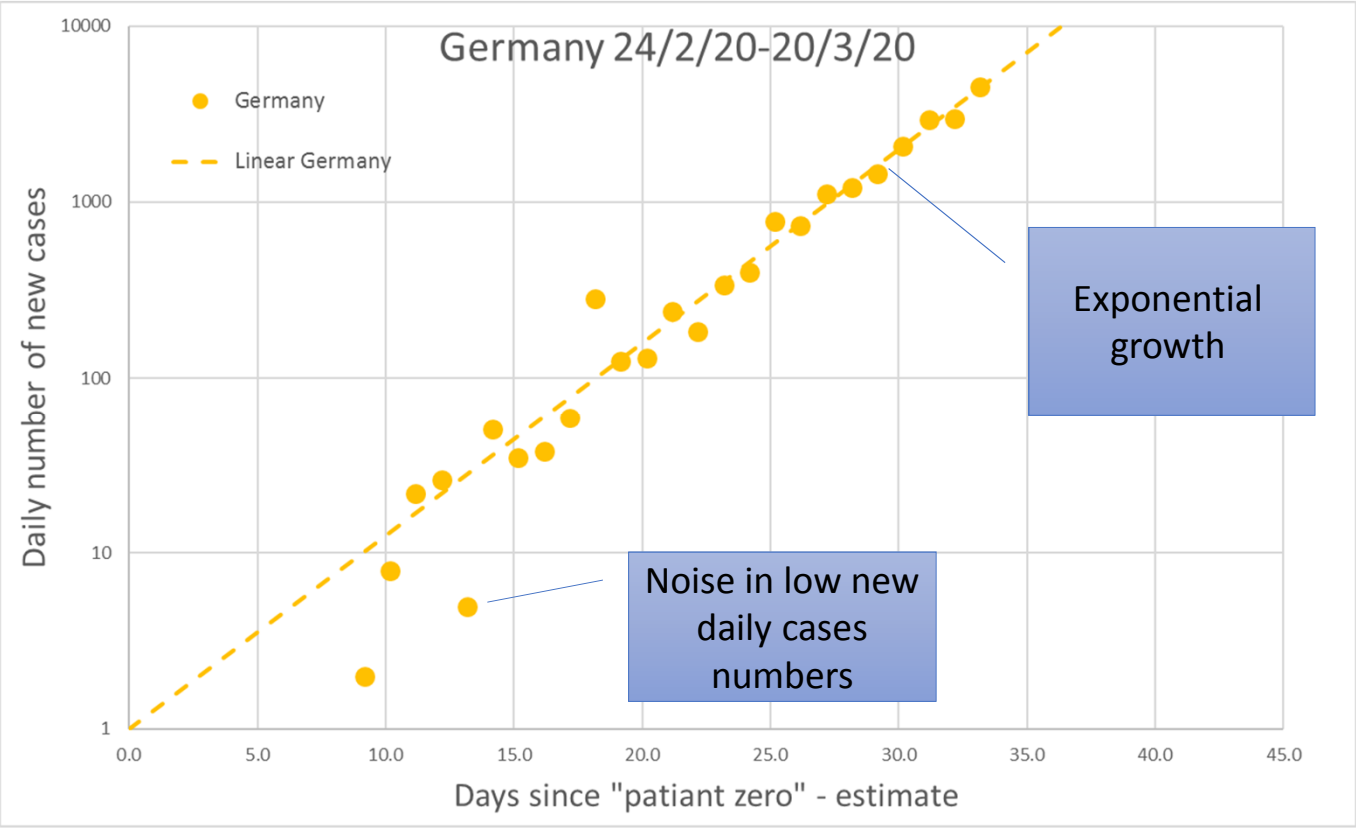
Corona growth

International survey (updated 20200320)

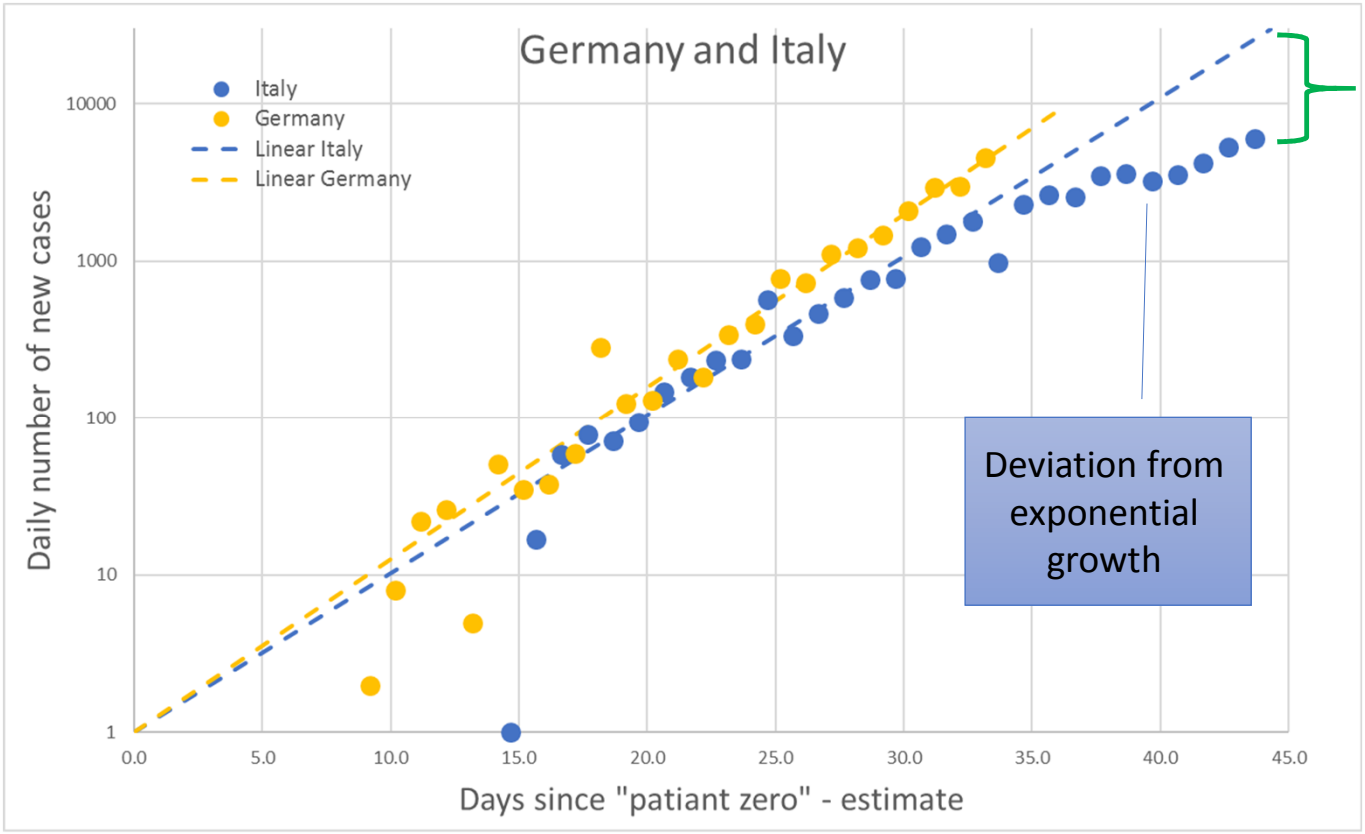
Dynamics has a typical form



Data source: https://www.worldometers.info/coronavirus/

- Linear fit in the range ~50-1000 new daily cases (NDC).
- Germany - 9.1 days for factor 10 growth.
- Growth rate – infections + testing ramp-up.
- Day 0 – defined as 1 NDC from linear fit.

Growth rate might slow down



Data source: https://www.worldometers.info/coronavirus/

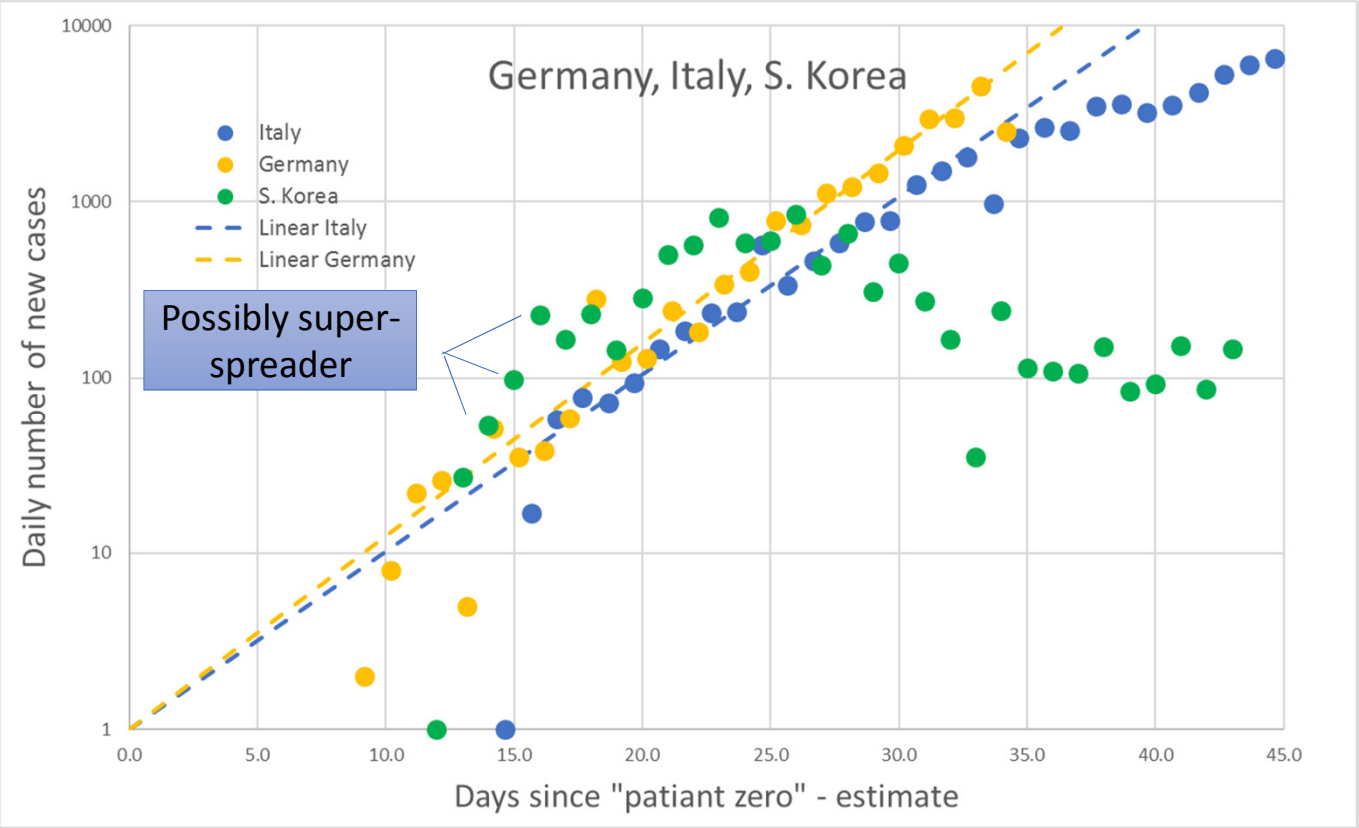
Possible reasons for slow-down:

- Lower infection rate.
- Lower growth in testing.
- Social clusters reaching "logistics curve".

Policy decisions affect growth curve after about a week:

- Testing is triggered by symptoms. Mean time infection-symptoms: 5 days.
- Total testing time averages at 2-3 days.

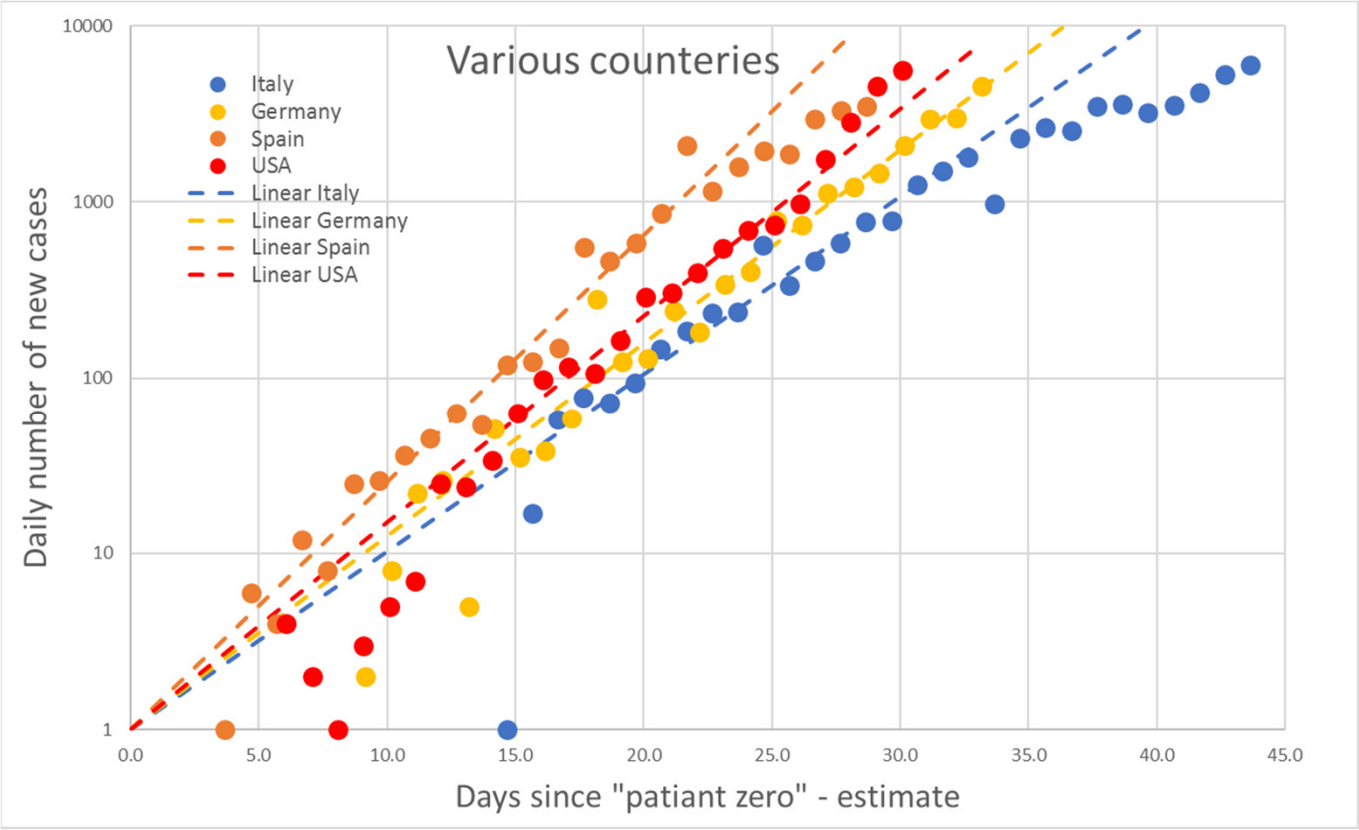
With proper action – infection curve may decrease rapidly



- S. Korea – decrease probably due to policy.

Data source: https://www.worldometers.info/coronavirus/

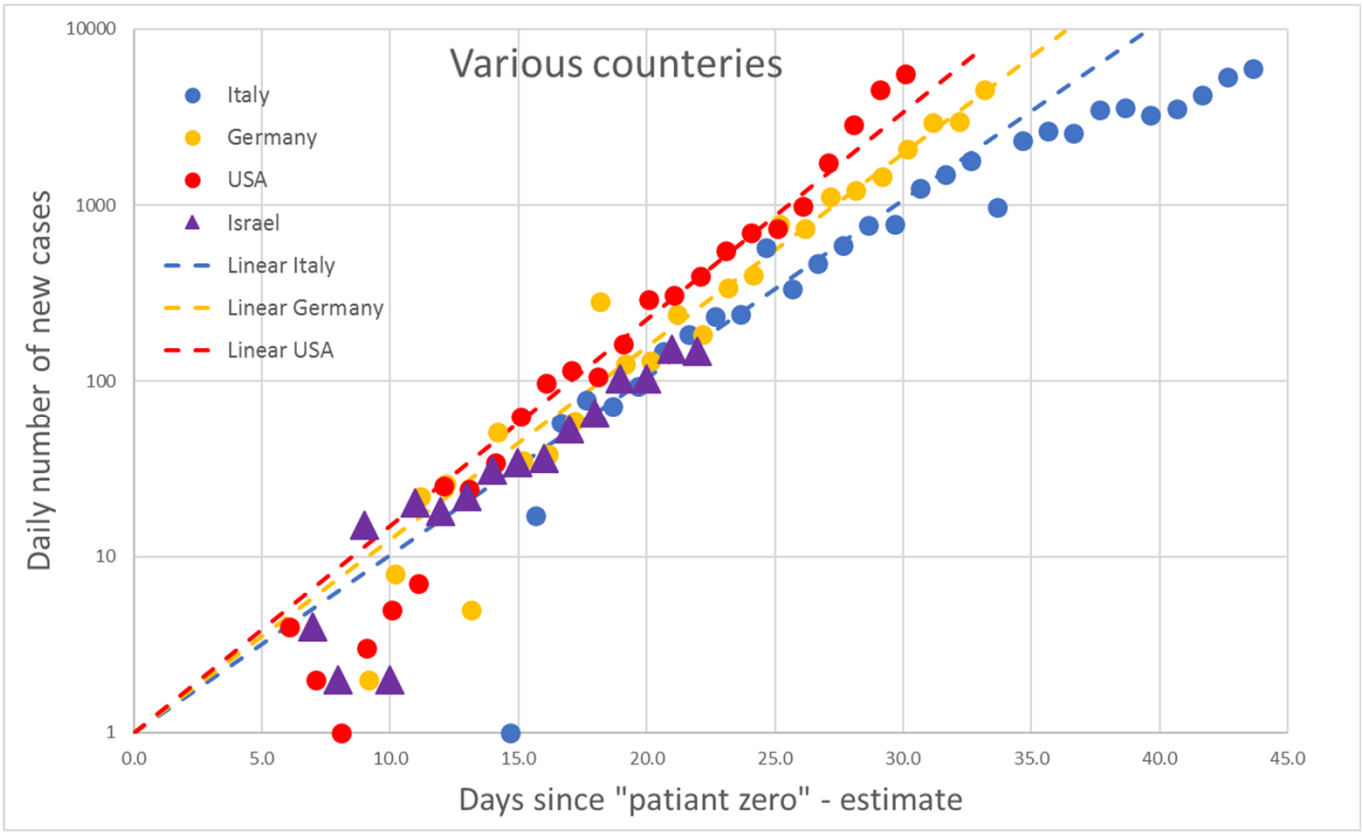
Growth rate varies



Data source: https://www.worldometers.info/coronavirus/

- Initial growth rate (before policies, testing growth decay, etc') varies.
- In most countries where data is available the rate ranges between 7-10 days for X10 growth.

Israel – initial growth rate



Data source: https://www.worldometers.info/coronavirus/ , Israel - Y. Elbaz, Private communication

- Exponential growth at constant rate in the last 11 days (10-20/3/20).
- Growth rate – at the lower range of other countries. About 9.75 days for X10 growth.
- No slow-down is apparent (20/3/20).
- Major policy decisions are still not in the time range (first day of schools shut-down was 13/3/20).

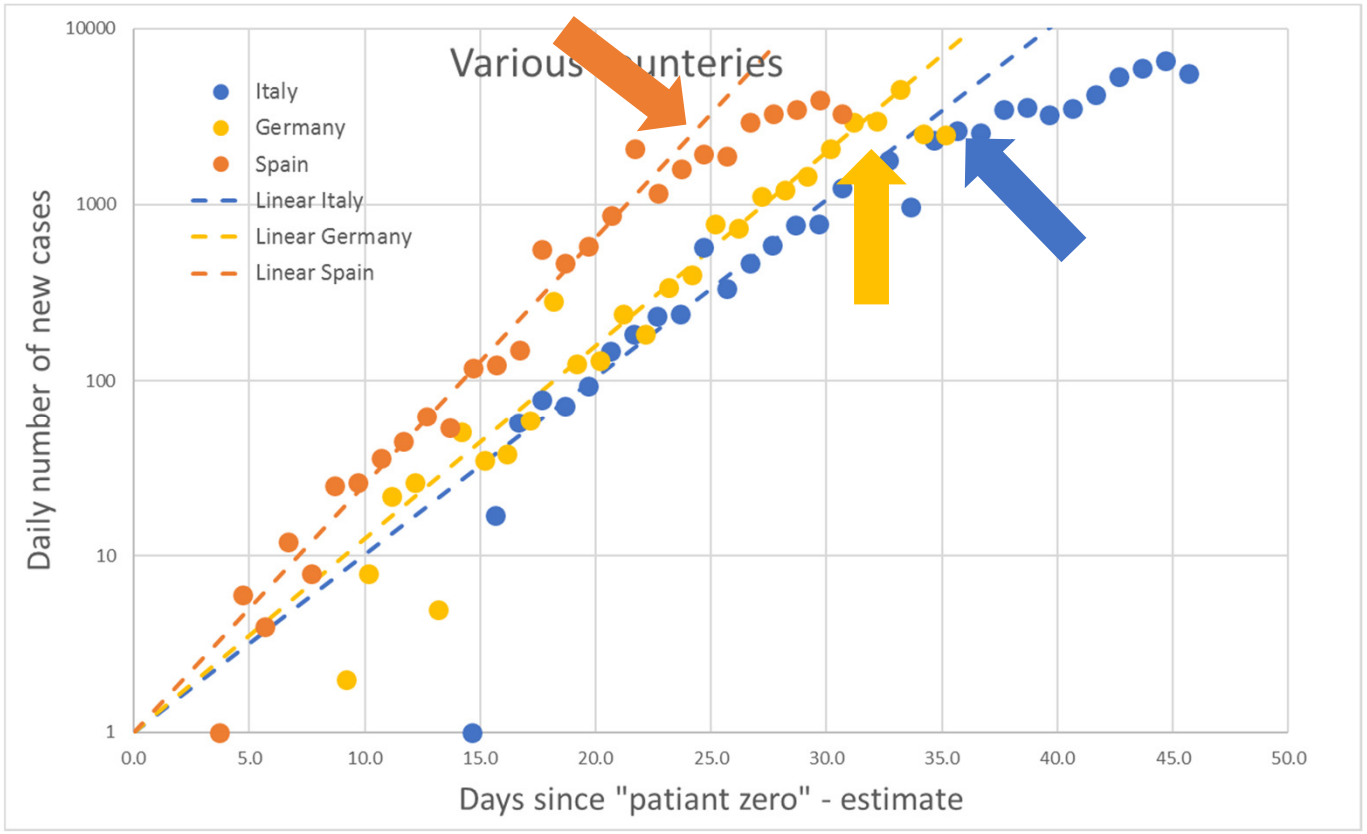
Comment: the data published in the media about Israel is different then present here – **much more noisy.** Once I got data from Yoni (MALAL) – it looked much better.

Near term goals (research)

- Improve data quality from Israel – interview data providers (testing criteria, daily number of tests, definition of **daily number of cases**, weekend corrections).
- Integrated “imported cases” effect on data.
- Correlate policy decisions with growth curves (S. Korea, China outside Wuhan, Italy).
- Methods to estimate current growth rate (without the ~week delay achieved in testing).
- Criteria for policy effectiveness.

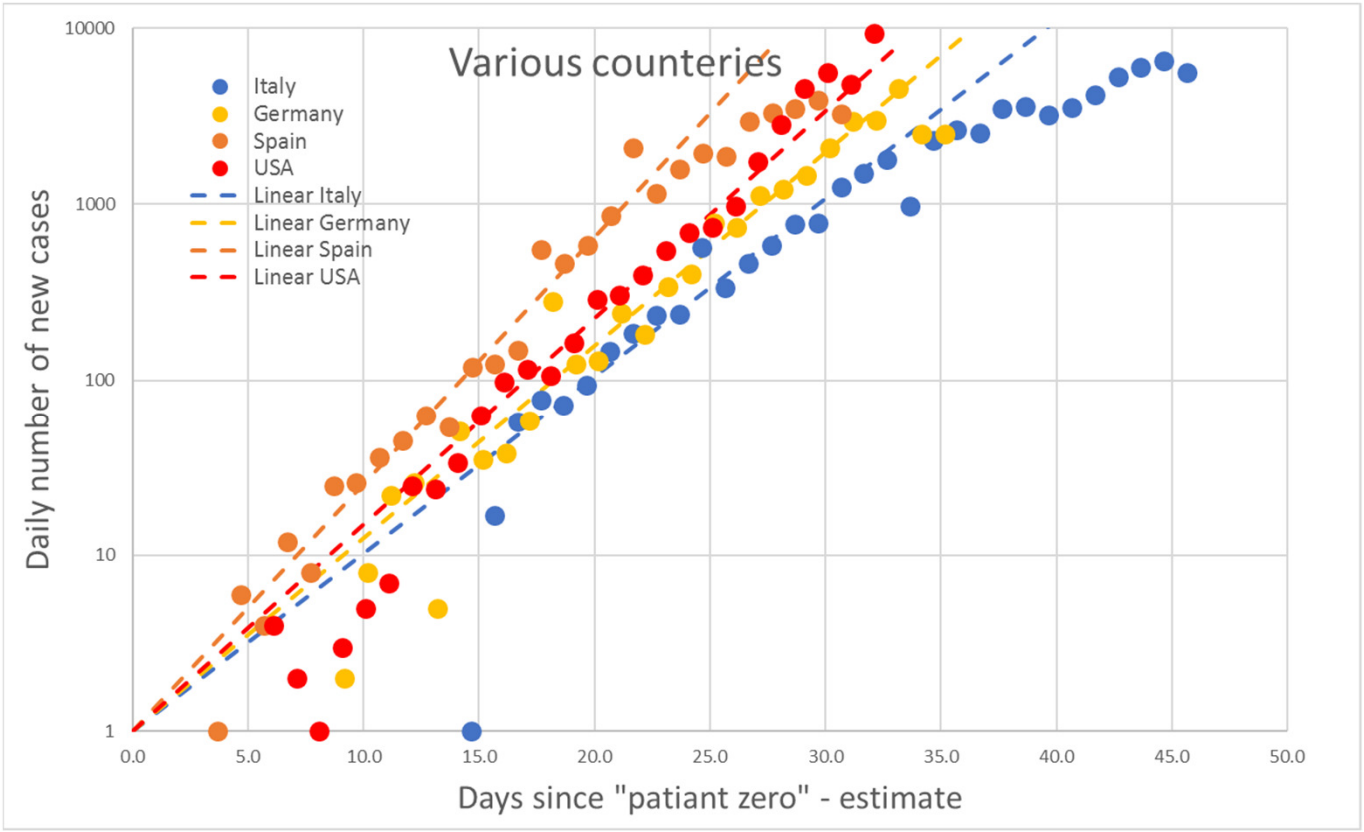
Update 20020322

In the last week mitigation efforts are apparent



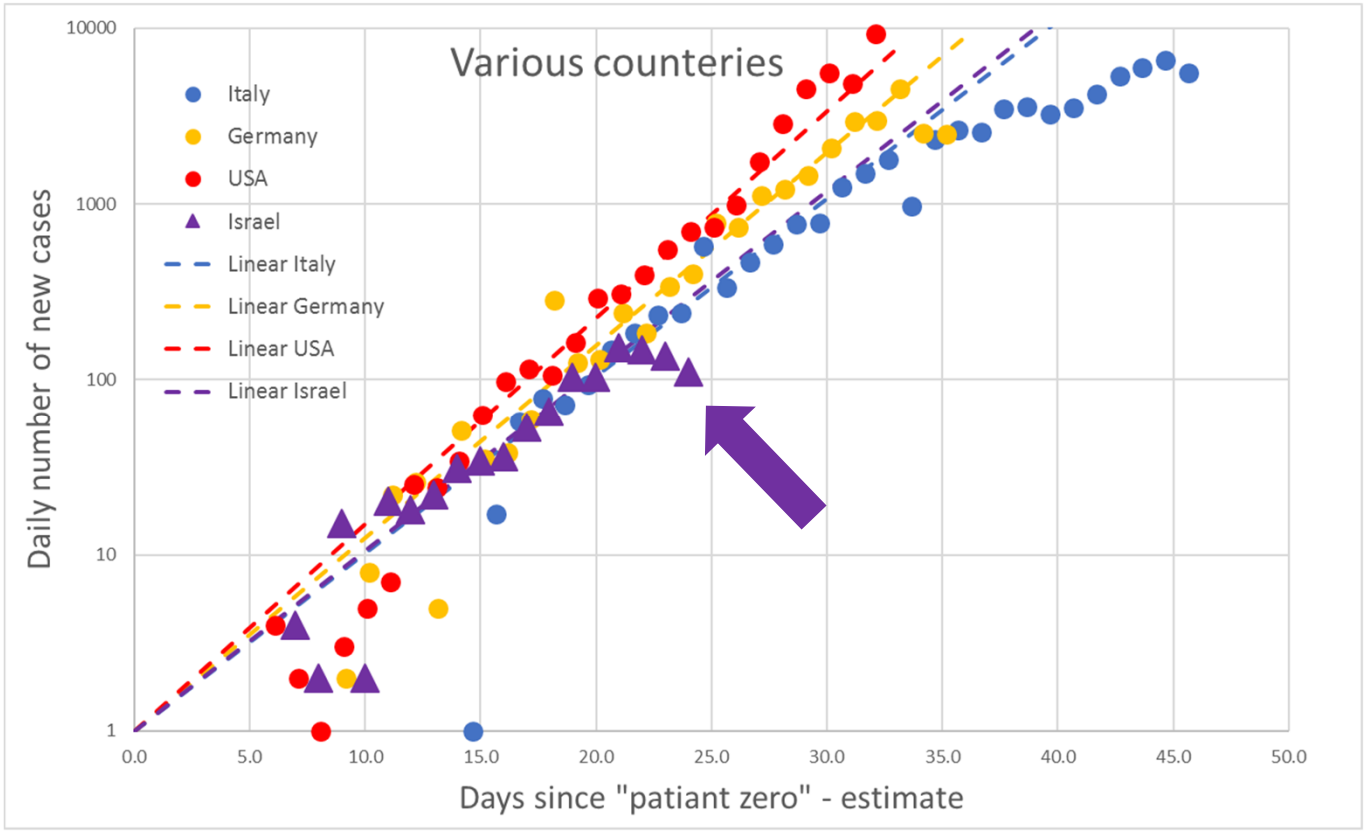
- Decay in growth rate are apparent in: Italy (last 12 days), Spain (last 6 days), Germany (last 2/4 days?).
- France show a similar behavior (not drawn for clarity) – last ~week.
- Hopefully due to policy decisions (not testing overload or such).
- Remember: Policy decisions – about 7-9 days before.
- Note that the turning point in different European countries is around the same number of NDC (~1000s) – maybe policy decision were made at the same severity (~100s).

….with one BIG exception



- No slow-down is apparent in the USA.

Israel – some hope?



- **WARNING: Last two data points for Israel are from the media (not from Yoni who provided all previous data).**
- **20/3 – 823 (from Yoni).**
- **21/3 – 960 (MALAL?).**
- **22/3 – 1071 (Media).**
- **If this is a slowdown – this is the lowest NDC point I see in the 8 reference countries I checked.**
- **Help required in getting the last two data points from "official sources".**