OFFICIAL REPORT
AITHISG OIFIGEIL

Health and Sport Committee

Tuesday 28 April 2020

Session 5

The Scottish Parliament
Pàrlamaid na h-Alba

Tuesday 28 April 2020

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HEALTH AND SPORT COMMITTEE
9th Meeting 2020, Session 5

CONVENER

*Lewis Macdonald (North East Scotland) (Lab)

DEPUTY CONVENER

*Emma Harper (South Scotland) (SNP)

COMMITTEE MEMBERS

*George Adam (Paisley) (SNP)
*Miles Briggs (Lothian) (Con)
*Alex Cole-Hamilton (Edinburgh Western) (LD)
*David Stewart (Highlands and Islands) (Lab)
*David Torrance (Kirkcaldy) (SNP)
*Sandra White (Glasgow Kelvin) (SNP)
*Brian Whittle (South Scotland) (Con)

*attended

THE FOLLOWING ALSO PARTICIPATED:

Professor Hugh Pennington (University of Aberdeen)

CLERK TO THE COMMITTEE

David Cullum

LOCATION

The Adam Smith Room (CR5)

Scottish Parliament

Health and Sport Committee

Tuesday 28 April 2020

[The Convener opened the meeting at 10:00]

Covid-19

The Convener (Lewis Macdonald): Good morning and welcome to the ninth meeting of the Health and Sport Committee in 2020. I thank all members for their attendance today, including colleagues who are joining the meeting from remote locations around Scotland. I thank our parliamentary staff, in particular the broadcasting office, for all their hard work in setting up this first remote formal meeting of the committee.

The committee recognises the very challenging times in which we live. We pay tribute to all the organisations in the health and social care sector, and to local essential services, for their continuing dedicated service and hard work at this time. We do not want to place any undue pressure on those bodies during this public health emergency, but we have agreed that it is, as the First Minister has said, important that parliamentary scrutiny and the accountability of the Scottish Government continue.

This date is marked every year as international workers memorial day, in honour of those who have lost their lives in the course of their employment. This year, the Royal College of Nursing, the Royal College of Midwives and other trade unions have called for a minute's silence across the United Kingdom to honour all the workers who have lost their lives to coronavirus while seeking to deliver healthcare and essential services on behalf of us all. The committee will observe that minute of silence at 11 o'clock.

I ask all meeting participants to ensure that their mobile phones are in silent mode.

The first item on our agenda is an evidence session on Covid-19 and pandemics in general. The committee has agreed to focus its attention initially on four aspects of Covid-19: personal protective equipment, testing, our resilience emergency planning and preparation, and the impact on care homes.

In order to address those issues, we will start the meeting with a wider evidence session. We have in mind, of course, what will happen as restrictions are eased, as well as what immediate lessons are already apparent and what lessons might become apparent, should restrictions subsequently require to be tightened in any way.

I welcome to the committee Professor Hugh Pennington, who is emeritus professor of microbiology at the University of Aberdeen. Professor Pennington, thank you for joining us.

Unusually, the committee will, because of the challenges of managing a virtual meeting such as this, take questions in a prearranged order. I will start with the first question, and then ask each member in turn to ask questions. I will invite Professor Pennington to respond to each member. Once a member's questions have been answered, I will invite the next questioner, and so on until the evidence session is concluded.

It is always helpful in circumstances such as these to keep questions and answers succinct and, once someone is called, to give broadcasting staff a few seconds to make the speaker's microphone operate before they begin to ask a question or provide an answer.

I will start. Considering the bigger picture around Covid-19 in Scotland, what more—if anything—do you believe could have been done in advance to prepare the national health service, the social care system and the country as a whole for tackling such a pandemic?

Professor Hugh Pennington (University of Aberdeen): We have had a pandemic plan in place for many years, but it was directed against influenza. Of course there are similarities, but there are also big differences between Covid-19 and influenza. The differences between the two viruses must be borne in mind when we talk about the things that were done well, the things that should have been done but were not done, and the things that were not done as well as they might have been done.

I declare an interest in that I am coming at this as a virologist who started his career, many years ago, at St Thomas' hospital, which we have all heard of because the Prime Minister was a patient there. At the hospital, I worked with June Almeida, the electron microscopist. June, who was born in Glasgow, discovered human coronavirus in the 1960s. That was a long time ago, but I have a little bit of experience of the matter.

What have we done well? Once we have decided to do something—for example, the lockdown—it has been successful. However, what we missed was that we did not put enough emphasis on testing. I declare an interest as a microbiologist, who used to run a laboratory whose main function was testing. Clearly, therefore, I put it high on my list of matters to think about.

Testing is one of the big differences between dealing with Covid-19 and dealing with influenza. In an influenza pandemic, we do little testing; we test to find out what the virus is, but most patients

never get tested. The test is usually quite laborious and it takes a long time to get a result. For influenza, antiviral drugs are available, so we treat people on spec, because the drugs are pretty safe to give.

For influenza, we also set in motion the development of a vaccine, although that usually happens a bit later than the peak of the pandemic. A vaccine means that we can cope with the aftermath of the pandemic and stop the virus going on the rampage again—although we are not usually successful in doing that.

We do not have either a vaccine or antiviral drugs available for Covid-19, so prevention is paramount, and testing is the only way to know where the virus is.

We have had a good test available since 13 January. Following the events in Wuhan, the Chinese did a genome sequence of the virus. That gave us information on which one could design a reverse transcription polymerase chain reaction—RT-PCR—test. Such tests have been around for a number of years, and many laboratories use the technique.

My main criticism of the United Kingdom-wide response is not that we did not develop a test: we did. Public Health England developed a test probably within 48 hours of the information being made available on the World Health Organization influenza information exchange website. Everybody had the necessary information to develop a test, which is a pretty straightforward exercise if the technology is available, as Public Health England has at its Colindale lab, with which I am very familiar.

We could have done a lot more to get the Public Health England test rolling in many of our centres. There was a problem in having a degree of centralisation to the test, which meant that we did not have many tests available. The number was far too low to do the sorts of things that we could have done.

My main criticism is therefore not that we did not have the test—we did—but that we did not use all the available facilities, not just in Public Health England laboratories or other national health service laboratories, but in research institutes and university departments that do biomedical research. Biomedical research is one of the UK's strengths, particularly in Scotland, and lots of labs have the RT-PCR equipment that is necessary to do the test.

We also have well-qualified and competent people using such testing in cancer research, for example. They might not have been using it for diagnosing viruses, but for looking at other aspects of nucleic acid biology—although we do not need to go into details of that. Those are people on whom we could rely to run a sound and safe test. I am sure that, if they had been asked, they would have put up their hands and said, "I'll do it by the middle of yesterday", because this is a national crisis.

My main criticism is in respect of conscription of all available facilities. Facilities are still being conscripted; my understanding is that, still, not all are being used in-house. There has been a delay in people getting their act together on conscription. I do not mean that force should have been used, but I do not know why there were not, for example, adverts in the newspapers. It does not matter how conscription could have been done—it could have been done, and it could have been done much faster and more effectively.

The mantra that has been uttered at the number 10 press conferences is that a bad test is worse than no test at all. That does not apply to the RT-PCR test: it is a very good and sound test, and it gives a result within 24 hours.

The Convener: In March, the strategy appeared to include testing and contact tracing. On 2 April, the chief medical officer announced that contact tracing would no longer be used, because the strategy had moved from the contain phase to the delay phase. Was that a strategic error? In the circumstances that applied on 2 April, would it have been possible to continue to test and trace? Is there a way to address that issue, as we go forward?

Professor Pennington: In my opinion, it was a policy error to move away from contact tracing. I might come back to this later: we want to get virus levels down to the point of elimination.

We can look at what is happening in New Zealand, which had far fewer cases to start with. New Zealand takes a draconian approach to stopping the importation of viruses. New Zealand is now at a point at which it has real and sound evidence that lets people talk about virus eradication—not about flattening the curve, or about diminishing or delaying the spread, but about getting rid of the damned thing altogether. I might come back later to saying why I think that that is possible.

Having said that, I do not know why the policy changed and why the idea of contact tracing was almost abandoned. My suspicion—although I do not have evidence for it—is that there was no testing capacity to do that. I think that the policy was driven by the lack of testing capacity, rather than the policy driving the need for more testing. That is my speculation.

Emma Harper (South Scotland) (SNP): There has been much media reporting about PPE: about whether we have the right amount and about how it is delivered to hospitals across the UK. I have a

particular interest, because I was an operating room nurse for 30 years before I was a member of the Scottish Parliament. I wore PPE every day, and there were particularly memorable issues when I looked after brain biopsy patients when we were diagnosing Creutzfeldt–Jakob disease.

I am interested in pandemic planning. Have we anticipated enough the need for PPE? Do we have the right number of items? Who is required to produce plans or to model the need for PPE? Is that Public Health England's responsibility or is it the UK Government's responsibility? Should we have prepared better and had more PPE?

Professor Pennington: We have not had enough PPE. There has been much evidence of that, particularly from people who want to use PPE but find it very difficult to access it, and from people who do not know whether they will still have any in two days.

I have seen pictures on television of people wearing what I consider to be inappropriate PPE, and of people who are not sufficiently protected in the environments in which they are working. I am less certain of whether that applies to staff who are looking after patients who are Covid-19 positive. I suspect that they do have the PPE that is required. PPE is absolutely vital. We know from bitter experience—not so much in the UK, but worldwide—of severe acute respiratory syndrome that a lack of high-quality PPE such as the FFP3 mask was a very bad thing in some places. That went wrong in Canada, for example, where hospital staff were infected. That was certainly a big issue with SARS, which is another coronavirus—we might come back to its similarities with and differences from Covid-19.

The lesson should have been learned about PPE for hospital staff, for people in contact with cases, and for people in nursing, especially those who look after patients who are on ventilators, for example, because a lot of virus is blown out when tubes are changed.

10:15

The issue is more about the PPE that is available to other people who are meeting patients who might have Covid-19 but have not yet been diagnosed. Then, of course, there also is the outstanding issue of care homes.

Overall, we just have not had enough PPE: there has not been enough of it in the stores, and there seems to be a problem in delivering even what is in the stores to places that need it. That goes back to the pandemic plans that are made, as I understand it, on a UK basis, and are refreshed from time to time. Those plans include PPE equipment, in terms of having enough stocks and stores to cope with an outbreak.

To be fair to all those who are involved in pandemic planning, I will make a suggestion. It is not an excuse for them, but it is maybe a reason why we did not pay enough attention to having enough PPE available in the stores to cope with a surge. I might come back to that issue later in other respects. "Surge capacity" means that something is available for use not this week or next week, or even next year, but for a sudden event that requires us to have it quickly in very large amounts. That is the whole point of having a store of material that is ready in case there is a sudden event. By definition, pandemics are unpredictable; we can predict that they will happen, but we do not know when.

My argument for getting the people whom I mentioned off the hook is that for, for example, the influenza pandemic of 2009, the prediction was that the best-case scenario for deaths in the UK would be 50,000, but in the end the number was 457. There were some very sad and tragic cases, but the number of people who had a very hard time and who required hospitalisation, and the need for staff to use PPE, were very much less than what had been predicted. My guess—again, this is speculation—is that because that last pandemic was, almost, a non-event, it caused us to put a little lower down the list planning for getting orders in for PPE and for making sure that we had supplies ready for surge capacity.

The World Health Organization was criticised for calling that example a pandemic. A pandemic is simply the worldwide spread of a virus, so it was right to call it that. People have in their minds an idea that a pandemic is somehow a frightful thing with high mortality. That is not so; a pandemic just means that there is worldwide geographical spread of a virus. That said, basically we had not prepared.

Another matter is where we buy PPE from. A lot of it comes from China: half the world's masks come from China. With China in lockdown and the factories that make such things being closed, that source has not been available to help us to cope with the problems that we have had because our pandemic planning has failed.

The Convener: Thank you very much. I remind members and our witness that our time today is not infinite, so please keep questions and answers succinct.

Emma Harper: We know that the PPE issue is highly important. Personal protective equipment comes in different shapes and varieties. You talked about FFP3 masks, and we know about face shields, goggles and so on. Last night's "Panorama" was pretty explosive on PPE—some of the PPE that was listed included paper towels and hand sanitiser.

We need to be really clear about what personal protective equipment is. We can then help to educate everybody about how important particular PPE is, depending on what area people work in, including intensive care. Do you have any comments to make on the importance of PPE and, in particular, knowing which items are specifically needed for dealing with coronavirus?

Professor Pennington: The virus is different from influenza. We pay little attention to PPE for influenza, except, of course, when patients are very sick and might be infectious.

One big difference between influenza and Covid-19 is that, generally speaking, in most of the pandemics that we have experienced in recent times, the mortality rate has been very low, with the focus on particular individuals. I am sure that I will come back to care homes later, so I will put them to one side for now. Care homes apart, influenza goes for a rather small and highly specific part of the population, but it has not been seen as a particular issue for healthcare staff. For most people, contracting an infection is not trivial, but it is nowhere near severe enough to take them to hospital.

It is absolutely crucial that staff are trained in the use of PPE so that they use it appropriately. That was an issue with SARS: some of the training in hospitals in Canada, for example, was seen to be defective. Staff simply have not been trained in the use of PPE, but that is crucial with Covid-19.

I go back to my earlier point. We do not have the luxury—that is probably an inappropriate word, but members get my drift—of antiviral drugs that work, as we have with the flu, and we do not have a vaccine that we can make in quite short order to protect the vulnerable before the pandemic has rolled on too far. We have neither of those things, so prevention is the only thing that we can do, and the only thing that we can do to protect healthcare workers is to have appropriate PPE.

In my view, hand sanitisers are not PPE at all. PPE includes gowns, masks and face shields, which protect people from getting the infection when they are in contact with patients. When people have the infection, there is nothing that can be done short of symptomatic treatment.

Emma Harper: I will move on to my next question, which is about which social distancing measures have the most or the least impact on transmission. Which social distancing measures are best in reducing the transmission of coronavirus?

Professor Pennington: The distance that is kept between individuals is by far the most important aspect of the attempt to control the virus. If a distance of 2m from other people is kept, the likelihood of the virus transmitting itself from people who breathe it out to people who breathe it in is not zero, but it is very low. It is clear that all that we can do during the outbreak is reduce the risks of transmission as much as we can, rather than preventing transmission completely. FFP3 masks might do that, but they are used in a very special circumstance that clearly does not apply to the general public. It is the distance between individuals that is important.

What are traditionally called fomites are second to that. Viruses get on to surfaces, people get them on to their hands from those surfaces and then they touch their face. There has been a lot of emphasis on hand washing, for example, to interrupt that route of transmission. The evidence so far is that that route might be important but, for obvious reasons, it is very difficult to find any evidence that it has occurred—we are not going around testing door handles, for example. However, hand washing after touching a surface that might have been touched by somebody else is a fairly straightforward thing to do.

As an aside, I am looking forward to a reduction in the number of cases of food poisoning. One of the most important things that people can do in that regard is wash their hands. If people touch a surface that may have had bugs on it, the virus or bacterium can get on to their hands, and they might then touch a piece of food and eat it. It is the same with the virus, except that the virus, instead of being ingested through the mouth, gets into the nose and the back of the throat, where it starts growing.

In my view, social distancing is by far the most important aspect of the control measures that we put in place, followed by simple, straightforward things such as hand washing. The use of soap and water is extremely effective—I can quote the evidence in support of that if you would like me to. Those are the important things.

Public gatherings are a separate issue. With public gatherings such as those in a pub, where everybody is crowded together, it will be very difficult to get social distancing rolling, but it could well be possible to do it in, for example, a restaurant, where the tables are far apart and so on. There is an argument to be had about football matches, but we need not go there at the moment.

To come back to social distancing, the virus is on the wind. Therefore, in Scotland, where there is a fair amount of wind, the chance of catching the virus is probably less than it would be on a tube train in London—that is common sense.

Miles Briggs (Lothian) (Con): Yesterday, the First Minister said that she believed that the reproduction number of the virus was about 1 in a community setting. From your experience, what do

you believe that the reproduction number of Covid-19 is in hospital and care home settings?

Professor Pennington: It is very difficult to do any kind of quantitation or measuring of that. We have to look at what is happening in such places and then work back from that to determine whether we think that the R number is less than 1 or greater than 1. If the R number is less than 1, it means that, on average, each person will infect less than one individual. If that is continued across the piece, the virus will die out, because it will eventually run out of people to infect. If the R number is greater than 1, the virus will continue to spread.

The R number for Covid-19 that has been estimated in many studies that have been put together is about 2.7, which is probably what it was at the beginning of the outbreak once the virus had started rolling here. At the moment, I would classify care homes where there have been cases of the virus as almost super-spreading environments where the virus is going on the rampage. Care homes are set up for social interaction between the residents, and the staff have to be close to the residents. Many of the residents will have dementia and so on, which makes it difficult to deal with the virus. Because of their illness, they have forgotten about hygiene. I am not being pejorative—that is a plain fact. We have known for many years that, once an infection gets into a care home, it has a very good chance of spreading far more than it will do in the community at large. In the community at large, the R number might be less than 1. I do not know how high the R number is in the care home setting, but it might be as high as 10, or even higher than that.

When the outbreak in the cruise liner off Yokohama started, the R number was 14. Because the authorities tried to control it by taking away all the passengers who had symptoms, it fell to about 1.7. That did not stop transmission, but it reduced it. That was in a situation in which individuals were isolated in cabins and were kept apart from one another. Even in the best-run care homes, the R number will probably be much higher than 10; it could be even higher than that.

That is based on the number of cases—the number of tragedies—in care homes. The number of people who have unfortunately died of Covid-19 is reported daily, and it will be an underestimate. We know that the virus does not cause 100 per cent mortality; even in high-risk groups, mortality rates are much less than that.

The virus is going on the rampage in care homes. I hope that we come back to that issue because, at the end of the day, the only way we can stop problems in care homes is to stop the virus getting into them in the first place because, once it gets into them, it is out of control.

10:30

Miles Briggs: There is obviously real concern about the infection rate in the hospital and care home sectors. What actions will have to be put in place to manage the higher rates of hospital and care home-acquired cases that you have outlined as we come out of lockdown? How can we create clean capacity in the NHS so that we can start up some of the vital work and operations in cancer and heart disease?

Professor Pennington: You raised two separate issues; I will pick up the second one first. Hospitals need to be seen as safe places so that we do not get the situation that we seem to be in at the moment where people are frightened to go to hospital because they are worried about catching the virus there. Many hospitals are already splitting their activities into red and green zones, or whatever the colours might be. They have a Covid area and a non-Covid area. The public must be reassured that the non-Covid areas are definitely what it says on the label and that there is no chance of Covid being in there.

There is obviously a backlog of operations that will have to be sorted out. A lot of discretionary operations—the cold operations—have been put on hold, and there were already quite long waiting lists. That will be bad news for somebody who has a bad hip, for example. Those people do not want to go into hospital and catch an infection such as Covid-19, and many of those who require hip operations will be in high-risk groups by virtue of their age.

It is down to the hospitals to be punctilious about making sure that they have two separate areas while the virus is still busy. They need to communicate or demonstrate to the public that they go in through door A if they have had a heart attack or whatever it is, or through door B if they have symptoms of Covid-19.

It would be even better if, even before somebody went into hospital, we could do testing so that we knew whether they had tested positive. We should not wait to test them until they get into hospital, otherwise people who have the virus might go into the non-Covid space. We know—and this is important—that people are infectious before they develop symptoms. It is therefore pointless to say to someone, “You don’t have a cough, you don’t have a fever and you don’t have any other symptoms of Covid, so you are okay”. That is far from being the case—good data is coming out that suggests that perhaps as much as 40 per cent of infections are being transmitted by people before they show any symptoms. Testing is paramount to making absolutely certain that we do not put people into the wrong category and that we do not miss anybody who is likely to infect other patients in a hospital.

Your other point was about care homes and how we stop the virus getting into them. Again, we can only do that by regularly testing people who go into care homes. We should give them a test and make sure that it is negative before they go in, and we should keep on testing them, because a single negative test result does not mean that they are not incubating the virus. A screening test would have to be done regularly and people should not be able to act until they had the result. They might not necessarily have to self-isolate; they would just have to delay things a little bit.

We could have routine testing of all people before they went into care homes, allowing them to go in only if the result was negative. Anybody who went in regularly would have to have repeat tests, just to make sure that they had not picked up the infection. As I said earlier, symptoms are a poor guide to whether somebody has the virus and a very poor guide to whether somebody is capable of transmitting it. Once the virus gets into a care home, it is too late to talk about testing and finding it. The virus then has a very good chance of spreading in the care home and causing mischief through a disease over which we have no control because we still do not have an adequate treatment.

Sandra White (Glasgow Kelvin) (SNP): I want to pick up on your point about testing and ask for your expert advice on care homes.

You are saying that the whole population would need to be tested because, basically, people do not know whether they have the virus and are spreading it. Is lockdown not a better way of controlling the pandemic? I just throw in that point, which relates to your previous comments.

My main question is about care homes. Health Protection Scotland has set out advice with regard to care homes. If anyone shows any symptoms, the people in the care home have to phone the health service to get advice. The guidelines refer to ensuring that there is good protection in care homes, which you also mentioned. For example, the guidelines mention hand washing, which is important. The point that I want to throw into the mix is that care homes are a complex area. We have private care homes, local authority care homes, voluntary sector care homes and not-for-profit care homes. In fact, well over 70 per cent of care homes are privately owned. How do you see the advice to care homes panning out? What could or should be done to best protect care home residents?

Professor Pennington: Protecting care home residents is absolutely paramount and the only way that we can protect them is to prevent the virus from getting into the care home in the first place. If I may, I will go back a little and talk about my experience, although not with Covid-19.

In 1997, I gave evidence to a World Health Organization committee that was talking about care homes as incubators of infection. Unfortunately, the infection that we were talking about then—E coli O157—is still more common in Scotland than it is anywhere else in the world. We have had very sad outbreaks in care homes involving that particular bacterium. It works in a different way, but it is the same issue as with Covid-19, in that the population in care homes is very vulnerable to serious outcomes of infection. For obvious reasons, hygiene in care homes is more difficult to control than in an ordinary domestic environment. As I said, we like to encourage residents to get together and to meet while eating their food and so on, but goodness gracious, that is an ideal way to spread infection. We have also had outbreaks of influenza in care homes that have resulted in high mortality.

The problem is not new. We have seen it before, and we have seen tragedies before. “Prevention, prevention, prevention” has to be the mantra. The only way that we can stop the virus is to prevent it from getting into the damned places in the first place—I am sorry to use those words, but I feel strongly about the issue. Clearly, if we got a vaccine, we could say that people could not work in a care home until they had been vaccinated, but we do not have a vaccine and we may never get a vaccine, or we may get one that is only partially protective. We cannot wait for a vaccine; we have to do something now, because the problem is with us now. People argue about whether the mortality in care homes is 40 or 50 per cent, but those are outrageous figures by any estimation. The only thing that we can do is prevention.

I return to the point about testing the whole population. The more people we test, the better, but we should be looking at preventing the spread of the virus by stopping it from getting into care homes. We must make sure that no person, of any kind, who goes into a care home has the virus, because they might unwittingly spread it. It is not someone’s fault if they do not know that they have the virus. How could they know, when roughly 40 per cent of people who transmit it have no symptoms? People feel fine and go to work, so there has to be a testing regime to ensure that—as far as is humanly possible—the virus is not being carried into care homes, because of the risk of person-to-person spread.

Sandra White: Thank you, professor. You have near enough answered my next question, on the approach in care homes.

Testing does not, for now, help people who are in care homes. They are not protected unless people know that they have the virus and that they have to self-isolate. People who are in care homes

and have the virus have been self-isolating as per the guidance that came in.

Is it possible to test everyone who goes into a care home, including agency nurses, contractors and others? As you said, people might not show any symptoms. My concern is how to stop people who do not show symptoms, but are carrying the virus, from going into care homes.

Professor Pennington: That is a very good question. First, we have to have the capacity to test far more people than are being tested at the moment. At the moment, testing is rationed because we do not have enough test kits available to do testing on the scale that, in my opinion, we need to.

Generally speaking, I know that lab tests often get rationed. If someone has symptoms of a very particular disease that requires an expensive, complicated test, someone will decide whether it is likely that that person has the disease before doing the test. However, we are not talking about an expensive, complicated test and, in any case, money does not seem to be an object in this situation and does not seem to be holding us back. Without spending vast sums of money—although, perhaps significant sums of it—we should be able to do all the testing that we need to do by scaling up the number of machines and people who are carrying them out. I have been through that, and have said that it is feasible if we put our minds to it and have a kind of conscription of machines and so on.

We must address testing capacity so that we have enough tests available and then we must set a regime for testing individuals, particularly those who will come into contact with vulnerable groups in the population. We know who they are pretty well, because we know that Covid-19 is different to influenza in that the older a person is the more likely they are to get a severe, complicated infection that, unfortunately, ends in their death. It is unlike most infections in that there is a very clear relationship between age and a bad outcome. Therefore, we know that a person is at risk when they are over 60, and that if they have all the other conditions that become more common as you get older—such as high blood pressure, heart disease, diabetes and so on—that also adds to the risk. Clearly, we know that if we want to look for people who have all those co-morbidities and underlying health conditions, and who are elderly, the best place to look for them is in care homes. If you ask the residents of a care home to put up their hand if they have three medical conditions, I suspect that most of them would put up their hand—those conditions are a factor of getting old. Therefore, people in care homes are at the top of the pyramid of people who need protection.

If we have to continue to ration testing, then testing to prevent the virus from getting into care homes has to be right up there. So does the testing of healthcare workers, although that is a separate issue. Certainly, residents in care homes are the most vulnerable in the population by definition. We do not need to do a survey to find that out—we know that they are. Clearly, we need to focus on care home residents as a high priority in any expanded testing regime.

10:45

Alex Cole-Hamilton (Edinburgh Western) (LD): Before I get into a more substantive question, I will briefly touch on the likelihood of a vaccine. Earlier, you said that we may not get a vaccine—or not an effective one, at that. That would seem at odds with some of the more optimistic projections about a vaccine from other public health professionals and virologists who say that the prospects are very good. Could you tell us why you are slightly more pessimistic and what factors might prevent a viable vaccine from hitting the marketplace, as it were?

Professor Pennington: I will answer your question in two ways.

I was hired into microbiology by Professor Ronald Hare, who was one of the first people to develop an influenza vaccine. He was working in Canada at the time and was hired by the US Government to produce a flu vaccine. He was very negative about flu vaccines because by the time he had developed one, it did not work. I am declaring a kind of scepticism because of historical events.

That vaccine did not work, not because the vaccine was no good, but because the virus had changed. Of course, that is what flu does and that is why we have to have new flu vaccines. Pretty well every year we have to change the vaccine's components because the virus mutates all the time and throws up new variants. Although those are not necessarily big variants, they are big enough so that last year's vaccine is not very good for this year. We have recently had problems with vaccinating to protect the elderly against flu. Professor Ronald Hare did his work in the 1930s and, although we have made some progress, we still do not have a flu vaccine that is anywhere near as good as the measles, mumps and rubella vaccine, for example, in protecting against infections.

Many of the vaccines that are being trialled for Covid-19 are based on flu vaccine technology, but some are based on other technologies, such as injecting the nucleic acid of the virus into people. That is an experimental process that has never been tried and has not been shown to work—it

might work, but I have my doubts. I have microbiology doubts that if you inject the virus's ribonucleic acid—RNA—it might recombine with the RNA of the type of coronaviruses that cause the common cold, which we all suffer from every year. The most common cold viruses are coronaviruses that are quite trivial. I expect that that issue will come out in the wash, but I hope that it does not come out in the wash by people falling ill as a consequence.

I am sceptical about putting a lot of money into vaccines. Although there are about 80 different groups developing them, there is no guarantee that any of those groups will come up with a vaccine that will be in any way better than the influenza vaccine. There is already evidence that suggests that immunity against Covid-19 is not particularly strong after infection and that many people do not really develop antibodies when they recover from the infection. That might suggest that traditional vaccines will not be particularly effective, because they will generate antibodies, which many people do not have much in the way of after an infection. That data caused the World Health Organization to say that the immunity certificates that are being talked about—if you recover from an infection, you can wave a piece of paper to indicate that you are immune and can do anything you like, without worrying about social distancing—are very misleading, because some people have not really developed much immunity to coronavirus.

I have gone on at length about this. I hope that effective vaccines will be developed, but I am not putting any money on that at this stage. Probably the best thing that we can hope for is a vaccine or set of vaccines that will be partially protective; they might not work as well in the elderly, because most vaccines do not. That is a general phenomenon, because elderly people's immune systems are also elderly and do not work too well. It would be a mistake to put all our money on a vaccine as the way to end the current crisis, because we might never get to that point, or if we get to that point it might not be as good as we would like it to be.

Apart from that, we do not have vaccine manufacturing capacity in the UK. I think that capacity is being hurried along—although I do not know whether the men who are working on the site are socially distancing; that is another issue. We have had problems in the past when we have had to put in our order for a vaccine that is made somewhere else. There are all sorts of practical problems like that, which militate against our having a vaccine by Christmas—that is highly unlikely.

Alex Cole-Hamilton: A newspaper quoted you recently as saying:

> "I think what we should be aiming for is not control of the virus, in the sense of flattening the curve or preventing a second peak, we should be aiming at eradication of the virus".

Will you talk about the metrics of that clear strategy? When is the point at which we can come out of lockdown and begin to eradicate the virus through contact tracing? What level of infection in the country is the tipping point at which we can begin to meaningfully test, contact trace and isolate, and to identify avenues of community transmission? What order of magnitude of new infections will we need to get to before that approach is possible?

Professor Pennington: On orders of magnitude, we have got to have at least 10, 20 or 30 times fewer new cases—I am giving a rather broad answer, because I just do not know what the figure would be; we have to have a lot fewer new cases appearing before we can even start thinking about moving to a contact tracing system. With the number of cases that we have at the moment, we cannot do that; there are too many cases occurring across the country. Okay, the decline seems to be going better in some parts of the country than in others, but there is still an enormous amount of virus being transmitted, and until we get that down at least tenfold we are not really in the game of starting contact tracing—and that is not because there is any kind of link there; it is because we do not yet have enough testing facility to do it.

We need a lot more testing facility and we need a lot fewer cases. Those two, combined, will mean that it is possible for us to go out and hunt for cases, just as the New Zealand Prime Minister has been talking about doing over the past couple of days. New Zealand is in a fortunate position in that yesterday it had fewer cases than Orkney—and there is a big difference between the populations of the two.

We have to have a very substantial decline in the number of cases. We might get to that point in a reasonable time, depending on how well we maintain social distancing. Social distancing is more important than the lockdown in the sense that it is affecting the whole population. The lockdown is more focused on particular areas of business and so on; it is stopping particular settings and events where people might get infected. Such things are more easily manageable, in some ways, than a situation in which the whole spread of the virus is going under the radar.

The order of magnitude that we need before we can start thinking about contact tracing is at least a tenfold reduction in active cases being reported daily. I hope that we can get to that point quite soon, because my timetable—which has also been reported in the newspapers—is that we

might be able to see the damn virus off by Christmas, if we really go at it.

The reason I say that is that the Chinese did it in a shorter time than that. They had a very big outbreak to begin with and they put in draconian control measures, some of which we could not do here. On the other hand, their general approach was the same: social distancing, testing, contact tracing, closing public events and so on. They put a lot of emphasis on travel because they did not want the virus to spread to the rest of China, and they were pretty successful in that. Small outbreaks happened in places such as Beijing and Shanghai, but they managed to cope with those. We would of course have that added problem in the UK, as we would not want to—I do not know whether we could—stop people moving about the country to go to work, for example. That is an issue.

If we got down to a very small number of cases and were using contact tracing to hunt the remaining ones, what we would be worrying about would be the importation of the virus into the country and not about our own virus. That would be a good outcome, which would clearly depend on what the virus was doing elsewhere. The virus might still be busy in the United States, for example, so we would have to think about controlling the people who arrive from there. I would not be worried about that, as it would be easily manageable with relatively small numbers.

The important statistic is the number of new confirmed cases—hospital admissions with the virus. If we could get that basic number of cases to a tenfold decrease from the numbers we have now, we could start to think about an aggressive contact tracing programme, which would require a massive increase in testing capacity. If we put the two factors together, we could think about eradicating the virus—our own virus moving among our citizens—in the UK. When we got to that nice position, we could worry about importation.

The Convener: I call Brian Whittle. I remind Mr Whittle and Professor Pennington that we will be pausing in three minutes.

Brian Whittle (South Scotland) (Con): Good morning, professor. I will make the question quick. There are a lot of discussions now about starting to lift some of the lockdown restrictions and there is concern about the potential for a second peak or surge of the virus. First, in the absence of a vaccine or treatment, is a second peak or surge inevitable if lockdown restrictions are lifted?

Professor Pennington: No. I am not sure where the idea of a second peak comes from—except that I know that it comes from flu. When we have a flu pandemic, we always get a second peak and sometimes a third. I do not understand why we should get one with this virus. We do not really understand why we get a second peak after flu, despite such things as antiviral drugs and vaccines. A second peak seems to be a flu phenomenon.

I do not see any reason why there would be a second peak of this virus and I have not seen any evidence to support the idea. The idea is a hangover from flu pandemic planning, from where the mathematical modellers have injected the notion that we might get a second peak. Rather than a second peak, what we will get if we do not do things properly is the virus dribbling on, with local instances of it taking off.

The pattern of this virus has been one of outbreaks, which have been due to particular gatherings of people—on cruise liners, for instance. In South Korea, a religious sect was responsible for a lot of cases, because people met, got infected and took the virus with them to different parts of the country. However, that is not a second peak; a second peak is a flu phenomenon and there has not been one in China for Covid-19. They managed to get the virus numbers down, which took a reasonable length of time.

11:00

The Convener: We will now observe a one-minute silence.

11:01

The Convener: Thank you. We return to Brian Whittle.

Brian Whittle: Professor Pennington, you are fairly scornful about the potential for antibody testing, because if antibodies are detected in someone, that does not necessarily mean that they have immunity or are not a carrier for the virus. Given the amount of attention that has been paid to antibody testing, what role, if any, should or could it play in an exit strategy?

Professor Pennington: My view has always been that antibody testing is for later. It tells us what happened in the past, because people develop antibodies after they have had an infection. It will not be helpful in control, the really important test for which is one that finds out whether someone has the virus now.

There are many technical issues involved in delivering a safe result with an antibody test—"safe" in the sense that it does what it says on the label and a positive result means that someone has been infected with Covid-19. We know that some people do not develop many antibodies after an infection, so they might test negative. There

could be cross-reactions with other coronaviruses, which are common in the community, and that would mean a false positive result. Sorting that out is tricky.

I was a virologist for many years and we used antibody tests to test retrospectively whether somebody had a respiratory infection. Sometimes we used such tests to try to find out what the virus was, but usually we used them just to give us a diagnosis. It was not a terribly helpful diagnosis for treatment, because by the time the patient had developed antibodies, they were usually either better or dead. However, it was useful in epidemiological terms after the event.

I have always seen antibody testing as a tool for evaluating what happened and to find out where the virus was. However, putting so much emphasis on it and seeing it as the holy grail and a game changer was not quite right. It was never going to be the game changer, and even if those people were right, the fact that we have had so much difficulty in developing an antibody test means that antibody testing will not be a game changer. If people do tests at home, who is going to collect the information? It does not really help. If you have a test that is not particularly reliable and people do it at home, what will one do with the results? The epidemiologists will not know what the results are, as it will be a private thing. I never saw antibody testing as particularly valuable as any kind of control measure.

Antibody testing will be very useful at the end of the day to find out what happened in the past. However, as a way of helping now, for example by preventing infections in care homes, it is just not there at all.

David Stewart (Highlands and Islands) (Lab): Could public health responses to the virus differ among areas depending on incidence and prevalence?

Professor Pennington: Absolutely. There is enormous variation in the incidence of infection across the country. Clearly, in England, London has had a very hard time. Birmingham had a hard time, but that developed a bit later than it did in London. It has been suggested by Jeremy Hunt, for example, that Cornwall could come out of lockdown earlier, because it has had fewer cases—although it has had quite a few cases, nevertheless.

I think that I have gone public in saying that in Scotland, the northern isles, particularly Orkney, and the Western Isles are places where we could do something different from the rest of the country, because they have had very few cases and they have very good public health systems. They also have controls over incomers, in that people cannot go there unless they have a very good reason for going there. Those areas could come out of lockdown earlier: schools and small businesses could open, for example. That does not mean to say that it would be the end of the road in terms of the impact of the virus and the control measures, because no cruise liners would be welcome there and the fishing industry might have problems exporting fish and getting it to market outside the United Kingdom.

Because those places have had so few cases, they are a bit like New Zealand. I think that Orkney has had three more cases on record than New Zealand has had, but nevertheless, the numbers are tiny. Such changes could happen only if we had in those places a comprehensive testing strategy to make sure that the virus was not going under the radar, which would be highly unlikely, but possible. Such testing would also reassure residents that they would be in the fortunate position of being in an area of the country from which the virus had been eradicated and was no longer present at all. If we kept up the controls over flights and ferries to the islands, that could be a very reasonable thing to do.

We would still have to keep the testing going, because we would still want to be absolutely sure that an individual who, unbeknownst to them, was carrying the virus would not get in and start an outbreak, because that would mean that we would be right back to square 1. Testing would be absolutely vital for that to be an effective strategy.

Looking at other parts of Scotland, I think that NHS Highland is the health board that has the next smallest number of cases. Of course, there will be special factors there, in terms of geographical distribution and where the virus has been busy. Has it been concentrated in Inverness or has it been busy in Dingwall or wherever? The information that has been published on where the virus is within the health board area is very sparse—in fact, it is almost zero. It would be very useful to know that before making any further comment. Has the virus focused its attention even on particular parts of towns? If it has—and it is reasonable to expect that it might have done—those are the areas in which we should really focus aggressive testing and contact-tracing efforts. If the virus has been busy in a particular street or area, doing that could make sure that it was knocked on the head.

Although there are staff coming and going, the virus is unlikely to be getting out of care homes, but a lot of attention would have to be paid to them, as foci of infection.

That is traditional shoe-leather epidemiology of the sort that John Snow practised in the 1850s in London. So far, we have not done much of that in this crisis—at least, very little has been

published—and it would be nice to see more data like that, if that work is being done.

David Stewart: We have rightly focused in today's discussion on the health implications of the virus but, clearly, we have to consider the economic, social and human rights issues of the crisis, and particularly the effects that social distancing is having on issues such as mental health. What is your assessment of that, and how do you assess the First Minister's view that, in terms of social distancing, it is important to have an easy, simplistic national message when it comes to enforcement?

Professor Pennington: Mental health is not my area of expertise, but I can see why the control measures will be distressing for certain people who, for example, like to have a lot of contact with other individuals and need that to keep them going and so on. That is obviously a downside to infection prevention. However, we are trying to prevent an infection that is potentially lethal, and is definitely lethal in some cases.

Further, there is more to it than lethality, because we do not know how well people who have a serious infection will recover from it; it is absolutely evident from all the data that the effects of the virus do not simply involve someone getting severe pneumonia, because the virus affects other organs. There have been problems with kidney failure, and it may even affect people's brains. It will certainly have an effect on people's nerves and reflexes. For example, there are some people who have low oxygen levels in their blood and, in response to the virus, they are not breathing in a rapid way because the reflexes that normally do that have been turned off. Then there is the story about the loss of the sense of smell. The virus has a broader effect than just the pneumonia and the need for ventilators and so on.

Clearly, there are big effects on people's feelings of—well, let's not shilly-shally about it: on their mental health. Equally worrying, of course, is the effect on other aspects of healthcare. Hospitals have shut down what we might call their discretionary activities to make room in their intensive therapy units and have converted operating theatres into ITUs and so on. Obviously, that will have an effect on a lot of folk in terms of longer waiting lists. Further, it will discourage people from going into hospital and having their coronary arteries treated in the catheterisation laboratories and all that sort of thing.

Mortality has gone up, and that is not entirely due to Covid-19; it is also due to the effects of the reaction that we have had to the virus that are having a bad effect on overall health. That is a phenomenon that epidemiologists call "harvesting", whereby, in an outbreak, there are people who perish from the consequences of infection and there are other people whose mortality is related but is not directly due to the infection itself. That has been shown in the mortality figures.

The sooner we get rid of the virus, the sooner we will be able to get rid of all those side effects and the sooner we will be able to pay attention to all the mental health issues that surround it, as well as the other effects, some of which are lethal. It really does come back to the fact that the only way that we can sort out the issue that you raise is to sort out the bloody virus and get rid of it.

David Torrance (Kirkcaldy) (SNP): Good morning, Professor Pennington. Where are the gaps in the evidence that is needed to inform the exit strategy?

Professor Pennington: That is an intriguing question, because, for many of the aspects of lockdown, we do not really have evidence that they work, although that is not to say that they do not work. One could quote the example of the Cheltenham festival. There has been a lot of jumping up and down about the fact that it was allowed to take place. However, what we have not seen yet is how many people contracted an infection because they were at the Cheltenham festival. Traditional shoe-leather epidemiology, as I called it earlier, would have sorted that out by now: a study would have been done that involved asking people who had been there whether they had had an infection, and that would tell us how many cases there had been.

It is the same with the Liverpool v Atlético Madrid football match, which people in Liverpool have been jumping up and down about. It is very difficult to know the effect without doing some straightforward epidemiological work.

The same also applies to closing things down. It is common sense that pubs are a good place to catch a respiratory infection, because people are there for an hour or two, they are close to strangers, there is a lot of heavy breathing going on and the atmosphere is probably conducive to the survival of viruses because it is humid and warm.

11:15

At the end of the day, science is about challenging common sense, but that is probably an area where we find that the science and the common sense come together. It is less certain in other areas, and the big area of uncertainty, which is a big problem, is schools. I return to the point that, up to the current pandemic, pandemic planning has always been based on influenza. We know that schools are incubators of influenza, and that is why we immunise children—to stop them being, basically, the incubators of viruses. They go

to school and spread the virus. They do not suffer terribly from it, but they take it home and they infect grandma and grandad, who are sitting by the fire, when they go to see them. That is well understood, and there is good evidence that schools are powerful in that regard.

The previous big pandemic that we had in the UK that had similar mortality, or a bit less than the current one, happened in 1957 and 1958. That was the Asian flu pandemic, which killed 20,000 people in the UK. We know that that virus came here in the summer, lurked until the schools opened and then took off in its first wave. The second wave came after Christmas. That is the sort of model that we are still using. However, the evidence that Covid-19 is busy in schools is not there—in fact, there is evidence against that. A very nice study that was done in Iceland did not find any virus in children aged under nine, but it found lots of virus in other people—particularly people who had come back from the UK before we knew that we had a busy virus, but also people who had come back from Italy and so on.

The evidence for schools is a stinker for policy makers. Do they take the risk and open the schools with social distancing, which is going to be very difficult, or do they just say, "Let's be on the safe side"? I am glad that I am not a policy maker, because that is a very difficult one.

David Torrance: What lessons can be learned from the outbreak that could be applied to any future Covid outbreaks?

Professor Pennington: I hope that we do not have any more Covid-19 outbreaks. My hope is that, if we get all the control measures right and we get the contact tracing rolling on a massive scale, we will be able to see off the virus. Being optimistic, I think that setting ourselves a target of just before Christmas would be good. We might not make it, because the virus might take us by surprise—we are in its hands, after all.

The lesson that we have to learn is that we have to do better on our pandemic planning. For example, we have to have better stocks of PPE and we have to have really good testing facilities and surge capacity, even though those things will not necessarily be running. That will be difficult for Governments, because they do not like to spend money for something that ain't going to happen. Reasonably, they want to satisfy the taxpayer that their money is being spent on something that will affect them positively.

I am fond of saying that the civil service is a conservative body—with a small c—because it is always looking for efficiency and economy. There is nothing wrong with that but, on the other hand, we have to have surge capacity built into our systems. It is like insurance. There is no point in saying—as I alluded to earlier, this may have happened—that because the previous pandemic turned out to be pretty much a trivial, non-starter pandemic and the previous ones have not been all that bad either, future ones will be the same. There is absolutely no guarantee of that.

All that we know is that there will be other pandemics. We do not know when they will happen and we do not know how serious they will be. However, if we are not prepared for them, and if we do not spend that bit of money—they are not vast sums of money—on having the capacity to cope with them, we will have the same issues that we have with Covid-19 just now.

It is possible that we will have another coronavirus pandemic, because coronaviruses are busy; we have seven coronaviruses running at the moment. However, to conclude this part of my evidence, my optimism rests on what happened with SARS. When it was busy, SARS had the same R number—2.7—as Covid-19. However, because we put in place strict control measures, we managed to eradicate it—SARS disappeared in 2003 and it has not come back. I see no reason why we could not aim to do that with Covid-19, and to do so as soon as possible. Indeed, we have to aim to do so as soon as possible so that we mitigate some of the frightful economic and health consequences—never mind of the virus itself, but all the associated consequences. We have to be absolutely punctilious about it.

George Adam (Paisley) (SNP): Good morning, Professor Pennington. I would like to go through some of the things that you have said today that go against most of the popular advice that we have been given. You believe that we should be looking not to level or flatten the curve, but to eradicate the virus. You also said that you have doubts about a vaccine and that there is no evidence that there will be a second peak of the virus.

You talked about the speculation in what you have said, and I know that there is a need, in times like these, to have academic debate on these matters. However, I am coming from the perspective of some of my constituents, who will be sitting in their homes at the moment worrying about the virus and about how they will go forward. When they hear someone with your expertise saying things that are contrary to the popular advice, why should they listen to you? Do you have evidence to back up what you said, or is it just your opinion, based on your expertise, of the current situation?

Professor Pennington: It is my opinion, based on my knowledge and expertise. I have been a biologist for many years, I have seen things come and go, and I have been involved in flu pandemics. I did my original PhD work on flu

viruses and other viruses in order to find out why they were so nasty—I give that as an example of where I am coming from. Nonetheless, at the end of the day, George Adam is right that an expert is just an expert, and that I am just one voice among many.

However, my evidence is not based purely on supposition and guess; it is based on evidence mostly, but not entirely, from other viruses, as well as on the enormous amount of literature on Covid-19 that has already come out. We say that it is a virus about which we know very little, which is true, but we are beginning to learn an enormous amount about it. Scientific papers are coming out every day, and all the big journals—such as *Nature*, *Science*, *The New England Journal of Medicine*, and *The Lancet*—have made their content on Covid-19 free. Although it is not in their business interests, they have made that content free so that we can see those papers almost instantly. However, a lot of the data that is coming out has not been peer reviewed and therefore has to be taken with caution.

My guess is that the idea that there could be a second wave has come about because it was in the pandemic plan that was based on influenza. We have not had a second wave in countries that have managed to control the virus, for example, so why should we have one? Covid-19 is not influenza; it is very different and there is no reason to suppose that it will behave like influenza. In fact, in many ways, it has not behaved like influenza. For example, the age range of people who are infected by it is quite different, and its pathology is—in so far as we can judge—quite different from that of influenza. The only real similarity is that it spreads through the air, just like influenza, but it gets around much more easily. A lot of it has been spread by asymptomatic individuals—that is based on research.

A lot of my "guesses" are not purely guesses. They are observations and opinions that are based on scientific research that has been published, some of which has been peer reviewed and some of which has not.

We have to be cautious about some of these things. I might be wrong—there might be a second wave, but I think that it is unlikely. All the evidence suggests that if we keep up with the control measures that we are using at the moment, the number of new cases will continue to come down. However sad they are, the number of deaths is more difficult to interpret because there are three or four weeks between somebody being exposed to the virus, going to the hospital and having an unhappy outcome.

The number of deaths is very much in arrears of what is actually happening. Even the number of new cases is about a week in arrears, because the incubation period is about six days. The best figures that we have for new and confirmed cases—as a microbiologist, I put all the weight on confirmed cases—are ones in which we know the virus is there. Suspected or possible cases are no more than that and would not carry much weight in a court of law; well, they might in a civil case, but they certainly would not in a criminal case. That is the sort of evidence that we want—good, solid evidence that what we are looking at is what is happening on the ground, even if it is only partial knowledge, because we know that there are many cases out there.

That is where I am coming from in terms of the evidence that I have been using to support my arguments. I hope that you will agree with me. My position is reasonably optimistic. In my view, there is no reason why we should not look at SARS as a model of a virus that we managed to control and eradicate, unlike flu, which is a virus that we have never managed to eradicate and which lives among us and kills people every year, particularly people in care homes and so on. I do not see any reason why we should be so pessimistic as to follow the flu model when we know that this virus is very different. That is the philosophy underlying my view.

George Adam: You will understand that my view is coming from the fact that I care about my constituents, how they are going to deal with this on a daily basis and how they have to listen to some of the ideas that have been proposed today.

You talked about testing. Correct me if I am wrong, but are you saying that everyone should be tested? I might get tested today and be okay, but I might have the virus when I come into Parliament next week. Will we have a constant cycle of testing? If you said that everyone should be tested, how would we do that?

Professor Pennington: No, I was not really saying that everyone should be tested. I am saying that we should be using a contact tracing method. That means that you find somebody who has the virus—they might well have symptoms when they test positive—then you track people with whom they were in contact in the previous week, and you might well want to get in contact with the people who were in contact with those people the week before.

We know that the virus can be excreted for longer than a few days; sometimes it is as long as two or three weeks. Testing all the people in that chain of contact will help us to find where the initial person got the virus. If the contacts test positive, they will have to self-isolate, and the contacts of the contacts will have to self-isolate. You would be putting a heavy burden on them, but it would be no heavier than that put on somebody who tested positive and had symptoms anyway. Most people

would agree that if they were found by contact tracing and tested positive, they would probably be quite happy to be told that, because they would then know that, in fairly short order, they would become negative again.

Clearly, the ideal thing would be to also test people before they are let out in order to make sure that they have gone negative. It has been a bit of a problem for care homes that people who have had the virus have been discharged from hospital but have not been tested before that to show that they have got rid of the virus and have gone negative.

11:30

We would be employing a more focused pattern of testing. It would be hunting for the virus among the population for people who are infected and are infectious, many of whom will have very mild symptoms or even no symptoms at all. We would need to find them and get them to self-isolate for a while in order to stop the chain of transmission.

As I said, we have to wait until the number of cases has come way down before we can start doing that with a reasonable chance of success. However, if we can do it effectively, we can do what we did with SARS. So far, we have managed to eradicate only one virus in the world, and that is SARS. Well, actually, we also did it with smallpox, which had an R number of 5. However, smallpox was a special case because, clearly, people had spots, so they were easy to find, although we often got the diagnosis wrong and thought that they had something else instead. That is a separate issue, but my point is that there are examples to follow of where we had success.

Time will have to go by before we can move aggressively to that mode. I do not know how long it will be, because we are in the hands of the virus. We have to ensure that the number of cases comes down substantially. I gave a figure of a tenfold decrease before we get to that point. We can then really go for the virus in hunting mode, as it were. It will take a lot of effort.

To throw in another point, I know environmental health officers in Scotland very well, as I have had many dealings with them over the years. They are an excellent professional body of folk. A lot of them must be twiddling their thumbs at the moment, because they spend a lot of time inspecting restaurants, which are all closed. They are good at interacting with the public and asking questions while keeping a doubt in their mind as to whether people are telling them the exact truth. Those officers would be brilliant at training contact tracers, and perhaps some of them could do the contact tracing. We have a corpus of highly professional people in Scotland who are probably underemployed at the moment, for good reason that is nothing to do with them—it is to do with their employment.

Technically, we can do it, so let us get on with it.

The Convener: Unfortunately, time does not allow me to take any of the several supplementary questions that I know colleagues would like to ask. However, I will ask you one final question. If there was a single point that you thought that the committee should make to those responsible for policy, particularly looking ahead to how we might move forward from lockdown, what would it be?

Professor Pennington: I will just quote the director general of the World Health Organization, which is an organisation that I hold in high regard, despite what some folk have said. The director general said, “test, test, test”. If we can get that message across, get the testing really blasting away and get the facilities that exist in research units working night and day, we can sort this problem.

The Convener: Thank you very much for your comprehensive answers to our wide-ranging questions. It is much appreciated.

That brings us to the end of the public part of the meeting. Our next meeting is provisionally scheduled for next Tuesday, which is 5 May. Notification of the meeting will be given in the usual way in the Parliament’s *Business Bulletin* and via the committee’s social media.

I now move the meeting into private session.

11:34

Meeting continued in private until 11:54.

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