COVID-19: Save lives, ventilators and the economy

When one third of the globe is in lockdown and 80 - 90% of the population is sent on mandatory leave (which probably lasts several months) and maybe 3-5% of the population dies in the next few months (lack of ventilators) due to a war against a small 120 nm virus thing, **it is an economic and health disaster of the same magnitude as a world war.**

The proposal below potentially reduces the need for mechanical ventilators for the population group targeted by a factor 250 - 400, and enables to restart normal economic activities in the society by a selected fraction of the population (may be 80%?) much faster.

The logical solution I propose is a simple logic based on solid facts from 3 sources:

  1) John Hopkins University, which publishes daily data for covid-19, died and confirmed, sources WHO, ECDC, CDC etc.
CSSE - Center for Systems Science and Engineering at JHU
https://systems.jhu.edu/

  2) The Italian analysis of 3200 dead and the co-morbidity analysis of 481 of these:
Report-COVID-2019_20_marzo_eng.pdf and Report-COVID-2019_17_marzo-v2.pdf
https://www.epicentro.iss.it/coronavirus/bollettino/Report-COVID-2019_20_marzo_eng.pdf
Italian analysis of 6801 dead and the comorbidity analysis of 710 of these:
https://www.epicentro.iss.it/coronavirus/bollettino/Report-COVID-2019_26_marzo_eng.pdf
Credits to COVID-19 Surveillance Group, Istituto Superiore di Sanità, Rome, Italy for these excellent reports.

  3) WHO China report and press conference:
WHO Press conference and who-china-joint-mission-on-covid-19-final-report.pdf
https://www.who.int/docs/default-source/coronaviruse/transcripts/joint-mission-press-conference-script-english-final.pdf?sfvrsn=51c90b9e_2
https://www.who.int/docs/default-source/coronaviruse/who-china-joint-mission-on-covid-19-final-report.pdf
  (Mortality about 1% outside Hubei, about 5% severe cases need ventilator)

The main pieces of information and conclusions to be derived from these sources are the following:

  1) No matter what many sources say, we actually have two well-defined groups where we know the mortality quite accurately (source JHU data);
      - China outside Hubei Province, (epidemic confined) 14'894 infected, mortality 0.82%
      - South Korea (epidemic confined) ca. 10'331 mortality rate 1.86% (as of 7 April 2020)

  2) The Italian analysis indicates that by far the major cause of mortality has to do with cardiovascular diseases, diabetes, high blood pressure (probably the majority) with contributions from cancer, COPD (chronic lung disease) and chronic liver and kidney diseases. People without any of these disorders have about 50 times lower mortality: that is for countries with the same prevalence of cardiovascular disease as China: 1% *0.021 = 0.021%.

3) Since the Italian analysis indicates that cardiovascular diseases seems to be the major cause of mortality, one can estimate mortality in other countries scaling with prevalence numbers from this report: Mortality from ischaemic heart disease by country, region, and age: Statistics from World Health Organization and United Nations, table 4.
https://www.ncbi.nlm.nih.gov/pmc/articles/PMC3819990/
For example: Italy 0.87 %, France 0.41%, Spain 0.56 %, Germany and Austria 1.22%, Denmark 0.91%, Lithuania 3.7%, etc.
This assumes that there are enough ventilators at the peak of the epidemic; otherwise it may be up to 5x larger (WHO China report).

4) No countries in Europe and the Americas have been able to test and track contacts enough to limit the epidemic like China, South Korea and Singapore have been able to. All have shown initial rapid exponential growth approx. 27 -34% per day, or 10 doubling every 8 days, in both mortality and positive test cases. A few weeks after lockdown it goes a little slower, +10 % (Italy) per day or doubling every week. The number of currently infected can be estimated from the number of dead, the exponential growth rate estimated over past 8 days and the estimated mortality rate scaled with IHD ratings.
It is a factor 9x (Germany) to 90x (France) greater than the publicly confirmed number of infected. My current estimates with that method ('known' mortality, corrected for Ischemic Heart Disease (IHD) ratios):

Country	Conf 31/03/20	Daily expon factor	Weekly expon. Factor	Dead 31/03/20	SMR for IHD	COVID-19 SMR from IHD [%]	Estim. Infect 31/03/20	Factor estim. / confirm.	Estim number ventilat 02/04/20
France	52,128	1.19	3.3	3523	30	0.41	4,812,166	92.3	64,449
Spain	95,923	1.18	3.2	8464	41	0.56	7,842,564	81.8	143,547
Germany	71,808	1.27	5.2	775	90	1.22	666,621	9.3	26,784
Italy	105,792	1.09	1.9	12428	64	0.87	3,538,476	33.4	101,099
Switzerl.	16,605	1.18	3.2	433	66	0.90	260,359	15.7	7,671
UK	25,150	1.25	4.7	1789	76	1.03	1,585,572	63.0	53,796
Denmark	2,860	1.19	3.3	90	67	0.91	54,963	19.2	1,644
USA	188,172	1.28	5.5	3873	95	1.29	3,429,130	18.2	145,432
Austria	10,180	1.26	4.9	128	90	1.22	102,948	10.1	4,136
Russia	2,337	1.38	9.3	17	349	4.73	8,728	3.7	1,360
Lithuania	537	1.28	5.8	8	275	3.73	2,617	4.9	321

S. Korea CMR	0.0152	1.5 %
S. Korea SMR_IHD	112	IHD rating
Infect2Death	10	Days
Vent Ratio	0.05	5.0 %

Data as of 1 April 2020:
High estimated/confirmed ratios for France, Spain and Italy probably due to both lack of ventilators (increased mortality) and low rate of testing, and for UK and Denmark low rate of testing. Germany and Austria are doing very well on the testing for SARS-CoV-2, but still about a factor 10 short of the estimated infected number of cases.

The logical and most effective method to reduce the burden on the health care and system and restarting the economy is the following proposal.

1) From the population's medical databases, find all those who are either over the age of 65 or have one or more of the symptoms related to cardiovascular disease: heart attack, confirmed ischemic heart disease, high blood pressure, diabetes, COPD (chronic lung disease), etc. And send all these people on mandatory sick leave as they are definitely at risk of being a huge burden on society in the immediate future: ventilator patients.

2) But how? OK health data is private and surrounded by GDPR etc. But don't doctors have access? Use the doctors who also have cardiovascular disease or associated conditions to work at home, and then put a bit in the National Register: High risk case, mandatory sick leave, must stay home during the covid-19 epidemic.

3) If the above cannot be implemented in countries because a medical database is not available, then simply quarantine people with i) hypertension, ii) diabetes, and iii) history of cardiovascular problems, iv) atrial fibrillation as well as all members of their household (or isolate them from their low risk family members).

It is both cheaper and healthier for that 'high risk' fraction of the population to stay in quarantine at home than to go to work and risk having to use a ventilator for several weeks.

The Italian report referenced of 26 March 2020 states that the 'low risk' fraction of the population has about 50 times less fatality that the population average. Wikipedia (and references therein) claims a typical prevalence in Europe of hypertension of about 30%. Let us assume for a moment that the prevalence in the working population of less than 65 years old is around 20 %, or one fifth of total population. **This implies that the mortality of covid-19 in the 'high risk' fraction is 5x50 = 250 times higher than the 'low risk' fraction of perhaps 80%**. It's almost a crime to send them to work at the front and not to confine them at home. The difficulty is in the selection.

4) After the peak of the epidemic, the rest of the 'low risk' population can safely go back to work as their risk of becoming serious ill and in need of a ventilator is quite low.

But the decision must be taken very quickly by the government, as the epidemic is still spreading exponentially very fast. The sooner the better!

Flemming PEDERSEN, Mingot, France 26 March 2020
flemming45pedersen@gmail.com
flemming@honeymooney.com