(https://www.motherjones.com/kevin-drum/2020/03/coronavirus-is-now-growing-faster-in-the-us-than-in-europe/, retrieved 3/14/2020)

# Coronavirus Is Now Growing Faster in the US Than in Europe

Kevin Drum, March 13, 2020

**UPDATE:** I don't think these charts are correct. I've replicated them here[1] through March 13 and they don't seem to show any unusual behavior for the United States.

Based on data from the Johns Hopkins Coronavirus Data Repository, here is how the outbreak has progressed in six Western countries:[2]
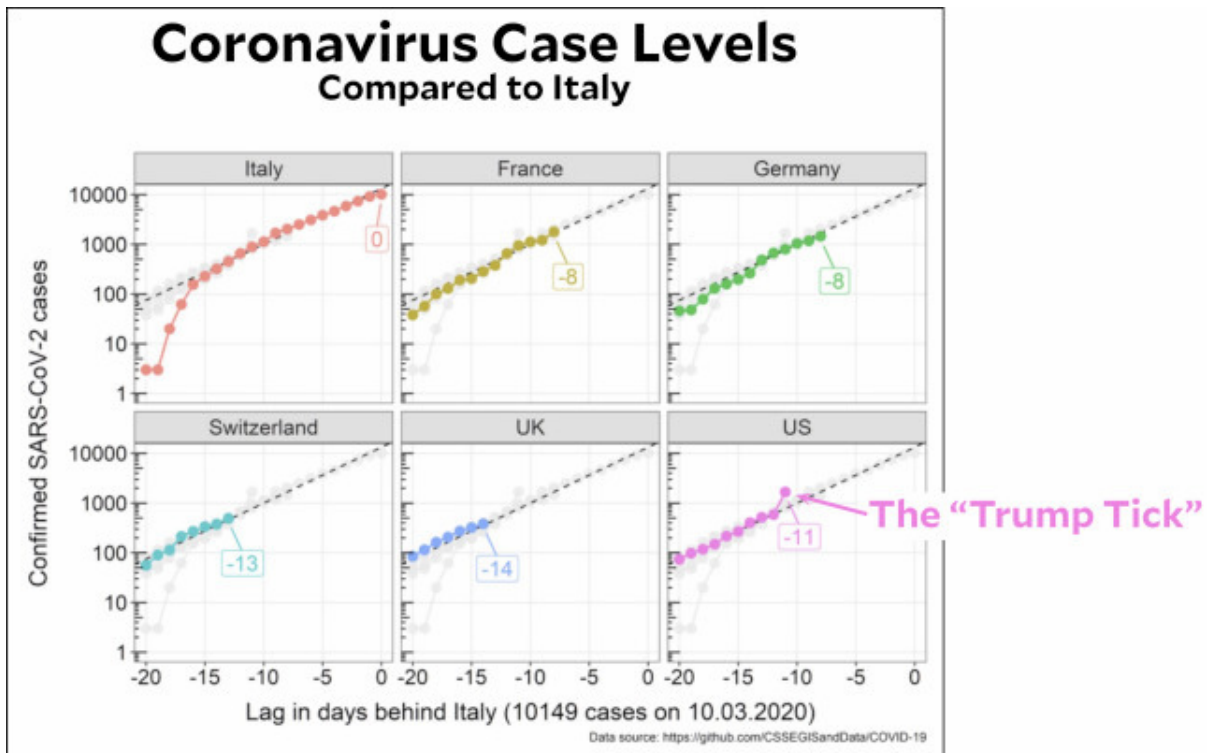


The charts are all done using a log scale on the y-axis, which means that exponential growth shows up as a straight line. So far, every country has shown the same growth rate except for one: the United States. We are 11 days behind Italy, but our caseload has suddenly started ticking up past normal. Note that the Trump Tick might look small, but this is because it, too, is on a log scale. That small tick indicates that we have about 2x or 3x more cases than you'd expect at this stage.

Why? Probably because the federal government refuses to act with the seriousness it should. Because that might be bad for Donald Trump's reelection chances.

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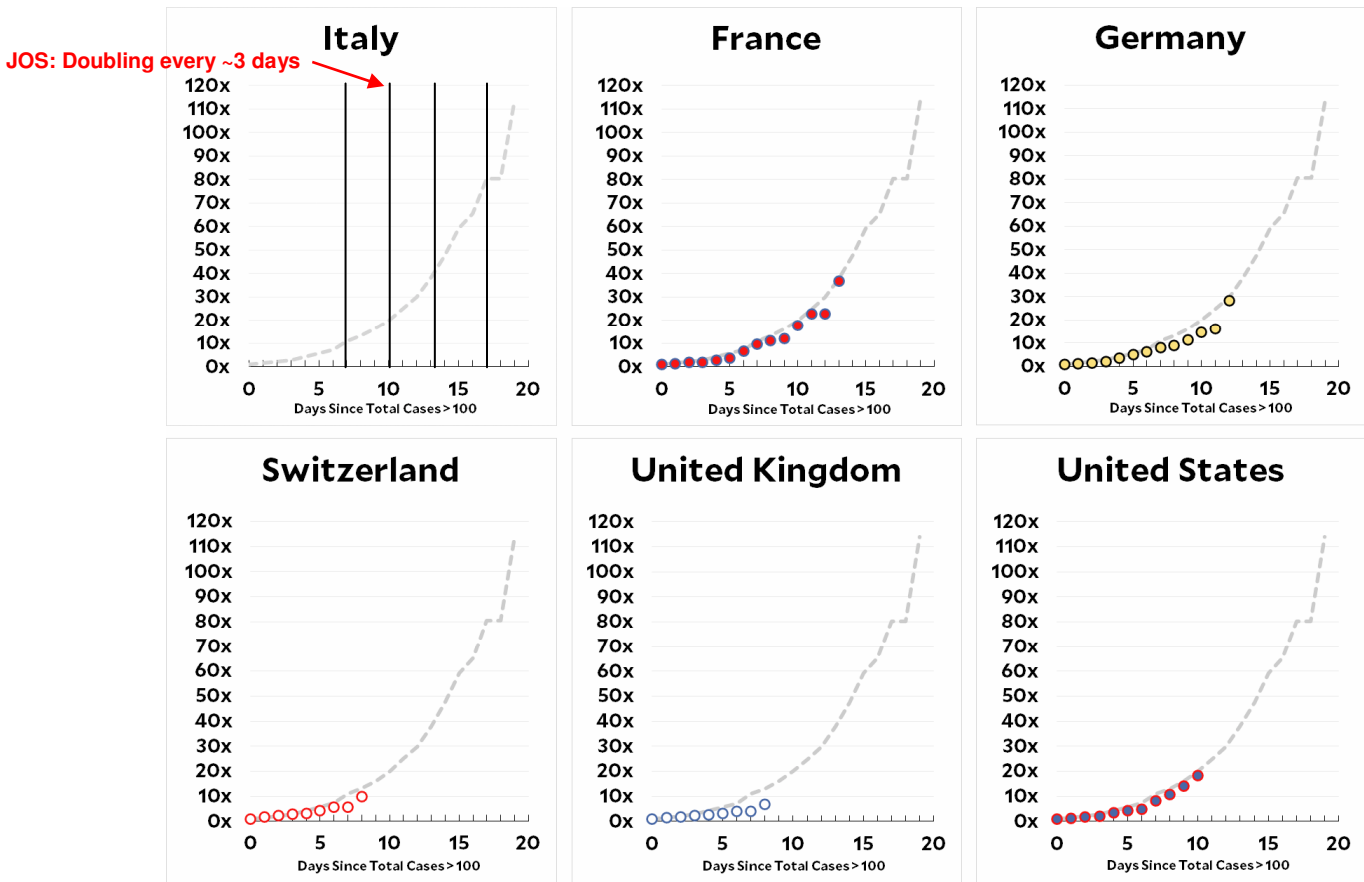[1]  https://www.motherjones.com/kevin-drum/2020/03/update-the-united-states-is-not-a-coronavirus-outlier/ [See below p.2]

[2]  https://twitter.com/originalspin/status/1238365314871463939

# UPDATE: The United States Is Not a Coronavirus Outlier

Kevin Drum, March 14, 2020

On Friday[3] I posted a series of charts comparing the coronavirus breakout in six Western countries. Italy was the baseline, using the day they passed 100 confirmed cases as Day 0. All the other countries also used the day they passed 100 confirmed cases as Day 0. What it showed was that everyone was following the same trendline as Italy. They were just a few days behind. The only exception was the United States, which showed a substantial tick upward above Italy on the final day.

But the more I thought about this, the more I wondered if it was correct. The US could tick up only if there were lots of test kits available to confirm coronavirus cases, and we haven't had a lot of test kits available. So I decided to replicate the charts myself. Here they are:



Source: Johns Hopkins COVID-19 dataset as of March 13 at:
https://github.com/CSSEGISandData/COVID-19/

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[3]    https://www.motherjones.com/kevin-drum/2020/03/coronavirus-is-now-growing-faster-in-the-us-than-in-europe/  [See above p.1]

My charts go through March 13, rather than March 10, and the main takeaway doesn't change much: every country is on Italy's path. The United States does show an upward tick between March 9 and March 10, but it's not enormous and it only puts us back on the main trendline anyway, not above it. The other countries also show a tick upward, including Italy, but it happens on March 13.

My tentative conclusion is that it was wrong to suggest that the United States had a big tick upward on March 10, and wrong to suggest that none of the other countries ever had a tick upward. As near as I can tell, every country is following nearly the exact same trendline regardless of how well or badly they responded to the outbreak.

**METHODOLOGY:** My charts are slightly different than the ones I showed you this morning. The spreadsheet with the daily data from Johns Hopkins is here.[4] I summed up the numbers for each of the six countries normally, but I ditched the log scale on the y-axis. Instead, I normalized Day 0 for every country to 1 and then showed the growth rate instead of the raw numbers.[5] I think this makes things a little easier to understand, and the raw numbers are easily available if you click the link and copy the spreadsheet yourself.

It is, as always, possible that I've made a mistake. If you think you've found one, please let me know.

**UPDATE:** Apparently the Johns Hopkins dataset contained an error that was corrected midweek.[6] By chance, I was using the corrected numbers, which is why I didn't replicate the spike. The other set of charts is also using the corrected data now, and everyone's charts are happily in agreement.


(https://www.motherjones.com/kevin-drum/2020/03/coronavirus-growth-in-western-countries-march-14-update/, retrieved 3/15/2020)

# Coronavirus Growth in Western Countries: March 14 Update

Kevin Drum, March 15, 2020

I'm not promising to do this every day, but having done it once it's now fairly easy to update. Note that the y-axis on these charts now goes up to 140x because the base trendline from Italy has continued to grow. That will continue to go up until the number of new cases flattens out.

It's worth noting that these are all official figures, and obviously they depend on how widespread testing is in various countries. The US numbers, for example, may be artificially low simply because we don't have test kits available. We won't know for sure until kits become widely available and we begin testing larger numbers of people.
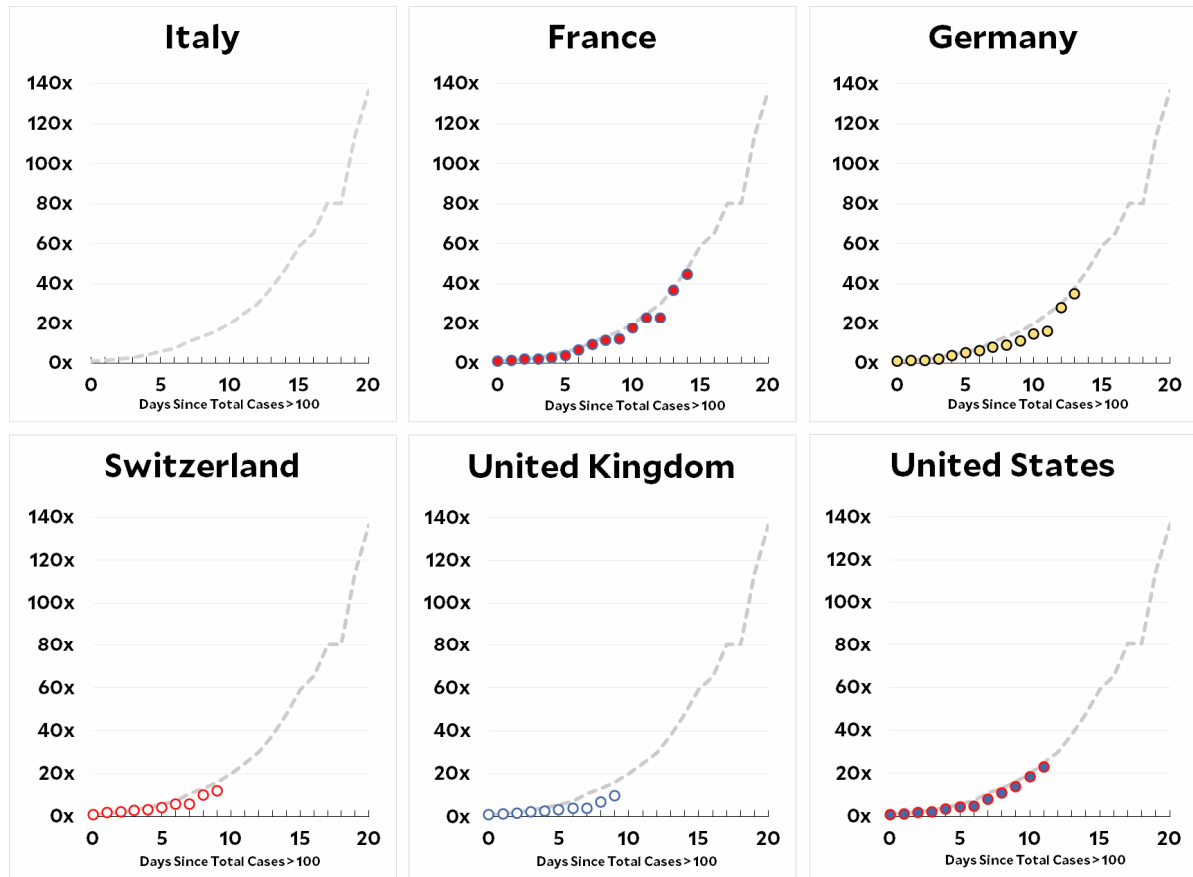
Also worthy of note is that actions we take now will affect the growth of coronavirus a couple of weeks from now, but our growth rate over the next two weeks or so is probably set in stone no matter what we do. This is partly because of simple inertia in our public habits, and partly because the pool

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[4]  https://github.com/CSSEGISandData/COVID-19/blob/master/csse_covid_19_data/csse_covid_19_time_series/time_series_19-covid-Confirmed.csv

[5]  JOS: So I guess this means Drum is saying that for plot purposes Day 0 now corresponds to 1 instead of 100 (or just >100).  This would mean that "10x" is the same as 10x100 = 1000 cases, though it is 10x1 in the plot, that is, he is dividing all his raw numbers by 100.

[6]  https://twitter.com/AlexSelbyB/status/1238823033625890816

of victims that will be identified in two weeks already exists. They're asymptomatic right now, but they won't be for long. We should be preparing for a 10x increase in coronavirus cases over the next two weeks.[7] The raw data from Johns Hopkins is here.[8]



Source: Johns Hopkins COVID-19 dataset as of March 14 at:
https://github.com/CSSEGISandData/COVID-19/

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[7] JOS: Gov. Inslee of Washington was saying their cases are doubling about every week (Rachel Maddow said doubling about every 6 days). That would be 4x in two weeks, not 10x. Or is this just a one-shot occurrence in the US because of a surge in testing? The graph for Italy on p.2 above seems to indicate a doubling approximately every 3 days, which is steeper than the other statements.

The exponential model is $dI/dt = k\,I$ for some constant k and infected population I, that is, the rate of change of infections is proportional to the number of existing infections. ($k = dI/dt\,/\,I$ means k represents the fraction (percentage) increase in infection.) This yields the solution $I = I_0 e^{kt}$ for initial infected population $I_0$ when t = 0. Suppose t is measured in days. We are interested in the doubling time, that is, when $I/I_0 = 2$. Then $k = \ln 2\,/\,t \approx .69/t$. So if the doubling time is t = 3 days, then k = .23 or 23%. If the doubling rate is every week or 7 days, then k = .1 or 10%. And finally if we get 10 times the number of infections after 2 weeks, then $k = \ln 10\,/\,14 = 2.3/14 = .16$ or 16%. This means the corresponding doubling time would be $t = \ln 2\,/\,k = .69/.16 = 4.3$ days, which actually is not that far off the curves Drum plotted. This also means Inslee's rate is too low, which may be due to the lack of an accurate number of actual infections because of diminished testing.

Italy reported an increase of infected cases from 21,157 on Saturday 14 Mar to 24,747 on Sunday 15 Mar. That is a 3,590 / 21,157 =.17 or 17% increase, which is close to Drum's number. That implies a doubling time of $t = \ln 2\,/\,k = .69/.17 = 4.06$ days. And this is borne out in Drum's next post's graphs (p.5).

[8] https://github.com/CSSEGISandData/COVID-19/blob/master/csse_covid_19_data/csse_covid_19_time_series/time_series_19-covid-Confirmed.csv

# Coronavirus Growth in Western Countries: March 15 Update

Kevin Drum, March 16, 2020

Here are the COVID-19 growth charts through Sunday. Note that France and Britain show some flattening, but that might be due to incomplete weekend reporting. As always, Day 0 is the first day that total confirmed cases went above 100 in each country. The raw data from Johns Hopkins is here.[9]



## COVID-19 Growth Rate
### Cumulative Confirmed Cases Since Day 0
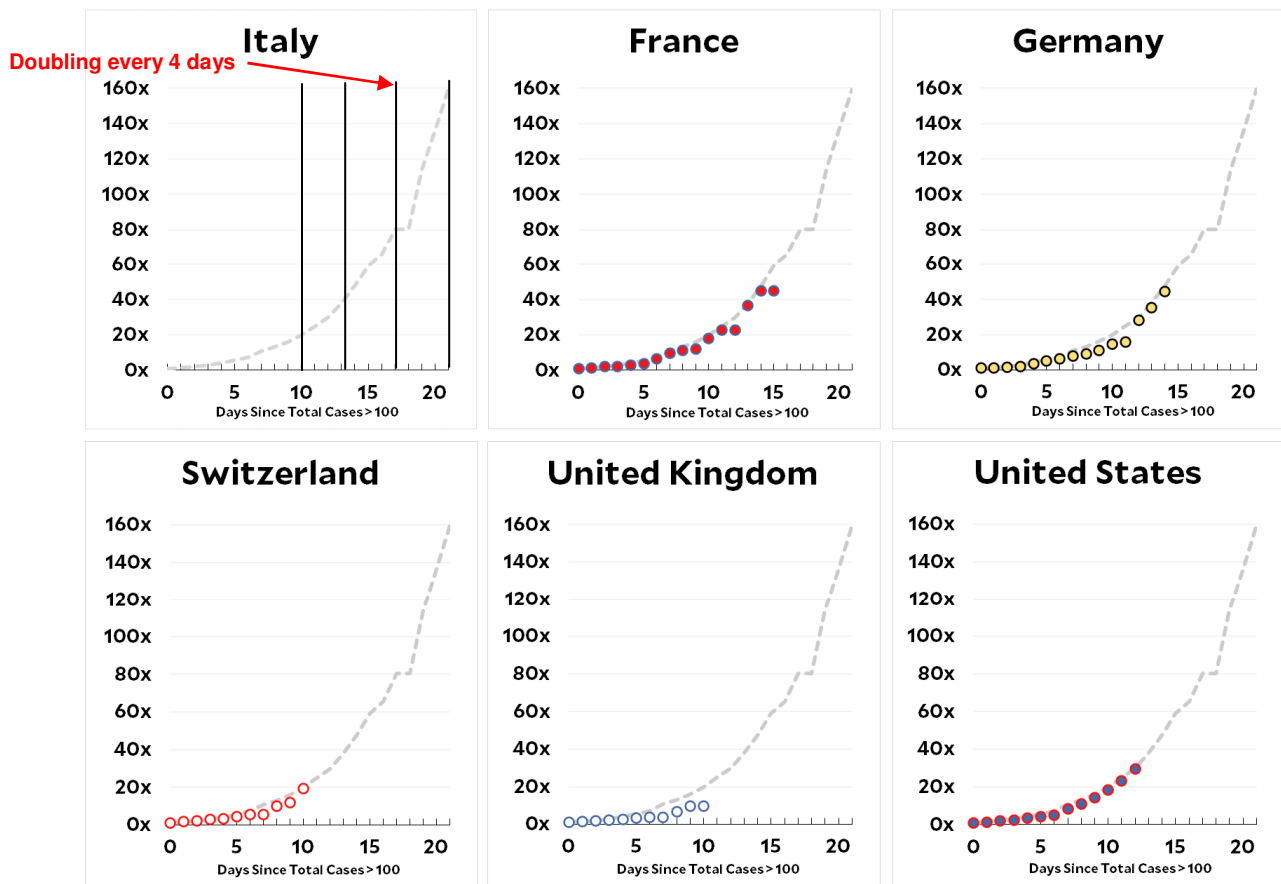
Source: Johns Hopkins COVID-19 dataset as of March 15 at:
https://github.com/CSSEGISandData/COVID-19/

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[9]    https://github.com/CSSEGISandData/COVID-19/blob/master/csse_covid_19_data/csse_covid_19_time_series/time_series_19-covid-Confirmed.csv

# Coronavirus Growth in Western Countries: March 16 Update

Kevin Drum, March 17, 2020

## COVID-19 Growth Rate
### Cumulative Confirmed Cases Since Day 0



Source: Johns Hopkins COVID-19 dataset as of March 16 at:
https://github.com/CSSEGISandData/COVID-19/
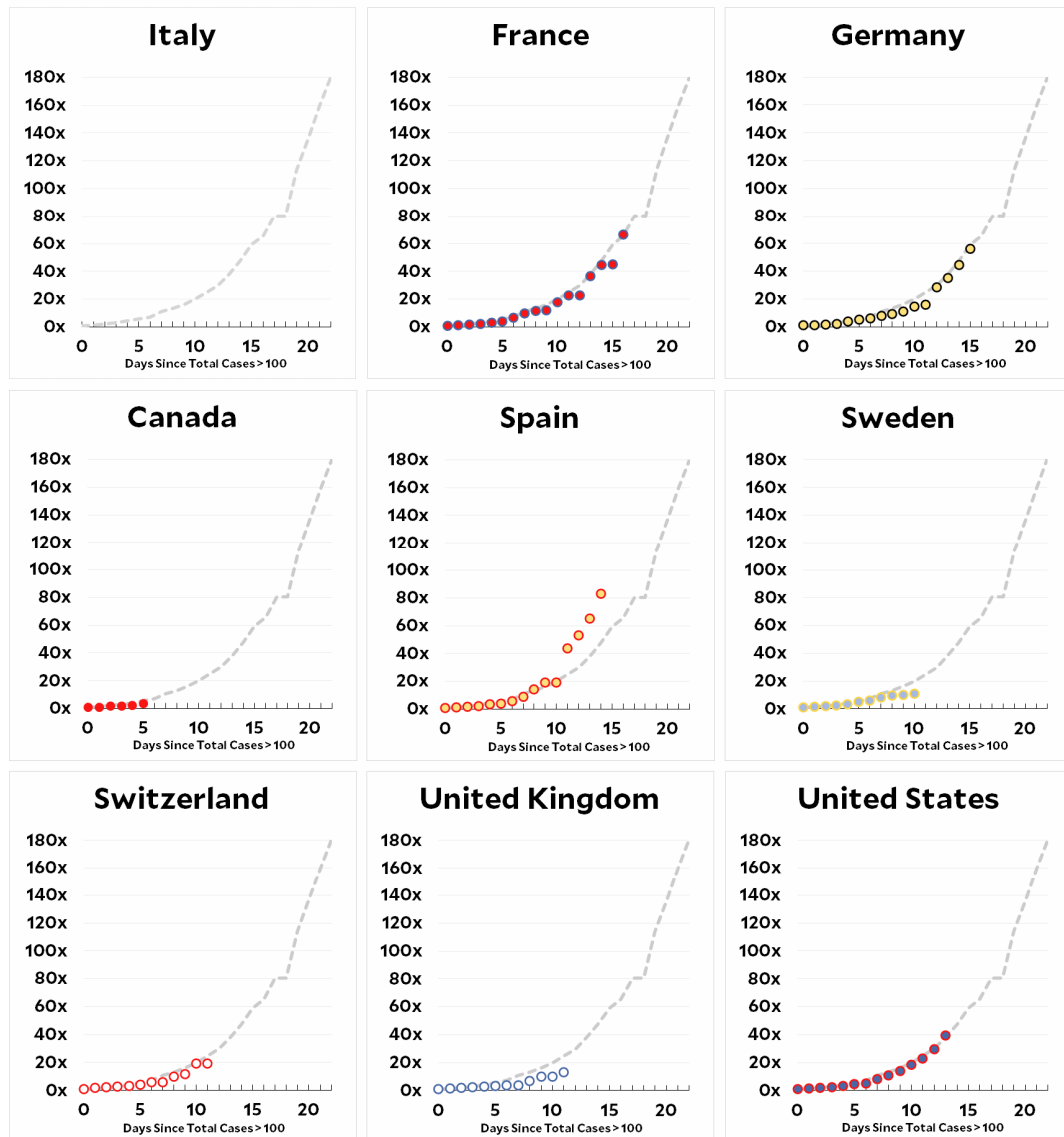
Here's the coronavirus growth rate through Monday. I've added three new countries. One reader suggested Canada, since they're right next door. My old boss wanted to see Spain, and since I used to

do everything he told me, why break tradition now? Then, to even things out, I added Sweden just to see how one of the Nordic countries was doing.

There's not a lot new here. Almost everyone is still on the Italian growth path. The big exception is Spain, which is in terrible shape, and the UK and Sweden, which continue to be a little under the Italian trendline. The United States remains almost perfectly on the Italian trendline, and there's really no reason to think we can get off it before the next two or three weeks at the earliest.

The raw data from Johns Hopkins is here.[10]

([https://www.motherjones.com/kevin-drum/2020/03/a-chart-qa-where-is-the-coronavirus-pandemic-headed/](https://www.motherjones.com/kevin-drum/2020/03/a-chart-qa-where-is-the-coronavirus-pandemic-headed/), retrieved 3/17/2020)

# A Chart Q&A: Where is the Coronavirus Pandemic Headed?

Kevin Drum, March 17, 2020

I've gotten some questions about my daily coronavirus charts[11] that are worth answering. To refresh your memory, here's an enlarged version of the chart for the United States:
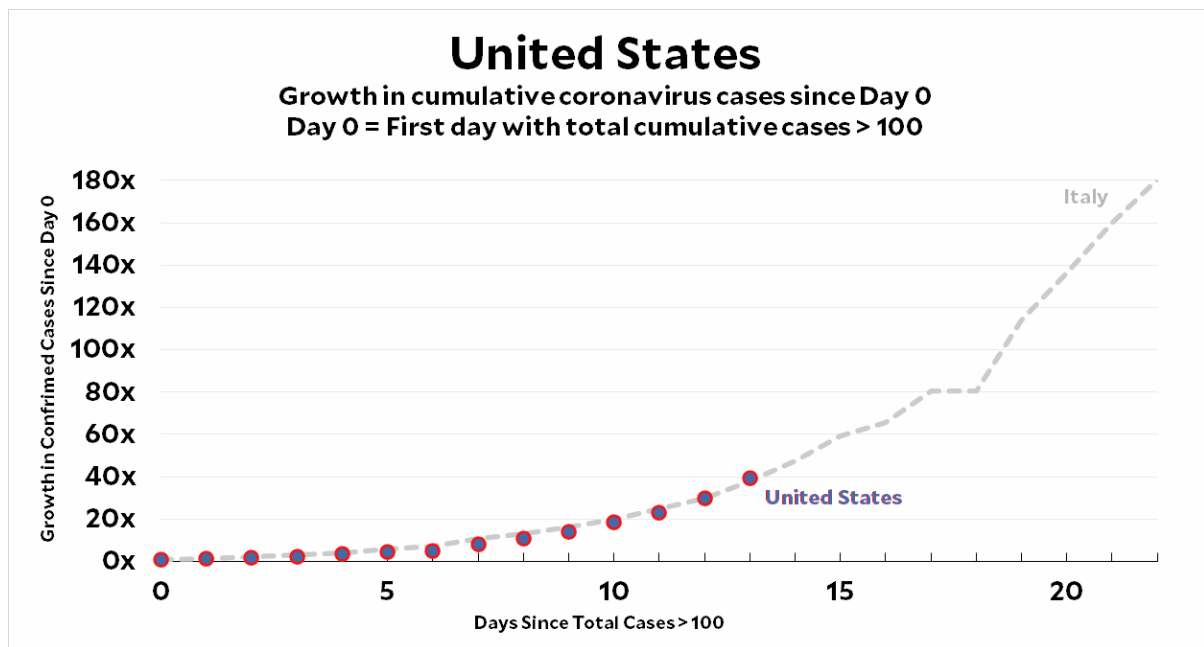


The gray line is Italy. The red and blue circles are the United States. Italy is the baseline for comparison because it was the first Western country to confirm more than 100 cases of coronavirus infection, so it's the farthest along the growth curve.

For every country, Day 0 is the first day that it recorded more than 100 confirmed cases. For Italy, this was February 23, when they recorded 155 cases. For the US, it was March 3, when we

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[10] https://github.com/CSSEGISandData/COVID-19/blob/master/csse_covid_19_data/csse_covid_19_time_series/time_series_19-covid-Confirmed.csv

[11] https://www.motherjones.com/kevin-drum/2020/03/coronavirus-growth-in-western-countries-march-16-update/

recorded 118 cases. We are nine days behind Italy. Since we seem to be following their path very closely, this means that in nine days we'll probably be where Italy is today.

Now for the questions:

**Q: What does the y-axis mean?**

A: It's the growth since Day 0. Since Day 0 is always pretty close to 100, you can just multiply by 100 to get the raw number of cases. The US, for example, was at 40x yesterday, which means about 4,000 confirmed cases.

**Q: Why not just show the number of cases instead of making us calculate it?**

A: Because the growth rate is more important. We should be thinking a lot more about growth rate than number of cases.

**Q: But what about country size? Sure, the US has 4,000 cases, but that's out of a much bigger population than Italy. Wouldn't it be better to show the number of cases per million, or something like that?**

A: No. Take a look at the populations of the largest European countries:

| | Population (millions) | Ratio | # Doublings (at 5.5 days per doubling) | Weeks |
|---|---|---|---|---|
| United States | 328 | | | |
| Germany | 83 | 4.0 | 2.0 | 1.6 |
| France | 67 | 4.9 | 2.3 | 1.8 |
| UK | 67 | 4.9 | 2.3 | 1.8 |
| Italy | 60 | 5.5 | 2.5 | 1.9 |
| Sweden | 10 | 32.8 | 5.0 | 4.0 |

Take a look at the line for Germany. It has a population of 83 million. The United States is four times as big. That sounds like a lot, but it's really nothing. We're only two doublings bigger than Germany, and at the current doubling time for the spread of coronavirus this represents only about 1.6 weeks. What this means is that raw size barely matters. When we hit Germany's level of confirmed cases, it's only a week and a half until we hit their level on a per-capita basis.

So don't worry too much about raw size. The coronavirus grows on an exponential basis, which means the growth rate swamps any raw number in a matter of days or weeks. Think growth, not levels.

**Q: Can you show the point at which various countries adopted strict lockdowns, quarantines, etc.?**

A: Sure, but that would require that we define our terms pretty precisely since every country has adopted different kinds of measures. If somebody with an expert knowledge of this stuff produces an index that measures "severity of countermeasures" or some such, I will be happy to add it to the charts. But it's not really something I can do on my own.

**Q: Why are you only charting Western countries? What about China and South Korea?**

A: Our experience so far suggests very strongly that Asian populations are willing to tolerate far more severe countermeasures than us freewheeling types in the West. China is the best example of this, but it's true of Singapore, South Korea, and Japan as well. Since the United States is my main interest, I

want to make comparisons that help us understand the trend that we're most likely to be on. This means comparing ourselves to countries that are similar to us in their tolerance for things like social distancing, quarantines, and so forth.

**Q: What's the point of all this, anyway? Are you just trying to scare people?**

A: I'm trying to do my best to show the trend we're on so that we have a better idea of where we're going to end up. That should help us plan for the most likely case. But if this scares you, that's a bonus: you *should* be scared.

Let me say that again: you *should* be scared, and the growth rate in my charts should help you get there. We have 4,000 confirmed cases right now. If this doubles ever 5.5 days, we'll have gone through 13 doublings by June 1. *That's about 32 million cases and it's only ten weeks away.* Do you think that in ten weeks we can seriously reduce the doubling rate? I don't. Do you think our hospital system is anywhere close to being able to handle millions of cases? Do you think maybe we should create a crash program to build more hospital capacity? I do. And by crash, I mean (a) starting now, (b) funded with infinite dollars, and (c) construction running 24/7.

**Q: Why should I be so scared? The world has gone through plenty of pandemics in the past century.**

A: Yep, and every single one of them is something we've had a vaccine for—or were able to create one fairly quickly. This is the first time we've had a fast-spreading virus with no immunity whatsoever. The last time this happened was 102 years ago, during the Spanish flu of 1918. And we all know how that one turned out.