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Convener, Health and Sport Committee
The Scottish Parliament

by email

6 May 2020

Dear Convener

Covid 19

Thank you for your letter asking for further information following the evidence that I gave to the Committee on 28 April. I respond as follows.

Testing capacity in Scotland.

This has increased substantially in recent days. In my view three linked conditions have to be met in order to successfully implement the test, trace and isolate policy announced by the First Minister on 4 May. They are sufficient capacity, rapid turn-round times, and local testing. If samples have to be transported long distances this will increase turn round times, and if testing capacity is limited, turn round times may be long because queues of samples to be tested may develop.

There are 21 NHS microbiology laboratories in Scotland. I do not know whether all of them are offering the COVID 19 RT/PCR test. I know that both Orkney and Shetland are, both good examples of small laboratories providing the service and showing that laboratory size is no obstacle to conducting a brand new test (first developed during the second week of January this year) using technology quite different from the standard methods which constitutes the bread and butter of their routine work.

Additional to the NHS laboratories is the Glasgow Lighthouse laboratory, capable of conducting 4,000 tests/day, nearly doubling current NHS capacity at the time of writing. Non-NHS laboratories could be used so long as they have safety cabinets for handling and processing swabs. Many university and research institute laboratories use RT/PCR and would be able to conduct tests to the required standards.

In principle I see no reason why any laboratory conducting the RT/PCR test could not significantly increase its testing capacity. Constraints in laboratories could be a shortage of PCR machines (the test is mostly automated), or test reagents. The latter has been flagged up as a problem. Whether it has been sorted out I do not know. It is important to note that laboratory test capacity is just that; "testing" often refers to sampling i.e. the taking of nose and throat swabs. Problems here refer to the availability of swabs and the location of sampling sites.

Testing of asymptomatic individuals.

The presence or absence of symptoms does not affect the reliability of the RT/PCR test. An excellent study of an outbreak of COVID19 in a care home in Washington State in the US, for example, found that 48 out of 76 residents tested positive, with 27 being asymptomatic when tested. 24 of them developed symptoms later. Infectious virus was isolated from 17 members of this group before they developed symptoms. Almost certainly they were capable of transmitting infection to other residents before they developed symptoms. The amount of virus was high whether the positive test samples were from symptomatic or asymptomatic individuals or from individuals who did not develop any symptoms at all.

Care homes.

It has been well known for many years that care homes provide an environment which facilitates the spread of a range of microbial pathogens, including *E.coli* O157 and influenza. Infection control within them is very difficult. Preventing the entry of the pathogen is essential. Transmission of COVID 19 by asymptomatic individuals is very well documented. It has been estimated that about 40% of infections have been contracted from asymptomatic individuals. Frequent and repeated testing of those going into care homes is the only preventive measure that will be significantly effective.

Geographical variations in the easing of lock down and social distancing.

I am on record as proposing that residents of Orkney and the Western Isles could be freed earlier from social distancing and lock down than mainland communities. They have had few COVID 19 cases (none in hospital in Orkney since 5 April and none in the Western Isles since 2 April), they have excellent public health systems, and they control travel from the mainland very significantly, thus reducing the risk of virus importation. Orkney has its own testing facility that provides a turn round time of less than 2 hours. For exit from local controls a prerequisite would be community testing on a significant scale and the establishment of a system of contact tracing. They could also serve as places to evaluate any smart phone apps.

Contact tracing (TTI).

Currently virus transmission continues in Scotland. The "COVID-19: Framework for Decision Making" document published on 5 May estimates that there are currently 26,000 infected individuals in Scotland. It is not evident how this estimate was made. On 5 May 1,720 patients with COVID-19 were in hospital. Contact tracing is labour intensive and will require much testing: reliance on identifying infectious individuals either index cases (i.e. those who started a chain of infections) or infectious contacts by symptoms alone will miss cases. Mass community testing will be needed to identify infectious but asymptomatic individuals as part of the contact tracing process. When new case numbers have significantly declined and when it is evident that the decline is being sustained for several days, it should be possible to start contact tracing to hunt down the virus.

Training in the use of PPE, and their provision.

I am unaware of any current issues affecting hospital health care workers in this regard. It would be helpful to see evidence from the regulators of care homes and of domiciliary care workers as to the provision of PPE and of training in their use. The frequency of COVID-19 outbreaks in care homes and the often high number of cases in them is of great concern, indicating that current infection control measures in them are not working. Surgical type face masks are known to be largely ineffective in preventing infections spread by the respiratory route, including COVID-19. FFP2 and 3 masks are considered to be protective. They should be used by care home staff during an outbreak , with training to ensure that their face fit is correct. I have not seen any information regarding their use in care homes at this time.

A second wave.

There was only a single peak of SARS cases, with spikes due to super spreader events. It was controlled by patient isolation, quarantine, effective PPE protection, and some screening of travellers. Temperature checks at airports were effective because cases don't become infectious until days after the onset of illness. With the exception of influenza, second waves of cases have not been a feature of pandemics caused by other pathogens spread by the respiratory route, the most virulent example in Scotland being diphtheria (until it was controlled by a mass vaccination programme during WW2).

The second wave of infections in the 1918-19 influenza pandemic killed many more than the first or the third. The first was in June and July 1918, the second in October and November 1918, and the third in February 1919. It is not known why the number of infections fell substantially after July or why the second peak happened. Herd immunity had not developed by the end of the first peak. There was no social distancing. No virus tests were done because the influenza virus was not discovered and grown until 1933. The possibility remains that the virus that caused the very mild first wave was genetically different from the one that caused the second wave This pandemic is the best remembered example of one in which the second wave was more dangerous and had more cases than the first. There have been three influenza pandemics since.

In 1957-8 (Asian flu) the first peak occurred in September and October and the second (in which there fewer deaths than the first) at around Hogmanay. Hong Kong flu in 1968-9 caused sporadic cases from September peaking from January to March 1969. A second peak occurred from November 1969 to February 1970; it was more lethal than the first. In the US the two waves occurred at about the same time, but differed from Europe in that the first peak was more lethal than the second. In 2009 (the Swine flu pandemic) there were relatively few fatalities. The first peak of cases was in July, when the total number of UK deaths was 10. The second wave peaked at the end of October, when the total number of UK deaths was137.

I have considered influenza pandemics in some detail because I think that the behaviour of influenza virus, notably in 1918, has influenced the thinking of the mathematical modellers who through SAGE influence government policy. Many of them have been engaged for years in planning for the next influenza pandemic. But in my opinion the more we learn about COVID 19 the more the differences with influenza virus become apparent.

No second waves of COVID19 infections have occurred in China, South Korea or New Zealand, countries in which local virus transmission is currently close to zero. Even in Singapore, where transmission controls have not so far led to this outcome, due mostly to outbreaks in migrant worker dormitories, there has been no second wave of cases. A smart phone app to assist in virus control was introduced in Singapore on 20 March.

I have seen no evidence to indicate that a second wave of cases of COVID 19 more virulent than the one we have endured would occur if control measures were to be lifted prematurely. It is far more likely that our situation would resemble that in Singapore, where infections would continue to occur with cases numbers declining but at a slower pace than if controls had been maintained.

Yours sincerely

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