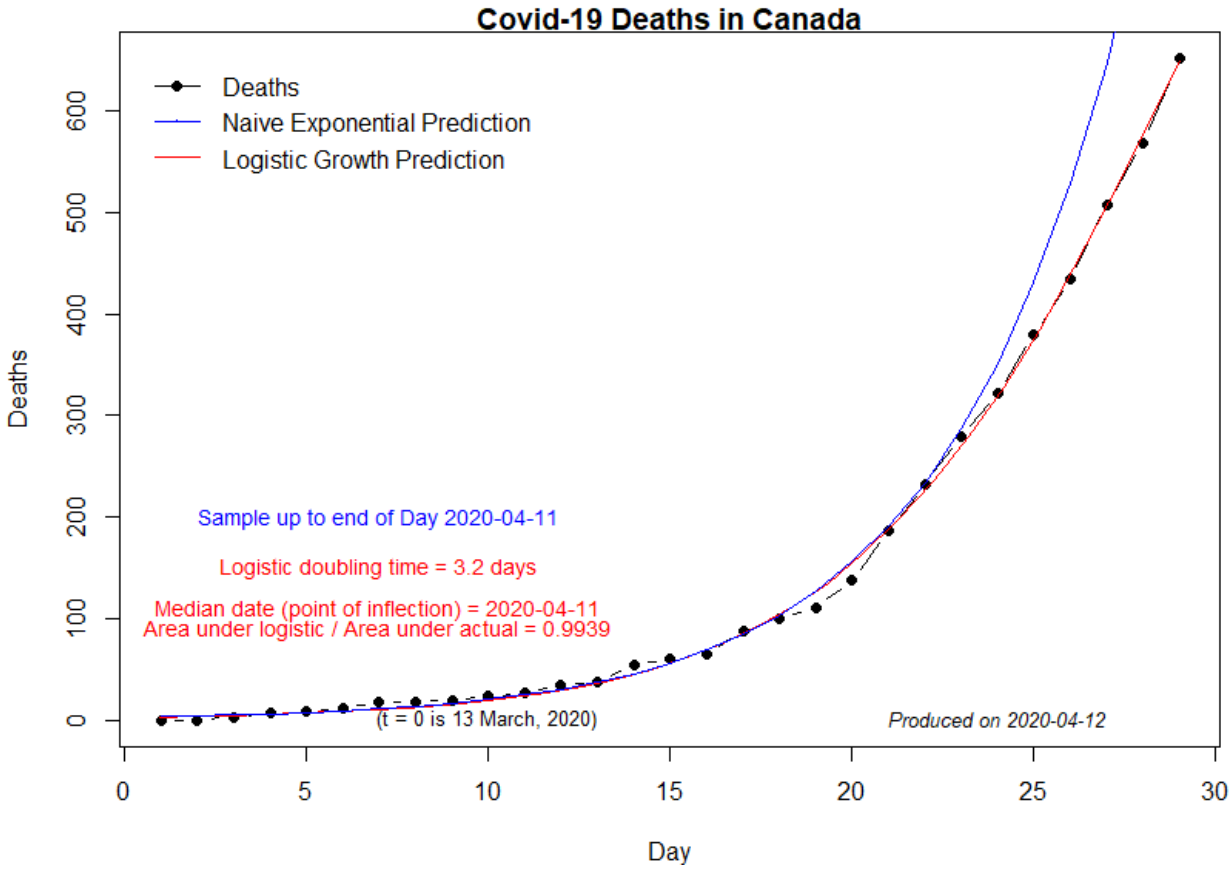
My R code for Covid-19 modelling is at

https://raw.githubusercontent.com/DaveGiles1949/r-code/master/Canadian_Covid-19_Deaths.R

The code will automatically download the latest data from my github account.

The chart below shows results based on *data from 14 March to 11 April inclusive*.

The Logistic model produces an "S-shaped" growth curve. One *disadvantage* is that this S-shape is symmetric about its point of inflection.

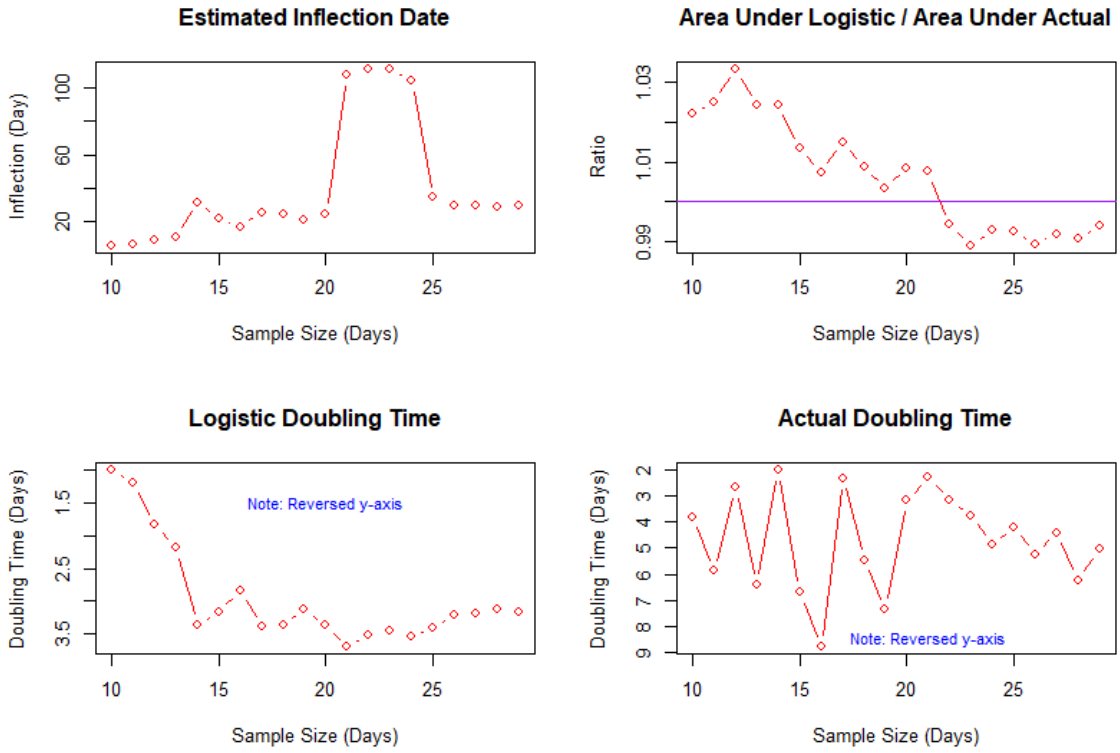


It's also interesting to see how the results change over time as more data become available.

This is summarized in the next set of charts, which are based on successive samples, each starting on 14 March, ending after 10, 11, …., 25 days. The last sample is the full sample used to get the chart above.

The second chart indicates the on-going "good fit" of the Logistic model to the observed data. A ratio value greater than 1.0 indicates that the model is over-predicting the actual data over the full sample range. A value of 1.0 would be "ideal", in a loose overall sense.

Both the observed and estimated "doubling times" for new cases have improved substantially. (Note the reverse axis on the last two charts, and the fact that a longer doubling time is better than a short one.)



The following plot shows the projections for total confirmed cases of Covid-19 based on the latest version of the Logistic model. The projections go to 7 days beyond the end of the latest sample.

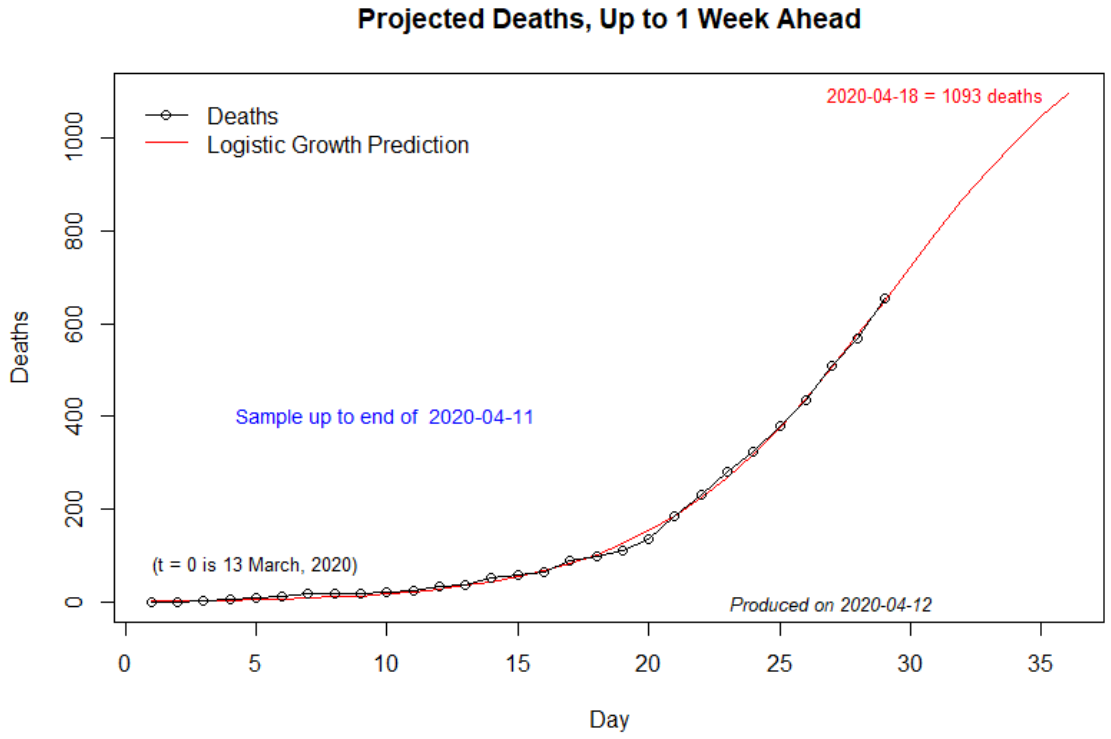


Table 2: Projected Covid-19 Deaths in Canada

(Projections are in Red; Actual Values are in Brackets)

Sample end (projection made): 08 April

09 Apr	*10 Apr*	*11 Apr*	*12 Apr*	*13 Apr*	*14 Apr*	*15 Apr*
510 [509]	585 [569]	663 [653]	744	824	902	977

Sample end(projection made) : 09 April

10 Apr	*11 Apr*	*12 Apr*	*13 Apr*	*14 Apr*	*15 Apr*	*16 Apr*
582 [569]	659 [653]	737	815	890	962	1029

Sample end (projection made): 10 April

11 Apr	*12 Apr*	*13 Apr*	*14 Apr*	*15 Apr*	*16 Apr*	*17 Apr*
643 **[653]**	713	781	846	906	961	1010

Sample end (projection made): 11 April

12 Apr	*13 Apr*	*14 Apr*	*15 Apr*	*16 Apr*	*17 Apr*	*18 Apr*
723	795	865	930	991	1045	1093