



What degree of compliance do we need?

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COVID-19 Actuaries Response Group – Learn. Share. Educate. Influence.

Summary

According to a King's College survey, the UK compliance figure for contacts is only 11%.

For the UK reproduction number R to fall below 1, there must be a vast improvement in public compliance with quarantine. To limit the spread of COVID-19 in large households, infected individuals would need to move to special quarantine hotels. This isolation strategy has been successful in China and Israel, and would address the problem of contagion spreading within large multi-generational households, many of which are BAME families.

Introduction

The exercise of individual liberty has to be weighed against the safety and well-being of others. This ethical balance is hard to strike during a pandemic, especially where much of the transmission is asymptomatic. People who are feeling well and have no symptoms may wish to socialise as usual, but in doing so they risk spreading infection. Under normal circumstances, residents of care homes have a basic right to be visited by their relatives; but not if the health of others is jeopardised.

For those with COVID-19 symptoms or who have tested positive, self-isolation is clearly in everyone's interest. In a King's College survey of over 30,000 people in UK between March and August¹, 70% expressed an intention to self-isolate if they were to develop key symptoms, but only 18% of the symptomatic reported that they had actually done so. These dismal figures call for strong political leadership to increase public compliance. The First Minister of Scotland was forthright in her rebuke of a Scottish MP who flouted this civic obligation in September.

Quarantine is also a civic duty for those tracked by smartphone to have been near someone who has tested positive. On 1 May, SAGE discussed the test and trace system under development. SAGE agreed a lower bound of 80% of close contacts to be reached within 48 to 72 hours, for the system to be effective. This criterion was met for just a few weeks until mid-June. However, with the progressive increasing spread of infection this percentage fell to below 70% at the end of September, and in mid-October, the percentage of close contacts reached went below 60%.

Suppose that contact compliance with instruction to self-isolate were as high as 80%. Then in mid-October, only half of close contacts would have been self-isolating. The detrimental impact on the reproduction number R is evident from the following simple illustration. Consider an asymptomatic infected person who lives alone, and is scrupulous in adhering to social distancing guidelines, including the rule of six.

¹ Rubin J. (2020) Effective test, trace and isolate requires better communication and support.. King's College London. September 25.

One October evening, he decides to alleviate loneliness by meeting with four casual acquaintances at home. The following day he has COVID-19 symptoms and notifies NHS. Suppose his attack rate for transmission of COVID-19 on that evening was 0.5, i.e. there was an even chance of each guest being infected.

Absent a test and trace system, his R is 2. If there were a fully effective and compliant test and trace system, there would be no onward transmission. However, if through ineffectiveness and non-compliance, only half of the infected guests self-isolate, then it would be expected that one guest would sustain transmission.

Compliance with the March lockdown instruction to stay at home was as high as 80%. Mobility dropped to 15% of the norm during the first weekend after lockdown, and socialising outside home was admitted by only about 14% of people surveyed by LSE¹. By contrast, according to a King's College survey², only 11% have been prepared to stay at home for two weeks because of contact with a confirmed case. Excuses have ranged from going shopping to not developing symptoms of COVID-19. In the above illustration, R would have been well above 1.

The less effective a test and trace system is, the more compliant the public needs to be with government guidance. Human behavioural response may be the opposite. People may question the value of strict personal adherence to guidance when large numbers of contacts are not being traced at all, and the number of cases per 100,000 is rising, despite local tightening of social distancing measures. Education, persuasion, incentivisation, coercion and restriction are all needed to ensure strong motivation to comply³.

Managing COVID-19 is a worldwide challenge to governments. With Europe battling the second wave, useful lessons may be learned from the suppression of COVID-19 elsewhere. With a population about one-third of UK, Taiwan has lost only a handful of citizens to COVID-19. This astonishing feat of public health administration has been achieved through soft regulation and hard compliance⁴.

Platinum standard for citizen compliance: Taiwan

Taiwan's commitment to compliance originates from the bitter experience of SARS in 2003. There were 343 officially confirmed cases, with 37 direct deaths and 36 SARS-related deaths. More than 150,000 people were placed in house quarantine for up to 14 days⁵. SARS was far deadlier than SARS-CoV-2, and the national memory of the SARS trauma has allowed the Taiwanese government to manage the COVID-19 crisis with a policy of soft regulation, and extensive planning.

Some state encroachment on communications privacy is publicly tolerated, as exemplified by those who had contact with Taiwanese passengers on the ill-fated Diamond Princess cruise ship, who had been allowed entry back in Taiwan. The Taiwanese government worked with telecoms companies to retrieve the digital footprints of these individuals, and trace their travel history. Those who had been to the tourist hotspots visited by the cruise ship were advised to quarantine for 14 days.

Taiwan really does have world-class contact tracing. On average, there are 20 to 30 contacts for each confirmed case. For one worker at a Taipei club, as many as 150 contacts were traced. About 340,000 people have been placed under home quarantine, with only one thousand fined for violation. This 99.7% compliance is enforced through phone tracking surveillance, creating an electronic fence around a home.

¹ LSE (2020) The lockdown and social norms: why the UK is complying by consent rather than compulsion. *British and Irish Politics and Policy*, April 27

² Rubin J. et al. (2020) Effective test, trace and isolate needs better communication and support. King's College London. September 25.

³ West R. et al. (2020) Applying principles of behaviour change to reduce SARS-COV-2 transmission. *Nature Behaviour*, May.

⁴ Huang C-Y. (2020) Soft regulation and hard compliance. *The Regulatory Review*, Penn Program on regulation, June 11.

⁵ Hsieh Y-H et al. (2005) Quarantine for SARS, Taiwan. *Emerg.Infect.Dis.* February.

The positive trade-off between personal liberty and public health is overwhelming: 14 days in the lives of 340,000 people have been exchanged for normal lives of 23 million citizens¹. Other populations may be less inclined than Taiwan's citizens to accept the stringent interventions that limit personal rights and liberties². The Taiwanese quarantine enforcement through phone tracking, as well as calls and visits from local officials, contrasts with the ad hoc UK system, where breaches occasionally come to light.

Policies that infringe on individual freedom may be inherently more sustainable within the East Asian culture which values collectivism. However, a time of national crisis, such as COVID-19, is a time for collectivism in every country. Effective enforcement of quarantine is needed in the UK. Some of the tactics used in Taiwan to encourage compliance are transferable: the provision of meal and grocery deliveries; online chat service to discuss problems; and a stiff penalty for breaking quarantine. As of the end of September, following the King's College survey, a new UK assistance package of £500 was announced to support self-isolation for those on lower income, who cannot work from home.

Higher UK compliance needed to keep R below 1

In the Imperial College study³ which precipitated the UK lockdown, modelling assumptions had to be made about public compliance with non-pharmaceutical interventions. The modelling output had to be robust against the uncertainty in compliance, given its role in public policy decisions. Consequently, the assumptions were not overly optimistic: 70% for isolation of symptomatic cases at home for 7 days; 75% for social distancing of those aged 70 or more; 50% for all household members quarantining for 14 days, following identification of a symptomatic household case.

These compliance figures are insufficient to prevent UK from escaping a cycle of tightening and easing of social distancing measures. As ICU cases rise, increased lockdowns (or equivalent NPIs) become necessary to prevent NHS resources from being exhausted, allowing for the ongoing need to reserve capacity for non-COVID-19 patients. Anticipating the multiple wave conundrum, a few days before the March lockdown, the author suggested that at least 90% compliance was needed⁴.

After the first wave, compliance has fallen well short of this aspiration for managing a second wave. An ONS Opinions and Lifestyle Survey was undertaken from 22 to 26 July of 1,150 people who said they had met up with others in the past week. Of these, 47% always maintained social distancing; 31% often did; 13% sometimes did; 5% not very often did; and 3% never did. Furthermore a quarter said they had met up with between 5 and 10 people, while 6% admitted the group was larger than 10. These disappointing survey results help explain why the progressive relaxation of social distancing in the summer elevated R above the threshold for increasing spread of COVID-19. For any plausible assumption of attack rates and contact numbers, R would exceed 1.

During the period of this ONS survey, on 24 July, face coverings became mandatory for people visiting shops. One of the arguments delaying this decision had been concern that wearing face coverings might induce complacency over social distancing. The ONS survey revealed how much complacency already existed. Had compliance with the guidance on social distancing been maintainable at a very high level of 90%, as in Taiwan, R would most likely have remained below 1. As with those Asian countries able to secure a high level of public compliance, a second wave might have been averted in UK.

¹ Wang C., Ellis S. (2020) Taiwan achieves record 200 days with no local coronavirus cases. *Time* magazine, October 29.

² Summers J. et al. (2020) Potential lessons from the Taiwan and New Zealand health responses to the COVID-19 pandemic. *The Lancet Regional Health – Western Pacific*. September 25

³ Ferguson N.M. et al. (2020) Impact of non-pharmaceutical interventions (NPIs) to reduce COVID-19 mortality and healthcare demand. *Imperial College COVID-19 Response Team*. March 13.

⁴ Fawehinmi Y. (2020) UK shutdown will need at least 90% of people to obey it to be effective. *Daily Telegraph online*. March 21st.

Measures to isolate infected individuals

Whilst waiting for a safe and effective vaccine to mitigate COVID-19 risk, further ideas for non-pharmaceutical interventions need to be considered. One such idea involves a proactive approach to isolating the infected away from a large household.

Compliance with existing social distancing guidelines, such as the rule of six, is not enough. Consider a large household of six family members, where one member becomes infected. With COVID-19 being transmitted from one person to another, it could take many weeks to clear the household of infection. Household transmission is aggravated in the autumn and winter months, when people cannot evade home contact by staying outside more.

Consider a total lockdown where everybody is required to stay at home for three weeks, and that there is absolute compliance. If an infected person in a household were unable to pass on the infection to another in the household, transmission would be driven to zero. Transmission links can be broken by removing infectious or potentially infectious people from the general population. This is not a fanciful idea; China has been very successful at this¹. Those testing positive have been removed from their households, so that they cannot infect others living there. Instead, they stay in designated medical facilities until they are free of the virus, as indicated by two consecutive negative PCR tests. Individuals who have been in contact with infectious persons self-isolate at home for two weeks.

In UK, especially in deprived areas, there are numerous high density dwellings where social distancing is impossible or impractical. Around 1.8 million people in UK live in multi-generational households, including young, middle-aged and older people. BAME communities are more likely to be living in such groups. Half of Bangladeshi households are multi-generational. To avoid household contagion, as and when one resident is tested positive, he or she could be taken to a central quarantining centre. With many hotels closed for business, they could be rented out as comfortable quarantine hotels, where guests receive both food and medical treatment. This has been done successfully in Israel². Most of those with COVID-19 at the Israeli corona hotels have had few or no symptoms and did not require hospitalisation.

This corona hotel initiative requires the compliance of citizens to be voluntarily accommodated in a corona hotel when tested positive, and where there is a risk of transmission to vulnerable people within the same household. Already, some BAME family members have booked themselves into hotels³. Such precautionary action has been limited in scope by family expense. A nationally organized scheme funded by the government would encourage isolation of the infected, and so contribute to suppressing R in densely populated urban areas.

Conclusion

The deepening second wave crisis requires greater public compliance than before in the UK; levels more characteristic of Asian countries where the coronavirus has been controlled. It is both remarkable and encouraging that, at the end of October, Taiwan had gone 200 days without a locally transmitted case.

Libertarian reliance on the good sense of the British people to do the right thing needs to be replaced by government insistence on public compliance. Quarantine should be more effectively enforced. Such national solidarity of purpose is characteristic of wartime, and could be achieved in the ongoing war against the coronavirus.

¹ Falush D. (2020) Isolate, isolate, isolate: China's approach to Covid-19 quarantine could be the most effective. *Telegraph*, April 20.

² Lappin Y. (2020) An insider's look at Corona hotels operated by IDF home front command. *Jewish Journal*, September 12.

³ Rahim Z. (2020) These families cherished multi-generational living. But COVID-19 wrecked it. *CNN* October 16.