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Pandemic to Endemic: The Race Against Time

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Foreword by Tony Blair

The government has this week set out important measures to help manage Covid-19 over the winter. It rightly aims to keep case numbers down, stop the NHS from becoming overwhelmed and avoid further lockdowns. This is critical not only in terms of controlling Covid itself, but also if we are to free up precious resources for the NHS to work through growing waiting lists of patients needing vital care.

There are important elements in the government's proposals that are to be welcomed. It is right, although overdue, that teenagers be vaccinated.

It is also right we offer booster shots to over-50s. Providing these shots will ensure those most at risk from serious illness are protected over the winter.

This paper by my Institute sets out a clear path for how the government's proposals can be augmented and accelerated to put the UK in the position to live alongside Covid without fear of further nationwide lockdowns.

Teenagers could and should have been vaccinated before schools returned. We have been calling for this step to be taken for some months. Now that the decision has been made to do so, it should be implemented urgently, with all eligible children vaccinated this autumn.

To avoid being behind the curve again on vaccination groups, the government should take urgent steps to consider vaccinating children under 12 as well. Evidence shows that young children, particularly those in nurseries, are transmitting the virus and putting at-risk groups in danger.

Booster shots for the over-50s must be administered with similar urgency. All those eligible for a third shot should be offered one this autumn. Underpinning this booster programme should be the widest possible supply of the vaccine. Credible data show that the AstraZeneca vaccine is as effective as other vaccines as a booster, and the government should include it in the supply plan.

The UK must do more to tackle enduring vaccine hesitancy. New and more targeted communications techniques are required, with some suggestions included in this paper.

Critically, the government also needs to put in place the central policy required to avoid further lockdowns: the introduction of a Covid Pass. Requiring a Covid Pass to enter crowded indoor spaces and events would drive vaccine uptake. A viable Covid Pass, displaying both rapid testing and vaccine status, would mean that, even with higher case numbers, a person free of the virus would be free to move around in public. This step, alongside further action on measures like mask-wearing, needs to be taken urgently to give businesses confidence that avoiding further lockdowns is more than an aspiration but is deliverable.

Covid-19 is a global challenge, requiring a global solution. No single country will be safe from the virus until every country is safe. This is why, as we have set out in reports together with the Global Health Security Consortium, global leadership is needed on vaccinating the world and putting in place the right vaccine absorption capacity. There must be a relationship between the domestic Covid policy of high-income countries and the urgent need to vaccinate low- and middle-income countries – including instilling confidence in workhorse vaccines like AstraZeneca’s, which is produced on a not-for-profit basis.

It is the right time to focus on getting to an end state of living alongside Covid, but it must be based on the right plan. Much of what the government has set out this week is welcome, but this paper shows how it can go further and faster in protecting the country.

Overview

The UK is largely free from Covid-19 restrictions and its economy is growing. A hugely successful vaccine rollout has meant that saving lives and protecting livelihoods have not been mutually exclusive objectives – as they were earlier in the pandemic – and that the country has been able to move beyond a crippling cycle of lockdowns. The government has rightly committed in recent days to trying to avoid further lockdowns and published detailed plans to underpin this.

The five key pillars of the government’s Plan A strategy for autumn/winter include: ¹

1. Building our defences through pharmaceutical interventions: vaccines, antivirals and disease-modifying therapeutics.
2. Identifying and isolating positive cases to limit transmission: test, trace and isolate.
3. Supporting the NHS and social care: managing pressures and recovering services.
4. Advising people on how to protect themselves and others: clear guidance and communications.
5. Pursuing an international approach: helping to vaccinate the world and managing risks at the border.

If pressure on the NHS reaches unsustainable levels and the preventative measures set out in Plan A are not enough, the government has also set out a Plan B for England, which would be enacted if the data suggest further measures are necessary to protect the NHS. Plan B includes: ²

1. Communicating clearly and urgently to the public that the level of risk has increased, and with it the need to behave more cautiously.
2. Introducing mandatory vaccine-only Covid-status certification in certain settings.
3. Legally mandating face coverings in certain settings.

We welcome these measures, but the risk of Covid-19 remains and the room for manoeuvre in the government’s plan is limited. It could cause the NHS to be overwhelmed at regional or national levels, with a high number of avoidable deaths among the unvaccinated, the immunocompromised and the elderly. Meanwhile, a majority of the world’s population remains unvaccinated, leading to a struggling global economy and severely limited international travel; longer term, a real risk remains that a new, deadlier, more transmissible variant of the virus could emerge. It is therefore in our enlightened self-interest to vaccinate the world as quickly as possible – but this must go beyond well-meaning words and loose commitments.

The government has set out the measures it believes can allow the country to manage the autumn and winter period. In our view this plan needs to be accelerated and additional measures introduced, or we

run the risk of further lockdowns. Our paper sets out a credible plan for how these damaging lockdowns can be avoided and a long-term end state of living alongside Covid-19 reached.

Domestically, the government must implement Covid-19 policies that are anchored to a clear short-term goal, otherwise the UK runs the risk of pursuing piecemeal tactics without the right plan. Recent discussions on boosters and vaccinating children fall into this category. As winter approaches, the immediate goal must be protecting the NHS and ensuring the percentage of patients in intensive-care units (ICUs) with Covid-19 does not breach its current levels of approximately 25 per cent.

Achieving this requires action now. We propose a combination of measures that directly prevents at-risk individuals from being hospitalised or dying of Covid-19, alongside a second set of measures that provides indirect protection to these groups by helping to keep case rates at a manageable level.

The first set of measures combines quickly administering third-dose booster shots for over-50s, giving therapeutics to those who test positive and a final push to convert those people who have been hesitant about vaccination.

The second set includes transmission-reducing measures such as enforced mask-wearing in crowded, unventilated spaces and the vaccination of teenagers now – especially those who spend time with elderly or vulnerable adults.

The use of a Covid Pass can help support both sets of measures and goals by incentivising vaccination and reducing transmission. As we have set out in previous papers, a Covid Pass is also the central plank in ensuring future lockdowns are avoided.

New and bespoke communications strategies are also required to ensure all those who can have the vaccine take up the offer. This could include proposals like a specific website and helpline to give factual information on the vaccine and related concerns.

In addition to these measures, further restrictions may be required if cases increase and there is an associated rise in fully vaccinated elderly people being hospitalised. Based on our modelling – which accounts for an expected winter surge in ICU demand – this daily case number would be around 50,000 per day, roughly double the current numbers. This is an essential short-term goal.

Longer-term, we must do all we can to bring Covid-19 to a manageable endemic state where cases are largely contained and – at worst – only a small number of outbreaks occur.

Ultimately, this can only be achieved by reducing transmission across the globe, and the UK must play an active role in helping to vaccinate global populations as quickly as possible and ensure that doses are administered strategically worldwide – focusing on health-care workers, vulnerable people and those living in densely populated areas.

Thinking globally should extend to every domestic decision the UK government takes now: we must account for the need to deploy precious doses around the world. For this reason, boosters should not be given to everyone and instead reserved only for those genuinely at risk from waning immunity. Based on the latest data from Public Health England, we believe this means giving boosters to those aged 50 and over, where the fully vaccinated account for 71 per cent of hospitalised cases, and the immunocompromised. Based on our analysis of global vaccine supply, if this approach were to be replicated across OECD countries, it would require roughly 500 million doses compared to 1.1 billion doses if we boosted everyone.³ The UK decision alone will have a smaller impact, and can be mitigated through faster and further action on vaccinating the world by implementing proposals we have set out in recent papers.

Finally, the UK's response to the pandemic has been characterised by the strength of our life-sciences sector, which has delivered rapid diagnostics, powerful therapeutics and workable vaccines that continue to save lives – and will do so the world over. As part of our long-term objective to reach an endemic state, innovations that can reduce transmission – including mucosal vaccines and antivirals – must be funded and supported.

Recommendations

This paper sets out two goals and the requisite set of policies to achieve them. Short term, it is paramount that we protect the NHS as winter approaches, recognising that a growing number of fully vaccinated elderly people are likely to be hospitalised following a positive Covid-19 test. Longer-term, we must work to make Covid a manageable endemic disease.

Short-Term Goal: Protect the NHS This Winter

Status: An acceptable level of symptomatic cases with the risk of hospitalisation and death removed or significantly reduced and the economy fully open.

Key Metric: Covid-19 patients as a proportion of ICU capacity stays below the current level, which is close to 25 per cent.

Policies to Protect At-Risk Populations

1. **Give third-dose boosters to the immunocompromised, health-care workers and those aged over 50 who are at risk of death or hospitalisation.** The immunity provided by the initial vaccine regimen is waning, and now 71 per cent of Covid-19 hospitalisations among the over-50s are fully vaccinated patients. Alongside the immunocompromised and health-care workers – who were vaccinated first and may be subject to waning immunity – this age group should be given additional shots.
2. **Deliver a final push to get the unvaccinated vaccinated.** Those most at risk of death are the unvaccinated over-50s and those with underlying health conditions. There are around 5 per cent to 10 per cent of the population in this category. Unvaccinated people also make up the majority of hospitalisations and ICU cases (and tend to also have underlying conditions such as high BMI). These people need to be vaccinated, and a Covid Pass should be introduced that provides an incentive to be inoculated.
3. **Provide therapeutics, including antivirals and monoclonal antibodies for at-risk unvaccinated people who test positive.** Monoclonal antibodies are widely available and, although expensive, do reduce deaths by 80 per cent among the vulnerable who test positive but receive them pre-hospitalisation. Antivirals prevent a virus from multiplying and can be used after a positive result.

Policies to Prevent Transmission

1. **Reintroduce mandated mask-wearing** in large indoors spaces and on public transport, and

encourage mask-wearing when interacting with vulnerable family members. Various studies have shown that masks reduce transmission, and we want to make sure that the unvaccinated and potentially at-risk fully vaccinated people aren't being infected.

2. **Rapidly vaccinate children aged 12 to 15, aiming for completion by October half-term, with strong guidance that parents immediately vaccinate those children who are in close contact with elderly relatives (for instance, a grandparent who looks after them).** Children are at much lower risk from the serious effects of Covid-19 but account for a large proportion of cases, with the most noticeable increase among those aged 5 to 11 years old. Since March 2021, case notification rates in those aged 16 to 18 years have increased more sharply than in other age groups, and this age group has had the highest case notification rate of all age groups since then. Case notification rates have also increased sharply in children aged 12 to 15. ⁴
3. **Consider vaccinating under-12s.** Careful consideration of data to make these decisions is essential and cannot be rushed. Therefore, it is important that the government now turns its attention to exploring whether vaccination can be extended to children under 12 in order to further reduce transmission in schools and between young children and at home.

“Emergency Break” Policies

Circuit Breaker: Our modelling suggests if cases double and boosters aren't rolled out, there will be a significant number of fully vaccinated people entering ICU. If we hit this point, then we'd need to limit mobility among the population and reintroduce the working from home mandate. Another lockdown must be avoided.

Long-Term Goal: Work to Reach a Manageable Endemic State

Status: Minimal cases and surveillance in place to identify outbreaks.

Key Metric: Reduce daily Covid-19 cases to manageable level and break the link with hospitalisations.

Policies

1. **Strategically vaccinate the world as quickly as possible, focusing on health-care workers, densely populated urban areas and those most at-risk from Covid-19.**
2. **Expand genomic sequencing, surveillance testing and rapid diagnostics to quickly identify and curtail outbreaks.**
3. **Invest in transmission-reducing measures, including mucosal vaccines.**
4. **Continue thorough analysis of antibody levels** to allow us to continue to track the progress and efficacy of the Covid-19 vaccines as new variants emerge.

5. **Monitor supply chains to ensure we are producing adequate amounts of new low-dead-space syringes**, but also other crucial emerging technologies that require us to rapidly scale up production in order to meet global demand.

Part 1: The Short-Term – Protect the NHS this Winter

As it currently stands in the UK, most Covid-related restrictions have been removed, case numbers fluctuate as mass events take place, and vaccine rollout struggles to reach a relatively small but significant group of hesitant, unvaccinated individuals. Rates of hospitalisations and deaths are lower than at previous points in the pandemic in relation to case numbers, thanks to the effectiveness of the vaccines, but a number of trends mean that we must take action now to prevent the NHS from being overwhelmed this winter.

The latest data show that vaccines are working well to prevent severe outcomes, but this reduces as people get older, and a growing proportion of Covid-19 deaths are among fully vaccinated older people. It is important to note, however, that older age groups contain the most fully vaccinated people and logically, therefore, show the highest number of deaths among those who have been double jabbed.

Although the highest number of hospitalisations is currently among the older age cohorts, these rates are considerably lower compared to the previous spike in January. This underscores how effective the vaccines have been at preventing hospitalisations as well as deaths, even in vulnerable groups. So while we need to boost protection for the vulnerable vaccinated as we enter winter, we also need to be clear that the primary risk to the NHS, certainly for now, comes from the unvaccinated.

As we enter autumn and winter, we are faced with a largely vaccinated population where the vast majority have a high degree of protection against symptomatic Covid-19 and hospitalisation. But every day, antibodies are dropping as the immunity conferred by the first two vaccine doses decreases, while at the same time, tens of thousands more people attain some level of natural immunity through infection or reinfection. It is an ever-changing scenario and one that, from a policy perspective, requires a clear focus and objective.

The priority must be protecting ICU capacity and ensuring that anyone at risk of hospitalisation from Covid-19 has their immunity boosted. Vaccinations weaken but do not fully break the link between rising cases and ICU demand, so handling this phase of the pandemic will also require measures targeted at bringing case numbers down.

Protect ICU Capacity and Address the Waiting List

There are generally four types of bed categorisations when it comes to ICUs. Level 0 is for patients whose care can be met in an acute hospital setting. Level 1 critical care (one level of severity greater) is

for patients whose condition is at risk of worsening, or those who have just been relocated from the next level of critical care. In Level 2, patients require specialised care and more around-the-clock observation and interventions, such as when an organ is failing or during the postoperative period. Level 3 critical care is the highest level, for patients who need respiratory support, or may have multiple failing organs. Our focus is primarily on Level 3.

Last year, routine health care was heavily scaled back to avoid the NHS becoming overwhelmed due to Covid-19. Another year like this would add significant further pressure to the backlog.

Lockdowns also meant that hospital admissions due to flu fell from the previous year, which kept additional strain off the NHS. This year ICU capacity needs to be ready to cope with both Covid-19 and flu.

We also must ensure the NHS is better able to deliver routine health care.

The total number of hospital beds in NHS England has nearly halved over the past 30 years, from around 299,000 in 1987/88 to 141,000 in 2018/2019. Before the pandemic, winter bed occupancy had been around 95 per cent of capacity. We can expect to be even closer to maximum capacity this winter, as Covid safety measures for non-Covid patients as well as beds being taken up by Covid patients will put additional demands on ICUs.⁵

Historically, ICU has operated at between 80 and 85 per cent capacity during winter and with no plans for extra capacity, it is important that we are able to keep the number of beds taken up by Covid patients to a minimum – especially if we want to keep the NHS open for other treatments this winter. This does not account for regional variation on capacity and cases, meaning there may be more acute pressures in different parts of the country.

Currently, Covid-19 patients are using 20 to 25 per cent of ICU occupancy – so for the NHS to be able to deliver routine health-care treatment at normal levels, we need to act now to keep Covid admissions from significantly increasing. If daily infections double from their current rate and exceed 50,000 per day, our modelling suggests that ICU capacity could become dominated by Covid-19 patients, seriously disrupting routine NHS care even further. To prevent this, we must do two things quickly: protect those at risk and keep case rates to a manageable number.

The Short-Term Policy Goal: Prevent Hospitalisations and Deaths

We need to implement measures that will help prevent both unvaccinated people and people who are fully vaccinated but at-risk from entering ICUs. We can do this in two ways:

1. Boosting protection for those at risk from death and hospitalisation; and

2. Keeping overall daily case numbers at a manageable level (one that keeps the economy open but simultaneously limits the number of hospitalisations and strain on the NHS).

If ICU admissions rise to the point where the proportion of Covid patients in ICU beds risks overwhelming NHS capacity, further measures will be required in order to reduce transmission.

The next sections of this chapter set out steps for delivering this two-pronged approach.

How to Directly Boost Protection for Those at Risk From Death and Hospitalisation

Recommendation 1: Provide boosters for those over 50 and the immunocompromised

It is clear that booster shots are necessary, and we need to administer them as quickly as possible. Although the government has recently decided to offer a third-dose booster to 500,000 immunocompromised individuals, boosters will be most impactful if rolled out to a much larger number of people, specifically those aged 50 and older.

For example, booster vaccines in Israel have had significant uptake, and they now appear to be having the desired effects on hospitalisations and serious illness. Studies from Israel have shown that three doses provide 95 per cent protection from infection, while two provide just 42 per cent protection.⁶

Everyone over 50 who wants a booster jab should get one – regardless of whether their immunity is natural (in other words, from previous infection), from vaccination or both. The question is not one of science, but rather logistics. In the interests of speed and providing as much protection to as many people as possible this winter through boosters, the key determinants for booster jabs should remain being over age 50 and being fully vaccinated.

Figure 1 – Decisions taken on booster shots around the world

Country	Boosters?	Date boosters were approved	Age Range	Vaccines being used
Austria	Yes	10 August	65+ (As well as residents of care homes, those with certain illnesses that put them at increased risk of severe Covid-19, anyone who received either a Johnson & Johnson or AstraZeneca shot as their initial vaccine)	Pfizer and Moderna
Belgium	Yes	18 August	Immunocompromised individuals, a group that consists of between 300,000 and 400,000 people	Pfizer and Moderna
France	Yes	12 August	65+ (As well as residents of care homes, people with comorbidities, and immunocompromised individuals)	Pfizer and Moderna
Germany	Yes	2 August	People originally vaccinated by Johnson & Johnson or AstraZeneca	Pfizer and Moderna

Country	Boosters?	Date boosters were approved	Age Range	Vaccines being used
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are eligible for a third dose of Pfizer or Moderna

Hungary	Yes	18 July	Anyone who wants one	Mix and match strategy
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Ireland	Yes	8 September	80+ (As well as over-65s living in care homes)	Pfizer and Moderna
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Israel	Yes	30 July	40+ (As well as health-care workers over 30)	Pfizer
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Italy	Yes	13 September	80+ (As well as the immunocompromised, care workers frequently exposed to the virus, and nursing home residents)	Pfizer and Moderna
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US	Yes	18 August	18+ (Immunocompromised already eligible)	Pfizer
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Source: <https://www.politico.eu/article/vaccine-booster-coronavirus-covid-19-europe-delta-varian-who/>

Using AstraZeneca for Boosters

As we set out in more detail below, vaccine hesitancy is a major issue around the world. Many people report that their main reason for not wanting to get vaccinated is concern over side effects. This hesitancy based on side effects disproportionately impacts the AstraZeneca vaccine, even though the data clearly show it is just as safe and effective as others.

The UK should be championing this UK-made, not-for-profit vaccine that has and will continue to play a leading role in the effort to vaccinate the world. While the Medicines & Healthcare products Regulatory Agency (MHRA) has approved the AstraZeneca vaccine to be included in the booster campaign,⁷ the Joint Committee on Vaccination and Immunisation (JCVI) has stated a preference for Pfizer to be used and a half-dose of Moderna to be used as an alternative.⁸ By not including AstraZeneca as an option for booster jabs, especially for people who received AstraZeneca originally, the UK government could inadvertently be furthering the narrative to the UK population and the rest of the world that AstraZeneca is not on a par with the other vaccines available.

This narrative has been carrying on for some time now, and the AstraZeneca vaccine continues to face the consequences of the growing brand-specific hesitancy. For example, approximately 40,000 doses of the AstraZeneca vaccine were thrown away in Wales because they expired before they were able to be administered.⁹ Across England, Scotland, Wales and Northern Ireland, 48.9 million doses of AstraZeneca have been given. So, if this wastage rate of 1.7 per cent is the same across all nations, that could mean that more than 800,000 doses have expired across the UK.¹⁰ When considering how many countries lack the number of doses they need just to vaccinate vulnerable populations, it is unacceptable that this many doses are going to waste, for no reason other than the brand of vaccine being offered.

As it stands, there is no clinical reason why AstraZeneca cannot be used as a booster for those who have received two doses of the vaccines. In fact, recent studies show the vaccine to have a similar safety profile as mRNA vaccines, with risks of blood clots higher from Covid, and, over time, a sustained, long-term effectiveness compared to other vaccines. For this reason, not including AstraZeneca in the booster regime risks further undermining the vaccine's role in the global rollout. This is a significant issue given that AstraZeneca should be the workhorse vaccine of the global rollout, as we have previously set out.

Domestic Booster Capacity: Supply and Staffing

According to statements made by the government, the UK has more than enough doses to carry out this booster programme domestically. It is unlikely but still unclear whether boosters will compromise pledges made to send doses abroad.

NHS capacity to administer boosters is another factor to consider. Because the decision to vaccinate all children aged 12 and older was made in mid-September, and therefore rollout to this age group did not

begin over the summer, the next few months could see a wave of pressure on the NHS’s vaccination capacity. On top of the Covid-19 vaccines, which is likely in time to include a wider booster programme and extend eligibility to children 12 and older, the NHS will also be in the middle of flu jab season. On average, the NHS administers 14 million flu jabs to adults and children each year.¹¹

Figure 2 – Number of people who may need a jab from the NHS in the autumn

Group	Total number of people needing a jab
<u>Second doses</u>	4.4 million ¹²
Immunocompromised	500,000
Adults 50 and older (potential boosters)	25 million
Total	About 30 million

Sources: https://c8930375-0dbb-4319-ae2f-025f70d4b441.filesusr.com/ugd/ab45f7_a40832c6069842e6af33fcf2b06611bf.pdf and <https://www.ons.gov.uk/peoplepopulationandcommunity/populationandmigration/populationestimates/articles/overviewoftheukpopulation/january2021> and <https://vk.ovg.ox.ac.uk/vk/inactivated-flu-vaccine>

Thinking Globally: The Impact of Boosters on Global Supply

Vaccine supply is an important consideration in the boosters debate – not just to determine if the UK has capacity to roll out third doses, but also for understanding the strain that boosters may put on global vaccine capacity. Modelling in a [recent Global Health Security Consortium report](#) showed that if every OECD country were to hold on to doses in order to roll out boosters, it would likely delay global rollout

by two to three months. The impact of the UK deploying booster shots for over-50s and vaccinating 12- to 15-year-olds is likely to be much less.

However, if AstraZeneca is taken out of the equation, either because a government decides not to use the vaccine or people decide not to accept it, the risk of delaying vaccinating the world increases. Behind Pfizer, AstraZeneca has the most vaccine supply agreements by dose. The companies with the five largest totals for doses agreed are: Pfizer, with supply agreements totalling approximately 5.5 billion doses; AstraZeneca, with agreements totalling 3.5 billion; Novavax, with about 2.6 billion doses; Moderna, with around 2.2 billion doses; and Janssen/Johnson & Johnson with an estimated 1.6 billion doses. ¹³

AstraZeneca has a huge role to play in vaccinating the world; the UK government can incorporate the vaccine into its booster campaign in order to restore confidence in the vaccine and ensure global supply is not hindered by AstraZeneca-specific hesitancy.

Recommendation 2: A Final Surge to Vaccinate the Unvaccinated

A critical step in bringing Covid-19 under control and allowing us to live alongside the virus is ensuring maximum possible vaccine take-up. While the UK has made remarkable progress on vaccinating its population, hesitancy remains, particularly among groups most likely to be spreading the virus. Currently, there are 2.3 million people aged between 18 and 29 in England who are completely unvaccinated. The right policy mix, including incentives, is required to encourage them to be vaccinated.

The Situation on Vaccine Take-up

Those most at risk of death are the unvaccinated over-50s and those with underlying health conditions. There are 5 per cent to 10 per cent of the population in this category. Unvaccinated people make up the vast majority of current hospitalisations and ICU cases, and these cases also tend to have underlying conditions such as high BMI. These individuals need to be vaccinated.

To date, more than 48 million people have had a first vaccine dose. About 89 per cent of over-16s and more than 43 million (80 per cent) of over-16s have had both doses. As we approach the end of September, vaccination rates are now rising very slowly or levelling off in every age group in the UK apart from 16- and 17-year-olds.

The highest rates of vaccination can be seen in the oldest age groups, which were the first groups eligible for vaccinations. There are also disparities in uptake between ethnicities and geographical locations, with vaccine take-up in poorer areas lower than in more affluent areas, for instance. ¹⁴

According to the government's autumn/winter plan, roughly 5.5 million people aged 16 and older in England remain unvaccinated. ¹⁵

Vaccine Hesitancy

Many areas across the UK have seen a fall in vaccine hesitancy in 2021, but local variation remains. In line with trends observed across Great Britain as a whole and as of 9 August 2021, young adults, those of Black or Black British ethnicity, the unemployed, and those living in deprived areas (England only) are generally the most hesitant towards vaccines across all English regions, Scotland and Wales. According to the ONS, the highest rates of hesitancy among these groups are generally seen in London and the Midlands.¹⁶

Another study suggested that the main reason for vaccine hesitancy – cited by 42.7 per cent of the 9,981 UK participants – were concerns over future unknown effects of a vaccine.¹⁷ Other causes of hesitancy, especially among young people, include the belief that the vaccines were developed too quickly and have therefore not been rigorously tested, the risk of rare side effects, and the belief that the vaccine is unnecessary for those at low risk of harm from the virus.¹⁸

Incentivising Vaccine Take-up

In order to promote vaccination, there are several examples domestically and internationally of governments, organisations and companies incentivising vaccination. For example, in the US, the governor of West Virginia, Jim Justice, announced that all West Virginians aged 16 to 35 who have been fully vaccinated are able to register online to receive either a \$100 savings bond or a \$100 gift card. In a survey of 7,249 people by the UCLA Covid-19 Health and Politics Project, a third of the unvaccinated population said a cash payment would make them more likely to be vaccinated.¹⁹

Similar initiatives have occurred in the UK. For example, Asda offers £10 George vouchers to 18- to 30-year-olds who spend more than £20. The travel website lastminute.com offers over-18s a £30 gift card towards holidays abroad. And National Express Buses in the Midlands has offered 1,000 people five-day unlimited travel-saver tickets, which can be used within 90 days, claimed by sharing vaccine booking references in the company's app.²⁰

Mandating Vaccination

In his recent announcement, US President Joe Biden announced an extensive vaccine mandate for private companies that employ more than 100 people. If vaccinations are not mandated, weekly testing is required instead. This requirement will affect more than 80 million workers.²¹

This new policy proposal comes after sweeping mandates for federal employees across the government. As part of this effort, the Department of Defense, the Department of Veterans Affairs, the Indian Health Service and the National Institutes of Health will complete implementation of their previously announced vaccination requirements, affecting 2.5 million people.²²

Vaccinations are also required for more than 17 million health-care workers at Medicare- and Medicaid-participating hospitals and in other health-care settings.²³

These mandates are clearly having an impact on vaccination rates. For example, at the beginning of August, when Tyson Foods announced its requirement for employees to be fully vaccinated, only 45 per cent of its workforce had gotten a jab. As of early September, it stood at 72 per cent, indicating that half of Tyson's previously unvaccinated workers had since received vaccines. United Airlines also announced its vaccination requirement, which led to more than half of its unvaccinated employees getting vaccinated. In Washington State, the weekly vaccination rate jumped 34 per cent after the governor announced requirements for state workers.²⁴

France took a slightly different approach to mandating vaccines by requiring the use of a Covid Pass to access many aspects of society. According to the prime minister's office, 12 million people have been vaccinated since President Emmanuel Macron announced the introduction of a coronavirus passport in July. While opinion is mixed, it is reportedly the view of many doctors that the requirement of the passport flattened the curve of the pandemic this summer. The passport scheme was enacted as France was facing a third wave fuelled by the Delta variant and the easing of preventative measures.²⁵

Launch a Focused Communications Campaign to Convert the Vaccine Hesitant

A significant amount of misinformation remains about the vaccine. We believe the government should seek to tackle this with a renewed communications strategy, setting out a national mission to ensure that all those who are able to be vaccinated *are* vaccinated. This should be positioned both within the framework of being an act for the benefit of the wider community and tackling specific issues of misinformation about the vaccine.

Vaccine uptake falls alongside NHS Test and Trace within the "Route Back to Normality" branch of the government's "Beating Covid-19 and Backing the NHS" strategy under the 2021–2022 Build Back Better vision.²⁶ This communications campaign has focused primarily on swift delivery of the vaccine alongside strengthening the NHS through the "We Are the NHS", "Help Us Help You" and "Better Health" campaigns. The government estimates that as a result of such communications, it saved between 22,629 and 27,658 lives and prevented between 1.5 and 1.8 million infections between April and December 2020.

Yet a study of 9,000 people completed by Belong – the Cohesion and Integration Network – and the University of Kent in August 2021, funded by the Nuffield Foundation, found that over half of respondents (51.6 per cent) perceived the UK government's Covid-19 communications to be low in honesty and credibility when compared with local-government communication (which just 35.5 per cent of respondents perceived to be low in honesty and credibility). Significantly, the study – titled "Public Perceptions of UK and Local Government Communication about Covid 19" – also found that

participants considered government information as more highly accessible and easy to find (44.8 per cent) compared to that of local government (23.7 per cent). The authors of the paper concluded that “the information that is most accessible (i.e., from UK government) is generally perceived to be less trustworthy, empathetic, and less focused on community needs”. Such conclusions reinforce those of another Nuffield study, “Fighting A Pandemic Needs Good Information”, which argued for increased transparency about the “data and analysis underpinning public-health decisions and to act quickly to correct inaccurate statements”. ²⁷

Addressing this discrepancy between easily available government information and often limited public trust is therefore essential in ensuring the vaccination of those in the population who remain hesitant about vaccination. In particular, the finding that 50.2 per cent of participants thought government communication was low on empathy suggests that the nature of such current communication itself may have an impact on vaccine uptake.

We believe the government should seek to tackle this with a renewed communications strategy, setting out a national mission to ensure that everyone who is able to be vaccinated gets vaccinated. It should frame this choice as an act that benefits the wider community *and* carefully tackles specific issues of misinformation about the vaccine. We believe a dedicated website and helpline should be set up to achieve the objectives of addressing misinformation and providing reassurance. These resources would be managed by NHS volunteers. ²⁸

Launch a Helpline and Website Aimed at Converting Those Who Are Hesitant About Vaccination

The creation of a specific website containing information about the Covid-19 vaccine would allow existing information from different government websites (including GOV.uk and the websites of Public Health England and the NHS) to be collated in a single accessible location. This would be linked to from the NHS website. Features of the website would include:

- Specific details regarding how the vaccine works, links to book a local appointment, and the vaccination process.
- Facts about the vaccine, its efficacy, its safety and emerging raw data on side effects.
- A FAQs section about the vaccine including risks regarding pregnancy, fertility, Long Covid, interactions with other medications and ongoing conditions.
- A live chat window connected to an NHS volunteer to answer specific questions and concerns.

A detailed core script would be provided to all volunteers.

Of course, the level of hesitancy about the vaccine is unlikely to be solved with a website alone. We also suggest that a database of NHS volunteers be established to provide tailored support to those needing to talk through concerns about the vaccine. As with the live chat window, a detailed core script would be

provided. While the majority of questions would be answered from the script, the involvement of medical professionals would also be desirable to address specific health concerns.

Use a Covid Pass to Incentivise Vaccination

The use of a Covid Pass can serve two purposes – incentivising vaccination and reducing transmission. As we have set out in previous papers, Covid Passes are also the central plank in ensuring future lockdowns are avoided. They are the only tool that allows us to show that those who have the virus and need to stay at home actually *are* at home, and that those who are free of the virus are able to move around freely.

In the short term, a critical element in ensuring vaccine take-up is mandating a Covid Pass in public settings such as hospitality. The French government has shown how a successful implementation of such a pass can drive take-up of the vaccine. In the UK, individuals should be able to present the NHS Covid Pass if asked to do so at public places such as cafes, restaurants, cinemas, large indoor gatherings and sporting events.

In the longer term, the use of a Covid Pass at large-scale or mass events can help keep transmission down and avoid future outbreaks and super-spreader situations. Mandating use of the NHS Covid Pass during periods of high caseloads could also be implemented to curb transmission rates. As we set out in a previous paper, the use of the NHS Covid Pass could have prevented between a quarter and a third of the projected cases and reduced the number of deaths in England alone by between 6,000 and 12,000.²⁹

Consider Mandating Vaccines for Certain Occupations

Vaccine mandates to return to work have been effective in the US, and the indirect mandating of vaccines through the requirement to show a Covid Pass in France has also been successful in increasing uptake. This mandate could include health-care workers or government employees.

How to Reduce Transmission

When compared to the costs of lockdown, interventions such as mask-wearing in certain settings, social distancing and ensuring adequate ventilation in indoor settings come at a very little cost.

Recommendation 3: Implement mask-wearing in large indoors spaces and on public transport, and mask-wearing when interacting with vulnerable family members

In closed spaces, such as public transport and large-scale public events, re-introducing mask-wearing would have a large impact on reducing the rates of transmission without needing to implement harsh

restrictions. Mask-wearing on public transport remains mandatory in a number of other countries, such as Germany, France and Italy.

Studies have shown that mask-wearing has a notable impact on reducing transmission. In Germany, studies focusing on mask-wearing in April 2020, around the time that it became mandatory, have estimated that wearing face coverings reduces the daily growth rate of infections by 47 per cent to 70 per cent.³⁰ A similar study carried out in Ontario, Canada, in July and August of 2020 highlights that two weeks after their implementation, mask mandates resulted in a 25 to 31 per cent weekly reduction in new cases.³¹

Additionally, a study jointly conducted by the Universities of Yale and Stanford showed that in Bangladesh, mask uptake resulted in a sharp decrease in symptomatic cases, at around 10 per cent. This figure rises to 35 per cent for people aged over 60. Although presenting a very different situation to the UK, the study is significant because of its size: with 340,000 people taking part, the study was run as a random control trial and is the largest of its kind.³²

Recommendation 4: Introduce measures to ensure adequate ventilation in populated indoor spaces

Adequate ventilation reduces how much virus circulates in the air, which helps reduce the risk from aerosol transmission. It is widely accepted that the risk from aerosols is greater in areas that are poorly ventilated.³³

The government has allocated £25 million for 300,000 CO₂ monitors in schools. The monitors will serve to alert staff if CO₂ levels rise, indicating that fresh air is failing to circulate. Prior to this decision, government guidance on ventilation did not go much further than recommending that windows are opened in order to improve natural ventilation – but this recommendation is not always practical on cold days during the British winter.

With the monitors in place, schools would be able to tell which rooms should keep their windows open, but there must be further support for air purifiers or mechanical ventilation so that pupils and staff have alternatives, especially in the winter, to opening windows.

The government's plan for ventilation does not set out what schools should do if their new CO₂ monitors identify areas of poor ventilation. It does not appear that there is additional funding set aside to improve ventilation in classrooms that have poor airflow, and the government has not yet given guidance to schools as to what steps should be taken once poorly ventilated rooms are identified.

Recommendation 5: Vaccinate Children Aged 12 to 15 as Quickly as Possible

In recent weeks, the number of children testing positive for Covid-19 has increased drastically. The American Association of Paediatrics has reported that on the week ending 26 August, children

accounted for 22 per cent of the total number of Covid-19 cases in the US. Although children themselves are not generally vulnerable to severe Covid infections, their parents, grandparents and family members could be. The government should approve vaccines for all children aged 12 and older, but leave it as optional, with accompanying guidance that parents vaccinate kids who are in close contact with elderly or immunocompromised relatives.

Although the UK had one of the earliest starts rolling out vaccinations, the government has been slow to extend eligibility to all children aged 12 and over, a decision already taken by several other major countries. For example, the US approved the Pfizer vaccine for 12- to 15-year-olds in early May, and Israel followed just a few weeks later. It is worth noting that in the UK we are now seeing case rates among these younger groups growing at rates over 100 per cent higher than the spike in January, due to the more transmissible Delta variant.³⁴

Now that the decision has been made to extend eligibility to all children aged 12 and over, the government must work to ensure these doses are administered by October half term. This is feasible. The UK has managed to administer more than 800,000 doses in a day during the vaccine rollout – equivalent to a quarter of the circa. 3.2 million children aged 12-15. As the table below shows, countries that began vaccinating children earlier than we did are now some way ahead.

Figure 3 – Countries vaccinating children aged 12 and older

Country	Vaccinating all children 12 and up?	Mandatory?	Date Approved	Uptake/Coverage
UK	Yes	No	14 September	
Denmark	Yes	No	17 June	58.2% with at least one dose 43.6% fully vaccinated <i>*Denmark collects its data as a 10- to 19-year-olds age group</i>

France	Yes	Yes (vaccine passport from 12 years and 2 months)	Administration started on 15 June	66% with at least one dose 51% fully vaccinated
Germany	Yes	No	16 August	20% with at least one dose 10% fully vaccinated <i>*This data is from August, before vaccination was opened to all children over 12</i>
Ireland	Yes	No	Administration started on 14 August	53.6% with at least one dose 25.3% fully vaccinated
Israel	Yes	Yes	Administration started on 6 June <i>*Teenagers now eligible for boosters</i>	12- to 15-year-olds: 42.4% with at least one dose 30% fully vaccinated 16- to 19-year-olds: 79.6% with at least one dose 70% fully vaccinated
Italy	Yes	Decision to be made by the end of September	6 June	49.9% with at least one dose 28.4% fully vaccinated

Singapore	Yes	No	18 May	TBC
The Netherlands	Yes	Yes (Vaccine passport from age 13)	6 of July	31% with at least one dose 39% fully vaccinated
Sweden	No			
US	Yes	No	10 May 2021	12- to 15-year-olds: 44% with at least one dose 33% fully vaccinated 16- to 17-year-olds: 52% with at least one dose 41% fully vaccinated

Sources: [COVID-19 Vaccine Tracker | European Centre for Disease Prevention and Control \(europa.eu\)](#); [US COVID-19 Vaccine Progress Tracker | Vaccinations by State | USAFacts](#); [Figures on the COVID-19 vaccination programme | RIVM](#)

During the week ending 5 September, the European Centre for Disease Prevention and Control, which collects data from all EU/EEA countries, reported in its epidemiological update that the only age group in which the number of cases had increased was children aged under age 15. As European countries only began vaccinating children aged 12 and over during the summer, it follows that total vaccination levels among 12- to 15-year-olds would be lower than other age groups

In contrast, in France – a country with one of the highest vaccination rates among teenagers – the transmission rate among 10- to 19-year-olds went down by 26 per cent in the week ending 5 September. Statistics from San Francisco also support the idea of vaccinating teenagers to bring the number of Covid cases down: around 90 per cent of teenagers there are fully vaccinated, and there have been no Covid-19 outbreaks since schools reopened on 16 August.³⁵ Outbreaks are defined by San Francisco’s

Health Department as “three or more cases in non-related households in which the source of infection occurred at the school, and not another setting.”

Additionally, the decrease in cases among 15- to 17-year-olds across Europe, despite most European countries reopening schools at the start of September, highlights the benefits of vaccinating adolescents – and is an example of the continued efficacy of vaccines. It is vital that a swift and effective vaccination campaign be implemented in the UK in order to reverse the trend of increasing cases among young people.

Balancing Risk: Vaccine Side Effects in Children

In terms of risk assessment, it is important to consider the possible side effects for children who receive the Covid-19 vaccine. For the most part, common side effects for children are similar to those experienced by adults, which are similar to those caused by the seasonal flu vaccine: soreness at the injection site on the upper arm, fatigue, headache, achy muscles or joints, and even fever and chills are also possible – all of which are usually temporary and generally clear up within 48 hours.³⁶

The US – which has been administering jabs to 12- to 15-year-olds for several months now and therefore has a large pool of data on side effects – has picked up on a potential but rare side effect for some adolescents. Since April 2021, there have been more than a thousand reports of cases of myocarditis (inflammation of the heart muscle) and pericarditis (inflammation of the lining outside the heart), according to the US Centres for Disease Control and Prevention (CDC). However, considering that hundreds of millions of Covid-19 vaccine doses have been administered, these reports are rare. The problem occurs more often in adolescents (teens) and young adults, and in males. The myocarditis or pericarditis in almost all cases is mild and resolves quickly.³⁷

And while most children are unlikely to be hospitalised with Covid-19, that does not mean that they face zero risks from the virus. For example, we do not yet fully understand Long Covid, and it is possible that children can develop the condition. Additionally, according to the US CDC, some children have experienced Covid-19 infections that began as asymptomatic or mild but weeks or months later developed a condition known as multisystem inflammatory syndrome in children (MIS-C), requiring hospitalisation. MIS-C is “a rare but serious condition associated with COVID-19 in which different body parts become inflamed, including the heart, lungs, kidneys, brain, skin, eyes, or gastrointestinal organs,” according to the CDC.³⁸

And critically, children who catch Covid-19, regardless of the severity of infection, are isolating and missing in-person learning for prolonged periods of time.

Recommendation 6: Explore Vaccinating Under 12s as Data Become Available

The UK was among one of the slowest countries to approve vaccines for the 12- to 15-year-old age group. Careful consideration of data to make these decisions is essential and cannot be rushed. Therefore, it is important that the government now turns its attention to exploring whether vaccinations can be extended to children younger than 12 years old. The sooner this research and analysis begins, the sooner we can determine if we will be able to provide vaccine-induced protection to another age group and prevent more children from catching and spreading the virus, as well as reduce the number of children who miss school due to testing positive for Covid-19.

According to ONS data, there are just over 9.6 million children aged 11 and younger in the UK, so it would take a relatively short amount of time to administer doses to this age group if deemed safe and necessary. ³⁹

Part 2: Long Term – Reaching an Endemic State

Our long-term goal should be to sustainably reduce transmission as much as possible, pushing Covid-19 to become endemic, with only small, contained outbreaks. With the right innovation and set of policies, this is possible. These innovations and policy decisions include:

- Preparing infrastructure for any potential future variants
- Vaccinating the world
- Surveillance and testing
- Biomedical/vaccine innovation

Prepare Worst-Case Scenario Infrastructure

Until we have achieved widespread vaccination globally, we remain at risk of the virus mutating into more transmissible, potentially vaccine-resistant strains. In the eventuality of a new strain or exponentially rising cases, there needs to be infrastructure in place if it is decided that stricter measures are needed. The government has set this out, in part, in Plan B of the autumn/winter strategy.

However, the plan needs to go further and factor in additional considerations. For example, if transmission is high in schools and it is deemed necessary for children to return to remote learning for a period, it is essential that all students have access to the technology and resources they need to continue their education with minimal disruptions. But keeping children in school is – and must remain – a top priority.

In order to protect medical staff, sufficient PPE must be available if cases rise and hospitals end up having to deal with a high number of Covid-19 patients. Mass testing should also be included in this infrastructure. The government should work with British companies to ensure there is sufficient manufacturing capacity to produce tests at scale so they can be deployed if necessary to outbreak areas should cases rise.

Vaccinating the World

The government's autumn/winter strategy references the need to vaccinate the world while noting the contributions the UK has made and its plans for the global vaccination effort. However, it does not go

into detail about the impact of boosters on global supply, nor does it cover the gaps in funding and supply that persist.

As of September 2021, the WHO's ACT Accelerator dashboard indicates there is a funding gap of \$16.6 billion if it is to complete its work of delivering tests, treatments and vaccines around the world.

The key COVAX milestone of two billion doses released for delivery is now expected to be reached in the first quarter of 2022 rather than by the end of 2021.

Of the 5.6 billion shots given globally, 80 per cent have been administered in high- and upper-middle-income countries, while less than 0.4 per cent have been administered in low-income countries.

According to the latest COVAX Global Supply Forecast, COVAX expects to have access to 1.425 billion doses of vaccine in 2021, according to the most likely scenario and in the absence of urgent action by producers and high-coverage countries to prioritise supply to the initiative. Of these doses, approximately 1.2 billion will be available for low-income economies participating in the COVAX Advance Market Commitment (AMC). This is enough to protect 20 per cent of the population, or 40 per cent of all adults, in all 92 AMC economies with the exception of India.

As the data in this section set out, and as we have stated previously, we clearly have a long way to go to vaccinate the world. The UK needs to continue to share doses and to support COVAX. Unfortunately, as the table below shows, the UK has delivered less than seven per cent of the vaccines it has promised to developing countries.

Global vaccination considerations need to be at the heart of the government's autumn/winter plan alongside domestic policies because efforts to vaccinate the world matter as much as domestic vaccination efforts.

Surveillance and Outbreak-Induced Testing

We welcomed the government's announcement in May that wastewater testing was to continue and that it had ramped up sequencing capacity to support variant detection.⁴⁰ Utilising surveillance methods, such as wastewater testing, will allow local authorities to identify outbreaks quickly. Any area where outbreaks are detected via wastewater testing or other surveillance means should be subject to mass testing as quickly as possible to slow virus spread and prevent any further spread.

Genomic Sequencing

Sequencing will be critical to understand how the virus evolves and to track changes in efficacy of vaccines, therapeutics and possibly diagnostics. The UK has led on genomic sequencing throughout the pandemic and this must continue. The UK has also leveraged this expertise to support global-sequencing

capacities through the creation of the New Variant Assessment Platform (NVAP), which was set up by Public Health England (PHE). The platform aims to deploy the UK's unique sequencing and virus-assessment capabilities to help other countries respond to Covid-19 and strengthen global health security.⁴¹

Biomedical and Vaccine Innovation

Historically, some experts have argued that pandemics typically have two types of endings: the medical and the social.⁴² The medical occurs when incidence and death rates plummet, or when vaccines prove immensely successful, as was the case with smallpox. The social end of pandemics occurs when fear of the disease wanes, death rates return to “acceptable” levels, and the public learn to live with the virus. Given what we know about Covid-19, it is likely that the latter will be the primary contributing factor to the eventual end of this pandemic. Innovations in how we deal with the virus, however, could accelerate this closure and potentially lead us closer to a more sustainable ending achieved by medical means.

Mucosal Vaccines

The development of more effective vaccines, such as mucosal vaccines, would be advantageous because they induce both a strong immune response and offer greater practicality in terms of cost and administration.⁴³ Typically administered orally or intra-nasally as encapsulated antigens or via droplets, delivery of mucosal vaccinations are low-cost and needle-free. The economic and administration benefits are various:

- **Cost effective:** Mucosal vaccines considerably reduce the multiple costs associated with needle-delivered injections, including but not limited to the cost of the injection device, its correct medical storage and disposal, and administration by professional medical staff.
- **Avoid supply shortages:** Reducing global reliance on medical-grade materials that have been subject to shortages would also moderate production bottlenecks that have curbed vaccine rollout to date.⁴⁴ Delays in plastic and glass production that are needed to produce and store Covid-19 vaccines would also be circumvented.
- **Reduce needle hesitancy:** While the majority of the 25 per cent of the UK adult population who signal positively about their fear of injections have already received a vaccination, those who report a fear of needles are twice as likely to cite phobia as the factor in their vaccine hesitancy. Large-scale studies have shown that a vaccine that avoids administration by needle could reduce hesitancy rates by 10 per cent.⁴⁵

A Combined Covid and Flu Vaccine

The extension of flu-vaccination programmes this winter aims to reduce hospitalisation and mortality at a time when the NHS expects to see an increase in winter outbreaks of Covid-19. The potential co-circulation of Covid-19 and flu has increased pressure on the delivery of both flu and booster doses, particularly among the over-50 age group.⁴⁶ Producing a single flu + Covid-19 vaccination offers one answer to this issue, paving the way to greater efficiencies in health-care systems, and higher levels of protection against both Covid-19 and flu. Trials begun by Australian manufacturer Novavax on 8 September initiated an early-stage study into a combined vaccine, with results expected in the first half of 2022.⁴⁷ An announcement by Moderna on 9 September offered a similar promise of formulating a single vaccine. Not to begin testing until July 2022, however, Moderna and rival Novavax will prioritise separate flu and Covid-19 booster shots ahead of this upcoming winter.⁴⁸

Nanopatch Technology

Investment from late 2020 by the US-based Biomedical Advanced Research and Development Authority into Australian biotech company Vaxxas suggests that the market for needle-free vaccines has been warming up. The deal, which will see \$22 million invested over a three-year cycle into the company, will facilitate the phase 1 trial of Nanopatch, a high-density micro-array patch (HD-MAP) for the delivery of adjuvanted and unadjuvanted influenza vaccines.⁴⁹ Financially backed by Merck, the World Health Organisation and the Bill & Melinda Gates Foundation, Vaxxas's dry-coating technology offers a further solution to complex logistical "cold chains" created for the transport and storage of vaccines. While market incentives to scale up research of Vaccine MicroArray Patches (VMAPs) have been limited, endorsement by UNICEF, for example, underlines real demand for the expansion of self-delivered immunisation coverage. Investing in such innovative vaccine technology, which can be administered easily and swiftly in a cost-effective manner, is a crucial next step in managing the pandemic and future pandemics.⁵⁰

New Needle Technology: Low-Dead Space Syringe

Innovations in syringes, such as Pfizer-BioNTech's low-dead space syringe, allow for the possibility of increasing the vial-to-dose ratio of vaccine produced. When using a regular 25g 1.5-inch syringe for every 0.30ml of fluid injected, 0.08ml additional fluid is lost in the "dead space" that exists between the plunger and needle.⁵¹ By contrast, the recommended low-dead space syringe created by Pfizer-BioNTech has a condensed dead-space volume of 0.035ml, reducing the loss of fluid per injection from 20 per cent to 11 per cent. This allows a sixth dose to be extracted from every Pfizer-BioNTech vial in addition to the regular five doses predicted.

Since it was a relatively new technology without much production demand going into the pandemic, shortages have been an issue. President Biden identified this in his National Strategy for the Covid-19 Response and Pandemic Preparedness briefing, and production has now increased. Companies such as

South Korean manufacturer Poonglim Pharmatech, in collaboration with Samsung, have been comparatively more successful in addressing such shortages by streamlining production efforts. A rapidly increasing production capacity from four million syringes per month as of December 2020 to 30 million per month as of April has contributed to Pfizer's increased vaccine projection from 1.3 billion to nearly 2.5 billion doses worldwide. ⁵²

It is vital that the UK continues to monitor supply chains and ensure we are producing adequate amounts of both these syringes, but also that we support other crucial emerging technologies that are required to rapidly scale up production in order to meet global demand.

Antibody Surveillance

The recent launch of the Antibody Surveillance Programme by the UK Health Security Agency represents the first instance of antibody testing made available to the UK public, who have tested positive for Covid-19. Whereas previous antibody testing of this kind aimed to increase understanding of immunity against Covid-19 from vaccination and infection specifically for clinical or research purposes, this new initiative will allow 8,000 people per day to carry out at-home testing. ⁵³

This will add to the efforts of the REACT studies (Real-time Assessment of Community Transmission), carried out by Imperial College London and Ipsos MORI in partnership with the Department of Health and Social Care and the NHS. Findings from Covid-19 round 12 REACT-1 study, taken from almost 109,000 volunteers tested in England between 20 May and 7 June 2021, found that, despite the successful vaccine rollout, Covid-19 infections rapidly rose in this period. ⁵⁴ However, findings from the more recent REACT-2 study carried out on 207,000 adults between 12 and 25 May revealed that almost 100 per cent of people had antibodies to the virus two weeks after receiving their second dose of Pfizer or AstraZeneca. ⁵⁵

Thorough analysis of antibody levels will allow us to continue to track the progress and efficacy of the Covid-19 vaccines as new variants emerge.

Conclusion and Recommendations

This paper sets out two groups of policy decisions that need to be taken immediately in order to efficiently tackle Covid-19 both in the short and long term. The time to act is now and the decisions taken, or not, in the coming days and weeks will not only determine the progress of the pandemic over the winter but our ability to manage the virus in years to come.

In the short term, we need to focus on keeping ICU figures below the specific threshold described earlier. Reducing the chances of unvaccinated people going into ICU while boosting the protection of the at-risk fully vaccinated to avoid them from having to go in will be integral to achieving this. Meanwhile, we want to keep cases at an acceptable level to reduce the spill-over to these people while keeping the economy open. To make these goals a reality, we need to combine measures that directly boost protection for those at risk from death and hospitalisation while indirectly protecting these groups by keeping cases to a manageable number. These measures include policies to protect at-risk populations and policies to reduce transmission.

Policies to Protect At-Risk Populations:

1. **Give a third-dose booster to the immunocompromised, health-care workers and those aged over 60 who are at risk of death or hospitalisation.**
2. **Deliver a final push to get the unvaccinated vaccinated.**
3. **Provide therapeutics, including antivirals and monoclonal antibody treatments, for the at-risk unvaccinated who test positive.**

Policies to Reduce Transmission:

1. **Reintroduce mandated mask-wearing** in large indoors spaces and on public transport, and encourage mask-wearing when interacting with vulnerable family members.
2. **Rapidly vaccinate children aged between 12 and 15, aiming for completion by October half-term**, with additional guidance that parents vaccinate those children who are in close contact with elderly relatives, such as a grandparent who looks after them.
3. **Consider vaccinating under-12s.**

Covid-19 is likely to be with us for some time. Therefore, short-sighted strategies that fail to consider longer-term management of the virus are inadequate. Our long-term recommendations are based on

policies that will contain outbreaks and ensure that the virus becomes endemic and therefore much less disruptive. Long-term recommendations include:

1. **Strategically vaccinate the world as quickly as possible**, focusing on health-care workers, densely populated urban conurbations and those most at-risk from Covid-19.
2. **Expand genomic sequencing, surveillance testing and rapid diagnostics to quickly identify and curtail outbreaks.**
3. **Invest in transmission-reducing measures**, including mucosal vaccines.

Footnotes

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