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Subject: Lessons from Italy and population death risk in <65 and in no underlying diseases.
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[jamainternal_boccia_2020_vp_200008.pdf](#)

Two papers I just published:

1. Analysis of what happened in Italy and lessons for New York and elsewhere. Urgent message: don't have people come to the hospital unless they are severely ill: they get infected even if they are not infected, they infect others, they gain nothing, extra deaths for no reason.
doi: 10.1001/jamainternmed.2020.1447
2. Preprint: Analysis of death risk in people <65 and those without underlying conditions. Death risk is in same range as death risk from daily commute by car, a bit higher in NYC.

<https://www.medrxiv.org/content/10.1101/2020.04.05.20054361v1>

Please disseminate.

Population-level COVID-19 mortality risk for non-elderly individuals overall and for non-elderly individuals without underlying diseases in pandemic epicenters

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ABSTRACT

OBJECTIVE:

To evaluate the relative risk of COVID-19 death in people <65 years old versus older individuals in the general population, to provide estimates of absolute risk of COVID-19 death at the population level, and to understand what proportion of COVID-19 deaths occur in non-elderly people without underlying diseases in epicenters of the pandemic.

ELIGIBLE DATA:

Countries and US states or major cities with at least 250 COVID-19 deaths as of 4/4/2020 and with information available on death counts according to age strata, allowing to calculate the number of deaths in people with age <65. Data were available for Belgium, Germany, Italy, Netherlands, Portugal, Spain, Sweden, and Switzerland, as well as Louisiana, Michigan, Washington states and New York City as of April 4, 2020.

MAIN OUTCOME MEASURES:

Proportion of COVID-19 deaths that occur in people <65 years old; relative risk of COVID-19 death in people <65 versus ≥ 65 years old; absolute risk of death in people <65 and in those ≥ 80 years old in the general population as of 4/4/2020; absolute death risk expressed as equivalent of death risk from driving a motor vehicle.

RESULTS:

Individuals with age <65 account for 5%-9% of all COVID-19 deaths in the 8 European epicenters, and approach 30% in three US hotbed locations. People <65 years old had 34- to 73-fold lower risk than those ≥ 65 years old in the European countries and 13- to 15-fold lower risk in New York City, Louisiana and Michigan. The absolute risk of COVID-19 death ranged from 1.7 per million for people <65 years old in Germany to 79 per million in New York City. The absolute risk of COVID-19 death for people ≥ 80 years

old ranged from approximately 1 in 6,000 in Germany to 1 in 420 in Spain. The COVID-19 death risk in people <65 years old during the period of fatalities from the epidemic was equivalent to the death risk from driving between 9 miles per day (Germany) and 415 miles per day (New York City). People <65 years old and not having any underlying predisposing conditions accounted for only 0.3%, 0.7%, and 1.8% of all COVID-19 deaths in Netherlands, Italy, and New York City.

CONCLUSIONS:

People <65 years old have very small risks of COVID-19 death even in the hotbeds of the pandemic and deaths for people <65 years without underlying predisposing conditions are remarkably uncommon. Strategies focusing specifically on protecting high-risk elderly individuals should be considered in managing the pandemic.

INTRODUCTION

As the coronavirus disease 2019 (COVID-19) pandemic has spread widely around the globe,^{1,2} estimates about its eventual impact in terms of total number of deaths have varied widely, as they are mostly based on mathematical models with various speculative assumptions. Regardless, it is very crucial to estimate how much smaller the risk of death is among non-elderly people (<65 years old) as opposed to older individuals and how frequent deaths are in people who are <65 years old and have no underlying predisposing diseases. Media have capitalized on stories of young healthy individuals with severe, fatal outcomes. However, the majority of patients dying with SARS-CoV-2 are elderly and the large majority of the deceased may have severe underlying diseases. Exaggeration should be avoided in responding to the pandemic.³ Accurate estimates of death risk have important implications for the projecting eventual total loss of quality-adjusted life-years, since deaths of young, healthy people contribute far more quality-adjusted life-years lost than deaths in elderly individuals with pre-existing morbidity. Knowledge of COVID-19 death risks for people <65 years old at the population level may affect the viability of different management strategies for the pandemic. People <65 years old represents the lion's share of the workforce.

Here, we used data from 8 European countries and 4 states in the USA that are epicenters of the pandemic with a large number of deaths and where data are available for deaths according to age stratification. We aimed to evaluate the relative risk of death in people <65 years old versus older individuals in the general population, to provide estimates of absolute risk of death in these epicenters, and to understand what proportion of COVID-19 deaths occur in people <65 years old and without underlying diseases.

METHODS

We considered data from publicly reported situational reports of countries and US states or major cities that have been major epicenters of the pandemic as of early April. Eligibility criteria include: (1) at

least 250 deaths accumulated as of April 4, 2020 (so as to qualify for a hotbed of the epidemic and to have a meaningful amount of data to analyze); and (2) information available on death counts per age strata, allowing to calculate numbers of deaths in people with age <65 or, alternatively, at least in people with age <60.

For each of the eligible geographical locations, we extracted information from the most up-to-date situational reports on April 4, 2020 focusing on total number of deaths, number of deaths in age <65 (or, if not available, number of deaths in age <60 and in age 60-69), number of deaths in age ≥ 80 (or, if not available, number of deaths in age ≥ 75) and, correspondingly, the proportions of the total deaths in each of these age categories. Information was extracted independently in duplicate by two authors (JI, CA) and discrepancies were resolved. Whenever information was unavailable for the desirable <65 years cut-off, we contacted the respective authorities issuing the situational report. We also extracted information on the proportion of men for all deaths and for deaths in each of these age categories, whenever available. For secondary analyses, we also extracted information on deaths in the subgroups of age <40 and age 40-64, whenever available (or, if not available, on <45 and 45-64).

One author (DC-I) downloaded information on the proportion of the population in each eligible location for each age group. We used census information from populationpyramid.net/world/2019 for countries and from worldpopulationreview.com for the US states and New York City.

We calculated the relative risk of COVID-19 death for an individual <65 years old as compared with an individual ≥ 65 years old for each eligible country and US state/city. This is calculated as $(\text{COVID-19 deaths with age } <65 / \text{population with age } <65 \text{ in the age-pyramid}) / (\text{COVID-19 deaths with age } \geq 65 / \text{population with age } \geq 65 \text{ in the age-pyramid})$. Inverting this relative risk shows how many fold lower the risk of COVID-19 death is for an individual <65 years old as compared with an individual ≥ 65 years old.

We also calculated the absolute risk of dying for a person <65 years old in each eligible country and US state/city by dividing the number of COVID-19 deaths as of April 4, 2020 in this age group by the census population in this age group. Certainly, the number of deaths will increase and there is some uncertainty about the total projected number of deaths in each of these locations when this epidemic wave has passed. Most locations seem to be close to the peak or may have passed the peak of the epidemic wave as of April 4, but this is not certain. To offer further insight, we extracted information also on the day that had the highest daily new cases documented and on the day that had the highest daily deaths as of April 4, 2020.

The magnitude of COVID-19 death risks is difficult to grasp, especially when population-level risks are small. Therefore, we converted the absolute risks of COVID-19 death into equivalents of death risk by a well-known, almost ubiquitous activity,⁴ driving/travelling by motor vehicle. We used estimates from the International Transport Forum Road Safety Annual Report 2018 (ref. 5) for the number of road deaths per billion vehicle miles for each European country. For Spain, Italy, and Portugal there were only data available for number of road fatalities per 100,000 inhabitants. Since these tend to correlate reasonably well with road deaths per billion vehicle miles in Europe, we used for Italy and Portugal the same road deaths per billion kilometers as Belgium, since they have the same road deaths per 100,000 inhabitants and we did the same for Germany and Spain. For USA locations, we used the state-specific data provided for 2018 by the Insurance Institute for Highway Safety.⁶ For New York City, we used motor vehicle fatality data pertaining to New York State. We then divided the estimated miles travelled that correspond to the same death risk by the number of days that have passed since the first COVID-19 death was recorded in each location and until April 4, 2020. The result transforms the average risk of COVID-19 death during the period where COVID-19 deaths occur into an equivalent of miles travelled by car per day.

Finally, we sought information from the situational reports on how many COVID-19 deaths had been documented in people <65 years old who had no underlying predisposing conditions. Predisposing

conditions for worse outcome in COVID-19 may include⁷⁻⁹ cardiovascular disease, hypertension, diabetes, chronic obstructive pulmonary disease and severe asthma, kidney failure, severe liver disease, immunodeficiency, and malignancy. We followed the data collection principles of each national and state organization on how underlying conditions were defined. Data were readily available in published reports for New York City and we obtained additional such data according to the presence or not of underlying conditions from the Italian COVID-19 team (personal communication, Dr. Luigi Palmieri) as of April 2, 2020 and from the Dutch COVID-19 team (personal communication, Susan van den Hof) as of April 4, 2020. We encourage other organizations to send us similar data, as they become available, so that they can be incorporated in further updates. Proportions were synthesized in a random effects meta-analysis with evaluation of between-dataset heterogeneity by the I^2 and Q statistics.

RESULTS

Eligible data

Fourteen countries (Belgium, Brazil, China, France, Germany, Iran, Italy, Netherlands, Portugal, Spain, Sweden, Switzerland, Turkey, United Kingdom) and six US states (California, Louisiana, Michigan, New Jersey, New York, Washington) fulfilled the first eligibility criterion and of those 8 countries (Belgium, Germany, Italy, Netherlands, Portugal, Spain, Sweden, Switzerland)¹⁰⁻¹⁷ as well as three states (Louisiana,¹⁸ Michigan,¹⁹ Washington²⁰) and New York City²¹ had some available data on required age categories. France also did have some available data per age strata, but age-stratified data had not yet incorporated 884 deaths from nursing homes which might markedly alter the age distribution, so these were not included in the analyses.

Death with age stratification

As shown in Table 1, individuals with age <65 account for only 5-9% of all deaths in European countries, while the rates are higher in three of the four US locations, approaching 30% of the total. Moreover, between half and three quarters of all deaths are accounted by individuals 80 years or older in

Europe and Washington State, while New York City and Michigan have slightly lower percentages of people ≥ 80 years old. There is a preponderance of men among all patients who died (56-69%) and this may be a bit more prominent among patients who died younger than 65, but information on this last variable is missing in several locations.

Table 1. Proportion of deaths accounted by specific age groups and proportion of men among people who died with COVID-19.

Location (date report)	Total deaths [^]	% of deaths with age <65	% of deaths with age ≥ 80	% male (all deaths)	% male (age <65)
Belgium (April 4)	1283	8.0	75.3**	58.8	68.0
Germany (April 4)	1158	4.9*[7.8]	61.8	65.0	84.2*[79.8]
Italy (April 2)#	12550	9.0	50.0	69.0	79.5
Louisiana (April 4)	409	23.7* [29.2]	ND	ND	ND
Michigan (April 4)	540	21* [27.7]	35	61	ND
Netherlands (April 4)	1651	5.1	57.7	61.2	ND
New York City (April 4)	1905	29.9	45.5**	62.1	ND
Portugal (April 4)	266	4.5* [7.5]	63.9	56.0	58.3* [68.3]
Spain (April 4)	4704	4.6* [7.4]	57.7	65.6	66.5*
Sweden (April 4)	373	4.8*[7.2]	60.9	58.7	ND
Switzerland (April 4)	540	3.0* [5.6]	65.1	63.9	56.2* [65.9]
Washington (April 4)	310	8*	55	57	ND

ND: no data; [^]Using data with available information on age; * data available only for the group with age <60 (the number shown in brackets is the approximated estimate for age <65 assuming that a third of the deaths in the 60-69 bracket are in <65 years old people, as suggested by other countries where data are available on 5-year age intervals); ** data available only on age ≥ 75 ; # personal communication with Luigi Palmieri.

Relative risk of dying with COVID-19 for individuals <65 years old versus older individuals

As shown in Table 2, the percentage of the population <65 years old varied from 76.99% in Italy to 87.69% in Washington state. For European countries, the relative risk of COVID-19 death for an individual <65 years old as compared with an individual ≥ 65 years old ranged from 0.014 to 0.03. Alternatively phrased, individuals <65 years old had 34-73 fold lower risk of COVID-19 death than older individuals. For New York City, Louisiana and Michigan, the difference was somewhat smaller, with those <65 years old having 13-15 fold smaller risk of dying than older individuals.

Table 2. Age distribution in the general population and relative risk of dying from COVID-19 for age <65 versus ≥65

Location	Percentage of population <65 years	Relative risk of COVID-19 death for those <65 versus those ≥65 years
Belgium	80.99	0.020
Germany	78.44	0.023
Italy	76.99	0.030
Louisiana	85.82	0.068
Michigan	83.00	0.078
Netherlands	80.39	0.013
New York City	86.37	0.067
Portugal	77.64	0.023
Spain	80.35	0.020
Sweden	79.80	0.020
Switzerland	81.16	0.014
Washington	79.78	0.031*

* Data on those <60 versus ≥60 years old

As shown in Table 3, within the age group of <65, almost all deaths occurred in the range of 40-65 years. The group <40 corresponds to 52-64% of the age group <65, but only ≤1% of COVID-19 deaths occurred in people <40 years old in Europe and the proportion was a bit higher in 3 US locations.

Table 3. Proportion of COVID-19 deaths accounted by the age group <40 years and the percentage of the population with age <40 years.

Location (date report)	n (%) of COVID-19 deaths with age <40	Percentage of population <40 years in the general population (%)	Percentage of population <40 years among those <65 years (%)
Belgium (April 4)	8 (0.62)*	47.6	58.8
Germany (April 4)	ND	42.9	54.8
Italy (April 2)	35 (0.28)	39.8	51.7
Louisiana (April 4)	18 (3.8)	54.4	63.4
Michigan (April 4)	16 (3)	50.0	60.2
Netherlands (April 4)	1 (0.06)	46.3	57.6
New York City (April 4)	116 (6.1)*	55.2	63.9
Portugal (April 4)	0 (0.0)	41.2	53.1
Spain (April 4)	28 (0.60)	42.4	52.8
Sweden (April 5)	3 (0.75)	48.7	61.1
Switzerland (April 4)	2 (0.37)	46.2	56.9
Washington (April 4)	3 (1)	49.7	62.3

ND: no data; *Data shown for the group with age <45 years (not available for age <40 years)

Absolute risk of death with COVID-19 at the population level

Table 4 shows the estimates of the absolute risk of dying with COVID-19 at the population level for people <65 years old and for those ≥ 80 years old as of April 4. For these estimates we used the total number of deaths as of the close of day April 4, 2020 and not just those where age information is available, assuming that the age stratification would be similar in all deaths as in the ones where age strata information has been released as of April 4. The absolute risk of death for people <65 years old ranged widely from 1.7 per million in Germany to 79 per million in New York City. The absolute risk of death for people ≥ 80 years old ranged from approximately 1 in 6 thousand in Germany to 1 in 420 in Spain.

Table 4. Population count and absolute risk of COVID-19 death for age groups <65 and ≥ 80 .

Location	Day with highest new COVID-19 cases#	Day with highest new COVID-19 deaths#	Total COVID-19 deaths as of April 4 (n)	Population <65 (n)	Population ≥ 80 (n)	Absolute risk of COVID-19 death for people <65 (per million)	Absolute risk of COVID-19 death for people ≥ 80 (per thousand)
Belgium	March 28	March 31	1283	9346151	1032499*	11	0.9*
Germany	March 27	April 2	1444	65508502	5737398	1.7	0.2
Italy	March 21	March 27	15362	46616108	4465708	30	1.7
Louisiana	April 4	April 3	409	3986700	79900	30	ND
Michigan	April 3	April 2	540	8337500	486629	18	0.4
Netherlands	March 27	March 31	1651	13745168	819669	6.1	1.1
New York City	April 3	April 3	1905	7254400	479548*	79	1.8*
Portugal	March 31	April 3	266	7939820	671048	2.5	0.3
Spain	March 26	April 2	11947	37553712	2901252	24	2.3
Sweden	April 2	April 2	373	8009176	522106	3.3	0.4
Switzerland	March 20	April 4	666	6972924	448632	5.3	1.0
Washington	March 30	April 4	314	6220800	750795	4.6^	0.2

ND: no data to allow calculation; # cannot exclude even higher values occurring after April 4; *for age ≥ 75 ; ^for age <60.

Table 5 shows the rates of road deaths per billion vehicle miles and the conversion of the absolute risk of COVID-19 death as of April 4 into motor vehicle travelled miles. The risk ranged from driving a total of 214 miles to 6684 miles. Dividing by the number of day since the first documented COVID-19 death, the risk of COVID-19 death for an individual <65 years old in the European countries is equivalent

to driving anywhere between 9 and 57 miles per day during this period. Washington state estimates are in the same range. The other three US location have higher estimates (driving 88 to 415 miles per day) for the 18-25 days during which they have witnessed COVID-19 deaths.

Table 5. Absolute risk of COVID-19 death expressed as equivalent of death risk from associated with motor vehicle driving over given distances.

Location	Road deaths per billion miles	Risk of COVID-19 death for <65 year old people as total miles travelled equivalent (until April 4)	Days with COVID-19 deaths	Risk of COVID-19 death for <65 year old people as miles travelled per day equivalent
Belgium	11.7	935	25	37
Germany	6.8	254	27	9
Italy	11.7*	2525	53	48
Louisiana	15.3	1940	22	88
Michigan	9.5	1890	18	105
Netherlands	7.6	810	30	27
New York City	7.6*	10383	25	415
Portugal	11.7*	214	20	11
Spain	6.8*	3484	61	57
Sweden	5.3	632	25	25
Switzerland	5.1	1039	31	34
Washington	8.8	515	45	11**

*Approximation (see Methods, we welcome provision of any more precise estimates); ** for age <60 years.

COVID-19 deaths in individuals <65 years old without underlying conditions

In New York City (situational report as of 9.30am April 4, 2020),²³ of 1905 deaths, information of presence of underlying conditions was available on 1354. Of those 1354 deaths, there were 25 deaths (1.8%) that occurred in patients with no underlying conditions and who were <65 years old. Thirty three of the 1354 deaths occurred in people without documented underlying conditions when all ages were considered.

In Italy (situational report of April 2,¹² supplemented with personal communication from Luigi Palmieri), detailed assessment had been performed on the medical charts of 917 deceased patients and of

those 6 (0.7%) had occurred in the absence of any underlying medical conditions in people who were <65 years old.

In the Netherlands (situational report of April 4,¹³ supplemented with personal communication from Susan van den Hof), of 1651 deaths, there were 5 deaths (0.3%) that occurred in patients with no underlying conditions and who were <65 years old. Data on underlying conditions had been collected on 67/84 deaths in the <65 age group.

A meta-analysis of the three datasets, showed that by random effects, deaths that occurred in patients with no underlying conditions and who were <65 years old account for 0.9% (95% confidence interval, 0.1-1.7%) of all deaths where presence of underlying conditions has been assessed. There was large between-dataset heterogeneity ($I^2=87%$, $p=0.0003$ for heterogeneity).

DISCUSSION

The evaluation of data from 8 countries and 4 US locations that are epicenters of the COVID-19 pandemic shows that non-elderly people <65 years old represent a very small fraction (5-9%) of all COVID-19 deaths in European countries and less than a third of all COVID-19 deaths in 4 US locations, even though this age group represents the vast majority of the general population. The risk of death is 13- to 73-fold lower in non-elderly people <65 years old than in older individuals. The age-dependent risk gradient is modestly sharper in European countries versus the US locations. Regardless, the absolute risk of death in the non-elderly population is consistently very low even in these pandemic hotbeds. As of April 4, only 1.7 to 79 per million people in this age group have died with a COVID-19 diagnosis. Moreover, the vast majority of deaths in this age group occur in the age group 40-65 that comprises 36-48% of the population in the 0-65 years old bracket.

Of course, additional deaths may be recorded, as the epidemic wave progresses. However, in many of the locations that we examined, the peak daily deaths was 2 or more days before our data cut-off. Unless there is a further peak of deaths downstream, the total risk of death for the entire epidemic wave in

these locations may be even less than twice the cumulative risk to-date, assuming a fairly symmetric epidemic wave, as in the case of Wuhan. In other locations, the total deaths may be more than twice the numbers as of April 4. However, even if the total deaths are several fold higher than the number of deaths documented until the data cut-off, the risk in individuals <65 years old remains very small.

Based on the data until April 4, for the whole COVID-19 fatality season to-date (starting with the date the first death was documented in each location) the risk of dying from coronavirus for a person <65 years old is equivalent to the risk of dying driving a distance of 9 to 415 miles by car per day during the COVID-19 fatality season. Most of the hotbed locations that we analyzed are on the lower side of this range, where the risk of death is in the same level roughly as dying from a car accident during daily commute. The highest risk (in New York City) corresponds to the risk of dying in a traffic accident while travelling daily from Manhattan to Baltimore round trip for these 25 days. People who are 40-65 years old may have about double that risk, while those 40 years old or younger have almost no risk at all of dying. Moreover, females may have 2-3 lower risk than males. These numbers correspond to the main epicenters of the pandemic, since our eligibility criteria were set explicitly to include the locations with the highest numbers of deaths. Therefore, for the vast majority of countries around the world and for the vast majority of states and cities in the USA with, the risk of death from COVID-19 this season for people <65 years old may be even smaller than the risk of dying from a car accident during daily commute.

We should acknowledge that we focused on mortality risk and not on hospitalizations. Empirical experience shows that COVID-19 has the potential to overwhelm specific hospitals, especially in settings where hospitals run close to maximum capacity even under regular circumstances, and when they serve high risk populations in cities with high population density and major congregations in mass events. Therefore, hospital preparedness is totally essential, regardless of whether the risk of death is very low in the general population. Similarly, work modeling hospital bed needs is useful. However, for understanding the risk of individuals from the general population, the analogy against deaths by motor vehicle accidents

is still relevant, since motor vehicle accidents also result in many more people who require hospitalizations and who suffer major injuries beyond the numbers of those who die.

The large majority of the deaths in non-elderly individuals occur in patients who have underlying diseases. Based on existing data to-date,⁷⁻⁹ cardiovascular disease, hypertension, chronic obstructive pulmonary disease and severe asthma, diabetes, kidney failure, severe liver disease, immunodeficiency, and malignancy may confer an increased risk of adverse outcome. Individuals with these diseases should consider that their risk may be higher than average and rigorous prognostic models need to be developed to estimate with accuracy the increased risk. In non-elderly populations, the more prevalent of these conditions is cardiovascular disease and hypertension, with prevalence of approximately 10% in the 20-39 age group and 38% in the 40-59 age group in the USA²⁴ and similarly high percentages in many other countries. Unfortunately, we could not identify data with the prevalence of these conditions specifically among the non-elderly deceased patients with COVID-19, and we encourage public health authorities to start reporting systematically data on comorbidities according to age strata. However, some data are available for the prevalence of these conditions across all age groups of COVID-19 deaths. For example, in the Netherlands, 49% of individuals dying with COVID-19 had cardiovascular disease or hypertension, and 27% had chronic pulmonary disease. Comparing with the prevalence of these diseases in the general population,²⁵ it is likely that ~2-fold increases in death risk may be reasonable to expect for people with these conditions in the general population. If so, the risk may remain very low, except in a minority of patients with the most severe manifestations of the underlying diseases.

We could retrieve data from three locations (Italy, Netherlands, and New York City) on the COVID-19 mortality of people who are both <65 years old and have no underlying diseases. Consistently, the data suggest that these deaths are remarkably uncommon, and they accounted for about 1% of all COVID-19 deaths respectively. There was some heterogeneity across locations, with this proportion accounting for much less than 1% in the two European locations and close to 2% in New York City. Data on assessment of comorbidities are still not complete and this may explain some of this difference.

Alternatively, it is possible that some New York City deaths may have occurred in people without access to medical care and thus poorly documented medical history, while Italy and Netherlands have more complete medical coverage of the population. It is very important for authorities to report similar data on comorbidities from other locations as well.

We should caution that the reported available data on comorbidities and deaths without comorbidities are sparse to-date. It is also possible that information on comorbidities is not accurately captured. Some people with no recorded comorbidities may have had some underlying diseases, but these were not reported in a crisis setting, or these conditions may have been undiagnosed. Overall, this further strengthens the notion that for healthy non-elderly people, the risk of dying from COVID-19 this season has been infinitesimally small. This is in stark contrast with many news stories that focus on the demise of young people and the panic and horror that these widely reverberated stories are causing.

Another interesting observation is the higher share of deaths in the <65 years old group in New York City, Louisiana, and Michigan as opposed to the 8 European countries and Washington state. This requires further investigation, but it may reflect unfavorable socioeconomic circumstances for victims of COVID-19 in New York City, Louisiana and Michigan. It is important to study in more detail the socioeconomic profile of the COVID-19 victims, but preliminary data show that deaths cluster in areas with high levels of poverty and underprivileged populations. If this early observation gets validated, this may signify that COVID-19 is yet another disease with a profile dependent on inequalities. Of interest, influenza deaths seem to have a similar difference in age distribution between the USA and European countries like Italy: a larger proportion of influenza deaths in the USA tend to be in the <65 age group,²⁶ as compared with Italy.²⁷ Of course, a major difference between influenza and COVID-19 is that the latter does not cause deaths in children, in contrast to influenza.

The vast majority of victims from COVID-19 are elderly people and in all European countries analyzed as well as in Washington state, more than half and up to three quarters are at least 80 years old. The median age of death for COVID-19 tends to be similar or slightly smaller than the life expectancy of

the population in each respective location. In several locations, large cluster of deaths have been observed in nursing home facilities. Moreover, as above, the vast majority of patients with COVID-19 have comorbidities and these could also contribute to the fatal outcome or may be even more important than SARS-CoV-2 in causing the death.²⁸ Overall, the loss of quality-adjusted life-years from COVID-19 may be much smaller than a crude reading of the number of deaths might suggest, once these features are accounted for.

The data that we have compiled nevertheless allow to estimate also absolute risks of death in the highest risk group, i.e. elderly individuals ≥ 80 years old in these 12 hot epicenters of the pandemic. These are markedly higher than the risks of death in individuals < 65 years old. However, the absolute risk of death even in this highest age category to-date and even in these hot epicenters do not exceed 0.24% in any location and in most locations it is lower than 1 in a thousand. Nevertheless, these risks may be high enough to warrant high alert and they suggest that, no matter what strategy is selected for addressing COVID-19 in the current or future epidemic waves should include special emphasis in protecting very elderly individuals.

As the data from the first epidemic wave of COVID-19 mature, knowledge of relative and absolute risks for different age groups and for people with different co-morbidities are instrumental for carefully choosing next steps. Aggressive measures such as lockdowns have been implemented in many countries. This is a fully justified “better safe than sorry” approach in the absence of good data. However, long-term lockdowns may have major adverse consequences for health (suicides, worsening mental health, cardiovascular disease, loss of health insurance from unemployment, etc.) and society at large.²⁹ It is even argued that lockdowns may be even harmful as a response to COVID-19 itself, if they broaden rather than flatten the epidemic curve.³⁰ Information from large scale testing and seroprevalence studies should soon give us a more clear picture about the true frequency of infections and thus more accurate assessments of the overall infection fatality rate. Data from Iceland suggest that almost all infections are either asymptomatic or mildly symptomatic and thus do not come to medical attention.³¹ These data also

suggest that the infection fatality rate may be close to that of seasonal flu (0.1%) rather than much higher earlier estimates. If larger scale studies further document that the infection is very common and infection fatality rate is modest across the general population, the finding of very low risk in the vast majority of the general population has major implications for strategic next steps in managing the COVID-19 pandemic. Tailored measures that maintain social life and the economy functional to avoid potentially even deaths from socioeconomic disruption plus effective protection of select high-risk individuals may be a sensible option.

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Conflicts of interest: none

Data sharing: All data used in this manuscript will be shared upon request.

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VIEWPOINT

What Other Countries Can Learn From Italy During the COVID-19 Pandemic

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In the coronavirus disease 2019 (COVID-19) pandemic, Italy has been hit very hard,¹ with 110 574 documented cases and 13 155 documented deaths related to severe acute respiratory syndrome coronavirus 2 (SARS-CoV-2) infection as of April 1, 2020. The number of cases and deaths cannot be explained simply because of the epidemic starting in Italy earlier compared with other countries besides China. It is important to understand why death rates were so high in Italy to learn how to best prepare and how to plan for optimal actions in other countries. Some contributing factors may be immutable (eg, age structure of the population), but even these need to be laid out carefully in preparedness assessments. Some other contributing factors are potentially modifiable.

Some factors pertain to demographics and background disease in the population. Italy has the most elderly population in Europe and the second most elderly population in the world after Japan. COVID-19 has a strong age dependence for the severity of the infection and the risk of death. The median age of people infected with SARS-CoV-2 who are dying in Italy has been 80 years, and the average age of patients requiring critical care support has been 67 years. Moreover, COVID-19 morbidity and mortality is strongly dependent on the presence of concomitant serious diseases, and Italy has a high proportion of patients with history of smoking and high rates of chronic obstructive pulmonary disease and ischemic heart disease.² The corollary is that preparedness for needs of intensive care unit (ICU) beds and estimates of expected deaths should consider the age structure and chronic diseases of the population served by each health care system. Taking this adjustment into account, burden of disease may be expected to be much less in most areas in the United States, with variability across states and hospital catchment areas. For example, the proportion of the population older than 65 years is 9.5% in Alaska as compared with 19.1% in Florida and 23.1% in Italy.

A second set of factors in Italy is the increased burden of cases that presented themselves to the health care system. The proportion of people infected must have been very high in specific areas that were highly affected. In the town of Vò, all 3300 residents were tested the day the first case was detected in the third week of February, and 3% were found to be infected.³ Following aggressive testing, the epidemic was extinguished. However, elsewhere in Italy, it is likely that the prevalence of infection was several times higher in the absence of effective public health intervention. For example, it is likely that the health care system was overwhelmed in Bergamo owing to massive viral transmission during the Champions League match on

February 19, 2020 (Atalanta vs Valencia), where a third of the population of Bergamo attended and continued celebrations overnight. Italian life is famous for its socialization and frequent congregations and clustering. It is possible also that in early stages, there was not much adoption of standard hygienic measures, and instructions to stay at home proved difficult to accept, with many complaints registered with the police.⁴ Accordingly, a higher level of preparedness should be considered for areas where mass gatherings have occurred or where there is extensive social intermingling.

A third set of factors pertains to the standard capacity of the health care system and decisions made during hospital management of the presenting cases. Italy has a highly competent state-run health care system, but it has only a modest number of ICU beds and very few subintensive care beds. Overall, 5090 ICU beds (8.4 per 100 000 population) are available in Italy, and 2601 beds in coronary care units (4.3 per 100 000 population),⁵ as opposed to much higher numbers (36 ICU beds per 100 000 population) in the United States.

Given the little experience in dealing with the new virus, it is unavoidable that some strategic mistakes were made about which patients should be hospitalized. In the winter, hospitals tend to run close to full capacity, with 87% average occupancy in Italy during the flu season. Apparently, many patients with relatively modest symptoms were admitted; by the time more patients with severe cases started to arrive, there were limited reserves.

Hospital overcrowding may also explain the high infection rate of medical personnel. As of March 30, 2020, 8920 medical personnel had been found to be infected in Italy,⁶ leading to further loss of capacity for hospitals to respond. Moreover, early infection of medical personnel led to the spread of the infection to other patients within hospitals. In Lombardy, SARS-CoV-2 became largely a nosocomial infection. Nine percent of infections in Italy occurred among health care personnel.⁶ Characteristically, the first patient with COVID-19 visited the emergency department twice, thus exposing all of the personnel and patients in that area before the infection was recognized.

Italy is a decentralized country; thus, preparedness and containment may have been hampered. There was a delay from the first case detection (February 21, 2020) to the first containment decree from the government that closed the relevant villages 3 days later. The lessons relevant to other countries are the need to (1) avoid bringing patients with suspected SARS-CoV-2 infection to the hospital, except when they clearly require hospital care; (2) maintain strict hygienic procedures in the hospital environment; and (3) act swiftly in

case of exposures of medical personnel to avoid loss of personnel capacity.

Stochastic factors should also be considered. Not all of Italy, but a few cities among hundreds of cities and towns have carried most of the burden of the epidemic and have seen their hospitals crash. The Lombardy, Emilia-Romagna, and Veneto regions carry the highest numbers of infected individuals and account for 46%, 13%, and 9% of all Italian cases, respectively. The most affected provinces are Bergamo, Brescia, Milan, and Cremona, which together account for 33% of all Italian cases.⁶ There is heavy seasonality of deaths (even more so in countries with high proportions of the elderly and people who smoke, like Italy), with 25% more deaths in winter as compared with summer.⁷ Many of the excessive deaths are related to respiratory infections and are an annual occurrence. Although the infections are typically related to influenza, in 2020, SARS-CoV-2 is also a key contributor. In fact, in the 3 months prior to the outbreak, there were fewer deaths than is typical for the winter months in North Italian cities, thus leaving a larger pool of susceptible, elderly individuals.⁸ The seasonal peak of deaths varies across hospitals, and it may be difficult to predict which hospital will have the maximal burden. The corollary is that some reserves of resources, such as ventilators, should be in a stand-by allocation with the ability to assign them rapidly to hospitals that saturate their capacity.

In the absence of prevalence and incidence data, including the results of serology testing, it is difficult to predict the effects of specific major public health decisions, such as lockdowns, on the course of the COVID-19 pandemic. For example, it is not known whether

implementing a lockdown at a time when many people can infect others could lead people to spend more time in close quarters with the elderly and those who are susceptible. Similarly, it is not known whether a new epidemic wave may emerge when lockdown measures are removed. There are also unanswered questions about whether the stress and panic of a public crisis leading to major disruption and lockdown may have increased the susceptibility of elderly and frail individuals to a respiratory virus. Countries with aggressive early contact tracing and extensive laboratory testing (eg, Taiwan⁹ and South Korea) seem to offer examples of successful containment. By comparison, in Italy both contact tracing and laboratory testing were more limited, and lockdown had to be used as a last, blind measure of desperation. It is important to study the effects of the policies that are adopted first on the expected wave of patients with severe illness who will need hospitalization.

Finally, a major question that should be answered is the causal contribution of SARS-CoV-2 infection to related deaths. It is difficult to differentiate between *deaths with SARS-CoV-2 infection* and *deaths caused by SARS-CoV-2 infection* because the vast majority of patients who have died had 1 or more other major pathologies (98.8% with at least 1 comorbidity, and 48.6% having 3 or more diseases) that contributed to their death.¹⁰ Also, the lost quality-adjusted life-years of patients who died and any long-term consequences for patients who survive should be formally studied. Through this research, the relative burden of disease from COVID-19 can be better understood, and resources in overburdened health care systems during periods of crises can be better allocated.

ARTICLE INFORMATION

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Cc: [Klausner, Jeffrey](#); [Art Reingold](#); [Jayanta Bhattacharya](#); [sten.vermund@yale.edu](#); [davkat7@gmail.com](#)
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Date: Tuesday, March 31, 2020 11:40:16 AM

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From: [John Ioannidis](#)
To: [Klausner, Jeffrey](#)
Cc: [Art Reingold](#); [Jayanta Bhattacharya](#); fowler@ucsd.edu; sten.vermund@yale.edu; davkat7@gmail.com
Subject: Re: meeting with the President in D.C.
Date: Monday, March 30, 2020 8:34:38 AM

Frustrating indeed. I am still struggling to see whether we can find a way to get in the White House

From: Klausner, Jeffrey <JDKlausner@mednet.ucla.edu>
Sent: Monday, March 30, 2020 8:31 AM
To: John Ioannidis <jioannid@stanford.edu>
Cc: Art Reingold <reingold@berkeley.edu>; Jayanta Bhattacharya <jay@stanford.edu>; fowler@ucsd.edu <fowler@ucsd.edu>; sten.vermund@yale.edu <sten.vermund@yale.edu>; davkat7@gmail.com <davkat7@gmail.com>
Subject: Re: meeting with the President in D.C.

Hi John

Given the about face yet again from the White House with new the 30 day plus national shut down, seems like our thoughts may have hit a wall and bounced back?

Thx

Jeff

Jeffrey D. Klausner, MD, MPH
Professor of Medicine and Public Health
UCLA David Geffen School of Medicine and Fielding School of Public Health
SKYPE: Jeffrey.Klausner

On Mar 28, 2020, at 1:27 PM, John Ioannidis <jioannid@stanford.edu> wrote:

CAUTION - EXTERNAL EMAIL: Do not click links or open attachments unless you recognize the sender.

Have kept asking/putting gentle pressure, I think our ideas have infiltrated the White House regardless, I hope to have more news on Monday...

From: Klausner, Jeffrey <JDKlausner@mednet.ucla.edu>
Sent: Saturday, March 28, 2020 1:21 PM
To: John Ioannidis <jioannid@stanford.edu>
Cc: Art Reingold <reingold@berkeley.edu>; Jayanta Bhattacharya <jay@stanford.edu>; fowler@ucsd.edu <fowler@ucsd.edu>; sten.vermund@yale.edu <sten.vermund@yale.edu>; davkat7@gmail.com <davkat7@gmail.com>
Subject: Re: meeting with the President in D.C.

Hi John
Any further updates?

Jeffrey D. Klausner, MD, MPH
Professor of Medicine and Public Health
UCLA David Geffen School of Medicine and Fielding School of Public Health
SKYPE: Jeffrey.Klausner

On Mar 24, 2020, at 9:01 PM, John Ioannidis
<jioannid@stanford.edu> wrote:

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From: Klausner, Jeffrey <JDKlausner@mednet.ucla.edu>
Sent: Tuesday, March 24, 2020 7:53 PM
To: John Ioannidis <jioannid@stanford.edu>
Cc: Art Reingold <reingold@berkeley.edu>; Jayanta Bhattacharya <jay@stanford.edu>; fowler@ucsd.edu <fowler@ucsd.edu>; sten.vermund@yale.edu <sten.vermund@yale.edu>; davkatz7@gmil.com <davkatz7@gmil.com>
Subject: Re: meeting with the President in D.C.

Hi all
Any updates on this?
Best
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Jeffrey D. Klausner, MD, MPH
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Subject: Re: meeting with the President in D.C.
Date: Saturday, March 28, 2020 1:27:58 PM

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To: John Ioannidis <jioannid@stanford.edu>
Cc: Art Reingold <reingold@berkeley.edu>; Jayanta Bhattacharya <jay@stanford.edu>; fowler@ucsd.edu <fowler@ucsd.edu>; sten.vermund@yale.edu <sten.vermund@yale.edu>; davkat7@gmail.com <davkat7@gmail.com>
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Let's hope for the best

John

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Subject: Re: meeting with the President in D.C.
Date: Tuesday, March 24, 2020 9:01:14 PM

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Sent: Tuesday, March 24, 2020 7:53 PM
To: John Ioannidis <jioannid@stanford.edu>
Cc: Art Reingold <reingold@berkeley.edu>; Jayanta Bhattacharya <jay@stanford.edu>; fowler@ucsd.edu <fowler@ucsd.edu>; sten.vermund@yale.edu <sten.vermund@yale.edu>; davkat7@gmil.com <davkat7@gmil.com>
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From: [James Fowler](#)
To: [John Ioannidis](#)
Subject: Re: meeting with the President in D.C.
Date: Monday, March 23, 2020 6:33:40 PM
Importance: High

Not sure if this helps, but I am in the Division of Infectious Diseases and Global Public Health, so I could be listed as Professor, Division of Infectious Diseases and Global Public Health if you think that will help. Otherwise, it's fine. Up to you.

james

On Mar 23, 2020, at 5:16 PM, John Ioannidis <jioannid@stanford.edu> wrote:

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Jeff, and Art

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John

<letterpage2.docx>

From: [James Fowler](#)
To: [John Ioannidis](#)
Subject: Re: A Fiasco in the Making
Date: Monday, March 23, 2020 6:30:22 PM

Thanks!
james

On Mar 23, 2020, at 5:55 PM, John Ioannidis <jioannid@stanford.edu> wrote:

Hi James,

I am inundated at the moment, but I did read it and found it just perfect!

Cheers!

John

From: James Fowler
Sent: Monday, March 23, 2020 11:12 AM
To: omg-l@mailman.ucsd.edu; omg-alumni-l@mailman.ucsd.edu
Cc: Holly Shakya; Raj, Anita; Jay Silverman; Harla Yesner; Tim Johnson; Chris Dawes; Oleg Smirnov; John Ioannidis; Kevin Patrick; Colin Teichholtz; McDermott, Rose; Jasper Benke; Mark Sobolewski; Tami Nakahara; MPletcher@epi.ucsf.edu
Subject: A Fiasco in the Making

I have just drafted the op-ed below and I plan to submit it later today.

If at all possible, would you please glance at it and give me feedback ASAP?

Thanks so much,
james

A Fiasco in the Making

As a new pandemic sweeps across the globe, the United States has decided to engage in a deadly social and medical experiment. To stop the virus in its tracks, we are told, we must stop in our own tracks. We must shelter in place and shutter all the places we normally gather. We must grind the economy to a halt. And we must do this for up to 18 months.

This decision has thrown the stock market into disarray with expectations of plummeting growth and skyrocketing unemployment not seen since the Great Depression. But do we know enough about the pandemic to make such a costly choice?

To answer that question, I turned to the very [study](#) that [changed minds](#) both here and in the United Kingdom about the seriousness of the disease. That study projects 2.2 million deaths in the United States if we do nothing about the pandemic. It also says we can dramatically reduce that figure if we isolate sick people, quarantine their house mates, close schools, and implement “social distancing” on a massive scale by reducing our social contacts with strangers.

Although the paper was not peer-reviewed and the underlying reasoning is only partially explained, the authors note that it is based on a [previously-published model](#), so I turned to that work as well.

What is really notable is how much care the authors took to explain their model’s limitations. They made it very clear that their guess about how well we can fight the disease depends a lot on the model’s assumptions about each policy’s effectiveness.

For example, their model says travel restrictions will only have a noticeable effect if they are 99% effective and they must be implemented quickly -- within 2 weeks of the first case in the U.S. by their reckoning. Similarly, benefits from quarantine critically depend on the chance that people are willing to self-isolate when sick, which is assumed to be a whopping 90% in the model, and the willingness of their housemates to self-quarantine, which only works, according to the authors, “if compliance is high.”

It remains to be seen whether we can achieve these high rates of compliance, but even if we can, the model also assumes that most people who get the disease are symptomatic and therefore quarantine the following day. In fact, [new evidence](#) suggests only 40% of infected people are symptomatic, and those who are must wait several days and in some cases weeks to find out if they actually have COVID-19. It's not hard to imagine that the average time between infection and self-quarantine is many more days than the model assumes, and every extra day dramatically reduces the likely effectiveness of quarantines.

What about massive scale social distancing? The authors are very clear when they write "stopping mass gatherings is predicted to have relatively little impact" because we do not spend much time exposed to each person at those events. But then they make an unsupported and contrary claim that social distancing works. They do this without showing the independent effect of social distancing compared to the "do nothing" scenario. Nor do they show how their recommended set of policies compares to the same set of policies but without social distancing.

Nor do they compare their recommended basket of policies to a basket with social distancing targeted to high risk groups over age 70. This is especially strange because in [Table 3](#) they actually show that restricting to this group actually works *better* than targeting everyone when the policy is combined with self-isolation and household quarantines.

So there is a lot of uncertainty here about the benefit of social distancing, and as far as I can tell, no quantitative estimate of the additional impact this policy has when added to other policies. This is absolutely crucial to understand because social distancing is arguably the most costly part of the intervention to our economy and to the positive health outcomes that it supports.

Let me raise two other points that make me wary of basing U.S. policy on this study. First, the authors did not account for delays in testing at all when they fit their model to available data, meaning we may be much farther along in the course of the disease and less able to have large impacts on its rate of spread. And policy response has been slow. Their model assumes that policies to stop the spread are enacted when we have between 100 and 3,000 cases in intensive care, but as of today we already have more than that.

One might argue that we do have such policies in place now, but in the absence of effective leadership at the federal level, implementation in the United States has been piecemeal and recent [work](#) suggests this lack of coordination will seriously limit the policies' effectiveness. Social distancing in particular likely only works if it is imposed nationwide.

Let me be clear. I am not saying that there is nothing we can do, and there are many studies in addition to this one that suggest we can reduce rates of transmission. But we are on track to spend at least \$4 Trillion in the U.S. correcting the economic problems created by the widespread mandatory business closures. That's money to prevent climate change. That's money to save lives in our future health care system.

As a scientist, I would like to know how many deaths we are preventing if we take this course. This paper that changed so many minds does not tell us, and even if it did I am highly doubtful that the number of lives saved outweighs the lives lost if we remain in lockdown for 18 months hoping for a cure that never comes.

If you don't trust me, listen to John Ioannidis, a professor of medicine at Stanford University. He is the first person who opened my eyes to the question "[Is This a Fiasco in the Making?](#)" Whereas I have shown here the uncertainty in just one paper, he surveyed dozens and is, if anything, even more skeptical than I am that we know enough to blow up the economy.

Ioannidis catalogued a whole list of problems ranging from poor data to exaggerated death rates to uncertainty about public willingness to contribute to the effectiveness of interventions, each of which cast doubt on whether we need to "flatten the curve," whether our efforts to do so could possibly work, and what the likely benefit from these efforts might be.

I am hopeful that we, as a society, will follow the Hippocratic Oath: first, do no harm. Interventions like case isolation, temporary home quarantine of those exposed, and asking businesses that can easily do so to work from home are low cost, so it makes sense to do them even if the benefit is unknown. But draconian social distancing measures that create their own extreme hardship and loss should only be implemented if they are justified by tremendous benefits of which we are highly certain.

Otherwise we will create a human-caused tragedy that could well dwarf the natural tragedy we are trying to avoid.

From: [James Fowler](#)
To: [John Ioannidis](#)
Subject: Re: A Fiasco in the Making
Date: Monday, March 23, 2020 6:30:22 PM

Thanks!
james

On Mar 23, 2020, at 5:55 PM, John Ioannidis <jioannid@stanford.edu> wrote:

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Sent: Monday, March 23, 2020 11:12 AM
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From: [John Ioannidis](#)
To: [James Fowler](#)
Subject: Re: A Fiasco in the Making
Date: Monday, March 23, 2020 5:56:04 PM

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One might argue that we do have such policies in place now, but in the absence of effective leadership at the federal level, implementation in the United States has been piecemeal and recent [work](#) suggests this lack of coordination will seriously limit the policies’ effectiveness. Social distancing in particular likely only works if it is imposed nationwide.

Let me be clear. I am not saying that there is nothing we can do, and there are many studies in addition to this one that suggest we can reduce rates of transmission. But we are on track to spend at least \$4 Trillion in the U.S. correcting the economic problems created by the widespread mandatory business closures. That’s money to prevent climate change. That’s money to save lives in our future health care system.

As a scientist, I would like to know how many deaths we are preventing if we take this course. This paper that changed so many minds does not tell us, and even if it

did I am highly doubtful that the number of lives saved outweighs the lives lost if we remain in lockdown for 18 months hoping for a cure that never comes.

If you don't trust me, listen to John Ioannidis, a professor of medicine at Stanford University. He is the first person who opened my eyes to the question "[Is This a Fiasco in the Making?](#)" Whereas I have shown here the uncertainty in just one paper, he surveyed dozens and is, if anything, even more skeptical than I am that we know enough to blow up the economy.

Ioannidis catalogued a whole list of problems ranging from poor data to exaggerated death rates to uncertainty about public willingness to contribute to the effectiveness of interventions, each of which cast doubt on whether we need to "flatten the curve," whether our efforts to do so could possibly work, and what the likely benefit from these efforts might be.

I am hopeful that we, as a society, will follow the Hippocratic Oath: first, do no harm. Interventions like case isolation, temporary home quarantine of those exposed, and asking businesses that can easily do so to work from home are low cost, so it makes sense to do them even if the benefit is unknown. But draconian social distancing measures that create their own extreme hardship and loss should only be implemented if they are justified by tremendous benefits of which we are highly certain.

Otherwise we will create a human-caused tragedy that could well dwarf the natural tragedy we are trying to avoid.

From: [John Ioannidis](#)
To: [Art Reingold](#)
Cc: [Klausner, Jeffrey](#); [Jayanta Bhattacharya](#); fowler@ucsd.edu; sten.vermund@yale.edu; davkat7@gmail.com
Subject: Re: meeting with the President in D.C.
Date: Monday, March 23, 2020 5:32:22 PM

oops, sorry, Art! Apparently I listen to too much Wagner!

Cheers!

John

From: Art Reingold <reingold@berkeley.edu>
Sent: Monday, March 23, 2020 5:30 PM
To: John Ioannidis <jioannid@stanford.edu>
Cc: Klausner, Jeffrey <JDKlausner@mednet.ucla.edu>; Jayanta Bhattacharya <jay@stanford.edu>; fowler@ucsd.edu <fowler@ucsd.edu>; sten.vermund@yale.edu <sten.vermund@yale.edu>; davkat7@gmail.com <davkat7@gmail.com>
Subject: Re: meeting with the President in D.C.

my name is spelled Reingold, and i have a lowly MD, but no PhD.

> On Mar 23, 2020, at 5:16 PM, John Ioannidis <jioannid@stanford.edu> wrote:
>
> <letterpage2.docx>

From: [John Ioannidis](#)
To: [Klausner, Jeffrey](#); [Art Reingold](#); [Jayanta Bhattacharya](#); fowler@ucsd.edu; sten.vermund@yale.edu; davkat7@gmail.com
Subject: Re: meeting with the President in D.C.
Date: Monday, March 23, 2020 5:30:36 PM

Just heard also from Michael Levitt and he enthusiastically confirmed he is on board...

From: John Ioannidis <jioannid@stanford.edu>
Sent: Monday, March 23, 2020 5:16 PM
To: Klausner, Jeffrey <JDKlausner@mednet.ucla.edu>; Art Reingold <reingold@berkeley.edu>; Jayanta Bhattacharya <jay@stanford.edu>; fowler@ucsd.edu <fowler@ucsd.edu>; sten.vermund@yale.edu <sten.vermund@yale.edu>; davkat7@gmail.com <davkat7@gmail.com>
Subject: Re: meeting with the President in D.C.

Dear James, David, Jay, Sten, Jeff, and Art

thank you for agreeing to join in this effort. Please see attached, the one paragraph and names-affiliations, I need to send it tomorrow by 10am PT to people trying to arrange the meeting. If I don't hear from you, I will assume it is ok to send. I am also waiting to hear confirmation from Michael Levitt and Dan Jernigan.

Let's hope for the best

John

From: [John Ioannidis](#)
To: [Klausner, Jeffrey](#); [Art Reingold](#); [Jayanta Bhattacharya](#); [fowler@ucsd.edu](#); [sten.vermund@yale.edu](#); [davkat7@gmail.com](#)
Subject: Re: meeting with the President in D.C.
Date: Monday, March 23, 2020 5:19:46 PM
Attachments: [letterpage2.docx](#)
Importance: High

Dear James, David, Jay, Sten, Jeff, and Art

thank you for agreeing to join in this effort. Please see attached, the one paragraph and names-affiliations, I need to send it tomorrow by 10am PT to people trying to arrange the meeting. If I don't hear from you, I will assume it is ok to send. I am also waiting to hear confirmation from Michael Levitt and Dan Jernigan.

Let's hope for the best

John

Dr Ioannidis (bio below) is assembling a group of world renowned scientists who can contribute insights to help solve the major challenge of COVID-19, by intensifying efforts to understand the denominator of infected people (much larger than what is documented to-date) and having a science- and data-informed, targeted approach rather than shutting down the country for very long time and jeopardizing so many lives in doing this. The aim is to identify the best way to both save more lives and avoid serious damage to the US economy using the most reliable data, since the infection rate may be off by a very large factor versus the number of currently documented cases. The scientists are willing to come to the White House personally or join by video conference.

List of scientists

Jayanta Bhattacharya, MD, PhD is professor of medicine, senior fellow at the Stanford Institute for Economic Policy Research and, by courtesy, at the Freeman Spogli Institute and professor, by courtesy, of epidemiology and population health and of economics at Stanford University, Stanford, CA

James H. Fowler, PhD is Professor of Political Science and Medicine at the University of California San Diego, San Diego, CA

John P.A. Ioannidis, MD, PhD is the C.F. Rehnorg professor in disease prevention, professor of medicine and professor of epidemiology and population health, professor by courtesy of biomedical data science, professor by courtesy of statistics, and co-director of the Meta-Research Innovation Center at Stanford (METRICS) at Stanford University, Stanford, CA

To be confirmed Daniel B. Jernigan, MD, MPH is the Director of the Influenza Division in the National Center for Immunization and Respiratory Diseases (NCIRD) at CDC, Atlanta, GA

David Katz, MD, MPH is president of True Health Initiative and the founding director of the Yale-Griffin Prevention Research Center

Jeffrey D. Klausner, MD, MPH is Professor of Medicine and Public Health at the UCLA David Geffen School of Medicine and Fielding School of Public Health, Los Angeles, CA

To be confirmed Michael Levitt is the Robert W. and Vivian K. Cail Professor in Cancer Research in the School of Medicine and professor by courtesy of computer science at Stanford University, Stanford, CA. Levitt received the 2013 Nobel Prize in Chemistry, [together with Martin Karplus and Arieh Warshel, for "the development of multiscale models for complex chemical systems".

Art Rheingold, PhD is Professor of Epidemiology and Head of the Division of Epidemiology and Biostatistics at the University of California Berkeley School of Public Health, Berkeley, CA

Sten H. Vermund, MD, PhD is the Dean of the Yale School of Public Health, Anna M.R. Lauder Professor of Public Health and Professor of Pediatrics at Yale School of Medicine, New Haven, Conn.

From: [John Ioannidis](#)
To: [James Fowler](#)
Subject: Re: I agree: we are making a terrible mistake. How can I help?
Date: Monday, March 23, 2020 11:33:17 AM

Brilliant! Will get back to you with details.

Cheers!

John

From: James Fowler
Sent: Monday, March 23, 2020 11:21 AM
To: John Ioannidis
Subject: Re: I agree: we are making a terrible mistake. How can I help?

Absolutely, yes!
james

On Mar 23, 2020, at 9:53 AM, John Ioannidis <jioannid@stanford.edu> wrote:

Dear James

I have been trying to reach people at high levels in government and I was told that they can arrange for the President to meet with 5 top scientists who can contribute insights to help solve this major challenge, by intensifying efforts to understand the denominator of infected people (much larger than what is documented to-date) and having a science and data-informed, targeted approach rather than shutting down the country for ever and jeopardizing so many lives for the wrong reason.

May I please ask you to be one of these top scientists in this small group? The tentative timing for this meeting would be this week, and I can work on confirming the date, as soon as I hear back from you. Your voice and stature can make a huge difference in this critical time.

Please let me know.

Best wishes

John

From: James Fowler
Sent: Sunday, March 22, 2020 6:20 PM
To: John Ioannidis
Subject: I agree: we are making a terrible mistake. How can I help?

Hi John,

I thought about writing an op-ed agreeing with your suggestion that we may be making a terrible mistake killing the economy for highly uncertain benefit, but instead I thought I would reach out to you first to see if there was some way I could help you in your efforts to spread this message.

Over the last 24 hours I have become even more convinced that what we have done is too little too late and our best hope now is to reopen businesses to prevent the health costs associated with a second Great Depression.

How can I help?

james
858-926-6033

James H. Fowler
Professor
Infectious Diseases and Global Public Health
School of Medicine
University of California, San Diego
<http://fowler.ucsd.edu>

From: [James Fowler](#)
To: [John Ioannidis](#)
Subject: Re: I agree: we are making a terrible mistake. How can I help?
Date: Monday, March 23, 2020 11:21:40 AM

Absolutely, yes!
james

On Mar 23, 2020, at 9:53 AM, John Ioannidis <jjioannid@stanford.edu> wrote:

Dear James

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Best wishes

John

From: James Fowler
Sent: Sunday, March 22, 2020 6:20 PM
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Subject: I agree: we are making a terrible mistake. How can I help?

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From: [John Ioannidis](#)
To: [James Fowler](#)
Subject: Re: I agree: we are making a terrible mistake. How can I help?
Date: Monday, March 23, 2020 9:53:29 AM

Dear James

I have been trying to reach people at high levels in government and I was told that they can arrange for the President to meet with 5 top scientists who can contribute insights to help solve this major challenge, by intensifying efforts to understand the denominator of infected people (much larger than what is documented to-date) and having a science and data-informed, targetted approach rather than shutting down the country for ever and jeopardizing so many lives for the wrong reason.

May I please ask you to be one of these top scientists in this small group? The tentative timing for this meeting would be this week, and I can work on confirming the date, as soon as I hear back from you. Your voice and stature can make a huge difference in this critical time.

Please let me know.

Best wishes

John

From: James Fowler
Sent: Sunday, March 22, 2020 6:20 PM
To: John Ioannidis
Subject: I agree: we are making a terrible mistake. How can I help?

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How can I help?

james

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Professor
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School of Medicine
University of California, San Diego
<http://fowler.ucsd.edu>

From: [John Ioannidis](#)
To: [James Fowler](#)
Subject: Re: I agree: we are making a terrible mistake. How can I help?
Date: Sunday, March 22, 2020 11:03:44 PM

Dear James,

I am so happy to hear from you! You have a very powerful voice, please do write an op-ed as you suggest and try to publish it in some major venue. I have heard from hundreds of great scientists in support of my views, but your voice is special. I am trying to see how we can organize efforts better, there is too much at stake, we will be in touch.

Best wishes

John

From: James Fowler
Sent: Sunday, March 22, 2020 6:20 PM
To: John Ioannidis
Subject: I agree: we are making a terrible mistake. How can I help?

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From: [James Fowler](#)
To: [John Ioannidis](#)
Subject: I agree: we are making a terrible mistake. How can I help?
Date: Sunday, March 22, 2020 6:20:44 PM

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