



Recovering Together

The urgent need for mass preventative testing in Scotland

May 7th 2020

1. Scotland needs to Test, Test, Test, and then test again

COVID-19 is a rare type of disease that is both highly infectious, highly lethal to vulnerable people, and hard to diagnose rapidly and accurately without lab-based testing. Many individuals who are infectious show no symptoms for up to two weeks whilst incubating the virus¹, and therefore have no reason not to go about their daily lives and infect up to four others² if not rapidly detected and isolated.

The exponential spread of the virus has only been halted through a widespread and now prolonged lockdown across Scotland. The astonishingly high public support for the lockdown has nonetheless been an act of great personal sacrifice for working families, a harbinger of lengthy downturn for the Scottish economy, and a period of suffering for many of our most vulnerable. All the while the terrible toll in lives is growing, with over a thousand Scots having died and more outbreaks occurring even in the most remote parts of our country.

Over the last week the Scottish government have communicated a strategy of ‘Test, Trace, Isolate, Support’³ as a way of easing lockdown, which is broadly aligned with the UK government’s mantra of ‘Test, Track and Trace’. This strategy will seek to prevent the spread of the virus, prioritising early identification and quarantine of all potential cases, in line with all effective strategies seen internationally. At the same time, social and economic support will be prioritised for those who are self-isolating (alongside business and employment support from the UK Treasury).

There are three new operational initiatives contained within this strategy (1) mass antigen testing to confirm new infections and understand the vectors of the spread, (2) contact tracing to find and lock down potentially infected people as soon as possible, and (3) antibody testing to start to validate an ‘immune population’.

Mass antigen testing has the potential to be by far the most valuable of these:

- **Mass reactive testing** allows some individuals who start to show COVID-like symptoms or who have been in close contact with confirmed or suspected cases to rejoin the workforce by confirming negative cases long-before the end of a 14-day period of isolation. Recent evidence suggests that around c.10% of workforce is currently self-isolating⁴, of whom many never develop symptoms. Self-isolation within the care workforce has been even higher – with as many as 25% of GPs across the UK⁵ reporting as self-isolating at any one time in April – and currently stands at 9.2% of all adult care home staff in Scotland⁶. Not only does this represent a huge drain on our vital care workforce today, but also shows the potential for a massive drag on any future economic recovery coming out of lockdown

¹ <https://www.who.int/docs/default-source/coronaviruse/situation-reports/20200402-sitrep-73-covid-19.pdf>

² <https://www.bbc.co.uk/news/health-52473523>

³ <https://www.gov.scot/binaries/content/documents/govscot/publications/advice-and-guidance/2020/05/coronavirus-covid-19-test-trace-isolate-support/documents/covid-19-test-trace-isolate-support-public-health-approach-maintaining-low-levels-community-transmission-covid-19-scotland/covid-19-test-trace-isolate-support-public-health-approach-maintaining-low-levels-community-transmission-covid-19-scotland/govscot%3Adocument/covid-19-test-trace-isolate-support-public-health-approach-maintaining-low-levels-community-transmission-covid-19-scotland.pdf>

⁴ <https://www.ons.gov.uk/employmentandlabourmarket/peopleinwork/employmentandemployeetypes/articles/furloughingofworkersacrossukbusinesses/23march2020to5april2020>

⁵ <https://www.gponline.com/quarter-gps-self-isolating-coronavirus-hancock-promises-100000-tests-day/article/1679279>

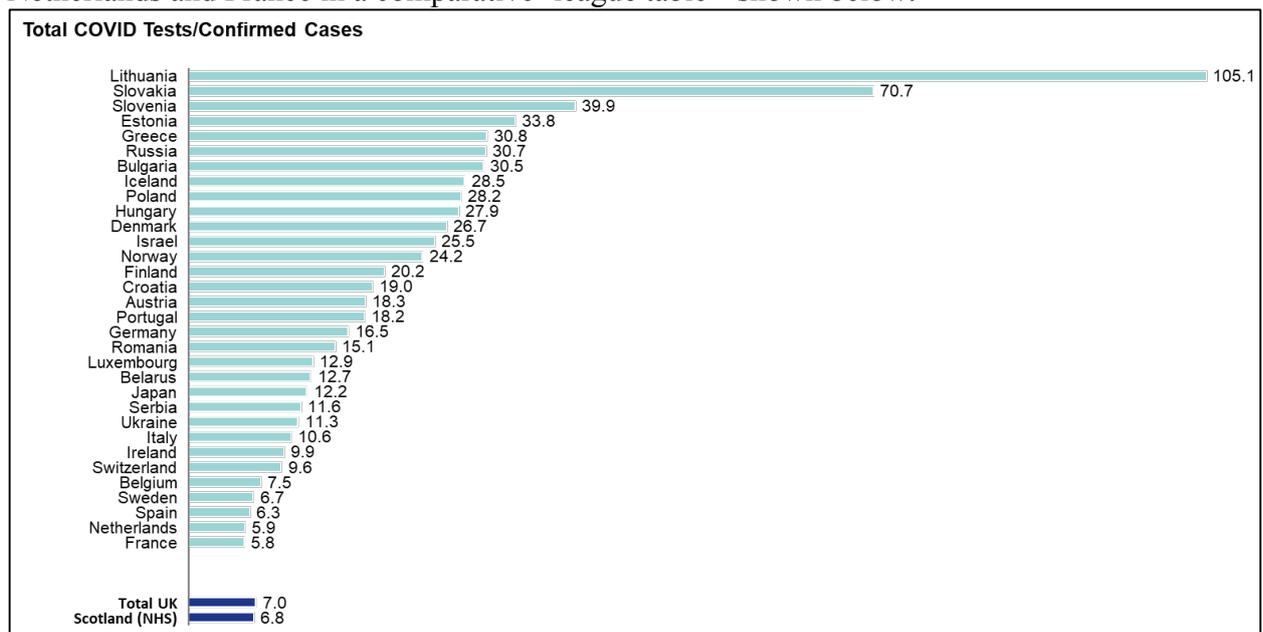
⁶ <https://www.gov.scot/publications/coronavirus-covid-19-daily-data-for-scotland/> - all daily data from May 4 release

- Mass testing allows continuous **routine preventative testing** of population segments who are the most likely to be infected or to infect the most vulnerable people in our society, such as health & care workers and those who live in high density accommodation; by testing these people regularly they will be able to self-isolate prior to becoming symptomatic
- Mass testing allows **'real-time' tracking** of infection spread to guide contact tracing and healthcare resourcing.

By contrast, antibody testing alone will only allow only a small percentage of the population to go 'back to normal' - potentially only for a limited period of time - and has the potential to be counterproductive if multiple economically and psychologically traumatic 14-day isolation periods will become the new normal for the non-immune population. Contact tracing too should be seen as an output of antigen testing, responding to positive test results and directing at-risk people to self-isolate and get tested.

2. Scotland is still playing catch-up with the virus as a result of insufficient initial testing

International case studies show that countries like Germany and South Korea that ramped up testing quickly as soon as the virus hit, so that they could test anyone showing symptoms and immediately contact trace a smaller number of cases, have been able to control the spread of the virus better than those – like Scotland – that did not. High level international benchmarks indicate that more than 15 tests per confirmed case are required in order to have confidence in how the virus is spreading across society. Although the data is naturally imperfect, it is clear that Scotland – and the UK as a whole – has suffered through inability to scale up testing quickly in comparison with European peers, with only 6.8 tests per positive case. This puts Scotland above only Sweden (who have a different strategy), Spain, the Netherlands and France in a comparative ‘league table’⁷ shown below.



Even with additional focus over the last month, as of May 5 Scotland had only tested just around 80,000 people across the Scottish NHS (63,311) and UK-wide systems (c.18,000), representing c. 1.5% of the population⁸. This is substantially lower than Germany, Denmark, Norway and Ireland, all of whom have already tested at least 3% of their population. Indeed, were it not for collaboration with the UK’s NHS, who have placed one of the three national ‘Lighthouse’ laboratories in Glasgow and are responsible for rolling out drive-through and mobile testing throughout the country, Scotland would be further behind.

Therefore, because of its inability to test in high volumes immediately, we do not know the most basic facts about the spread of COVID in Scotland, among them:

- How many people have already been infected, or are infected right now. The Scottish government’s current estimate of 26,000 currently infected is within a broad range of 10,000 to 35,000 .
- What proportion of the infected will either require hospitalisation or intensive care or, in the worst case scenario, are likely to die.
- What the effective reproduction rate (the number of people a single patient can be expected to infect on average) is in Scotland now, and was pre-lockdown.

⁷ Source – Ibid (Scotland - NHS only – UK government testing in Scotland unlikely to change the ratio); <https://www.gov.uk/guidance/coronavirus-covid-19-information-for-the-public>, <https://ourworldindata.org/what-can-data-on-testing-tell-us-about-the-pandemic>

⁸Ibid.

3. The Scottish government's strategy and ambition for testing is insufficient by any standard to make up for lost time in controlling the spread of Coronavirus, and enabling a return to even a semi-functioning economy

Four recent academic papers from leading institutions have estimated the volume of testing needed on a daily basis to regain control of the virus and reduce R_e to sustainable levels (ie <1) from the global average absent intervention of 2.5. Recent papers from Harvard⁹ and Paul Romer¹⁰ have suggested that testing 7% of the population each day will be required to reduce effective reproduction rate from global average 2.5 to the <1 required to control the disease; Cleevely/Susskind et al¹¹, building on Romer's methodology, have suggested 9% of the population should be tested on a daily basis – prioritising routine testing of the highest-risk groups; researchers at the London School of Hygiene and Tropical Medicine and the University of Southampton have suggested that this figure should be $>10\%$.¹²

In contrast to international academic opinion and case studies of countries that have been able to get the virus under control and start to emerge from lockdown, the Scottish government's current plan is, at best, to test around 0.3% of the population per day (15,500 people) by the end of May.¹³ It is unclear what scientific advice they have taken to arrive at this figure and we would urge them to provide the medical and other advice they have received in selecting this target.

For while the Scottish Test, Trace, Isolate, Support Strategy document states that '*it is crucial that we develop a testing capacity that enables us to offer testing to everyone who needs it, in a way that is accessible for them*', the focus is solely on '*testing people who have COVID-19 symptoms ...if they have symptoms, (they) are able to receive the test quickly, and get results delivered rapidly*'. (para 12). This is ignoring the clear need for preventative as well as reactive testing. More recently the Scottish health minister has hinted that she now wanted routine testing for the over 100,000 Scottish care workers but this is not a commitment made in the testing document and there is no capacity plan to support it.¹⁴

As of May 1st, Scotland had daily capacity to perform 8,350 tests per day – less than 0.2% of the population, split evenly across the Scottish NHS labs and the 'Lighthouse' lab in Glasgow. However, Scotland is not currently using its capacity effectively. On May 4, 3,923 tests were performed in Scotland across both systems, implying a utilization rate of only 45%. By comparison, on May 5 the UK-wide system carried out 78,049 tests out of a capacity that can reasonably be estimated to be around 120,000 (65% utilization) So despite the repeated pleas of care bosses to test more homes and workers, precious testing capacity has not been used.

Our fear is that this lack of strategic thinking about both capacity and demand will both inhibit mass preventative testing and will also likely undershoot what will be required to test newly symptomatic patients. Extrapolating from the current levels of self-isolation in the workforce, post-lockdown between 0.5% and 1% of the population are likely to begin self-isolation in any given day.

Therefore, under the Scottish government's current plan:

⁹ https://ethics.harvard.edu/files/center-for-ethics/files/roadmaptopandemicresilience_updated_4.20.20_0.pdf

¹⁰ <https://paulromer.net/covid-sim-part1/>

¹¹ <https://voxeu.org/article/stratified-periodic-testing-covid-19>

¹² [https://www.thelancet.com/pdfs/journals/lancet/PIIS0140-6736\(20\)30936-3.pdf](https://www.thelancet.com/pdfs/journals/lancet/PIIS0140-6736(20)30936-3.pdf)

¹³ <https://www.gov.scot/publications/coronavirus-covid-19-test-trace-isolate-support/pages/5/>

¹⁴ <https://www.heraldsotland.com/news/18428295.coronavirus-jeane-freeman-scolds-care-home-owners-not-following-guidance/>

- **Key workers will not be able to get regular testing**, and so are liable to infect vulnerable patients in the period (potentially more than a week) when they are infectious but not yet symptomatic
- **At-risk patients in care homes** will not have regular testing
- **Workers starved of wages and potentially unable to claim sick pay** will be forced to self-isolate for 14 days even if they do not have the disease
- Authorities will have an **insufficient understanding of the virus spread** across the country to take rapid and timely action
- The 2,000 or so **contact tracers** being recruited today will have on average only 1.5 new cases each per day to work on (assuming pessimistically that historical 'positive' rates of c.20% are maintained).

In summary, the Scottish Government's plan to build capacity to perform 15,500 tests by the end of May is wholly inadequate and falls far short of the ambition we would hope to see at this stage. If this is not addressed, Scotland risks being forced to fight Coronavirus with its hands tied behind its back, with workers infecting others when they should be at home, while others are trapped at home when they could be at work. There is no reliable way out of lockdown without mass preventative testing, and with UK government employment support (the furlough scheme) likely to reduce from July Scotland needs to be fully prepared to begin the process of restarting the economy and mitigating the impact of a long-term depression.

As the Scottish Government's most recent paper makes abundantly clear¹⁵, Scotland is still on a knife-edge with this virus, with low awareness of the current rates of infection and reproduction, and limited headroom to change restrictions. Unless and until there is a mass preventative testing programme in place that can both identify and isolate those who have the virus *and* react to and reassure those who don't, this restricted policy-making environment will have continue for a very long time.

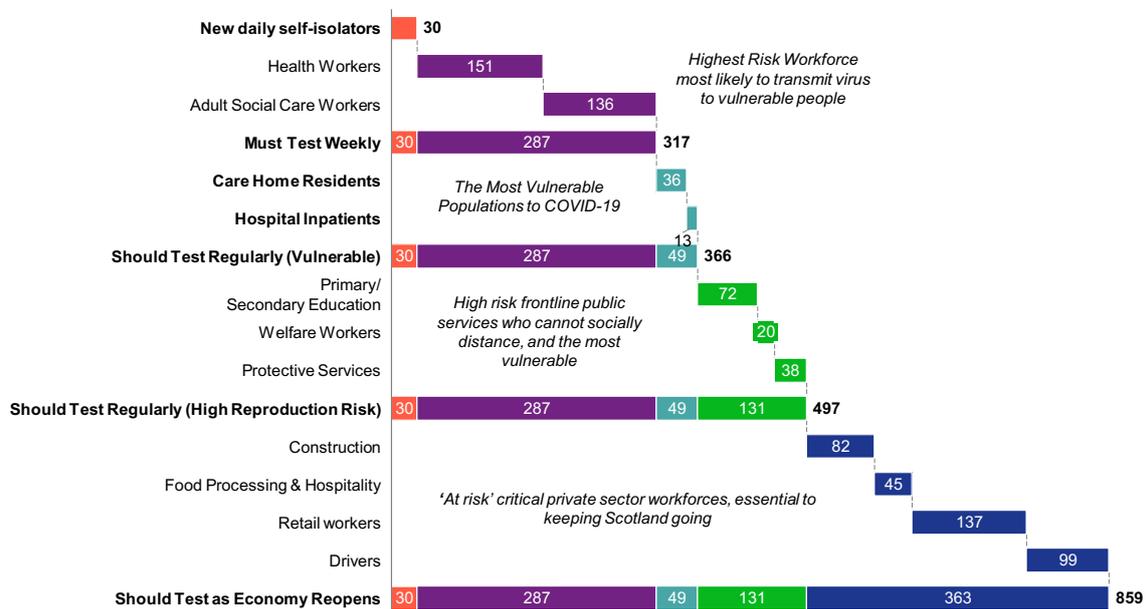
It goes without saying that these same arguments apply to the rest of the UK.

¹⁵ <https://www.gov.scot/publications/coronavirus-covid-19-framework-decision-making-further-information/>

4. **Scotland must raise its ambition for testing – starting with a commitment to offer preventative tests to at least 800,000 Scots most at risk**

A step change in ambition is required. If we are going to conquer this disease, it should be clear that – as a start – government should be aiming to provide regular preventative testing to protect every health worker, care worker, police and fire officer, teacher and all those involved in the construction, transport and retail sector. The testing should extend to care home residents and hospital in-patients, amounting to over 800,000 Scots. At a minimum we need these people to have access to regular and reliable tests both so that our healthcare system is safe and secure, and so that our economy can re-start. Those on the front line in the NHS and in our social care sector should come first; we believe that these vital workers should be given access at least once a week to a test so they can remain at their post.

Scaling Scotland’s Testing Needs



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Our Scottish Future is therefore calling on the Scottish government to raise its ambition for testing, so that we will be able to provide mass preventative testing for the most at-risk key workers and members of our society: We think that at a minimum in addition to the up to 30,000 new self-isolators each day, Scotland should plan to test on a regular and ongoing basis:

- The c.300,000 Scots who work in health and social care to keep both our most valuable and our most vulnerable members of society safe
- The c.50,000 most vulnerable members of Scottish society in care homes and inpatient care facilities
- The c.100,000 education, fire, police and welfare workers in Scotland

¹⁶ Source = ONS/NOMIS – Jan-19 – Dec 19 Workforce

- The 350,000 private sector workers in critical industries who are least able to abide by social distancing (including workers in construction, retail, transportation, and food processing)
- All arrivals at Scottish airports with recent travel to virus hotspots (currently a very small number, but with potential to grow as lockdown eases).

We suggest an initial priority of testing all new self-isolators and giving guaranteed weekly tests to health and social care workers, and regular targeted testing for care home residents. Once this has been achieved, scaling the preventative testing programme to include the most at-risk public and private sector workers as part of getting the country back to work safely should be further prioritised.

An ambitious target with clearly articulated benefits could galvanize all relevant stakeholders to action – as has been seen in other health systems. At benchmark direct cost per test of £15-20 this would be big money, but in this situation any investment to keep the population safe and out of lockdown will be well made. The Scottish economy is expected to be worse hit than anywhere else in Great Britain according to OBR, with the Fraser of Allander Institute modelling a 20-25% hit to GDP for each day of the current lockdown¹⁷.

¹⁷

<https://www.scottish-enterprise.com/learning-zone/research-and-publications/components-folder/research-and-publications-listings/economic-commentary>

5. Scotland can only build a mass preventative testing programme through further co-operation with the other nations of the UK

Our recommendation will require exponential growth in testing capacity over a very short period. Scaling up testing to this level in Scotland as things are today is not without challenges:

- With only c.50% of Scotland's total lab capacity used over the last week, more efficiently generating/mandating the demand to match supply so that as many people as possible that can get tested do get tested
- Increasing the ease with which patients can take tests at home or in community and primary care settings, and ending the systemic complexity that is caused by the twin-Scottish and UK systems operating within Scotland
- Accessing sufficient laboratory instruments and reagents in an international market that is extremely stretched, with insufficient current manufacturing capacity being deployed in Scotland or the UK
- Managing quality and consistency across a very broad base of sub-scale laboratories
- Working with remote and island populations
- Integrating and managing data across various Scottish and UK institutions.

International case studies give clear guidance on what 'good' can look like here. In general, whilst testing prioritisation and distribution is best done locally, they point to the need for strategic procurement and innovation to be pursued at as large a scale as possible so as to get the most out of the scientific supply chain and laboratories. We would particularly point to the success of:

- South Korea, in building a highly distributed testing network (much more accessible than Scotland now has), including manned kiosks to lower the convenience barriers and infectivity of testing
- The FDA in the USA, who have fostered and rapidly validated innovative methodologies to drive more accurate and less resource-intensive ways of doing testing
- The Gulf states, who have procured scarce resources at scale, in bulk, and in advance in such a way as to enable suppliers to re-purpose existing manufacturing operations, and are now operating 'megalabs' that can do 10,000's of tests per day
- Germany, who have re-purposed existing 3rd party laboratory capacity quickly to circumvent lengthy international procurements
- Singapore, who are using real-time data analytics at scale to rapidly re-prioritising testing dynamically according to where the disease hotspots are.

There are clear ways that Scotland will benefit from co-operating with the rest of the UK for the benefit of all four nations:

- Integrating the latest global innovation in processing an ultra-high volume of tests through joint validation of new labour, cost, and time-saving technologies (such as saliva sampling)

- Procuring the necessary assays, reagents, consumables and instruments collectively, using the scale of the whole of the UK to re-shape and re-purpose international supply chains, and together to provide the order book and financing to enable UK life sciences businesses to upgrade manufacturing capacity
- Using a large and combined 'data lake' to analyse and better understand the spread of the virus, enabling better forecasting and resource deployment decisions locally
- Jointly developing the Lighthouse laboratory in Glasgow to become a 'megalab' that takes operational best practices from across the UK to deliver high-quality, high-throughput testing services flexibly and at scale (ie 10,000's per day) for at least the Central belt, potentially alongside others from the public or private sector

If Scotland does not start testing at scale, and taking advantage of the co-operation it can access from being part of the UK we fear that there will be a greater price to pay in terms of both lives and livelihoods lost.

Regardless of what the rest of the UK does, Scotland has the operational independence, not to mention the clear social and economic need, to commission what would be globally the most ambitious testing programme yet envisaged. But with testing as with so much else for COVID-19 – contact tracing apps, economic support, life-sustaining equipment, antibody testing, and all the rest - the Scottish government does not have to start from scratch and alone.

We are already seeing strong medical co-operation on the ground with the Lighthouse lab in Glasgow, field testing centres, and usage of military logistics capacity. We can choose to go further and whole-heartedly embrace and utilise the procurement scale, asset base, and innovation that Scotland is entitled to as one of the four nations of the UK. In doing so we will also be making a vital contribution to the shared capacity, resilience and expertise of the whole of the UK in combatting a disease that respects neither politics nor borders. Or we can choose to continue as we are – at the risk of testing falling behind those who would gladly work alongside us if we wanted to do so.

Whilst the Scottish government deserves the support and goodwill of all Scots in its response to the Coronavirus crisis, it in turn owes all Scots access to the best that the UK as well as Scotland can offer.

6. *We therefore make six simple requests of the Scottish and UK Governments*

- 1) Publicly commit to a preventative programme of regular/routine testing targeted at the most at-risk populations, and publish the scientific advice behind all targets.**
- 2) Work together to ensure the whole weight of the UK's NHS demand pool can be used when purchasing scarce scientific instruments and consumables.**
- 3) Further integrate the sample-collection and laboratory assets and networks across Scotland in order to drive higher utilization of existing and planned capacity.**
- 4) Join forces to rapidly trial and validate 'game-changing' technology advances that could render a mass testing programme easier to scale – and support a UK wide approach to track-and-trace too.**
- 5) Deploy more UK military vehicles and logistics capabilities to operate mobile laboratories for islands and remote areas in Scotland – and examine how to use empty lab facilities in Scotland which are available at present.**
- 6) Enable seamless data sharing across the UK to build common analytical tools that will enable a better understanding of the spread of the disease and effective resource-deployment.**

Our Scottish Future (<https://ourscottishfuture.org/>) is a think tank concerned with the future of Scotland and the UK. For further information contact Prof. Jim Gallagher at info@ourscottishfuture.org.

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