

Hypothesis

How Risky if China Moves Away from Its Zero-COVID Policy?

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Abstract: We found four striking differences in the COVID-19 case fatality rate (CFR) or the ratio of symptomatic COVID-19 cases versus asymptomatic infections. These striking differences all suggest that the risk for China to move away from its zero-COVID policy shall depend on China’s control measures. The CFR of COVID-19 in China can remain less than one tenth of influenza, namely that COVID-19 can be “tiny influenza” in China, if COVID-19 cases shall be well isolated in well disinfected environments (e.g., staying at well-disinfected home) with good maintenance treatment, to minimize their co-infections and maintain their body functions. Otherwise, the CFR of COVID-19 in China can be several times higher than influenza, namely that COVID-19 can be “giant influenza” in China. This analysis is also important to mitigate COVID-19 worldwide.

Keywords: COVID-19; case fatality rate; risk; co-infection; control measures

1. Contrary opinions based on surprisingly different case fatality rates (CFRs)

There are two contrary opinions regarding the risk if mainland China (MC) moves away from its zero-COVID policy. Some experts think the risk shall be relatively very low [1], because the COVID-19 CFR in MC has been less than 0.01% or 1/10 of that of influenza (0.12%), no matter whether the value is calculated using MC’s data from 1 June 2020 (0.0043%, 4/69867), 1 January 2022 (0.0037%, 2/53380), or 1 March 2022 (0.0057%, 2/46155), to 15 April 2022. Some other experts think the risk shall be very high, because the CFR in other regions was much higher, which is the major reason why MC sticks to its extremely costly zero-COVID policy [2]. From 1 June 2020 to 7 April 2022, the CFR was constantly 4,700–15,000% (47–150 times) higher in the USA, France, Germany, Japan, Hong Kong (HK), and the world outside MC than in MC (Table 1).

Table 1. The COVID-19 CFR in some regions from 1 June 2020 to 7 April 2022.

Regions	Deaths	Recovered	The CFR
Mainland China (MC)	4	43,159	0.009%
World outside MC	5,778,629	432,193,804	1.319%
USA	902,404	66,441,210	1.358%
France	114,240	23,712,840	0.479%
Germany	123,173	17,751,471	0.689%
Japan	27,565	6,314,519	0.435%
Hong Kong	8,553	1,091,631	0.777%

The striking differences were mirrored by the marked scenarios that, from March 1 to April 8, of the 150,000 infections recently identified in Shanghai, only one showed severe signs and no one died, while dozens or hundreds of COVID-19 cases died daily in HK in the same period [2].

2. Exploration of the reasons for surprisingly different CFRs

Exploration of the reasons for the striking CFR differences between MC and other regions can be crucial to risk analysis and decision-making to mitigate the devastating pandemic.

We found that MC was superior to the six other regions listed in Table 1 in providing good isolation of cases, good disinfection of their living environments, and good maintenance treatment, as required by its very strict zero-tolerance policy, and the healthcare systems in the six other regions were heavily overwhelmed by COVID-19 cases for some time. Theoretically, good maintenance treatment (e.g., using ventilators to aid severe cases to breathe) is crucial to reducing the deaths, and good isolation of cases and disinfection of their living environments can minimize co-infections with other pathogens, which can be much more various than what we can detect in clinical laboratories. Co-infections can be more dangerous to COVID-19 cases than to healthy people³, and more dangerous to elderly people than young people, because the immunity of COVID-19 cases and elderly people has been dampened. Therefore, the measures of isolation of cases, disinfection of their living environments, and maintenance treatment (IDM) can account substantially for the striking CFR differences (47–150 times).

Besides IDM, data quality can also account substantially for the striking differences. For example, if 80% of the cases and 20% of the deaths in a region were not reported, the reported CRF of this region become 3 and only 3 times higher than the authentic CFR. Notably, almost all the cases in MC were identified and reported after May 2020, as needed for the very strict zero-COVID policy, while only a portion of cases in the six other regions listed in Table 1 were identified and reported, although the COVID-19 data of the USA, France, Germany, Japan, and MC were rated relatively reliable [2].

We analyzed other various factors including climate, living habits, population youngness, human genetics, therapy medications, virus evolution, and the increase of herd immunity that can influence the CFR [4–7]. We think all these factors could account partially, but not that substantially, for the striking CFR differences (47–150 times). For another example, if the rate of elderly people is higher by 50% in a region than in MC, its CFR can be higher by around 50% in this region than in MC for this reason, as most COVID-19 deaths were from elderly people.

The COVID-19 CFR of HK supports the crucial effect of IDM. The CFR of HK was 2.053% (195/9,499) from 1 June 2020 to 28 February 2021, 68 times higher than the CFR in MC, 0.030% (2/6,759), in the same period [2,8]. This 68-time difference cannot be explained with vaccination as mass vaccination started after February 2021 in HK and MC, or age distribution which, mathematically, could not account for more than 5-time difference in the CFR, as the rate of elderly people infected with COVID-19 was likely less than 5 times higher in HK than in MC in this period. We think the 68-time difference cannot be explained with other factors except the IDM measures which were implemented much less strictly in HK than in MC [9,10].

The COVID-19 CFR of MC before June 2020 supports the crucial effect of IDM. The CFR in Hubei province, 6.622% (4,512/63,620), was 7 times higher than that in other provinces of MC, 0.824% (122/14,687), before June 2020². This 7-time difference in the CFR cannot be explained with any reasons, such as age distribution and vaccination, except IDM, as before June 2020, many severe COVID-19 cases in Hubei province rather than other provinces were not well isolated in well disinfected environments because too many cases in Hubei province, particularly in the city of Wuhan, overwhelmed the healthcare systems for some time during this period.

Table 2. The potential effect of four major factors on the CFR or RSA difference*.

Compared scenarios (MC=mainland China)	Difference in the CFR or RSA	Effect of four major factors			
		Data quality	Age distribution	Vaccination or infection	IDM measures
MC vs other regions from 1 Jun 2020 to 7 Apr 2022	47–150 times (CFR)	A little	A little	A little	Greatly
Hubei vs other provinces in MC before Jun 2020	7 times (CFR)	Little	Little	Little	Greatly
Hong Kong vs MC from 1 Jun 2020 to 28 Feb 2021	68 times (CFR)	Little	A little	Little	Greatly
Communities in Shanghai with different IDM from 27 March 2022 to 18 April 2022	17 times (RSA)	Little	Little	Little	Greatly

*CFR: case fatality rate; RSA, the ratio of symptomatic COVID-19 cases versus asymptomatic infections; IDM: isolation of cases, disinfection of their living environments, and maintenance treatment

The recent data of Shanghai support the crucial effect of IDM. From 27 March 2022 to 18 April 2022, the ratio of symptomatic COVID-19 cases versus asymptomatic infections was 0.927 (12,528/13,511) in common communities in Shanghai with relatively looser isolation restrictions and fewer disinfection activities, 20 (6–2445) times higher than the same ratio, 0.043 (14,749/344,642), in the communities which were specially isolated and disinfected due to identification of COVID-19 infections. This 20-time difference became 17-time difference if the ratio in the communities which were specially isolated and disinfected was calculated using the symptomatic COVID-19 cases versus the asymptomatic infections four days earlier (14,698/267,634 = 0.055), to exclude the potential effect of the higher detection frequency in these communities. This 17-time difference in the ratio support that the IDM measures could greatly mitigate COVID-19 infections.

3. Paramount importance of the above analyses to mitigate COVID-19 worldwide

We summarized the above analyses in Table 2. They should have paramount importance for the global control of COVID-19, as they suggest that the IDM measures are highly effective in mitigating COVID-19 because they can minimize co-infections and maintain normal body functions. They also suggest that the future risk for MC to live with COVID-19 depends on its control measures. The risk can be very low if the IDM measures are well implemented. The risk can be very high if the IDM measures are not well implemented. Since elderly people are more vulnerable to COVID-19 and co-infections, they should be given better IDM, besides vaccination.

The above analyses elucidate that it is highly beneficial to their own health for asymptomatic or mild cases to stay at home with good disinfection of their rooms and good maintenance treatment for days, which is also crucial to public health and minimizing their great pressure on the healthcare systems. Meanwhile, the above analysis clarifies that it can be a dangerous fallible pitfall to use temporary hospitals to host asymptomatic or mild COVID cases together, which may lead to widespread co-infections and increase greatly the COVID-19 CFR. Notably, temporary hospitals for treating severe COVID-19 cases should be built and employed, if needed.

4. Feasibility of the measures to mitigate COVID-19 as per the above analyses

The IDM measures are feasible in many regions if well prepared. First, hospitals can provide good IDM for severe COVID-19 cases, which can be rare if vast asymptomatic or mild cases well employ the IDM measures. Second, good maintenance treatment is usually simple for asymptomatic or mild cases, and good isolation of asymptomatic or mild cases can be as simple and inexpensive as staying at home for days, and good disinfection of their living environments which can be as simple as using soap water to clean their

rooms. Multiple studies showed that soap water is effective to remove and/or kill various pathogens [11].

5. Data calculation methods

In this report, the CFR was calculated through dividing the total deaths by the total cases with known consequences (deaths or recoveries), using the data from the Worldometer and relevant official sites [2,8]. The ratio of symptomatic COVID-19 positives versus asymptomatic cases were calculated using the official data available online [12].

Author Contributions: J.-M.C. designed this study, analyzed the data and drafted the manuscript. J.-W.C. made the core conclusion. All authors collected and analyzed relevant data and revised the manuscript.

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