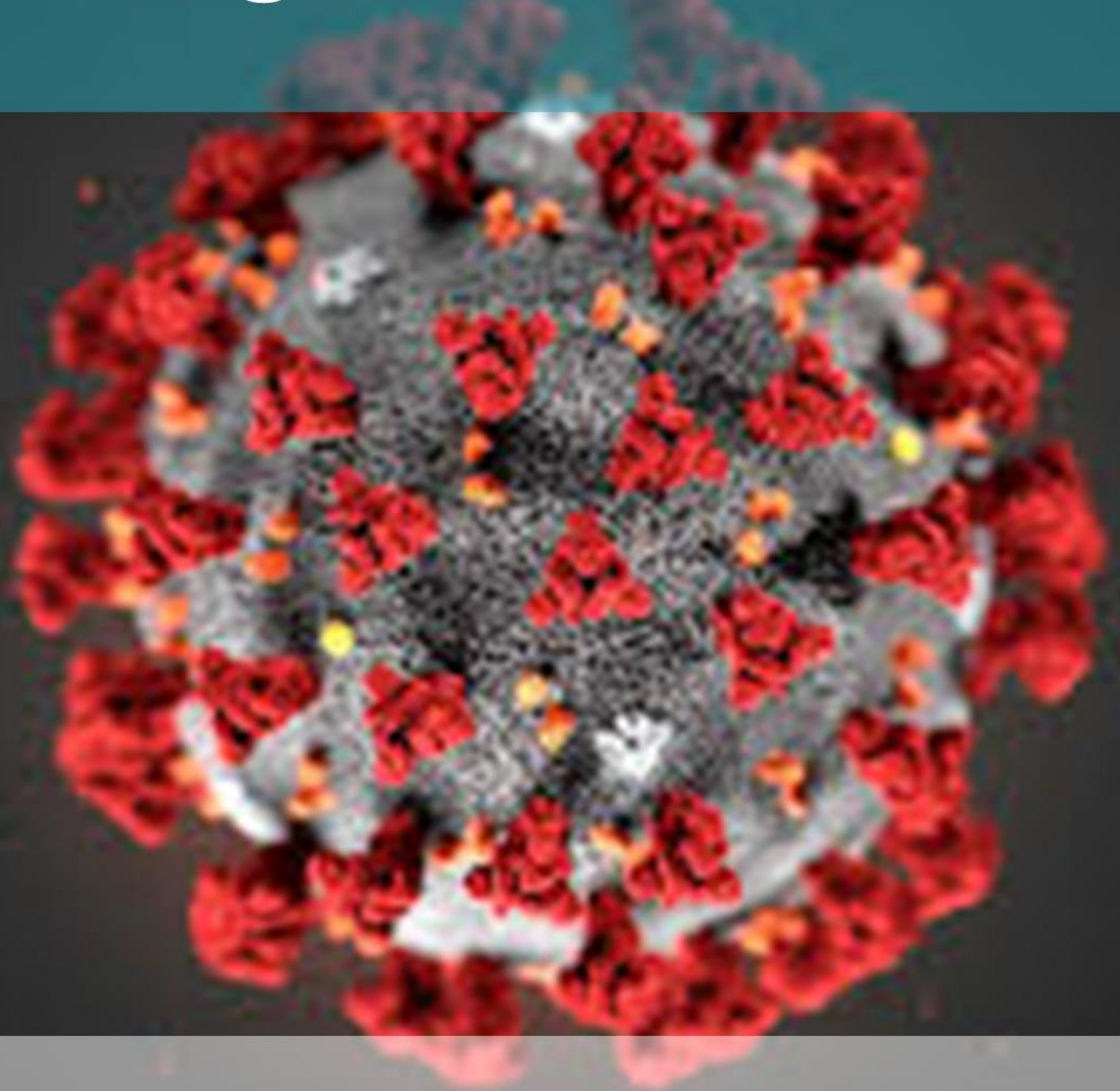


Living with COVID-19



COVID-19 response, exit, recovery and the future for healthcare and life sciences

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30 April 2020

Executive summary

The COVID-19 pandemic has had a massive impact on the world, causing disruption and dislocation for those who have been infected and transforming everyday life. The implementation of strict restrictions on movement and travel has made the UK go into a standstill, closing down schools and universities and forcing most people to work from home. In the UK, the economy has experienced a significant setback, driving the government into emergency mode. A rapid increase in the number of COVID cases has made the UK the fourth most infected country in the world, although the UK is now thought to have reached the peak of new daily cases.

Impact of the crisis on health and care systems and life sciences

The massive demand arising from the crisis has put the health and care system under pressure, starting with admissions to hospitals and critical care and shifting to hospital discharge and community and social care services. Non-COVID activity has more than halved as people have stayed away from healthcare facilities to avoid infection, most referrals to healthcare services have been stopped, and elective procedures have been cancelled. This decreased activity has made it possible to manage the crisis within existing health services capacity. The COVID pandemic is acting as a catalyst for transformation in the healthcare system, which has demonstrated an ability to make change swiftly and take system-based decisions. This crisis has highlighted the need to improve integration across the system, which has resulted in unprecedented levels of planning, information sharing and co-ordination. There has been a dramatic acceleration in the use of digital technologies, for example the embracing of virtual appointments within primary care.

The life sciences industry has been profoundly affected by the COVID pandemic in two fundamentally different ways; one involves a race to find diagnostic tests, vaccines and therapies for COVID-19, and the other is usual business coming to a halt. Parts of the life sciences industry are busier than ever before as they work rapidly on three critical areas. First and crucially, hopes of a rapid return to normality depend on the discovery of a safe and effective vaccine that can be rapidly developed, approved, manufactured and distributed. Second, there is a need for better therapies to help to reduce the shocking 50% mortality rate for COVID patients who need critical care.¹ And third, it is crucial to develop better tests to permit rapid and comprehensive testing, as well as antibody tests that could potentially indicate immunity against the virus. It is also worth mentioning that, during this critical period, the life sciences industry has a crucial duty of continuing seamlessly to supply existing products despite the disruptions in workforce and the supply chain. Other parts of the life sciences industry, however, have been brought to a significant slowdown, or even standstill, unable to continue business as usual activities including research into new medicine and clinical trials.

Towards an exit strategy

For society as a whole, the only long-term exit strategy from the lockdowns put in place to address the spread of COVID is an effective vaccine or herd immunity. To date, the collapse of health systems around the world has been avoided or minimised by lockdown. But this lockdown has come at the cost of suspending normal health and care for the population, particularly elective procedures, and the deepest recession since the great depression with the corresponding further impact on health. The most obvious exit strategy is to enable the easing of the lockdowns in a risk-based way (e.g., allowing younger people and businesses that can maintain social distance to resume activity whilst shielding the old and vulnerable). There needs to be comprehensive testing (of both disease and immunity), and contact tracing, to monitor and plan for the potential of multiple further peaks of the disease.

Healthcare systems will have to take measures in preparation for other possible surges of the virus starting with continued monitoring to track any rise in cases. The health and care system will need to manage the long-term morbidity associated with patients recovering from COVID-19. Hospitals will need to create permanently higher levels of critical care capacity to be prepared for another peak in infections. Care homes, in particular, are vulnerable to becoming hotspots for the spread of the virus and will require stringent measures of screening and social distancing. The Life Sciences industry will need to be able to rapidly scale up the production of vaccines, therapies and test equipment and compounds, as soon as they have been demonstrated as effective. There will be challenging issues in securing the supply chain and distributing products.

¹ Intensive Care National Audit and Research Centre, ICNARC report on COVID-19 in critical care – 24-April 2020: <https://www.icnarc.org/Our-Audit/Audits/Cmp/Reports>

Considering recovery

Reviving the economy whilst maintaining social distancing will require most businesses to retain some form of the 'work-from-home' model and reduce the number of people in the workplace. Digital platforms will remain crucial for connecting and working remotely. Businesses that cannot operate digitally will face a bigger challenge and will need to provide protective equipment, maintain social distance, and consider staggering starting times for work.

Healthcare systems will have to deal with the backlog of patients that have been staying away due to concerns about COVID-19. This will require prioritising cases that need urgent care (particularly cancer), using digital to prioritise and accelerate access, and separating COVID-19 and non-COVID-19 sites (potentially by making use of the private sector). This might mean also a much more severe death toll indirectly related to COVID-19.

Life sciences companies need to get back to their business as usual activities which involve continuing their non-COVID-19 discovery work, resuming their clinical trials for therapeutics, and defining out how to engage with health care professionals as well as how to build partnerships with the NHS. The COVID pandemic has also created issues or challenges around global supply chains that will need to be addressed.

Living with COVID-19

The world is likely to be forever changed post-COVID-19, starting with how people conduct business as there is a large shift to remote work. People will need to learn to become comfortable interacting again and going to public places. Greater use of digital technology to control the spread of the virus could start raising concerns around user privacy.

The health and care system will need to retain the novel practices that it adopted during the COVID pandemic including retaining 'digital by default', i.e. digital interactions unless there is a specific need for face-to-face. Also enhancing the health and care system as the core unit of planning and responses and maintaining the ability to flex capacity as needed. This will allow the health and care system to transform further in order to improve readiness for future health crises.

The life sciences industry will have renewed trust and commitment from the public as the importance of vaccination and testing have been proven during the crisis. It also seems likely that there will be an enhanced and permanent impact on digital approaches to supporting and enhancing the effectiveness of targeting, diagnosing and treating individuals. This may be facilitated by a step change in attitudes to digital and data sharing.

Last but not least, from a government perspective, there will be a need to take the learning from this crisis and using this to refine, improve and reinforce Business Continuity Plans. This will ensure that the next crisis is managed significantly better in terms of timely actions, clarity and consistency of measures. This goes beyond the country, with the World Health Organisation (WHO) as a key player in this.

Success in the post-COVID world

The COVID-19 pandemic has taught the world many lessons that are likely to leave lasting changes in people's lives. For the health and care system, success involves mainstreaming virtual consultations, building meaningful partnerships, maintaining a larger critical care capacity and developing clearer pathways for elective and urgent patients. Expectations for the health and care system have been raised, which means that there will need to be more co-ordination within it, driving a common pathway and a step-change in data sharing which will lead to a significant change in analytical capabilities.

For life sciences companies, it is the prime time to put their resources to use, to bring about positive change which can be leveraged to improve their reputations. Going forward, success for the life science industry will rely on having strong collaborations and partnerships within the industry as well as with governments and providers. This change starts with working out the nature and purpose of these new partnerships.

Impact of COVID-19

The human toll

The COVID-19 pandemic is the largest global health crisis that the world has experienced in generations and has had a major impact on all aspects of life, none more so than healthcare. To date, the virus has infected over 3.2 million people around the globe and taken over 231,000 lives.² On a societal level, the highly contagious nature of COVID-19 has forced most countries around the world to impose tight restrictions on travel, interaction and movement, which has had massive repercussions on businesses and the economy.

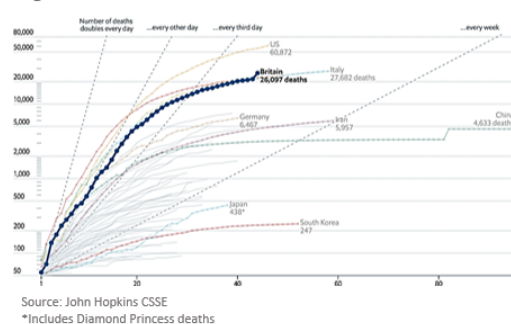
The COVID-19 pandemic has rapidly made its way across the globe, infecting 215 territories around the world in a matter of months. The UK is currently the 4th most infected country in the world.³

Like other countries around the world, the number of deaths in the UK has grown rapidly. Most notably, the UK has followed a similar trajectory to Italy.

The human toll has been significant. There is clear evidence of COVID-19 striking down the old and people with underlying health conditions. However, there are also a surprising number of cases of younger people. Although initially there was an analogy made to flu or pneumonia, deaths from COVID-19 are far higher.

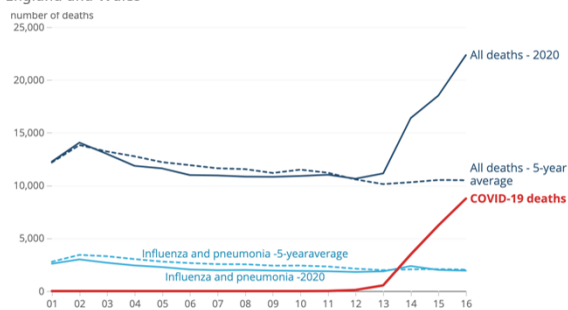
Confirmed COVID-19 deaths by country, to 20 April 2020⁴

Log Scale



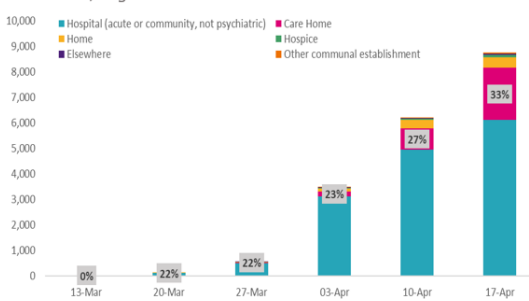
Number of deaths registered by week, 28 December 2019 – 17 April 2020⁵

England and Wales



Confirmed weekly COVID-19 deaths by place

Thousands, England and Wales



People in care homes have been hit hard by infections and deaths and account for the majority of deaths outside of hospital. Although it was long feared that this was the case, data on this only became available at the end of April. It appears that the insufficient testing of patients admitted to care homes and a lack of PPE for staff means that COVID-19 has been particularly deadly for the extremely vulnerable population of care home residents.

On 22 April, it was confirmed by the UK health secretary⁶ that a corner has been turned and that the UK is on the downward slope in daily new cases and daily number of deaths. A significant number of other countries are now seeing a similar peak, and are asking the question 'What next?'

² Worldometer, COVID-10 pandemic: <https://www.worldometers.info/coronavirus/>

³ Gov.uk, Coronavirus (COVID-19) cases in the UK: <https://coronavirus.data.gov.uk/>

⁴ The Economist, The Economist's coverage of the Coronavirus: <https://www.economist.com/news/2020/03/11/the-economists-coverage-of-the-coronavirus>

⁵ Office for National Statistics, Deaths registered weekly in England and Wales, provisional: week ending 17 April 2020: <https://www.ons.gov.uk/peoplepopulationandcommunity/birthsdeathsandmarriages/deaths/bulletins/deathsregisteredweeklyinenglandandwales/provisional/weekending17april2020>

⁶ The Guardian, UK has reached peak of coronavirus outbreak, says Matt Hancock: <https://www.theguardian.com/world/2020/apr/22/uk-has-reached-peak-of-coronavirus-outbreak-says-matt-hancock>

Social controls

In the absence of a cure or vaccine, COVID-19 has pushed many countries to impose tight restrictions on mobility, restrict travel internally and internationally, and enforce lockdowns which are impacting on movement outside the home to limited approved activities such as exercise, medical requirements and purchase of food. By reducing opportunities for social interaction, governments are attempting to slow the spread of the virus.

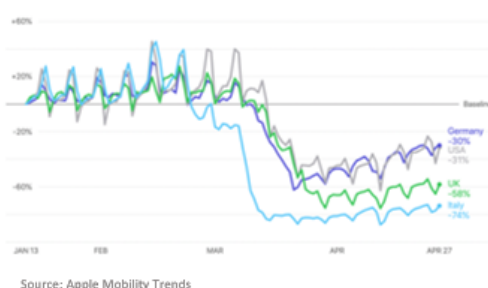
Communities and individuals around the world have had a central role in taking measures to protect themselves and others through restricting movement, maintaining hygiene and social distancing. They have also learned to become more self-sufficient in managing their pre-existing health condition (e.g., through self-isolation).

Mobility data from Google⁷ and Apple show the decrease in movement across differing countries as a result of lockdowns. Apple data shows mobility across the UK has decreased by 58%, lower than that of Italy (-73%) whose lockdown measures have been longer and more stringent, but higher than that of Germany (-31%). In just three months since 13 January, UK citizens have managed to reduce their use of transit by 83%, walking by 65% and driving by 58%.⁸

By contrast Sweden has taken a far less strict approach, relying on individuals to be socially responsible. Schools and restaurants, unlike in other countries, have remained open. Although Sweden's death rate has been lower than countries such as the UK and Italy, they have been considerably higher than their Nordic neighbours of Finland, Norway and Denmark.⁹

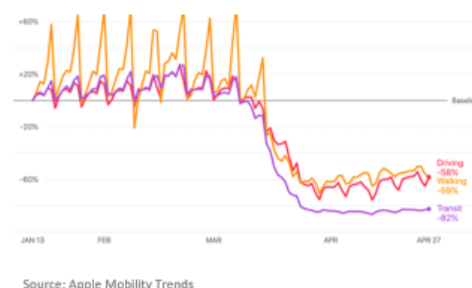
Change in mobility trend since 13 January 2020¹⁰

Percentage, USA, Germany, UK and Italy



Change in UK mobility trend since 13 January 2020

Percentage



Economic impact

In the UK, the Office of Budget Responsibility predicts that the lockdown will cause a large shock to the economy and public finances, forecasting a 35% fall in GDP and a 10% increase (over 2 million people) in unemployment in the second quarter. The Office for Budget Responsibility also foresees a significant increase in public sector net borrowing and debt due to the economic disruption.¹⁰

Where possible, businesses have had to adopt a 'work from home' strategy to keep themselves operating whilst still abiding by governmental decisions. However, there are many industries where businesses are simply unable to operate from home. In the absence of a time limit on the current lockdown, many companies are struggling to survive and are cutting costs and making redundancies. It is unknown how many will survive until the COVID-19 pandemic is under control.

The UK government has launched a set of rescue measures to support businesses that are affected by COVID-19, including a Coronavirus Business Interruption Loan Scheme, a 12-month break from business rates for retail, leisure and hospitality sectors and cash grants for small businesses and companies. Measures are also being taken by the Bank of England to provide financial assistance to struggling companies.¹¹ In total, £330bn in bailout is promised, equivalent to 15% of the UK GDP.¹²

⁷ Google mobility data: <https://www.google.com/COVID19/mobility/>

⁸ Apple mobility trends: <https://www.apple.com/COVID19/mobility>

⁹ Quartz: Sweden's very different approach to COVID-19: <https://qz.com/1842183/sweden-is-taking-a-very-different-approach-to-COVID-19/>

¹⁰ Office for Budget Responsibility, Coronavirus reference scenario: <https://obr.uk/coronavirus-reference-scenario/>

¹¹ Pillsbury, UK government Economic Stimulation Measures in Response to COVID-19: <https://www.pillsburylaw.com/en/news-and-insights/uk-government-economic-stimulation-measures-in-response-to-COVID-19.html>

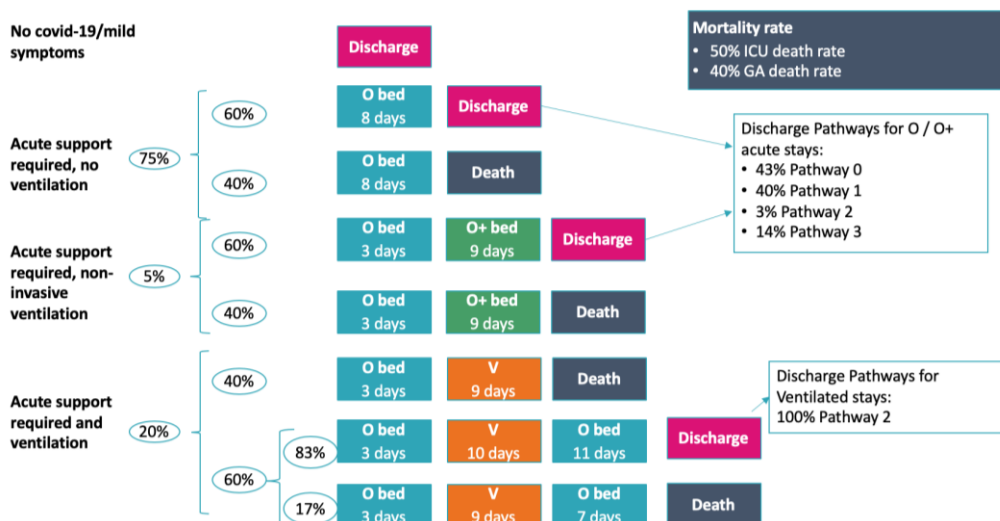
¹² The Telegraph, Chancellor unleashes £350bn bailout to rescue UK economy from coronavirus crisis:

<https://www.telegraph.co.uk/politics/2020/03/17/chancellor-unleashes-330bn-bailout-rescue-uk-economy-coronavirus/>

Impact on health and care

As COVID-19 spread, it became apparent that health systems around the world would be stretched to the breaking point and health leaders in the UK shifted to emergency command and control to cope. A critical set of questions to ensure the system had sufficient beds, staff and kit needed to be addressed. These included:

- **How many people would be infected, need hospitalisation and potentially die?** A crucial intervention was made by Imperial College researchers, who published the first definitive study of COVID-19 on 16 March, showing that the infection rate (r_0) for COVID-19 was 2.7-3.5. This means that, without restrictions on social interactions, every person contracting the virus would infect three more people, and that the number of people infected was doubling every 1.5 days. This produced the definitive warning that the health and care system would be overwhelmed unless social measures were put in place to halt the speed of the spread of COVID-19. This projection caused the government in the UK to act, turning from a more laissez faire approach based on herd immunity, to one that copied the lockdown approach taken in Italy and elsewhere.
- **How many Intensive Care Unit (ICU) beds would be needed?** The modelling of the COVID-19 pandemic was used to generate estimates not just of infection but also estimates of the hospitalisation rate (4.4%) and the requirement for ICU (20%), length of stay (18 days) and mortality (a devastating 50%). Scared by scenes in Italy and China, there was a race to convert healthcare beds in the UK to critical care beds and to ensure there were enough ventilators.
- **How many other beds would be needed?** Whilst the media attention was initially on critical care beds, another crucial question being asked was whether there would be enough beds across the health system, including hospital beds for non-COVID patients, community beds and social care beds. This required calculating the length of stay for different pathways and the community and social care requirements for patients being discharged from hospital.
- **How many staff would be needed?** Initially, the main focus was on critical care, and the solution for staffing extra critical care capacity was to pull staff from other areas of the hospital (for example, using dermatology consultants to support emergency care) or change staffing ratios. In looking at projected peaks of demand, it seemed that the critical care capacity could be available, but this would leave potential gaps in the availability of beds for non-COVID 19 patients. For community and social care, the requirements for staff depended on the level of discharges from hospitals, the ability to reduce or stop non-COVID-related activity and the level of staff sickness.
- **How much testing would be needed?** This question has still not been answered. Containing the spread of the virus would require wholesale testing of the population. There is also an obvious need to test all patients, ideally before hospital admission, so as not to mix COVID and non-COVID patients. There is a next need for frontline staff in both hospital and community settings to be tested, and in fact all other key workers in contact with the population. Tragically, it appears the lack of testing of patients and staff in care homes has contributed to the high death toll.



Simplistically, cases reached their peak in the first week of April, but deaths have continued to rise because there is a 5 to 14-day incubation period before an infected person becomes symptomatic. Once symptomatic, patients who become severely ill start to flow through hospitals, as shown in the following pathway diagram that is based on Imperial College research and also informed by the intensive care national audit and research centre (ICNARC) and hospital discharge data. Patients who are infected are not usually tested until they start to exhibit symptoms, and death could occur from 8 days to over 12 days, which creates a varied lag in time from case to deaths.¹³

In its response to COVID-19, the NHS has embraced new ways of providing services, leading to rapid transformation in certain areas, particularly digital. For example, the NHS has rapidly expanded the number of consultations done virtually, including remote assessments in primary care, to continue to see patients whilst limiting face-to-face interactions. Anecdotally, up to 80% of appointments within primary care are now being carried out digitally or over the phone.

The crisis has also seen a shift from traditional organisational silos to system-based decisions. Organisations across the NHS, and partners, are working more closely than ever before, and this alignment is allowing decisions to be made faster than ever before. Individual health systems have been granted more authority, with the ability to make changes swiftly within the system. There has been an emergence of new kinds of partnership between health care systems and industry (e.g., to provide ventilators and PPE), between care systems and universities and between public and private health care (e.g., the use of the private sector capacity by the NHS).

The COVID-19 crisis has forced everyone to try to understand how the whole system works, how to manage the system on a day by day basis and has demonstrated the need for deeper integration within the system. For example, as part of the COVID response, critical care capacity has been managed across London, and whilst there was originally a big shortage in critical care beds, the NHS has managed to expand its capacity by making room within its hospitals and by making use of capacity in the private sector. A common treatment pathway was adopted for COVID-19 which led to greater transparency through the daily situation report.

In fact, with lockdown taking hold, the spread of the virus stalled, “business as usual” health care activity has significantly reduced and, as a result, most health systems - including the NHS - have been able to operate largely within existing capacity, albeit with significant expansion of critical care. The key question being, what is the longer-term effect of this?

There have been reductions in every form of contact with the health system, with figures reported to include:

- Primary care activity has dropped 30-50%
- New referrals from primary care to hospitals have dropped even further
- A&E attendances are down about 30%
- Emergency admissions have dropped 50%
- Elective admissions have dropped 90%.

Decline in non-COVID activity in the NHS ¹⁴

UK emergency department attendance¹⁴

Year-on-year % change



Source: NHS England, FT analysis

Daily number of emergency department attendances from cardiac patients

7-day rolling average, England



Source: NHS England, FT analysis

¹³ Intensive Care National Audit and Research Centre, ICNARC report on COVID-19 in critical care – 24-April 2020: <https://www.icnarc.org/Our-Audit/Audits/Cmp/Reports>

¹⁴ Financial Times, Empty non-coronavirus beds raise fears that sickest are avoiding NHS: <https://www.ft.com/content/d5ac0a79-6647-4f49-bb64-d1cc66362043>

Life Sciences

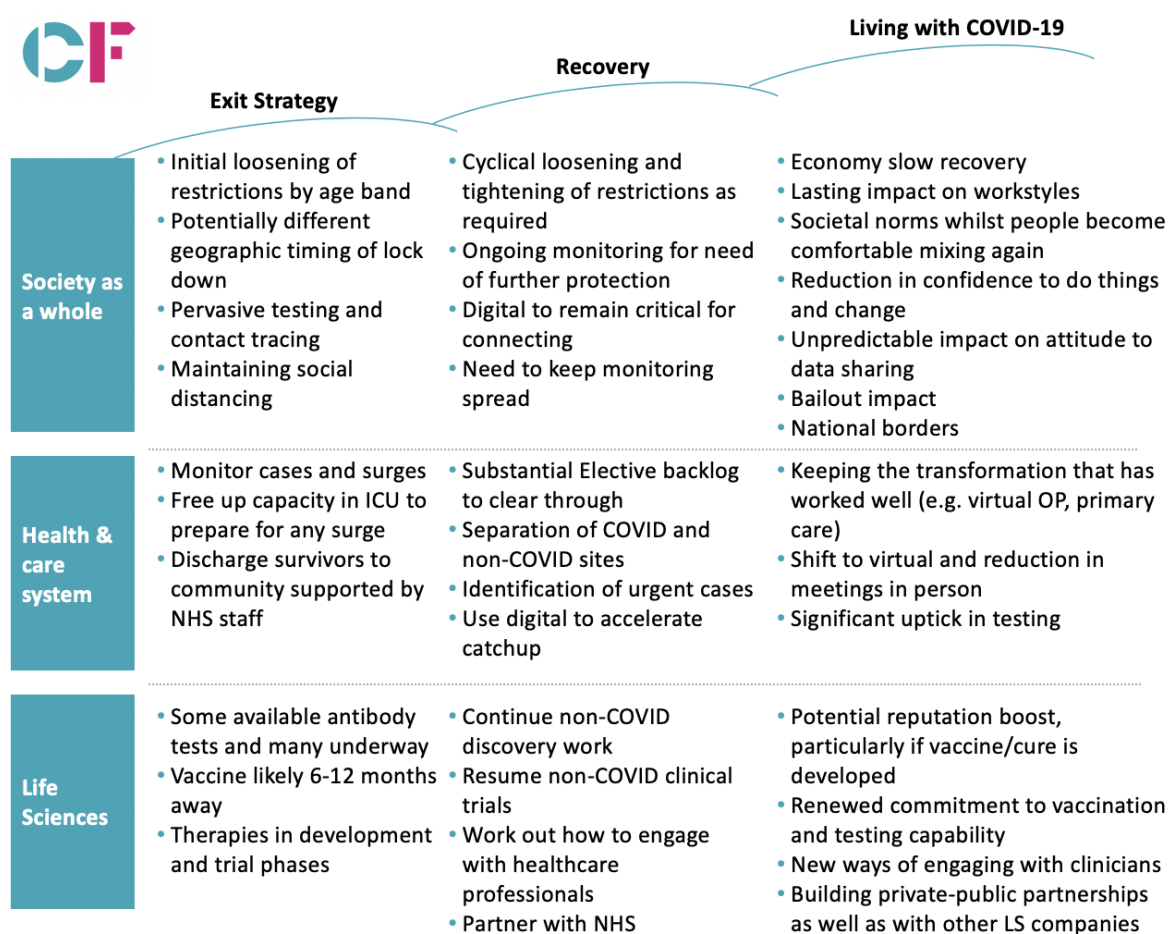
The Life Sciences industry has been affected by the COVID-19 pandemic in multiple ways. As global organisations they were amongst the first to shut down their workplaces and rapidly expand remote working arrangements, where possible. Research has been affected, with many clinical trials put on hold as most efforts are shifted to supporting the COVID crisis. Some companies are actively involved in the quest for tests, vaccine, or therapies or are simply supporting the effort to fight the spread through generous donations of personal protective equipment and other initiatives.

Almost all Life Sciences organisations have found themselves unable to carry out their business as usual commercial activities, particularly face-to-face interactions and hospital visits, as social distancing measures have been put in place. This poses major challenges for how companies operate, with significant field support, implementation support, medical and scientific liaison all being, in effect, stopped. This has created a tremendous effort by Life Sciences organisations to reassess the “classical” commercial operating model and find new, or expand existing, ways of keeping commercial and scientific activities running. The COVID-19 crisis has been the single most effective lever to accelerate digital strategies implementation in many companies, out of urgent necessity. It may also mean that there will be a new normal that will rely much less on field forces and more on virtual presence and digital interactions with health care providers. This is especially important given that non-COVID diseases have not miraculously disappeared.

This may result in deeper organisation and transformational questions in the Life Sciences industry, ultimately accelerating the implementation of a vision that has already been in discussion in the boardrooms of the commercial operation teams. The crisis has also highlighted the critical importance of the local medical affairs teams. These teams have to handle tremendous workloads to deal with an acceleration of early scientific signals, interactions with Health Authorities, requests for compassionate uses of drugs, clinical trials designs and implementation in record time, which also can enhance or harm a company reputation. It is clear that the operating models of the Life Sciences industry post-COVID-19 will look different than before, more virtual, more digital, but also more scientific and customer oriented, therefore providing an opportunity for the industry to partner more and better with health care systems. The COVID-19 pandemic has been, and still is, a tremendous threat to the Life Sciences industry, but is also an incredible opportunity for it to show that it is more about supporting patients and healthcare than making short term money, and therefore improve its reputation in the eyes of the wider community. The responsible approach to supporting health systems, health care providers and governments in various ways (personal protective equipment donations, research collaborations, sharing assets and data) will prove that the Life Science industry is a partner in the system, and hopefully this can be leveraged to change perception in the longer term.

Roadmap for society, health and care systems and life sciences

As understanding of the situation develops, it is crucial to form an understanding of what the long-term impacts of COVID-19 are likely to be and how the future might be shaped to reach the best possible outcomes. Broadly, some key emerging themes include: a shift to the virtual and a reduction in face-to-face meetings; a change in societal norms as people try to get comfortable with interacting again; and a renewed commitment to vaccination and testing.



Source: CF

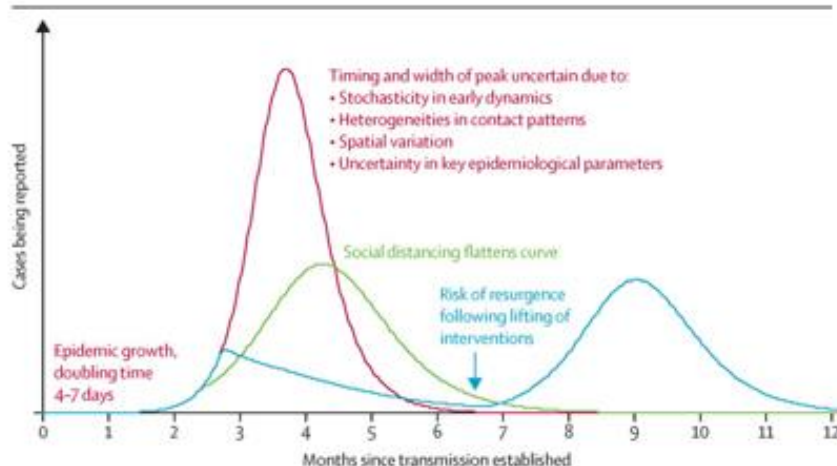
Society as a whole

Exit strategy

As the COVID-19 pandemic reaches its peak, an end to the lockdown is not yet foreseeable. Considering such uncertainty, society, health and care systems, and Life Sciences companies need to start planning for an exit strategy to ensure optimal outcomes and mitigate worst-case scenarios. As has been warned by politicians in the UK and around the world, now is a dangerous time as public patience with social controls wears thin, the economic damage mounts and the attendant impact on health in non-COVID population becomes clearer. The danger is that, in the absence of vaccine and therapies, a release of controls on social interaction will increase the spread of disease and risk an uncontrolled outbreak.

To illustrate the point, at the writing of this article, there are 26,771 total COVID deaths (including care home and community deaths) in the UK.¹⁵ With an estimated infection fatality rate of 0.5-1.0%, that suggests 2.7-5.4 million people are infected in the UK population of 66 million (or 4.0-8.1% of the population). London deaths are estimated to be about 6,000 people and which suggests 0.6 to 1.2 million people are infected with COVID-19 (or 6.5-13% of the population). There are suggestions from analysis in Iceland, the Diamond Princess cruise ship and the USS Theodore Roosevelt, that it may be that up to 50% of the population (especially the young and fit) are asymptomatic. This would suggest 8-16% of the UK have already been infected. And even if London was assumed to be ahead of the curve, and this number was doubled (13-26%), it is obvious that the UK is a long way from the necessary herd immunity of 62-72% for R_0 (the virus reproduction number) of 2.7-3.5 estimated for COVID-19. This means that in the absence of a vaccine or therapy, at least 2-3 more infection peaks would be required before herd immunity could be achieved.¹⁶

Illustrative simulations of a transmission model of COVID-19¹⁷



Source: The Lancet, How will country-based mitigation measures influence the course of the COVID-19 epidemic?

Given that it is estimated a vaccine will take somewhere between 6 and 12 months to develop and approve, governments will need to move to more selective approaches to controlling the infection that are risk-based in the relaxing of restrictions, and in doing that, there has to be pervasive testing and contact tracing.

- **Easing restrictions:** When there starts to be a lower incidence of cases, a strategic approach should be taken to start to ease restrictions by allowing children and young adults to resume their normal activities first, whilst still protecting high-risk groups.
- **Pervasive testing:** The optimal practical route out of social isolation measures may be a policy to test everyone within the UK, and, to achieve that quickly, the number of tests per day needs to be increased way beyond the current 100,000 tests per day target. However, before achieving the necessary scale of testing, there needs to be widespread sampling in order to understand what percentage of the population have potentially already been infected.
- **Contact tracing:** Contact tracing allows tracing of anyone who has met an infected person in the previous days by recording and monitoring everyone they with whom they came into contact. If this can be done in ways that do not threaten liberal democracy, it could prevent further widespread infection. Google and Apple have partnered to develop a contact tracing tool, that should help identify people who might have come into contact with an infected person.¹⁷ Although the NHS have said they will be using a different app.¹⁸ Australia has already launched a similar app called 'COVIDSafe' which citizens can download voluntarily to help trace the spread of the virus.¹⁹ In addition to apps, however, there will be no substitution for substantial teams of contact tracing as was well documented in the WHO report on Wuhan.²⁰

¹⁵ Gov.uk, Coronavirus (COVID-19) cases in the UK: <https://coronavirus.data.gov.uk/>

¹⁶ The Lancet, How will country-based mitigation measures influence the course of the COVID-19 pandemic: [https://www.thelancet.com/journals/lancet/article/PIIS0140-6736\(20\)30567-5/fulltext](https://www.thelancet.com/journals/lancet/article/PIIS0140-6736(20)30567-5/fulltext)

¹⁷ Apple Newsroom, Apple and Google partner on COVID-19 contact tracing technology: <https://www.apple.com/ae/newsroom/2020/04/apple-and-google-partner-on-covid-19-contact-tracing-technology/>

¹⁸ BBC: <https://www.bbc.co.uk/news/technology-52441428>

¹⁹ Australian Government, Department of Health, COVIDSafe app: <https://www.health.gov.au/resources/apps-and-tools/COVIDSafe-app>

²⁰ World Health Organization: <https://www.who.int/docs/default-source/coronaviruse/who-china-joint-mission-on-covid-19-final-report.pdf>

- **Maintaining social distancing:** Before herd immunity has been established, or a vaccine has been developed, it will be necessary to maintain social distancing measures even after some restrictions have been lifted. This will affect everything including work, shopping, travel, and health services.

Politicians will need to make difficult and transparent decisions on how to trade-off different considerations such as impact on the economy versus impact on the health and care system, as well as harm from COVID-19 versus harm from not treating other conditions.

Recovery

When considering the above, an important question is raised about how the economy is re-started whilst social distancing is maintained?

For workers, whose children are still not going to school, working from home might be the only option in the absence of alternative childcare. More employees will likely continue to work from home after their experience during lockdown has shown it is not just possible, but also productive. In Germany, the Minister of Labour plans on presenting a bill this autumn to make working from home a right, if applicable to their workplace.²¹

Businesses will also start to ask the questions “will travel still be allowed?” and “will travel still be deemed necessary?” For companies who have had positive experiences with video conferences with clients and colleagues, it be perceived as unnecessary to regularly travel both internally and internationally, especially with the threat of contracting the virus still present. A requirement for social distancing to be maintained on aircraft could be potentially devastating for airlines with dropping available seats resulting in rising ticket costs and falling volumes.

What about occupations that cannot be conducted digitally? Everything from bakeries to biotech labs fall under this category, and they will be left with fewer options. It will be crucial to maintain social distancing and, where possible, stagger the start times of employees to reduce the number of people in the workplace. Most workplaces will need to consider the need for facemasks alongside improved access to hand washing and sanitisers.

Living with COVID-19

Life after COVID seems difficult to imagine. After the COVID threat is lifted, people will need time to adjust and slowly become comfortable mixing again. Unemployment rates are likely to be high, and many businesses will require time to recover. For now, the future remains uncertain, and, if a vaccine is not successfully developed and administered around the world (or it turns out that people can get infected a second time) certain aspects of life will have to change, including maybe accepting a higher level of risk for the most vulnerable people.

Nevertheless, if there is one thing that has been learned from the lockdown, it is that there is a lot that people can achieve from the safe distance of their own homes. As such, working remotely, online learning and e-commerce are likely to stay incorporated in people's lives even after the pandemic is over. There may be a transformation in how businesses conduct their work, many may carry on with the ‘work-from-home’ model, or some version of it. Whilst some have found it extremely difficult to work from home and to stick to working hours, many others have found that having the time to themselves allows them to be much more focused and efficient. Work-life balance has improved just through the reduction of the daily commute.

GPS tracking via mobile devices has been used significantly to exert greater surveillance and tracing in efforts of controlling the outbreak. As such, some governments have been tracking citizens’ mobile phone networks to catch any breach of curfew restrictions, while Google and Apple have partnered to develop new tools to help with contact tracing. Many companies like Google and Facebook are taking the huge volumes of data, including location-tracking information, that they were already collecting for advertising purposes, anonymising them and sending them to public health authorities, researchers, and government agencies.²² These new implementations have started to raise many questions about user privacy. When does prioritising health over privacy go too far? Whilst most of the information being shared now is anonymous, and therefore unidentifiable, privacy advocates are warning against an escalation of the demands from authorities amid the COVID-19 outbreak that may lead to major privacy concerns which can threaten civil liberties.

²¹ DW, German labor minister calls for right to work from home: <https://www.dw.com/en/german-labor-minister-calls-for-right-to-work-from-home/a-53253366>

²² Bloomberg, Pandemic data-sharing puts new pressure on privacy protections: <https://www.bloomberg.com/news/articles/2020-04-05/pandemic-data-sharing-puts-new-pressure-on-privacy-protections>

Health and care system

Exit strategy

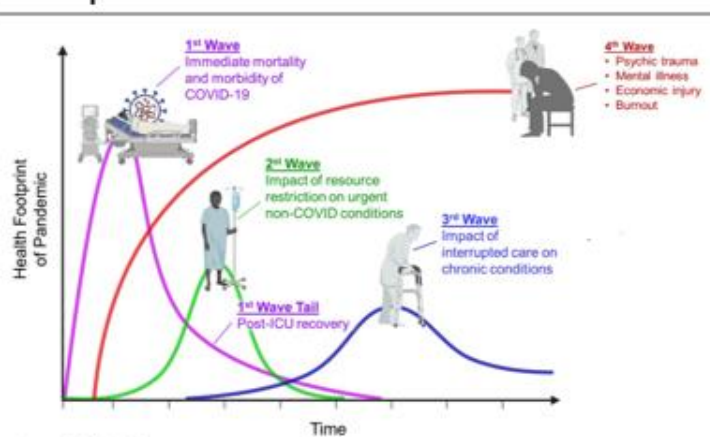
As the health and care system continues to treat people who are infected, more patients who are no longer critically ill will need to be discharged into the community. It seems that discharged patients will need somewhere between 1 and 4 weeks of care, which means that the pressure will increase on services in the community, putting a greater demand on the number of available staff. To keep community care running effectively, there must be provision for enough PPE, and the ability to test all staff. Care homes are in danger of becoming hotspots for COVID-19 contagion and may, therefore, need to close their doors to anyone with suspected COVID-19.

- **Surveillance:** As restrictions are relaxed, it will be essential to closely monitor daily cases and identify any potential surges. Imperial College London modelling suggested readiness for further peaks.²³
- **Winding down surge ICU capacity whilst maintaining readiness for another peak:** Plans and processes need to be agreed and implemented, to ensure that there is enough critical care capacity if there are further peaks. This needs to be done in parallel with keeping COVID-free capacity within hospitals to maintain the running of usual services, whilst reassuring non-COVID patients that they will not be infected.
- **Discharging patients from hospital:** There needs to be a shift from critical care beds to community and social care when possible, supported by NHS staff. Different approaches will need to be taken for people on each of the different pathways, those going home unsupported, those who need a care package, and those going to care and nursing homes.
- **Care homes.** As older people are more susceptible to COVID-19, and their reliance on carers makes isolation difficult and transmission rates within care homes very high, there needs to be a greater consideration as to whether hospitalised patients should be discharged back into care homes. Care homes urgently need to improve screening for COVID-19 whilst continuing their lockdown and social distancing measures. COVID-19 death tolls in care homes are likely to increase very rapidly unless strong measures are adopted.²⁴ The shortage of PPE, insufficient testing and little preparation have highlighted the need to ensure localised emergency planning goes across the whole health and care sector and are not focused only on hospital care.

Recovery

Healthcare systems are suffering a great deal, having had to work in full force and under a lot of risk for months on end. However, the strain on these services is not likely to be lifted even after the COVID-19 crisis reduces, as there are many cases that have been de-prioritised which will need to be attended to in an organised and strategic manner and through co-operation between public and private providers. The NHS will need to increase its capacity to respond to likely peaks of the virus, as well as separating patients who have tested positive and those who have not. A visual representation of the need to address different waves of COVID-19 is shown.²⁵

Four impact waves of COVID-19²⁵



Source: Dr Victor Tseng

- **Clear the backlog:** The NHS needs to address the backlog of elective care, cancer cases and chronic conditions that have built up from weeks of patients staying away from healthcare settings. Indeed, there has been an observed 50% decrease in hospital activity and near elimination of elective activity.
- **Identify and select highest risk cases:** This needs to be done by first separating elective and non-elective cases to identify patients in need of urgent care, with the ability to fast-track these cases. The Royal College of Surgeons

²³ <https://www.imperial.ac.uk/media/imperial-college/medicine/sph/ide/gida-fellowships/Imperial-College-COVID19-NPI-modelling-16-03-2020.pdf>

²⁴ The Guardian, Care home fatalities to be included in daily coronavirus death tolls: <https://www.theguardian.com/world/2020/apr/28/uk-records-4343-care-home-coronavirus-deaths-in-a-fortnight>

²⁵ Victor Tseng, MD.: <https://twitter.com/VectorSting/status/1244671755781898241>

has set out prioritisation criteria to develop consensus on approaches to treatment amid the COVID-19 pandemic,²⁶ which can serve as a basis for identifying the most urgent cases to be treated first.

- **Address cancer in particular:** Cancer Research UK has observed that every step of the cancer pathway has been disrupted by COVID-19, including, screening, GP referrals, diagnostics and testing and treatment. At present:
 - 200,000 people per week are no longer being screened
 - Urgent referrals have dropped by 75%
 - 2,250 cancer cases are likely to be going undiagnosed across the UK, and these will be stacking up over time
 - Early cancers are being ‘parked’ for 3 months or more, with the chances of curative surgery become less likely²⁷
- **Segment COVID and non-COVID sites:** To prevent non-COVID activity being shut down by COVID activity, patients will need to be separated into COVID and non-COVID sites to prevent the infection of non-COVID patients within healthcare settings.
- **Make use of private sector capacity:** To manage the build-up of cases, the NHS has secured six months of capacity from March in the private sector which could be used to help segment COVID and non-COVID cases.
- **Make instant testing for COVID available:** Testing for the COVID infection needs to shift from results taking 2-3 days, to near-instant testing. It is advisable that 'instant' testing is available to all frontline staff and patients to reduce the likelihood of further spreading of the virus within hospitals. Additionally, antibody tests could potentially have an important role of indicating whether staff members have developed immunity against the virus.
- **Respond digitally:** It will be crucial throughout this catch-up period to make use of digital platforms (such as virtual consultations) to accelerate the process. Additionally, digital tools may be used to help identify and screen individuals in need of urgent care to help accelerate them through the pathway.
- **Dramatically improve A&E:** It will be impossible to consider leaving A&E so crowded, which means that performance will have to be improved and A&E facilities expanded.
- **Build a whole system prevention and population health approach:** A greater number of people are conscious about their health and are taking more responsibility for their own well-being. Building on these emerging practices and systematising them will be an important part of recovery.
- **Address mental health:** The mental health ramifications of the COVID-19 pandemic are already proving to be huge. Social distancing, isolation and the economic situation have led to increased levels of anxiety, depression and suicide. Currently, the focus is shifted away from promotion of good mental health and there is a limited number of mental health beds, that will be put under enormous strain.

Living with COVID-19

As previously mentioned, there have been some positive changes within the NHS in its response to COVID-19. These changes provide irrefutable proof that the NHS can incorporate innovation and new practices into its services in ways that can improve its efficiency as well as patient outcomes. Hence, the long-term impact of the pandemic on the NHS should be to:

- Embrace the ‘digital by default’ approach to service delivery
- Maintain and enhance health and care systems as the core unit of planning and responses, bringing together health and care across the entire pathway
- Maintain plans for how capacity can be flexed to respond to any future crises
- Establish an integrated, person-centred, rather than an organisation-centred, approach to prevention and support

This will allow the NHS to improve its operations, however, creating a permanent gold standard on infection control in health care, including the ability to quickly increase capacity when needed, will require funds, infrastructure and workforce capacity that are currently not available.

²⁶ Royal College of Surgeons of England, Updated Intercollegiate general surgery guidelines on COVID-19: <https://www.rcseng.ac.uk/coronavirus/joint-guidance-for-surgeons-v2/>

²⁷ Cancer Research UK, How coronavirus is impacting cancer services in the UK: <https://scienceblog.cancerresearchuk.org/2020/04/21/how-coronavirus-is-impacting-cancer-services-in-the-uk/>

Life Sciences

Exit strategy

Life sciences companies have a crucial role to play in the response to COVID-19 by accelerating the development, testing and approval of antibody tests, vaccines, and treatments, and, most vitally, ensuring a steady supply of these products.

Life Sciences companies are working together and risking large investments, as they have never done before, to find successful vaccines and therapies for COVID-19. In the US, the NIH (National Institute of Health) is bringing together a dozen of the biggest names in Life Science (including AbbVie, Amgen, AstraZeneca, GSK, J&J, Eli Lilly, Merck, Novartis, Pfizer, Roche, Sanofi and others), as well as the US Food and Drug Administration (FDA) and other organisations for a public-private partnership to speed up the race towards vaccine and treatment options. This partnership will allow Life Science companies to develop collaborative frameworks, prioritise vaccine and treatment candidates and speed up clinical trials to accelerate the response to the pandemic.²⁸ Finding a successful vaccine and drug needs to be a global effort, with countries and companies working together for optimal and fastest outcomes.

- **Antibody test:** Antibody, (or serology), tests can detect if a person has been exposed to COVID-19 and developed antibodies against it.²⁹ There are three types of serology tests (Rapid Diagnostic Test, Enzyme linked immunosorbent assay, and Neutralization assay) which are all blood-based but vary in their ease of application and time to results, as well as level of the detail that they provide.³⁰ The tests have a potentially huge role to play in reducing the need for social isolation as they may be the key to giving people the green light to resume their normal lives. However, the World Health Organization has found no evidence of yet showing that people who have antibodies and have recovered from COVID-19 are protected from a second infection.³¹ Hence, further research is still needed to better understand the immunity response against the virus.
- **Vaccine.** The World Health Organisation has identified a landscape of the top COVID-19 candidate vaccines, and as of April 26th, there are 7 candidates in clinical evaluation and 82 in pre-clinical evaluation. The candidates contain some of the biggest names in Life Sciences, as well as universities and research institutes, many of which are combining their technologies to reach quicker and better results such as GSK/Sanofi, BioNTech/Pfizer, University of Oxford and many others.³² At present, a vaccine is not yet estimated to be ready before 6 to 12 months, however, some companies have envisioned that some early results might be available this summer. Crucially the capacity to mass produce the vaccine will need to be in place.
- **Therapies.** As with vaccines, the list of candidates attempting to develop effective treatments for COVID-19 is a long one. Some of these potential treatments are experimental and being developed specifically for COVID-19, whilst other treatments involve repurposing existing drugs and reviewing whether they are effective in treating COVID-19.³³

²⁸ National Institutes of Health, NIH to launch public-private partnership to speed COVID-19 vaccine and treatment options:

<https://www.nih.gov/news-events/news-releases/nih-launch-public-private-partnership-speed-COVID-19-vaccine-treatment-options>

²⁹ CNN health, What are antibody tests and what do they mean for the coronavirus pandemic:

<https://edition.cnn.com/2020/04/14/health/antibody-test-explainer/index.html>

³⁰ John Hopkins Bloomberg School of Public Health, Center for Health Security, Serology-based tests for COVID-19:

<https://www.centerforhealthsecurity.org/resources/COVID-19/serology/Serology-based-tests-for-COVID-19.html>

³¹ World Health Organization, "Immunity passports" in the context of COVID-19: <https://www.who.int/news-room/commentaries/detail/immunity-passports-in-the-context-of-COVID-19>

³² World Health Organization, Draft Landscape of COVID-19 candidate vaccines – 26 April 2020: <https://www.who.int/who-documents-detail/draft-landscape-of-COVID-19-candidate-vaccines>

³³ Reuters graphics, The lifeline pipeline: <https://graphics.reuters.com/HEALTH-CORONAVIRUS/yxmviqywprz/index.html>

Recovery

COVID has caused significant disruption to Life Sciences business as usual. Research efforts have been diverted to COVID vaccines, therapies and testing. Existing clinical trials have been postponed, and visits to health care professionals have all but disappeared. To start recovery, Life Sciences companies will need to:

- **Continue non-COVID discovery work:** Non-COVID drug and vaccine discovery has been considerably reduced during the past months, with the focus being on COVID coupled with an overall reduction of activity. It will be important to resume full discovery operations as soon as possible to continue to build healthy pipelines.
- **Resume clinical trials for non-COVID related therapeutics:** Clinical trials (except for those related to COVID) have almost fully come to a stop, which comes at a considerable cost to the firms involved. It will be crucial for Life Sciences companies, hospitals, and patients that clinical trials are resumed as soon as possible.
- **Work out how they will begin to engage with health care professionals again:** Promotional activity has reduced to video calls, with hospitals being completely off-limits, and clinicians unable to give time to non-patient work. Once the COVID-19 peak passes, it will be vital to work out how to engage with healthcare professionals. This will likely begin with an increase in video calls, and slowly transitioning back to face-to-face meetings, if deemed relevant. The key capabilities present in organisations will have to evolve accordingly as the “back to normal” will not mean back to the same organisation as before.
- **Work out how they partner with the NHS:** The past couple of months have seen a considerable increase in the number of partnerships, both within Life Sciences, but also between the private and public sectors. The NHS has been becoming more open to partnering with Life Sciences over the past few years and no doubt will be even more so as they look to rebuild and evolve. Life Sciences companies should see this as an opportunity to build more and more fruitful partnerships. This will result hopefully in a better reputation for the industry as well, and therefore more trust in partnerships.
- **Respond to global supply chain issues:** How does a world that has suddenly become aware of global supply chains maintain security of supply? Currently, 54 countries have bans on exports, including Belgium, which manufactures a significant amount of medicines and vaccines. This will put a premium on increasing local supply. Nonetheless, the Brexit preparedness that has seen very close collaboration between industry and government, has yielded great benefits in terms of continuity of supply of medicines.

Living with COVID-19

The COVID-19 pandemic has been a large wakeup call to the entire world, showing us that despite how far we have come with our health and technological advancements, efforts still need to be put into being better prepared for possible viruses and epidemics that could arise every year around the world. The COVID pandemic has thus renewed the world’s commitment to vaccination and testing as these have become the only tools to exert some control over the outbreak. Which begs the question, what will happen if another virus emerges in the future which is even more fatal? Should the state be incentivising more in the development of vaccines and antimicrobials?

What will succeeding in a post-COVID world look like?

Upon exiting this pandemic there are going to be many lessons we have learnt, particularly within healthcare. It is important to ask ourselves: 'what does success look like for healthcare and Life Sciences in a post-COVID world?'

For patients and the families, the lasting positive impact of COVID-19 should be the ability to interact with health and care systems in a digital way. For too long, the rest of the world has transformed to work around the needs of consumers and offer convenient digital access, whilst health and care systems pointed to exciting pilots but not widescale change. More transformation has occurred in the last 4-5 weeks than the past 4-5 years in this regard. In a world living with COVID-19, the ability to access these services in a convenient and safe way will be critical. This will be particularly in primary care and outpatient settings but should extend to cover diagnostics and also greater use of digital data to support risk stratification and targeting of patients who most need any kind of care.

For healthcare systems, being able to build on the successes and work together in new ways will be a significant measure of success. This will facilitate an increasing flow of data available and the ability to plan and manage capacity over a wider area on a day-to-day basis, both of which before this crisis were sporadic at best.

There are a number of service changes that will be required to succeed, namely:

- Gold standard infection control
- Ability to separate urgent and elective cases on different sites
- Greater surge capacity, particularly within critical care

Implementing each of these will have its challenges, particularly around the capital and workforce required, which will be an issue for the UK government to solve.

Finally, there has been a clear direction of significantly raised expectations about health and care systems. This means that there needs to be greater effort to consolidate and build partnerships across the healthcare sector, including with private providers and Life Sciences companies, to ensure better responses to future health crises. This includes co-ordination across health and care systems, driving a common pathway and a step-change in data sharing which will lead to a significant change in analytical capabilities.

As for the Life Sciences industry, it has found itself in a prime position to develop the necessary vaccines, diagnostic tests and therapies that can help the world to get the COVID-19 pandemic under control. As such, success for Life Sciences companies involves leveraging the power that they now possess to improve their overall reputation. There is potential renewed interest in strengthening partnerships with governments, providers, and other Life Sciences companies, and to operate as one team as has been the case during the COVID-19 pandemic. In the UK, it will be imperative for Life Sciences companies to build strong partnerships and work in collaboration with the NHS. Life Sciences companies will hence have the opportunity to increase the value that they provide to society by agreeing priorities with their healthcare partners, offering sensible pricing and having relentless focus on maximising incremental therapeutic benefit from their new products.

About the authors



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We would like to thank and acknowledge the support of Nour Mohanna, JT Joseph, and Liz Knight in the drafting of this article. We would also like to thank for helpful input from Dame Ruth Carnall, Hannah Farrar, Anne Rainsberry, Mike Parrish, Professor Sir Chris Ham, Professor Donna Hall, Andrew Dillon, Elliot Dunster and Laurent Abuaf.

We would like to recognise the amazing efforts of all front-line staff and key workers in confronting this crisis.