

NHS Test and Trace: the journey so far

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Key points

- Testing for COVID-19 to identify cases and close contacts of those who test positive, alongside asking those close contacts to isolate, is essential to control the spread of the disease.
- NHS Test and Trace launched on 28 May 2020 and although progress has been made, it is not yet the ‘world-beating’ contact tracing programme that was promised, with ongoing challenges around test capacity and contacting both cases and their contacts.
- Despite significant investment, only between 50% and 60% of contacts of known cases are being advised to isolate, yet the government’s Scientific Advisory Group for Emergencies (SAGE) has suggested that for a contact tracing system to be effective, it needs to trace around 80% of contacts of an index case.
- As cases in England rise, the government needs to urgently learn from the journey so far to ensure that tests are available for those who need them and that policies aimed at improving contact tracing do not further exacerbate the inequalities already exposed by COVID-19.

Introduction

As of 22 September, over 340,000 people in England have tested positive for SARS-CoV-2, [with more than 37,000 confirmed deaths](#). While there is currently no approved vaccine, testing for COVID-19 to identify possible close contacts of those who test positive, and asking those close contacts to isolate, [remains crucial for the control of the disease](#).

NHS Test and Trace (NHSTT) is England's COVID-19 contact tracing programme. It was launched on 28 May and is a central part of the government's COVID-19 recovery strategy. The Prime Minister has pledged to deliver a ['world-beating system'](#). Yet since it was introduced, the programme has been [repeatedly criticised](#) for failing to live up to expectations.

In the first part of this long read, we outline how the programme works and analyse the key stages in the development of testing and contact tracing in England. Following this, we highlight some of the ongoing challenges faced by NHSTT before offering suggestions about how these challenges might be addressed.

What is NHSTT?

The NHSTT programme is a [£10bn](#) national cross-government programme chaired by Baroness Dido Harding, [reporting directly to the Prime Minister and the Cabinet Secretary](#). The programme has [four objectives](#):

1. increase the availability and speed of testing
2. identify possible close contacts of those who test positive, and asking those close contacts to isolate
3. rapidly identify and contain outbreaks
4. enable government to learn about infection rates and respond appropriately.

To deliver these objectives, NHSTT originally intended to deliver widespread swab testing alongside contact tracing based on online notifications, telephone-based contact tracers, a new smartphone app, and partnerships with local authority public health services. Yet, as with the implementation of any new national programme of work, difficulties have arisen at each stage of development.

Timeline of COVID-19 testing in England

The first known cases of COVID-19 in England were confirmed on 31 January, with contact tracing and outbreak management led by local and regional Public Health England health protection teams.

On 12 March, as the number of cases in the community rose, testing and [contact tracing of members of the public in England ended \(the 'contain' phase\)](#). Instead, a case in the community was defined based on an individual's symptoms and their likely exposure to someone with the virus, rather than on a positive test result (the 'delay' phase). The country's limited testing capacity was reserved for patients admitted to hospital, and active contact tracing was confined to high-risk settings with vulnerable individuals, such as care homes and hospitals.

In the early stages of the pandemic around 1,500 tests per day were being processed. Capacity for further testing was limited, partly by national Public Health England laboratory infrastructure that was designed to give quality assurance and specialist microbiology testing rather than mass testing. Another setback resulted from [the virus being classified as a category 3 pathogen](#), which requires laboratories to have stringent safety measures. These are only in place in a limited number of containment level 3 laboratories, few of which lie outside of Public Health England. But in [early March procedures were developed to allow testing to be carried out in the much wider network of containment level 2 laboratories](#).

The lack of testing capacity contributed to the decision to [stop the testing of community cases on 12 March](#). Following this, testing capacity was initially increased through greater use of NHS England laboratory services. But the number of tests that could be processed remained limited, partly due to a [shortage of the required testing materials and reagents](#). Soon after, on 2 April, the government outlined its [five-pillar strategy](#) for increasing testing across the UK (Box 1), including an ambition [to conduct 100,000 tests per day by the end of April](#).

Box 1: The UK government's five-pillar strategy to increase testing

- **Pillar 1:** increase NHS swab testing for those with a medical need and the most critical key workers, using NHS and Public Health England laboratory facilities.
- **Pillar 2:** mass swab testing for critical key workers in the NHS, social care and other sectors using new facilities often based on commercial partnerships with the private sector.
- **Pillar 3:** mass antibody testing to determine immunity.
- **Pillar 4:** surveillance testing to learn more about the disease and to help develop new tests and treatments.
- **Pillar 5:** develop a national effort for diagnostics to build large scale and long-term mass-testing capacity.

Source: The [government's five-pillar strategy](#) to increase testing across the UK, published 4 April.

The increase in testing capacity included setting up three new 'lighthouse laboratories' in Milton Keynes, Alderley Park and Glasgow, and forming commercial partnerships with pharmaceutical and diagnostic companies to allow for testing of front-line NHS staff. By 15 April, there was enough capacity for the government to expand testing to all symptomatic care home residents and staff. This included family members of staff with symptoms [and all patients being discharged from hospital into care homes](#).

On 28 April, the expansion of armed forces-led mobile testing units saw the start of a [roll-out programme of testing](#) for:

- residents and staff in care homes for people with dementia or aged older than 65 years, with or without symptoms

- those older than 65 years with symptoms and any symptomatic household members
- symptomatic workers unable to work from home, alongside their symptomatic family members.

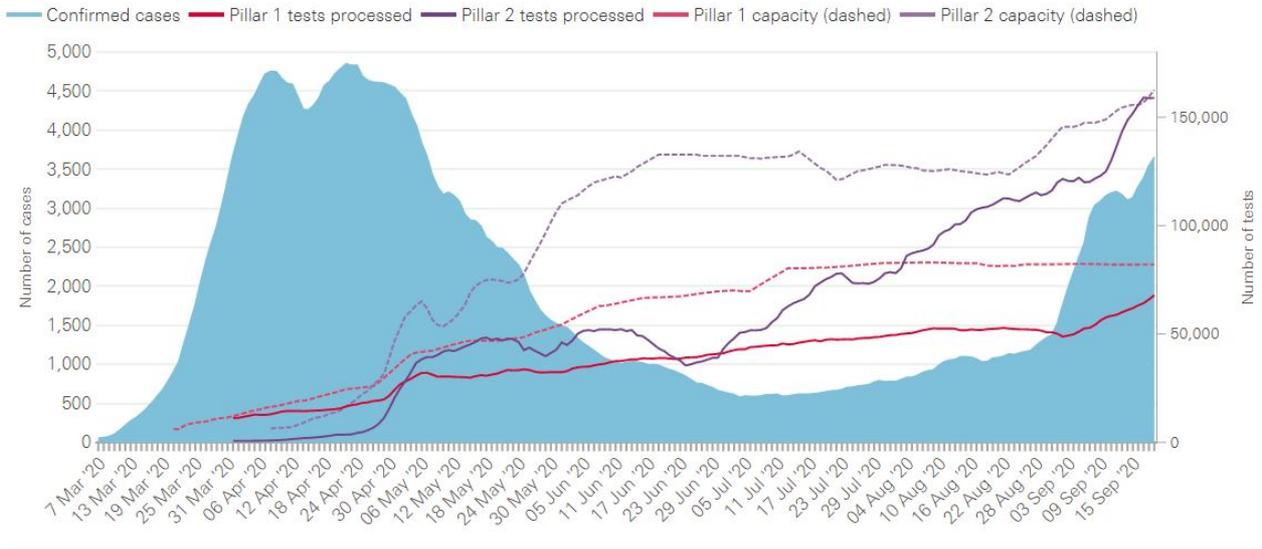
By 18 May, eligibility for testing under pillar 2 had expanded to include anyone with symptoms.

On 1 May, the Secretary of State for Health and Social Care announced that the government had achieved its goal of carrying out 100,000 tests a day, with 122,347 tests ‘made available’ across the UK on 30 April. This included 83,143 tests across pillars 1 and 2 processed by laboratories, as well as tests posted to private homes and care homes that were not necessarily completed. By this stage, the description of pillar 1 and pillar 2 test had been updated to:

- pillar 1 tests – those carried out in hospitals or as part of managing outbreaks
- pillar 2 tests – those available to the wider public.

After laboratory capacity (the number of tests laboratories are able to process) dropped in the first 2 weeks of May, it grew rapidly over the following 2 months. The number of tests being processed also increased to [over 200,000 tests per day](#) across pillars 1 and 2 by mid-September (around 180,000 in England), reaching pillar 2 capacity (Figure 1). In July, the government announced its ambition for daily testing capacity to reach more than 500,000 pillar 1 and pillar 2 tests per day [across the UK by the end of October](#).

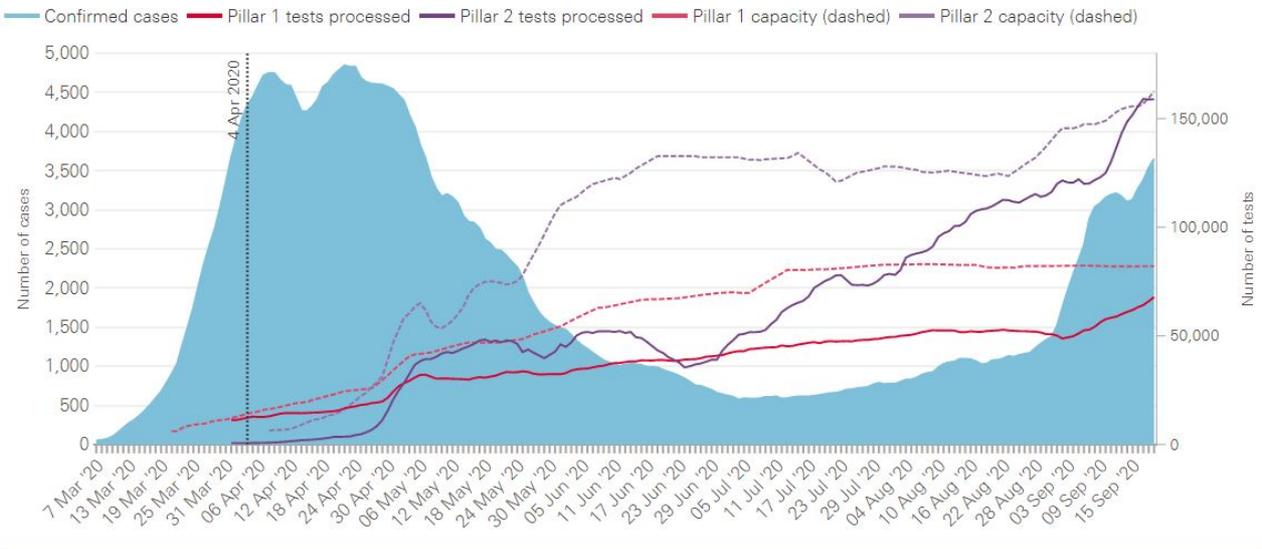
Figure 1: The daily number of COVID-19 tests and cases
7-day averages of tests and cases for UK Pillar 1 and 2 testing



The Health Foundation © 2020 Source: [Coronavirus \(COVID-19\) in the UK](#)

4 April 2020 The Government published its five-pillared strategy for increasing testing across the UK. 2/6 < >

Figure 1: The daily number of COVID-19 tests and cases
7-day averages of tests and cases for UK Pillar 1 and 2 testing



The Health Foundation © 2020 Source: [Coronavirus \(COVID-19\) in the UK](#)

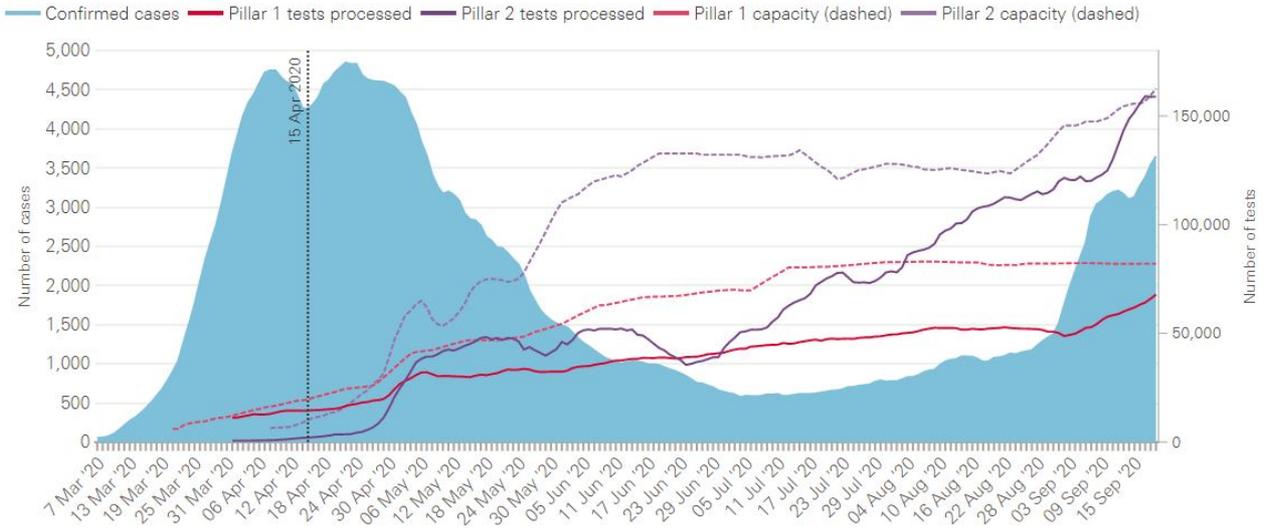
15 April 2020

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Changes to testing availability for the social care sector: all symptomatic residents, staff, and family members would be able to access tests, and all patients discharged from hospital would be tested before going into care homes.

Figure 1: The daily number of COVID-19 tests and cases

7-day averages of tests and cases for UK Pillar 1 and 2 testing



The Health Foundation © 2020

Source: [Coronavirus \(COVID-19\) in the UK](#)

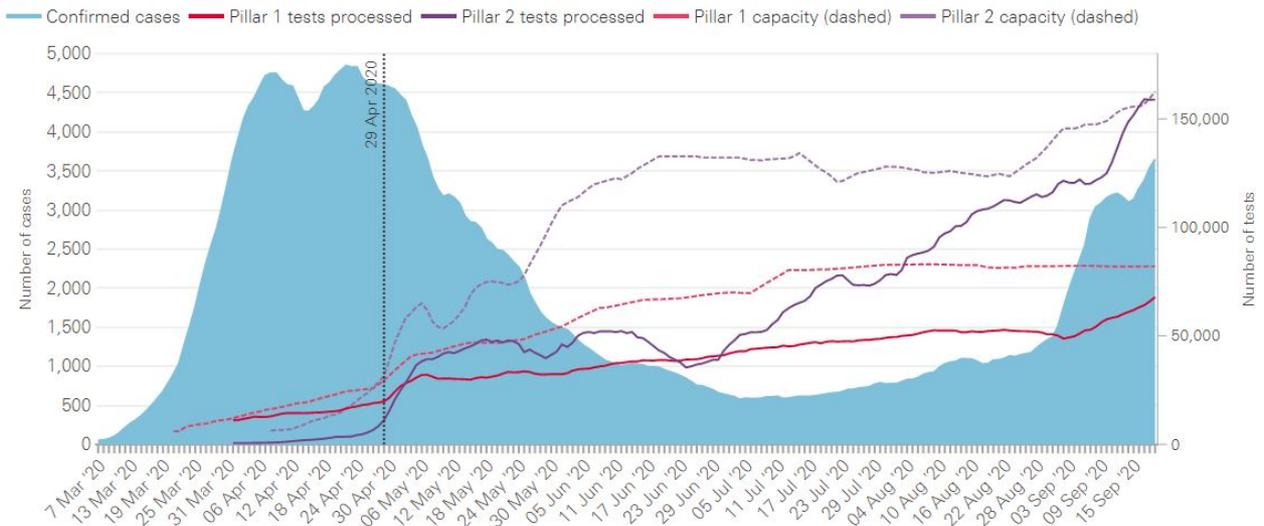
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- Tests extended to symptomatic and asymptomatic residents and staff in social care settings when investigating outbreaks.
- Start of rollout programme of testing across all care homes, for anyone over 65 years old with symptoms (and their family members), and for symptomatic workers unable to work from home.

Figure 1: The daily number of COVID-19 tests and cases

7-day averages of tests and cases for UK Pillar 1 and 2 testing

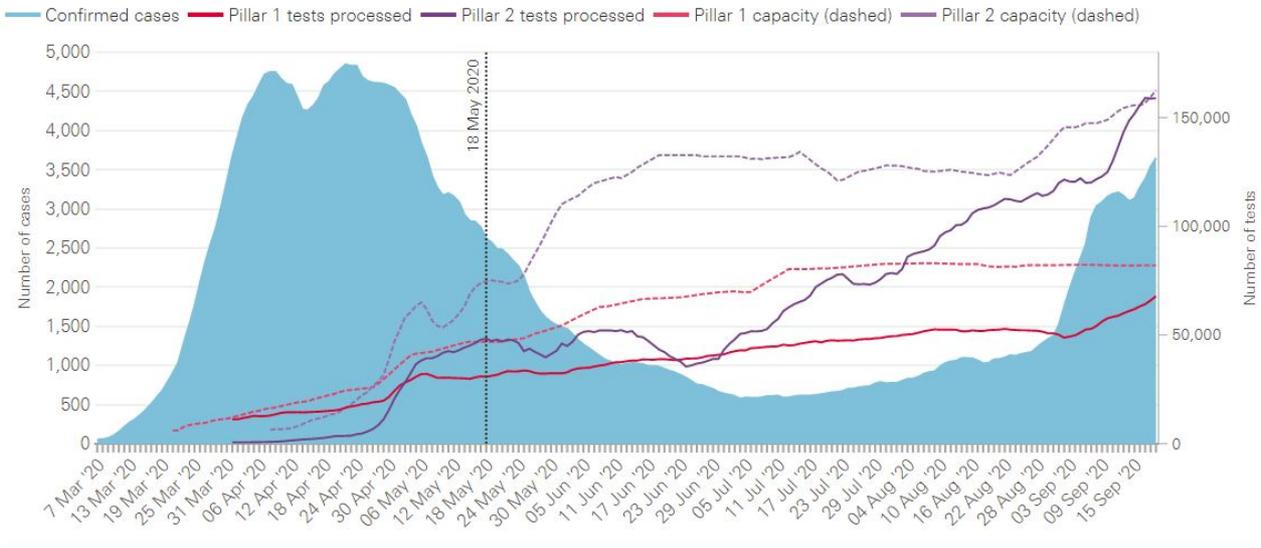


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Source: [Coronavirus \(COVID-19\) in the UK](#)

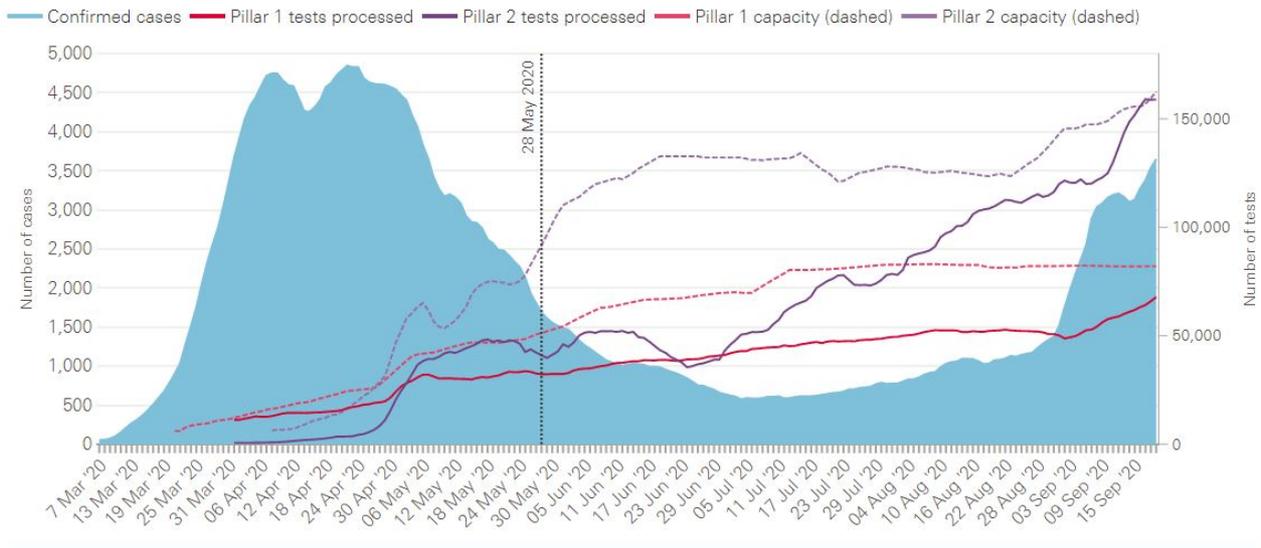
Eligibility for testing under pillar two became available to anybody with symptoms.

Figure 1: The daily number of COVID-19 tests and cases
7-day averages of tests and cases for UK Pillar 1 and 2 testing



NHS Test and Trace system launched in England.

Figure 1: The daily number of COVID-19 tests and cases
7-day averages of tests and cases for UK Pillar 1 and 2 testing



Data used in Figure 1

The daily number of confirmed cases, tests processed and testing capacity in the UK are from the [Coronavirus \(COVID-19\) in the UK](#) dashboard and were accessed on 23 September 2020. A confirmed case is [defined as a person with at least one positive COVID-19 test result from pillar 1 or 2](#). A person with more than one positive test should only be counted as one case, but before 2 July cases were counted twice if tested in both pillar 1 and 2. Cases are reported by specimen date (the date when the sample was taken from the person being tested). Tests processed are tests that have been processed by labs in the UK, with either a positive or negative result and may include multiple tests for an individual person. [Testing capacity is a projection based on reports from labs](#) on how many tests they have capacity to carry out each day based on the availability of staff and resources. Tests are reported by the reporting date.

How NHSTT works

As of 23 September, when a member of the public develops symptoms of COVID-19, they can order a test through the NHS website or by telephone, and choose to [either visit a test site or receive a home test kit](#) (pillar 2 testing). Employees, residents, and patients in high-risk settings, such as care homes and hospitals, can be tested through NHS and Public Health England laboratory facilities (pillar 1 testing).

Contact tracing begins when a person tests positive for COVID-19. Once the test result has been received, a case is asked to self-isolate for a minimum of 10 days (unless symptoms are ongoing). NHSTT then contacts the case by text message, email or telephone to ask for information about their recent household and close contacts in the 48 hours before becoming unwell. Details regarding visits to other places where people may have been exposed, such as a workplace, school or GP practice, are also requested.

At this point, the case is defined as being either complex or non-complex. Complex cases are those linked to outbreaks or where an individual has recently visited a high-risk setting, such as a hospital or care home. These are managed by the local Public Health England health protection team and local government to control any potential or emerging outbreak.

All other cases are defined as non-complex. Non-complex cases and their contacts are managed initially by the NHSTT team, with contacts informed of their exposure and asked to self-isolate for 14 days by text message or email (followed by a telephone call if there is no response).

To support those being asked to isolate, there are local authority helplines for practical, social or financial support. Workers who meet eligibility criteria can receive [statutory sick pay](#) during self-isolation. And from 28 September, people on lower incomes in receipt of benefits will be [eligible for a payment of £500](#) when isolating.

How NHSTT developed

At the government's daily press briefing on 23 April, the Secretary of State for Health and Social Care previewed the contact tracing elements of the [proposed test, track and trace system for COVID-19 in England](#). Further details were cascaded to [local directors of public health the following day](#). The plan combined the Public Health England web-based contact tracing tool, known as the contact tracing and advisory service, with both telephone-based contact tracing and a smartphone app. To staff the system, the programme aimed to recruit 15,000 call handlers and 3,000 qualified public health and clinical professionals. In total around [21,000 contact tracers were subsequently employed](#).

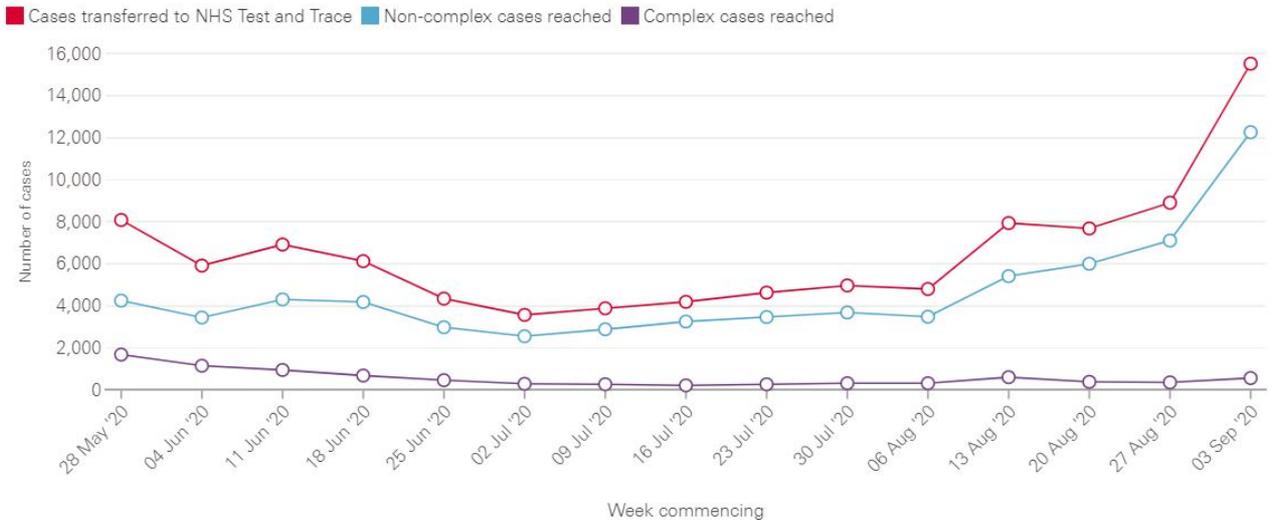
The system was piloted from 5 May on the Isle of Wight and the NHSTT programme (as it was now titled) [launched on 28 May](#), albeit without the app.

Multiple organisations are involved in NHSTT across the public and private sectors. Pillar 1 testing is provided through NHS and Public Health England laboratories, and pillar 2 testing is delivered through [a range of academic and commercial partnerships](#). Examples include operational delivery from the army and companies such as Deloitte and G4S, recruitment using Sodexo, [testing kits through Randox](#), [logistics with Amazon](#), and processing involving university laboratories as well as companies such as AstraZeneca and GlaxoSmithKline.

Call handlers providing contact tracing for non-complex cases are recruited by Serco. However, through the first 2 months of NHSTT it became apparent that call handlers were struggling to reach a significant proportion of cases and their contacts. As a result, around 20% of cases passed to NHSTT have been uncontactable and, of the non-complex cases contacted by call handlers, only around [60% of their contacts have been reached and advised to isolate](#).

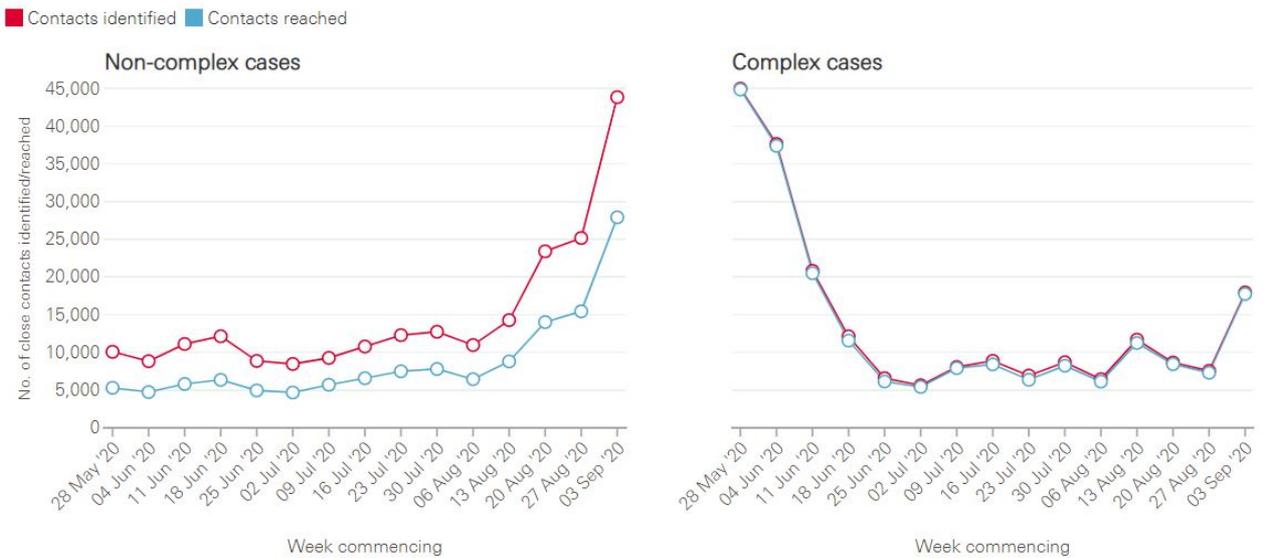
For these non-complex cases, each contact needs to be identified and reached by a contact tracer. By contrast, complex cases and outbreaks are largely managed at an organisational level – for example, by the care home manager or hospital infection control team reaching nearly 100% of contacts. In addition, the time taken to advise close contacts of non-complex cases to self-isolate, from when a case is identified, can be significant – with a little over 50% of the percentage of contacts advised within 24 hours, and nearly 8% taking over 3 days. Figures 2 and 3 illustrate the numbers of cases and contacts handled by NHSTT and Figure 4 shows overall NHSTT performance.

Figure 2: The number of cases transferred to the NHS Test and Trace system and reached by a contact tracer by week



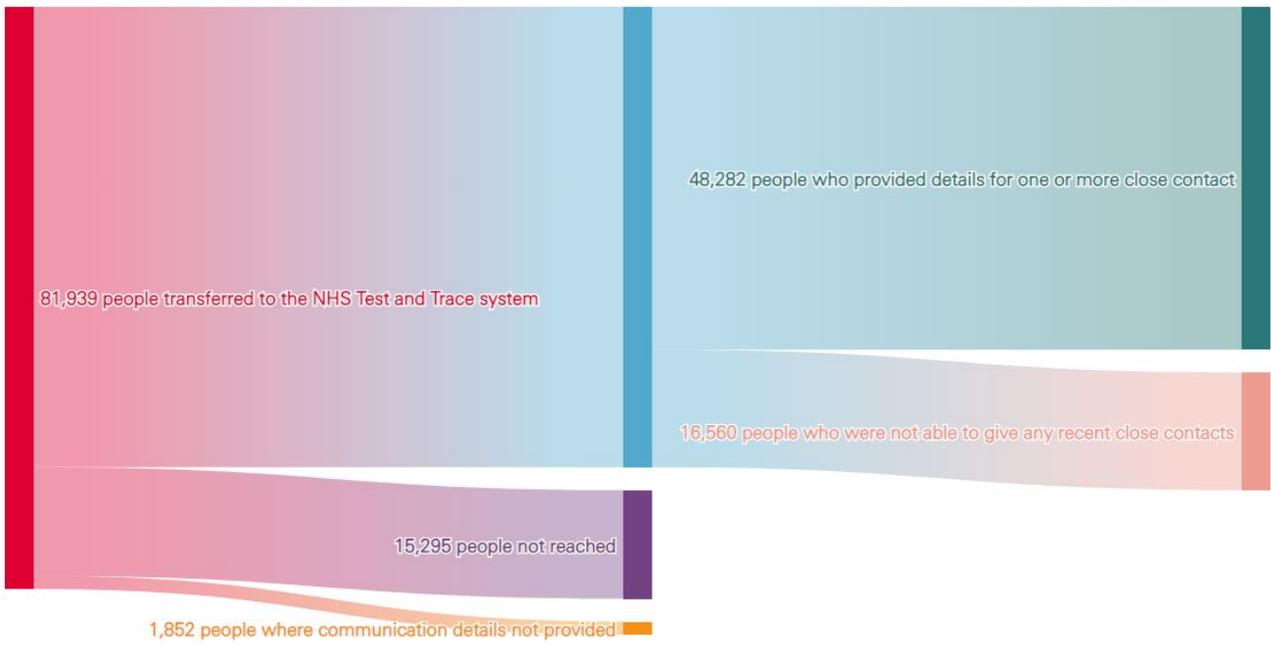
The Health Foundation © 2020 Source: DHSC, NHS Test and Trace (England), 2020

Figure 3: The number of close contacts identified and reached by week



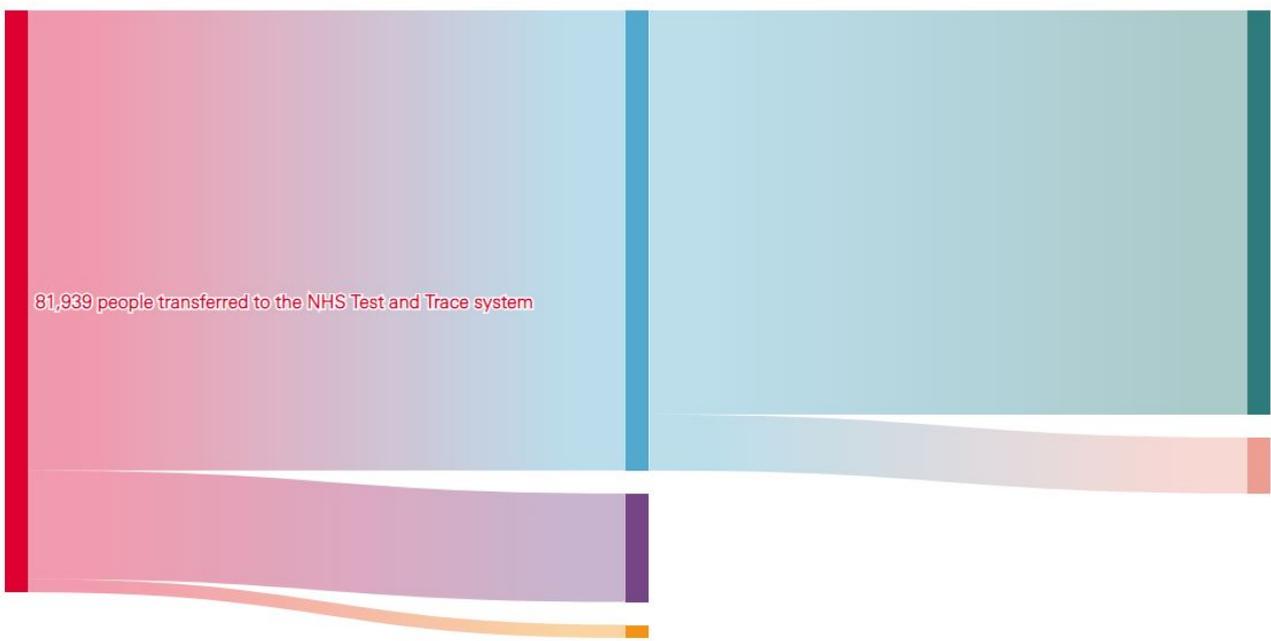
The Health Foundation © 2020 Source: DHSC, NHS Test and Trace (England), 2020

From the launch of NHS Test and Trace on 28 May to 9 September, 61% of people^{1/3} < >



The Health Foundation © 2020 Source: [NHS Test and Trace \(England\)](#) and [coronavirus testing \(UK\) statistics](#) • Note: Data from 28 May to 9 September 2020.

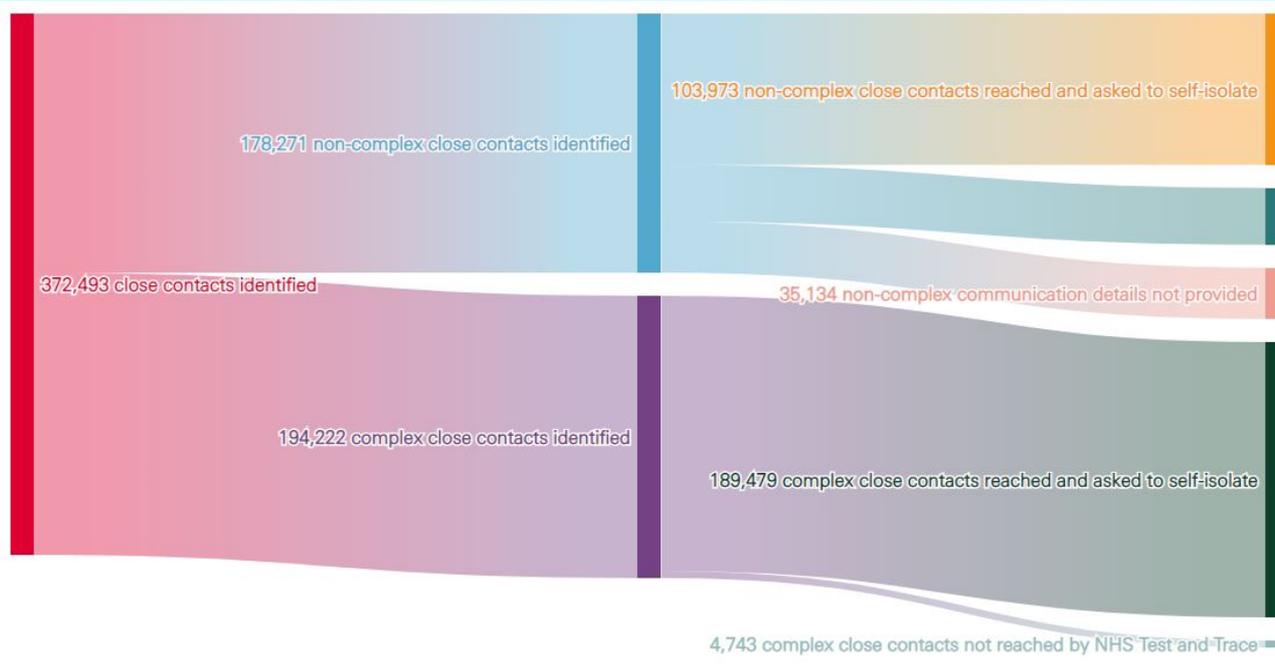
89% of cases reached were non-complex. 2/3 < >



The Health Foundation © 2020 Source: [NHS Test and Trace \(England\)](#) and [coronavirus testing \(UK\) statistics](#) • Note: Data from 28 May to 9 September 2020.

59% of close contacts of non-complex cases were reached and asked to self-isolate compared to 98% for complex cases.

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Source: [NHS Test and Trace \(England\) and coronavirus testing \(UK\) statistics](#) • Note: Data from 28 May to 9 September 2020.

Data used in Figures 2 to 4

Data on the NHSTT is from the [Weekly statistics for NHS Test and Trace](#) for England as released on 10 September 2020. Figures 2 and 3 are based on the statistics for the week commencing 3 September 2020. Figure 4 is based on the total cases and contacts in NHSTT from 28 May to 9 September 2020. Full explanations of how the data is collected and definitions are provided in the [NHS Test and Trace statistics \(England\) methodology](#).

Role of local authority public health teams

Local Public Health England health protection teams and local authorities have long-standing relationships with their community and a history of handling infectious disease outbreaks. In June, local authorities in England developed COVID-19 outbreak control plans to help manage ongoing outbreaks, [supported by an additional £300m of funding](#). However, local directors of public health were initially unable to implement much of their plans because they were unable to access the necessary case-level data from commercial laboratories due to [concerns surrounding data governance](#).

On 17 July, the government published the [COVID-19 contain framework: a guide for local decision makers](#). This clarified the responsibilities of local government to control local outbreaks in partnership with local Public Health England health protection teams. It also specified powers for [local authorities to close specific premises and public events if necessary](#), and introduced test and trace support and assurance teams. These teams provide a link between national and local government, and support the development of local responses to rising case numbers or outbreaks.

Following this increase in local responsibility and in response to rising case numbers, some local authorities, such as Sandwell and Blackburn with Darwen, developed local contact tracing processes for non-complex cases – [reaching up to 90% of individuals that the national system was unable to contact](#). The role of local public health teams was further emphasised in the [NHSTT business plan published on 30 July](#) that set out a range of objectives. These included increasing awareness of NHSTT, expanding testing capacity, and shortening the time between taking a test and receiving results.

In light of local contact tracing successes and the ongoing national difficulties that NHSTT has had with reaching some cases, [the government said on 10 August](#) that NHSTT would reallocate 6,000 of its contact tracers [to provide greater support to local authorities](#) developing their own contact tracing systems for hard-to-reach non-complex cases.

Shortly after, on 18 August, [the government announced a new National Institute for Health Protection](#), which will further reshape the organisational jigsaw of health protection in England. The proposed institute is [due to launch in Spring 2021](#) and will initially be led by Baroness Dido Harding, accountable to the Secretary of State for Health and Social Care. It will bring together the health protection remit of Public Health England alongside NHSTT and the recently created [Joint Biosecurity Centre](#) (responsible for COVID-19 data surveillance and scientific advice).

Challenges facing NHSTT

The challenges facing NHSTT can be divided into those due to lack of knowledge about the virus, uncertainty around public responses to government policy and messaging, and issues related to creating new national infrastructure.

Transmission

COVID-19 is difficult to control because of how readily the virus can be transmitted. Without interventions such as lockdowns or social distancing, [it is estimated that each infected person would, on average, infect a further 3.8 individuals](#). The equivalent number for flu is about 1.3 individuals. Isolating infectious cases and their recent contacts can break the transmission chain. But in the context of widespread community transmission this must happen quickly.

The success of isolating cases and contacts is affected by [how readily the virus can be passed on to others before symptoms start](#). The virus can be detected in saliva 1–3 days before symptom onset, meaning [transmission can](#) readily occur before a case is aware they are unwell.

The challenge is further complicated by [uncertainty around the amount of transmission by individuals who do not develop symptoms at all](#). The ongoing ONS COVID-19 survey has found that of 165 people who tested positive, as many as [72% did not report having symptoms on the day of their test, or before or after their test](#).

Regular testing of individuals without symptoms is a potential way of identifying those who might unknowingly be infectious. This may be particularly useful in high-risk settings. For example, on 3 July [the government announced plans to introduce regular and widespread testing](#) of people without symptoms in care homes for those older than 65 years and adults with dementia. The testing strategy included weekly testing of care home staff and monthly testing of residents (although [implementation was delayed until September](#) due to problems with producing the necessary test kits – and regular testing is reportedly still yet to be fully implemented).

On 2 September, the government committed £500m to [developing mass testing, including the use of rapid point of care tests](#). This has been followed by a variety of reports and leaks describing ‘[operation moonshot](#)’: a proposed £100bn [government programme targeting up to 10 million tests per day](#). The government hopes that mass testing will not only be able to support local areas to manage rising case numbers, but that regular testing may help people to return to a level of normality in their daily lives.

However, there remains a need for caution given the difficulties of [interpreting results among people without symptoms](#). There are also [concerns around the diagnostic accuracy of the rapid test kits that](#)

[would be used](#), uncertainty in understanding and [managing](#) the risks of people receiving incorrect test results (for example, testing positive despite either not being infectious or not having the disease), and huge economic and logistical challenges of developing such a large number of tests.

Public engagement with the system

For NHSTT to work effectively and people to follow guidance on isolation, there must be widespread [awareness, trust, and use of the system](#).

[A public health campaign was launched on 30 July](#) to encourage more people to have a test, with the aim of increasing '[awareness of NHSTT from around 60%...to over 80%](#)' of the population by October. However, national media and social media do not reach everyone, and local communications have been essential during local outbreaks. For example, the [Warwickshire local public health team raised awareness of NHSTT](#) through translating information for people who do not speak English, engaging with young people, and briefing community and faith leaders so they could spread the messages.

Accessing tests can also be difficult. As national testing infrastructure was developed, it was initially difficult for some people to reach a testing centre because it was either too far away or individuals did not own a car. To help with this, postal tests were introduced, and there are plans to expand testing so that by October most people in urban settings will be [within a 30-minute walk of a test site](#). However, testing problems escalated in September with limited laboratory processing capacity meaning many individuals have been either unable to get a test or asked [to travel hundreds of miles](#) to access one. In addition, home test kits and drive-through booking slots were prioritised for those living in regions with high or rising case rates.

Around 80% of cases contacted by NHSTT give details of close contacts, and only around 80% of contacts are reached by NHSTT and advised to isolate. In some cases it takes [over 3 days for those contacts to be reached from when the case is first transferred to the system](#).

After initial delays due to concerns about acceptability and effectiveness, a smartphone contact tracing app is [due to launch on 24 September](#). This has the potential to help NHSTT by quickly alerting people who would otherwise not have known they were in close contact with someone infectious (eg on public transport). However, there are gaps in evidence of effectiveness, and in understanding the impact on different population groups. Polling by Ipsos MORI on behalf of the Health Foundation (completed prior to the announcement of the app's launch) found differences in whether people were likely to download and use the app along the lines of ethnicity, occupation, educational level and age – reinforcing concerns of a potential digital divide. For example, while 57% of younger people (18–24) were more likely to say they would download the app and 76% would use it to report symptoms, these figures fell to 41% and 48% respectively, among those 65+.

Ongoing close evaluation will be crucial to [understand](#) the app's effectiveness as well as its impact on different population groups.

Isolation

Individuals were initially informed that they have a [duty to request a test if they develop symptoms consistent with COVID-19](#) infection and adhere to isolation guidance. However, it can be difficult to isolate for the required length of time for a [range of financial, practical and emotional reasons](#), not to mention the recent challenges of accessing a test. Research suggests that less than one-quarter of those who test positive for COVID-19 may comply with [isolation guidance](#). The potential reasons for this include [knowledge of national guidance, current social norms, and the negative financial consequences of not working](#). In response, from 28 September not only will people on low incomes be eligible for payments of £500 when isolating, but it will be against the law to breach isolation rules with fines for non-compliance [starting at £1,000](#).

Existing infrastructure

As discussed earlier, the test and trace infrastructure in England at the start of the pandemic was soon overwhelmed by the sheer number of COVID-19 cases and their contacts. Laboratories in Public Health England were not designed for mass testing and the difficulties of rapidly increasing test availability shaped [the government's decision to stop testing potential community cases](#) in early March. Instead, tests were prioritised for high-risk settings, such as hospitals and care homes, and NHSTT was subsequently created to increase national testing capacity and coordinate widespread contact tracing. And in September, testing infrastructure again became overwhelmed making it hard to track cases and outbreaks.

International approaches

Different countries are taking a range of different approaches to COVID-19 testing and contact tracing. In Box 2, we highlight Germany, Scotland and South Korea to illustrate some of these differences.

Box 2: Contact tracing in Germany, Scotland and South Korea

Germany

Germany has a federal government and responsibility for public health lies with the country's [16 federal states and approximately 400 counties](#). National guidelines are adapted to local needs.

[The Robert Koch Institute is the national public health organisation that supports the public health authorities](#). The institute undertakes infectious disease surveillance, risk assessments, and publishes strategy, guidance and response plans.

[Germany was one of the first countries to develop a diagnostic test](#). Widespread COVID-19 testing was quickly grown through the country's network of private and public laboratories. This was in part facilitated by the government requiring that all insurance companies pay for tests, thereby incentivising private laboratories to increase test capacity.

By the end of August, test capacity reached 1,064,000 per week although, as with England, the country has experienced difficulties with processing large numbers of tests. There are also some [differences in testing strategies between regions in Germany](#). For example, on 1 July the state of Bavaria made free testing available for the whole state population. And on 3 August, the state of North Rhine-Westphalia made free testing available to all those working in schools and childcare facilities.

To help with contact tracing, [Germany has recruited paid contact tracers and military personnel](#). The specific [procedures for isolation and quarantine of cases and their contacts](#) are determined by local authority level public health offices and include isolation, maintaining a certain distance from others, regular hand washing and ventilating rooms.

On 16 June, Germany introduced a contact tracing app called Corona-Warn. Although the impact of the app on infection rates is not yet clear, by 25 August it had been [downloaded 17.6 million times](#).

Scotland

In the UK, public health responsibilities are devolved, meaning England, Scotland, Wales and Northern Ireland have some differences in their approaches to testing and contact tracing.

[Test and Protect](#) is Scotland's programme for contact tracing and is part of a test, trace, isolate, support strategy. [Tests are processed](#) by NHS laboratories, universities, the Scottish National Blood Transfusion Service and the UK government's lighthouse laboratory in Glasgow.

As in England, widespread contact tracing for all cases of COVID-19 stopped on 12 March. Policy then shifted to a delay phase, aiming to slow the spread of infection and protect the particularly vulnerable. On 18 May 2020, [a pilot for testing and contact tracing confirmed cases was launched in three NHS regional boards](#). The Test and Protect programme was extended to all 17 NHS boards across Scotland on 28 May.

The Scottish government describe their contact tracing as ‘using established, tried and tested techniques and delivered by health protection professionals in local teams with national level support arrangements’. Public Health Scotland (the national NHS body responsible for public health, including health protection) [launched the National Contact Tracing Centre](#) on 17 July. This centre trains and employs NHS contact tracing staff, who work from home and can be deployed across Scotland. Public Health Scotland work in equal partnership with NHS boards to plan how contact tracing is delivered and improved.

As with England’s NHSTT, all those with positive tests are asked to give details of their contacts. [Both cases and contacts are given isolation advice](#), and complex cases and situations are managed by public health teams in the relevant local NHS board, working with Public Health Scotland where necessary.

Scotland released its [contact tracing app](#) on 10 September, based on technology that is [already being used in Northern Ireland and the Republic of Ireland](#). It will work with these countries’ apps to support movement across common areas of travel.

South Korea

The South Korean government made [several changes to the country's health system](#) to improve pandemic preparedness following difficulties responding to an outbreak of Middle East respiratory syndrome (MERS) in 2015. This has helped to enable a rapid response to COVID-19.

Testing and contact tracing in South Korea has been credited with helping [to contain the virus early in the pandemic](#), without having to impose lockdowns similar to those seen in Europe. The [testing infrastructure](#) includes many drive- or walk-through testing stations for people with symptoms of COVID-19. Cases are then managed by municipal health officials. There are also [immediate response teams to manage high-risk locations](#).

Each case is investigated to trace the source of the infection and identify all contacts. The case is interviewed, and health care workers and family members are also interviewed if necessary. [Other data, including medical records, mobile phone location information, CCTV footage and credit card records, may also be collected](#).

All identified contacts are required to self-isolate at home or, if they are unable to remain separate from others, in a self-quarantine facility or hospital. They are issued with a quarantine notice, given [information on the isolation rules](#) and telephoned twice a day to check for COVID-19 symptoms.

Travellers entering South Korea are [required to download and use an app](#) to monitor whether they develop symptoms of COVID-19 and enforce self-quarantine. They also receive a test.

What next for NHSTT?

As we approach winter, the government needs to consider how to increase the number of contacts it reaches, and to rapidly learn from the test and trace journey so far.

How can NHSTT increase its reach?

At the beginning of September, NHSTT was able to contact around four out of every five cases transferred to its system, four out of every five of these cases then provided details of contacts, and three-quarters of contacts were subsequently reached. This equates to potentially as little as 50% to 60% of contacts of known cases being advised to isolate. Yet [SAGE has suggested](#) that for a contact tracing system to be effective, it needs to trace around 80% of contacts of an index case.

For NHSTT to improve its performance, case identification has to improve. Despite the huge efforts to increase test capacity over the past 6 months, much work still needs to be done. [The challenges faced by people booking tests](#) in September, in part due to [lack of laboratory capacity](#), has the potential to undermine the public health response at both national and local levels. Without accurate case numbers it is impossible to fully understand how quickly the disease is spreading or to know which local areas and population groups are most affected.

NHSTT also needs to contact more of the cases that are identified, and subsequently reach more contacts. Contact tracing systems led by local authorities will likely go some way to achieve this, as will [the introduction of England's contact tracing app](#).

So far, £300m has been allocated to local authorities to support the management of local outbreaks. The government will need to make sure that already stretched local government public health departments are adequately resourced to fully implement a contact tracing service, while maintaining their wider ongoing roles in improving the health of their population and narrowing inequalities.

Once cases and contacts are identified, [compliance with isolation guidance can be improved](#) by helping people to access essentials, [providing social support](#) and ensuring adequate financial protection. The [£500 available to people on low incomes from 28 September](#) will offer some protection against financial hardship. However, the concurrent introduction of fines for breaching isolation rules may dissuade people from getting tested in the first place, or from disclosing contacts to NHSTT.

There also needs to be a particular focus on social care settings. [Social care staff and vulnerable adults receiving care have been disproportionately impacted by COVID-19](#). Ongoing delays to the introduction of regular testing of all care home staff and residents suggest that [the social care sector is still not receiving the attention it warrants](#), particularly as we approach winter.

How can NHSTT learn from its work so far?

Rapid evaluation learning is crucial for NHSTT to improve its effectiveness.

There is evidence of a wide variation in the percentage of [contacts reached in different local authorities](#) and there are reports that lockdown has had differential effects in containing cases across, both in [different parts of the country and different population groups](#). Local contact tracing services may help to reduce this variation but work should be rapidly undertaken to identify possible causes and solutions.

It is currently unclear how difficulties with accessing tests in September is affecting different population groups – either by socioeconomic status, demographic, or region, and what the impact will be of the new payments and fines introduced from 28 September. Without understanding this in detail, there is a risk that limited test availability will further exacerbate the [inequalities exposed by COVID-19](#).

The COVID-19 app should publicly report not only on its uptake and effectiveness in reducing disease transmission, but also on its impact among vulnerable groups including the elderly, those from deprived areas, and people from Black and minority ethnic groups. Local contact tracing plans could then be adapted to target resources towards these more vulnerable population groups should widening inequalities look likely.

And finally, in addition to examining test feasibility, [trials of mass testing](#) should include people without symptoms to understand the potential impact of incorrect results and how to support those likely to suffer the most economic and social hardship following isolation.

Conclusion

The difficulties associated with implementing an entirely new national programme of work should not be underestimated. Over half a million tests are now being conducted every week in England, and over 10,000 cases and 40,000 contacts are being reached every week by a system that has been operating for less than 4 months.

But it is not yet the world-beating contact tracing programme that was promised and significant scope for improvement remains. As cases continue to rise and until an effective vaccination programme is in place, a well-functioning test and trace system is increasingly urgent for keeping open schools and businesses, and to effectively target support and resources to those most in need.

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