NOTEWORTHY

INKUBATIONSZEIT DES CORONAVIRUS

10.03.2020

13.3.2020

Nachdem im Augenblick nicht viel mehr zur Inkubationszeit/Infektiosität von COVID-19 herauszubekommen ist, hier einige Überlegungen, was in der Inkubationszeit passieren muss.

Dabei sind vor allem zwei historische Artikel zur Spanischen Grippe 1918/1919 wichtig wie gestern schon erwähnt. Hauptunterschiede in der Epidemiologie der aktuellem COVID-19 ist die geringere Mobilität der Indexpersonen, die höhere direkte Ausbreitungsgeschwindigkeit “3 day fever”, längere Inkubationszeit (10 Tage), Todesopfer v.a. in der Gruppe der 20-40, dazu 3 Wellen zu denen wir noch nichts bei COVID-19 sagen können.

Eine wichtige Frage zur Beendigung der Pandemie ist natürlich, wieviele der Kontaktpersonen getraced bzw isoliert werden müssen, bevor eine Pandemie nur noch durch Globalmassnahmen beherrschbar ist. Nach einer aktuellen Simulation und R0=2.5 müssten 70% der Kontaktpersonen getraced werden. Allerdings ist Tracing nur machbar, wenn weniger als 1% der Ansteckungen vor Symptombeginn stattfinden. Ich glaube, diese Zahl liegt aber ein Vielfaches höher, deswegen bin ich seit letzter Woche der Meinung, dass wir Globalmassnahmen wie Grenz-, Schul-, Kindergärten-, Uni-, Firmen- und Kirchenschliessungen für ca 8 Wochen in Deutschland brauchen.

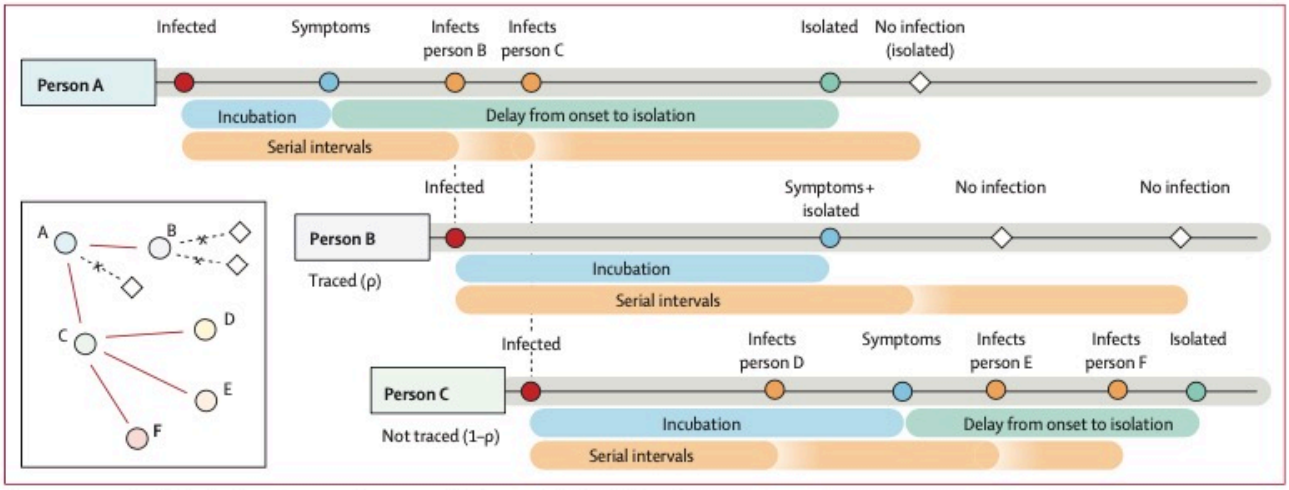


Figure 1: **Example of the simulated process that starts with person A being infected**
After an incubation period, person A shows symptoms and is isolated at a time drawn from the delay distribution (table). A draw from the negative binomial distribution with mean reproduction number (R_0) and distribution parameter determines how many people person A potentially infects. For each of those, a serial interval is drawn. Two of these exposures occur before the time person A is isolated. Each contact is traced with probability ρ, with probability 1–ρ they are missed by contact tracing. Person B is successfully traced, which means that they will be isolated without delay when they develop symptoms. They could, however, still infect others before they are isolated. Person C is missed by contact tracing. This means that they are only detected if and when symptomatic, and are isolated after a delay from symptom onset. Because person C was not traced, they infected two more people (E and F), in addition to person D, than if they had been isolated at symptom onset. A version with subclinical transmission is given in the appendix (p 12).

https://www.thelancet.com/journals/langlo/article/PIIS2214-109X(20)30074-7/fulltext 10/3/2020

Welche nicht-pharmakologische Massnahmen (non pharmacological interventions, NPI) wurden 1918 durchgeführt? Dazu Markel 2007

> We obtained data on the timing of 19 classes of NPI in 17 U.S. cities during the 1918 pandemic and tested the hypothesis that early implementation of multiple interventions was associated with reduced disease transmission. Consistent with this hypothesis, cities in which mul- tiple interventions were implemented at an early phase of the epidemic had peak death rates 50% lower than those that did not and had less-steep epidemic curves.

Maximalen Effekt hatte bei Markel 2007 das Verbot öffentlicher Veranstaltungen, gleichauf mit Schulschliessungen, erst dann kam die Isolierung. Etwas anders aufgearbeitete Daten, aber ebenso maximaler Effekt bei Hatchett 2007, wenn Schulen, Theater und Kirchen schliessen:

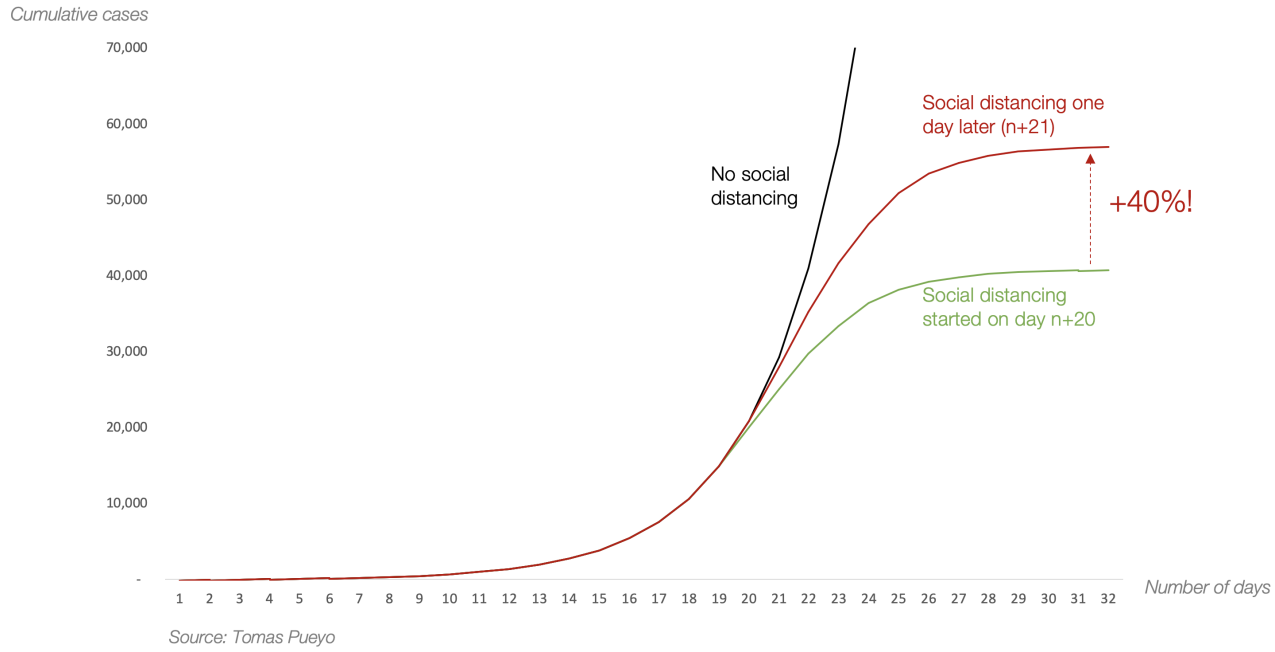
Table 2. Correlation between influenza epidemic outcomes and timing of interventions in 17 U.S. cities in 1918

	Outcome: Excess weekly P&I deaths		
Measure of interventions	Peak	Normalized peak	1918 total
Number of interventions before:			
10/100,000 CEPID	**−0.53, $P = 0.03$**	**−0.53, $P = 0.03$**	−0.31, $P = 0.22$
20/100,000 CEPID	**−0.68, $P = 0.002$**	**−0.64, $P = 0.005$**	**−0.52, $P = 0.03$**
30/100,000 CEPID	**−0.51, $P = 0.04$**	**−0.55, $P = 0.02$**	−0.29, $P = 0.27$
40/100,000 CEPID	−0.32, $P = 0.21$	−0.40, $P = 0.11$	−0.07, $P = 0.80$
CEPID at time of intervention:			
First	0.08, $P = 0.76$	0.004, $P = 0.87$	0.07, $P = 0.79$
Second	**0.54, $P = 0.02$**	0.47, $P = 0.06$	0.39, $P = 0.12$
Third	**0.54, $P = 0.02$**	**0.52, $P = 0.03$**	0.31, $P = 0.22$
Fourth	**0.66, $P = 0.004$**	**0.70, $P = 0.002$**	0.38, $P = 0.13$
Fifth	**0.55, $P = 0.02$**	**0.67, $P = 0.003$**	0.27, $P = 0.30$
Sixth	0.26, $P = 0.31$	0.44, $P = 0.08$	0.05, $P = 0.84$
CEPID at time of:			
Closing schools	**0.54, $P = 0.02$**	**0.63, $P = 0.007$**	0.25, $P = 0.34$
Closing theaters	**0.56, $P = 0.02$**	**0.72, $P = 0.001$**	0.17, $P = 0.52$
Closing churches	**0.56, $P = 0.02$**	**0.70, $P = 0.002$**	0.17, $P = 0.53$
Closing dance halls	0.03, $P = 0.90$	0.04, $P = 0.87$	0.15, $P = 0.57$
Other closures	0.33, $P = 0.19$	0.34, $P = 0.18$	0.24, $P = 0.35$
Making influenza notifiable	0.01, $P = 0.97$	−0.07, $P = 0.79$	0.11, $P = 0.67$
Bans on public gatherings	0.46, $P = 0.06$	**0.56, $P = 0.02$**	0.27, $P = 0.30$
Imposing case isolation	0.16, $P = 0.53$	0.14, $P = 0.59$	0.13, $P = 0.62$
Bans on public funerals	−0.09, $P = 0.75$	0.09, $P = 0.72$	−0.41, $P = 0.10$

Three measures of epidemic intensity. Peak weekly excess P&I death rate, normalized peak weekly excess P&I death rate (peak divided by median weekly rate during the study period), and 1918 study period total excess P&I death rate are related to number of interventions before reaching a specified CEPID, CEPID at time when specified numbers of interventions had been imposed, and CEPID at time when specific interventions had been imposed. Spearman rank correlations and associated P values are shown, with bold type for $P < 0.05$.

Schulschliessungen wären jetzt extrem wichtig. Und Erhöhung der Bettenkapazitäten. Von den historischen Plots kann man direkt abschätzen, was ein Tag Verzögerung der Schliessung bzw ein Tag zu frühe Öffnung an Exzess Mortalität bedeutet. Die Pueyo Grafik stimmt mit hoher Wahrscheinlichkeit.

Chart 23: Model of Cumulative Cases of Coronavirus with Social Distancing Measures Taken One Day Apart



Source: Tomas Pueyo

https://medium.com/@tomaspueyo/coronavirus-act-today-or-people-will-die-f4d3d9cd99ca 13/3/2020