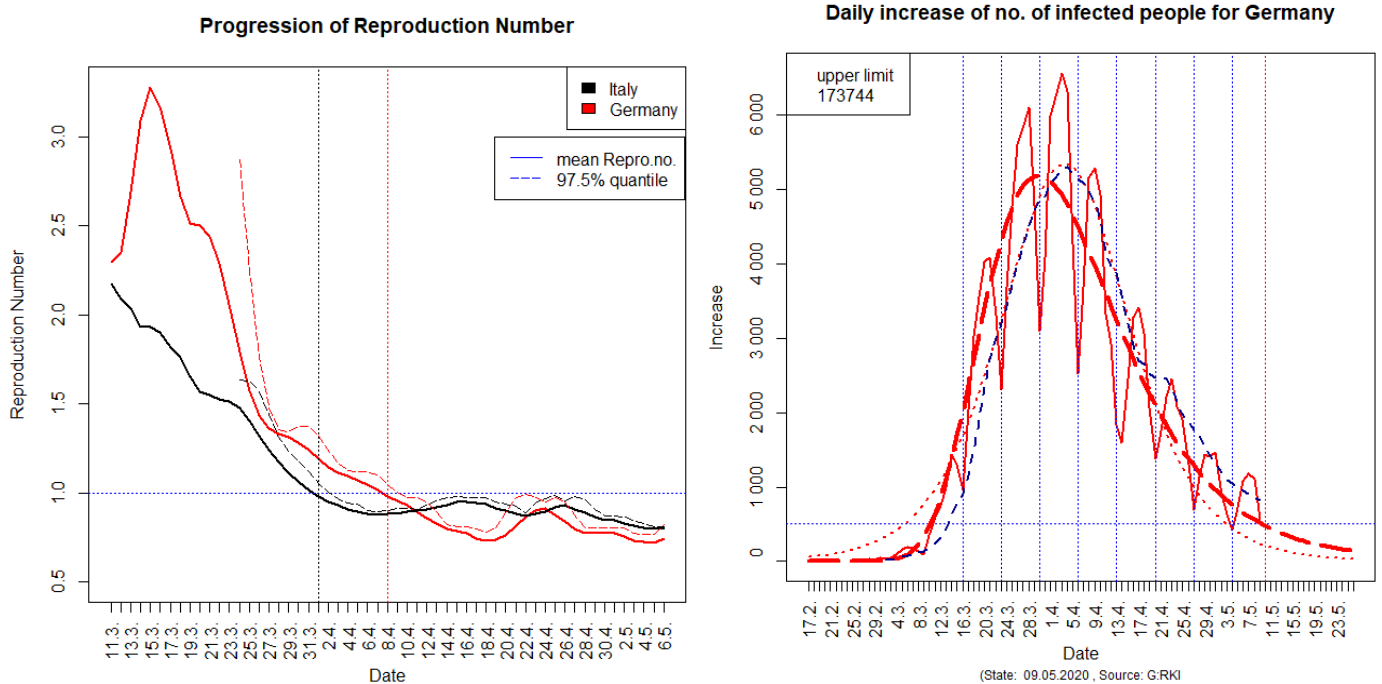


**09.05.2020: COVID-19 Pandemic: Germany: Estimations consolidated: Stagnation predicted for 10.5.; upper limit estimated higher than 173 000**



The left figure shows the mean reproduction numbers (solid line) and the 97.5% quantile (dotted line) for the COVID-19 pandemic based on new infections reported by the Robert-Koch-Institut (RKI, Berlin) at the 9.5. and by Johns-Hopkins University for Italy. To avoid reporting artefacts, we ignored the last 3 observations (being too preliminary for Germany) and smoothed observations by **moving averages** of order 7. Then, we determined the **reproduction number** at time  $t$  by the ratio of the moving averages at times  $t$  and  $(t-4)$ , i.e. by relating means of successive blocks of 4 values each. Vertical lines indicate the predicted intersections with 1, the horizontal line is at 1.

The right figure shows the daily real new infections of COVID-19 (solid line) and two kind of predictions (dotted and dashed lines) for **Germany**. Predictions are generated by an optimally fitted **weighted logistic model** (dotted line) and an optimal **Gompertz model** (bold dashed line), respectively. Only for Italy, the Gompertz model was weighted. Vertical blue dotted lines indicate Mondays, the red vertical dotted line the start of **stagnation** of new infections ( $< 500$ ) as predicted by the Gompertz model. The horizontal dotted line indicates 500 new infections. The **blue dashed line** indicates the 7-days moving average in order to smooth reporting artefacts.

**Reproduction numbers** are estimated to be lower than 1 since 1.4. for Italy and since 8.4. for Germany. The 95% uncertainty region is very narrow and steadily below 1 for Italy since the beginning of April. For Germany, the reproduction number is lower than 1 only since 8.4. Note that the uncertainty region stays now distinctly lower than 1 for both, Germany and Italy.

The representation of daily new infections shows that the numbers reported by the RKI follow waves related to weekdays with local minima at Mondays (with the exception of the week after Easter where Monday is a public holiday). The Gompertz model appears to be much more realistic than the logistic model in all time regions! With the Gompertz model, stagnation ( $< 500$  new infections) we now predict only for the 10.5. for Germany (and for the 24.5. for Italy). **Regarding the 7-days moving average one might expect the weekly mean to be lower than 500 somewhat later than 10.5. for Germany.** The estimated upper limit of the no. of infected people in the first wave of the pandemic is higher than 173000 for Germany (and around 236000 for Italy).