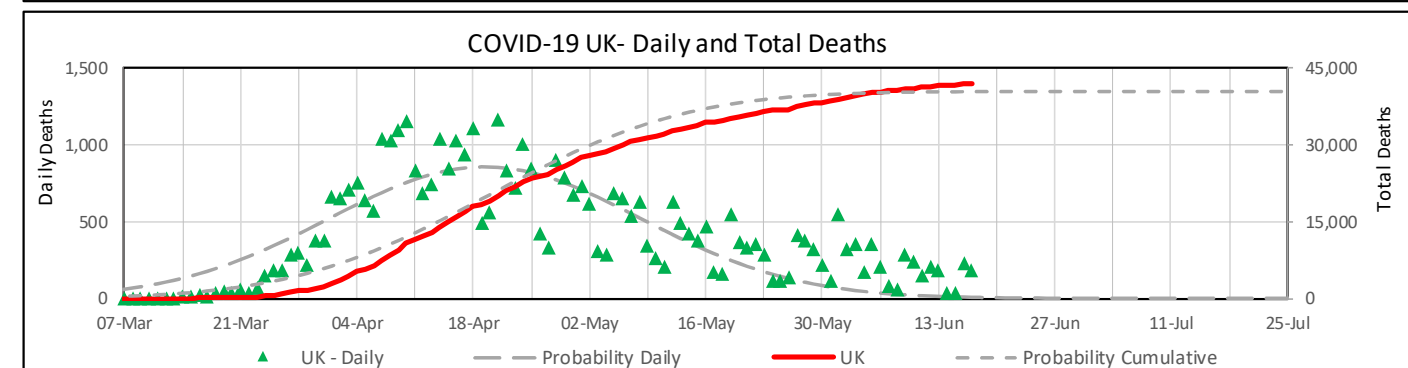
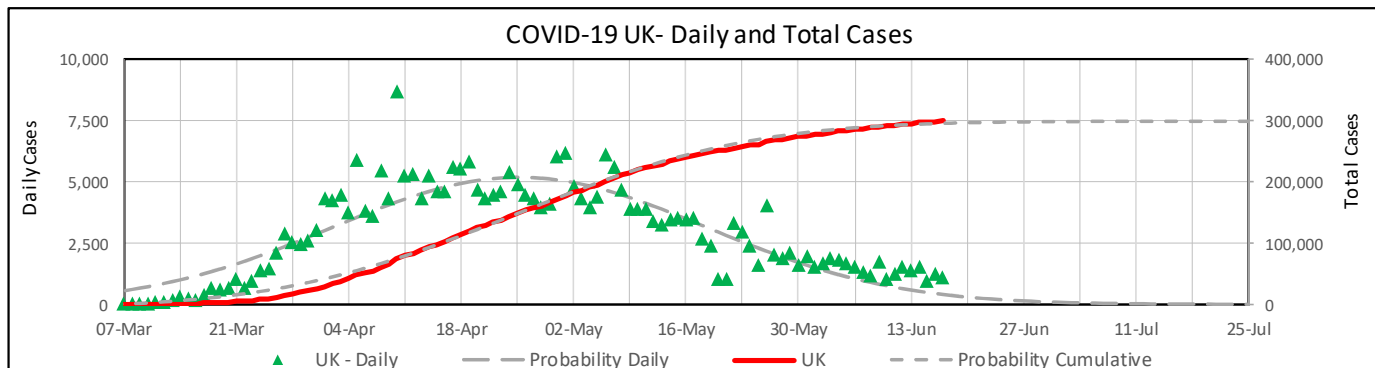
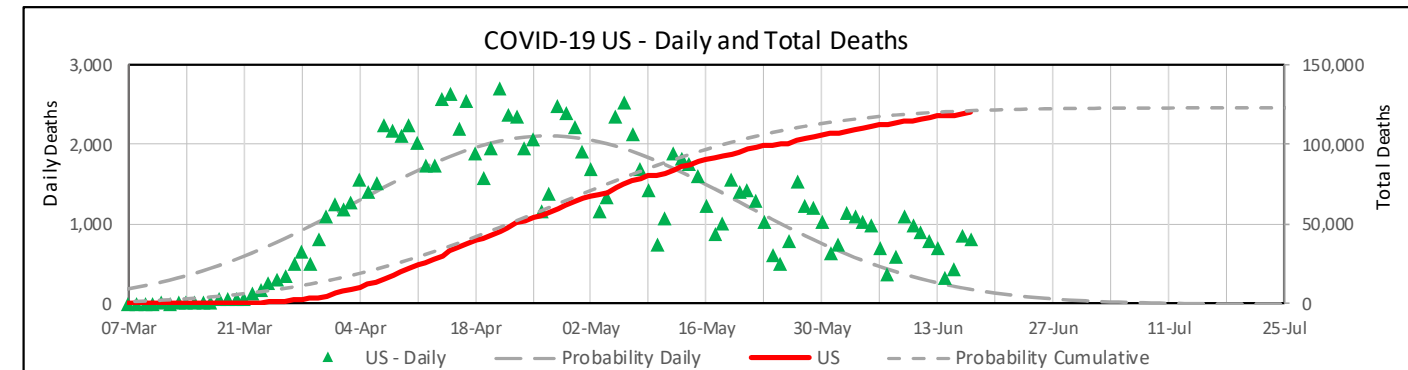
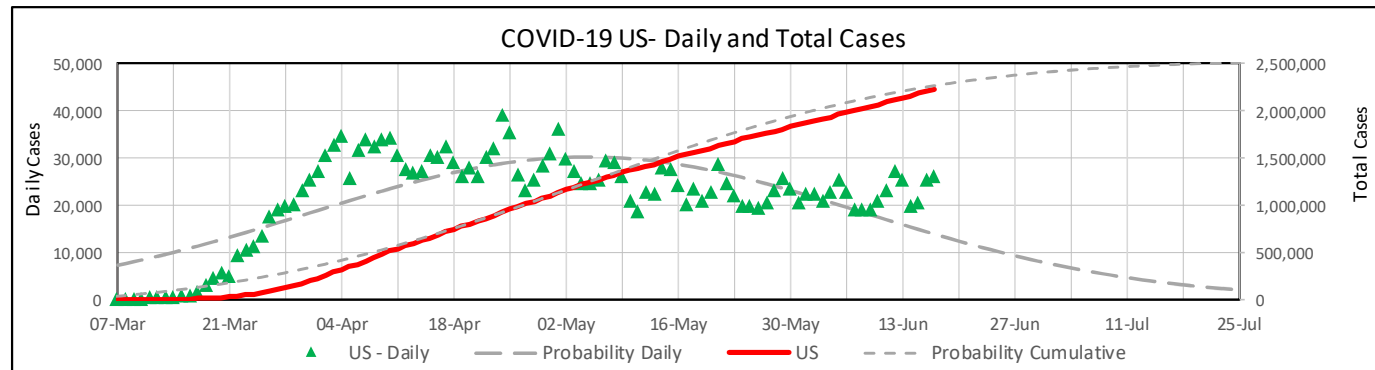
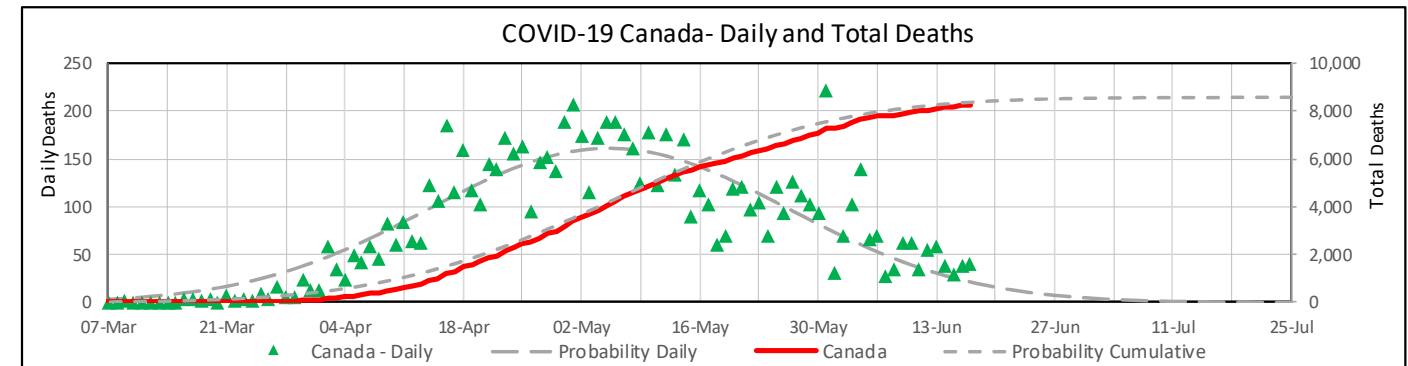
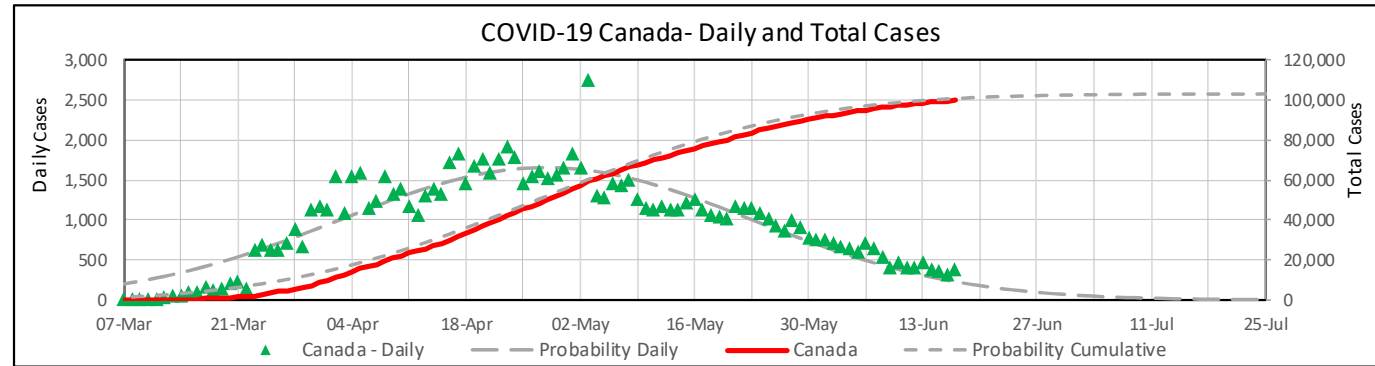
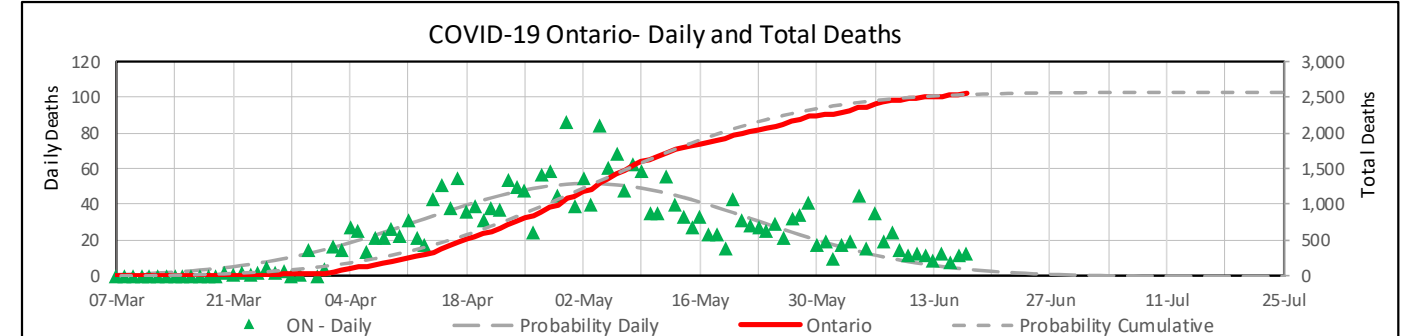
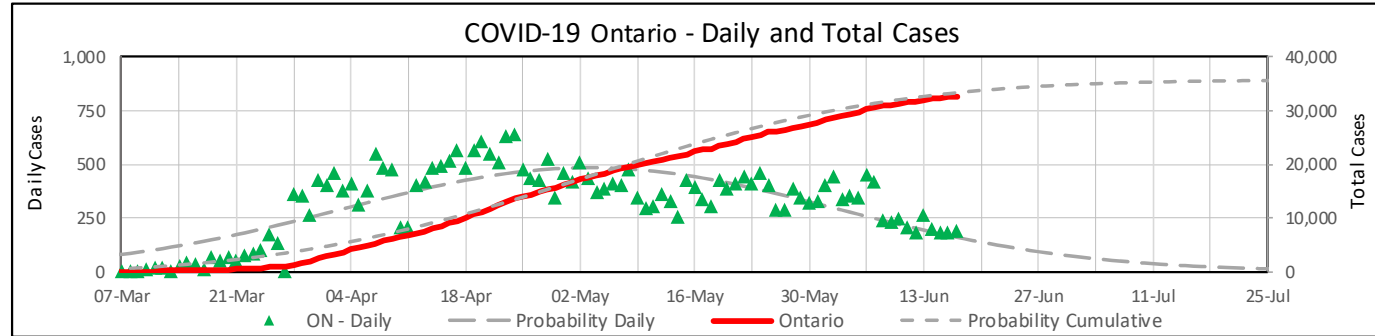
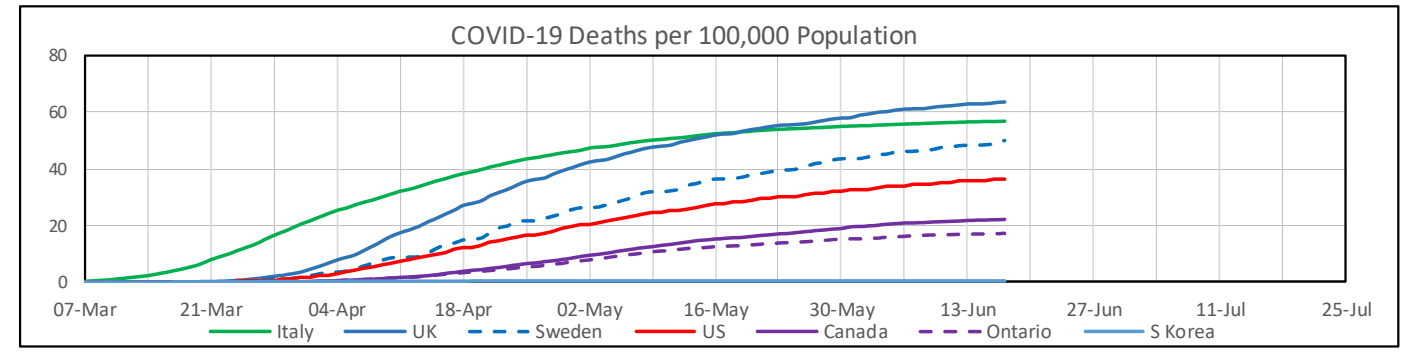
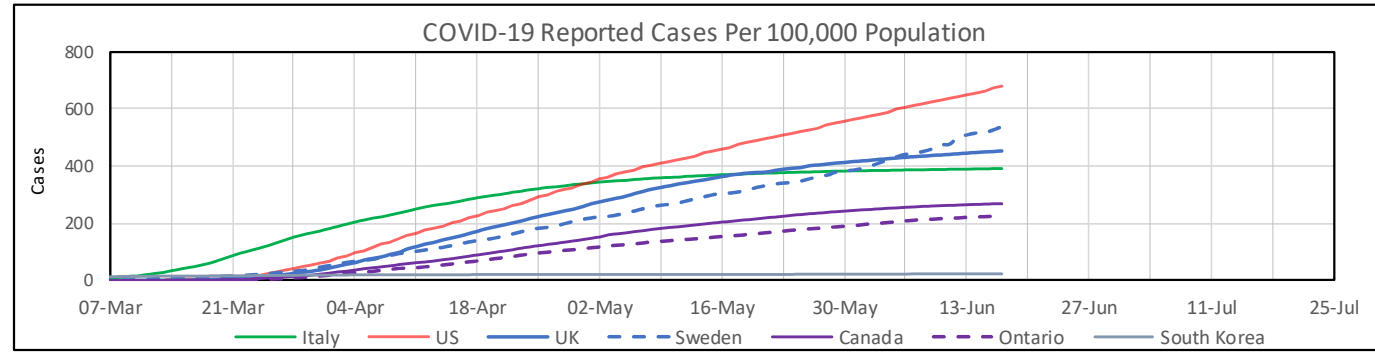


COVID-19 Observations – 18 June 2020 – by Alex Harrington



The state of emergency in Ontario is extended until June 30, and all the Province can now go to stage 2 opening. Except Toronto, Peel and Windsor-Essex.

If you're interested in seeing what's going on with the virus in Ontario or other places, there are lots of dashboards around. <https://covid19dashboards.com/> is one that shows Ontario hot spots, as well as several other things. The Ontario Health Data platform has info at <https://computeontario.ca/covid-health-platform/>. The info is two weeks old so don't hold your breath waiting for it.

The detailed charts above keep singing the same song. The US is levelling off between 20,000 and 30,000 new cases each day, with no sign of a letup. This has been going since May and the reluctance to follow preventative measures has prolonged the situation in the US. Charts for the other countries show a steady decline in cases. Death data follow the same pattern, but with more variability.

The charts with the seven-day averages on the right show that the US has made little progress in controlling the virus, with cases now starting to rise. Sweden continues to suffer an increase in cases, most of this due to an outbreak in a northern mining town. All the others continue their decline.

One of the arguments you hear, particularly from the US where cases are stubbornly refusing to drop, is that "there's more testing so of course there's more cases." That's true and it's not true – it all depends what you're doing with your testing and where you are on the case curve.

One of the ways to see how you're testing, or getting things under control, is to look at tests per case – how many tests do you have to do to find a case. If you're in a hospital with a bunch of infected people, not very many. A few tests should turn up a case. So a low number tells you you're only sampling where people are sick. Or you're not testing enough to see what's going on in the broader population.

To see how testing affects the cases we're seeing, I've plotted tests per case for the countries being tracked here. I used seven-day average tests and seven-day average cases so the data would be smoother and easier to see. That chart is below. The first thing to notice is there are two vertical scales – the one on the right is for South Korea. Their tests per case are about five times higher than the others, so they need a separate scale or everyone else would just be a skinny line on the bottom.

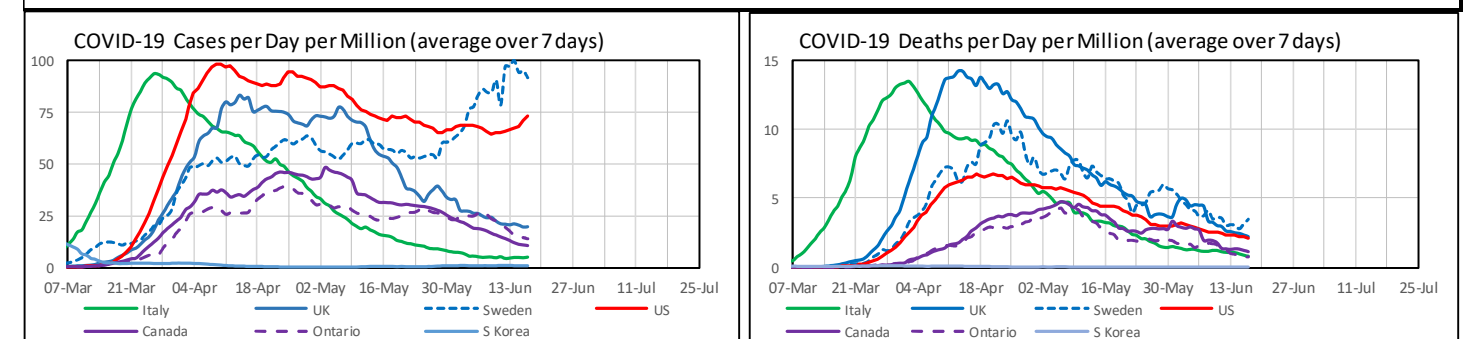
There are two types of patterns to see on the chart – the first is South Korea. That's the light blue line on top. I don't have the data for the start of the infection in South Korea, but when the tests per cases start going up on the graph, South Korea had entered monitoring mode. New cases had dropped to a handful each day and

testing was to look for outbreaks, so very few cases were found, although many tests were being done. In early May and late May there are large and sudden drops in the curve – both times outbreaks were identified. Testing switched to tracking contacts intensely. More cases were identified so tests per case dropped – it didn't take much to find a case because they knew they were testing high probability candidates who had been in contact with an infected person. Once the outbreak was controlled, testing went back to monitoring the population and the curve went up again. Another outbreak has been identified in the last week, so the curve is now dropping as they switch to tracking mode.

South Korea has been successful in containing the virus – they have done what we have only talked about. Their data can provide an idea of the scale of testing needed for case tracking and monitoring. For the three outbreaks identified

| COVID-19 Summary Data | | | | | | | | | | | |
|-----------------------|-------------------|--------------------------|-------------|-------------------------|-------------|-------------------|-----------------|--------------------|-----------------|-------------------|------|
| | Tests per Million | Tests per Day | | Tests per Reported Case | | Cases per Million | | Deaths per Million | | Deaths Per Case | |
| | Total to Date | Average over Last 7 days | | Total | Last 7 days | Total to date | Average per day | Total to date | Average per day | Total to date (%) | |
| | | Total | Per Million | | | | Last 7 days | | Last 7 days | | |
| South Korea | 22,059 | 11,429 | 223 | 93 | 239 | 238 | 0.8 | 5 | 0.01 | 2.3% | |
| Italy | 77,622 | 54,286 | 897 | 20 | 184 | 3,928 | 5 | 569 | 0.8 | 14.5% | |
| UK | 60,656 | 68,571 | 1,032 | 14 | 50 | 4,504 | 20 | 634 | 2.2 | 14.1% | |
| N. America | US | 75,784 | 491,329 | 1,493 | 11 | 21 | 6,790 | 73 | 364 | 2.1 | 5.4% |
| | Canada | 60,262 | 37,889 | 1,013 | 23 | 97 | 2,669 | 10 | 221 | 1.1 | 8.3% |
| Ontario | 75,272 | 24,575 | 1,687 | 33 | 120 | 2,247 | 14 | 175 | 0.7 | 7.8% | |
| Scandinavia | Sweden | 40,761 | 8,666 | 858 | 8 | 8 | 5,403 | 92 | 499 | 3.5 | 9.2% |
| | Denmark | 141,435 | 11,973 | 2,062 | 67 | 294 | 2,117 | 7 | 103 | 0.1 | 4.9% |
| | Norway | 53,752 | 3,450 | 643 | 33 | 313 | 1,619 | 3 | 45 | 0.1 | 2.8% |
| | Finland | 40,597 | 2,086 | 378 | 32 | 142 | 1,290 | 2 | 59 | 0.1 | 4.6% |

Italy, the UK and US, Ontario, Denmark and Finland report total tests, others report people tested. Total tests can be 25-50% higher than people tested



on the graph, tests per case were about 200 to 300. That is pretty high – they have tracked down a lot of people to find a case. When they are monitoring the population – just watching to look for outbreaks, the tests per case are even higher at 600 or more. As successful as they have been, they are still having outbreaks, and the recent ones are more widespread than earlier ones.

For the other countries it's a different story, and another scale on the graph. Testing is so low we have to use the left side scale. Italy got hit hard and early and their tests per case stayed below 30 until new cases had significantly dropped by the end of April. Only then could testing start to expand, and now has reached about 200 tests per case. That's the story for many other countries – the tests per case have not risen until the cases dropped significantly.

Ontario (and Canada) started off pretty poorly at about 10 tests per case but gradually improved (with a hiccup near the end of May). Ontario finally got its testing act together (and cases dropped off as well) and throughout June has improved until it is now at about 120 tests per case. Ontario has averaged nearly 25,000 tests per day in the last week.

The UK has more or less followed the Canada line in terms of numbers, until this week. The UK leveled off at about 50 tests per case – we'll see what happens over the next week or so, but it does not look as if it will improve much.

Along the bottom of the chart you can see data for the US and Sweden. Their lines are pretty well level – the US at about 20 test per case and Sweden at about 7 tests per case. As we've seen, this level of testing means you're testing where people are sick. It's telling you very little about what's going on in the population. If your population is not helping by ignoring health guidelines, you are going to get more cases as you test – pretty simple. It's when you get things under control that your cases go down even as you test more. With leadership in the US and the UK pretty well ignoring the seriousness of the situation, it is unlikely things will improve much in the near future.

Using South Korea as a guide indicates that at least double the current testing rate in Ontario is desirable, and necessary. There certainly appears to be no huge case tracking system in place – not the "army" of people that was once talked about. Speaking of army, there is talk in the US of using the National Guards for case tracking. I'm not sure I see that ending well, given the attitude of some in the US.

Put this all together and it means the same old thing – it's not over yet, and I'm not sure we're learning very much.

Take care of yourselves and don't endanger others.

