

Managing extreme risks

How the new government can learn from Covid to be better prepared for the next crisis



About this report

The Covid pandemic exposed weaknesses in the UK's approach to managing extreme risks. This report looks at some of the problems that emerged and sets out recommendations for how the government could strengthen its risk management to ensure that the UK is better prepared for the next crisis.

 [@instituteforgov](https://twitter.com/instituteforgov)

www.instituteforgovernment.org.uk

Contents

Summary	4
The UK's current approach to managing catastrophic risks	8
The pandemic highlighted weaknesses in the UK's risk management	13
Improving management of catastrophic risks	28
Conclusion	35
References	36
About the authors	50

Summary

Before 2020, the UK's pandemic preparedness was considered world-leading. UK governments had developed new approaches to low-probability, high-impact risks, often described as extreme, catastrophic or tail risks, and international comparisons put the UK among the most prepared countries in the world for a pandemic.¹

However, managing extreme risks well in practice is difficult. Governments face constant pressure on their attention and resources, from the performance of their health and education systems to the many and varied short-term crises that emerge at home and abroad. Tackling these often seems the most urgent priority, making it hard for ministers to devote attention and resources to seemingly distant threats. The UK is no different.

Previous crises, including BSE, foot and mouth disease and swine flu, all exposed problems, including limited service capacity and difficulties with co-ordination and communication. More recently, and starkly, the coronavirus pandemic again showed the UK was less prepared than was thought.

Successive UK governments had identified pandemics as a major threat, but had focused primarily on influenza, significantly underestimating the possible impact of an outbreak of a novel infectious disease such as Covid-19. In 2017, a novel infectious disease had been assessed as likely to cause around 100 deaths.² As of the start of June 2022, just under 178,000 people had died in the UK within 28 days of a positive Covid test, and almost 196,000 with Covid on their death certificate.³

The process for assessing risks was too closed – with too limited a role for external experts. The way risks were monitored was also highly variable: while areas like national security and weather events were monitored by dedicated bodies, monitoring of other risks, including infectious diseases, was primarily led by departments or spread across several agencies.

Some risks were identified but not carried through into operational plans. The UK had, for instance, identified the potential impact of a flu pandemic on the education system, but the Department for Education had not drawn up any plans for closing schools, among the biggest failures of the pandemic.⁴ And while the rapidly developed economic support packages administered by the Treasury and the business department proved far more successful, it is also the case that neither department entered the pandemic with plans for this in place.⁵

There was also too little focus on how resilient, or able to weather shocks, key services – such as health and social care – were, again despite this being identified as a concern by successive exercises.

Four problems underpinned the lack of preparedness exposed by the pandemic

First, risk management was not seen as a priority by many departments. Ministers and key officials devoted relatively little time to it, and the latter were not incentivised to develop necessary skills and expertise. Preparedness exercises are supposed to hold departments' feet to the fire. But they were narrow in scope, and often the recommendations they did produce – such as improving stockpiles of personal protective equipment (PPE) – were ignored.

Second, central co-ordination was too weak. In the UK system, departments are primarily responsible for 'owning' risks, with oversight from the Civil Contingencies Secretariat (CCS) in the Cabinet Office.⁶ But one insider described Whitehall as a "polo mint" – meaning the centre is too weak.⁷ Experts we spoke to felt that the CCS is trying to do too many things at once – including overseeing risk identification and management, and planning for crisis response – and not succeeding in doing all of them well.

Third, resources were not always invested efficiently in maximising resilience. This is hard to get right: constraints on budgets mean ministers face difficult choices about where to allocate spending. It would not be sensible (or politically sustainable) to invest in vast amounts of standing capacity that may never be used or may be poorly suited to the next crisis faced. The key is investing where it can make most difference, while holding back sufficient capacity to tailor a response.

The Office for Budget Responsibility (OBR) has convincingly argued that an important principle for resilience is to retain sufficient fiscal space to respond to the specific threat that materialises: if the UK's public finances became weaker, it would become less resilient.⁸ That said, the pandemic suggested there were areas – particularly in health and social care – where capacity was a major issue, suggesting more than just fiscal flexibility is needed. Ministers will need to focus on how best to invest in flexible capacity that boosts resilience across a range of threats.

Fourth, external scrutiny of government performance on risk management has been limited except in the immediate aftermath of crises. Parliament and the National Audit Office (NAO) have provided some scrutiny, but there is no body that clearly or routinely has this responsibility. The last select committee report on pandemic flu preparedness *not* written in response to a disease outbreak was in 2005.⁹

This report, which draws on expert interviews and a roundtable held with officials and external experts in January 2022, assesses options for strengthening the UK's approach to managing catastrophic risks. It builds on the work of several organisations – including the Centre for Long-Term Resilience (CLTR), the National Preparedness Commission, the NAO and the Lords Select Committee on Risk Assessment and Risk Planning.¹⁰

We focus on the role of central government, while acknowledging that risk management requires a 'systems approach' extending to a wide range of actors beyond Whitehall. The report principally addresses extreme risks, though some of the issues it identifies will apply to wider risk management.

It argues that what is required is nothing less than a fundamental change in culture – giving much greater priority and clout to risk management. To achieve this, it calls for a reorganisation of how risk is managed within government. This should begin with adopting a modified 'three lines of defence' model, which involves separating out responsibilities for risk management, oversight and audit (sometimes the model is described as four lines with assurance divided between internal and external roles).¹¹

The three lines of defence model is widely used in the private sector to hold organisations to account for the way they manage risks. It clarifies roles and responsibilities and ensures challenge. In government, the three roles currently overlap, leading to confused incentives for ministers and officials.¹² From this starting point, we go on to make recommendations for individual departments, the centre of government and external bodies.

The Johnson government committed to improve risk management and a new National Resilience Strategy was due in spring 2022 (although this may now be further delayed until a new prime minister is in place). The incoming government should make this a priority and avoid losing interest as day-to-day pressures return, as has happened after other crises.

This is vital not only in the aftermath of Covid, but also because the risks the UK faces – from extreme weather to biosecurity and new pandemics – may be becoming more frequent and their impact, in an interconnected world, more severe. Government has a critical role in ensuring the UK is better prepared next time.

Recommendations in brief

- The upcoming National Resilience Strategy should set out a plan to overhaul the UK's approach to risk management based on a modified 'three lines of defence' model.
- The first line of defence – day-to-day risk management – should remain with departments, with permanent secretaries explicitly responsible for contingency planning. The Cabinet Office should strengthen incentives to ensure officials develop risk management skills and capabilities.
- To strengthen the second line of defence – oversight and co-ordination – the Cabinet Office should create a strong central unit, built out of the CCS, with responsibility for risk management and the power to proactively assess and hold departments to account on preparedness. This unit should be separate from the crisis response function to ensure it can focus on long-term risk.

-
- This second line should also have a ministerial component – the new prime minister should appoint a strong minister or group of ministers to convene a new cabinet committee to co-ordinate management of cross-government risks and reach agreement on trade-offs. This should sit alongside the National Security Committee with involvement of key cabinet ministers, including the chancellor.
 - To improve the third line of defence – audit – parliament and the NAO should strengthen their scrutiny of risk management. Parliament should create a new cross-cutting joint committee to scrutinise preparedness. The government should also consider the case for a new external body, along the lines of the Climate Change Committee (CCC) and OBR, to provide expert advice and scrutiny.
 - In addition, to ensure risk management is appropriately resourced, the Treasury should require departments to explicitly consider risk management in their spending review bids. This could be done through inclusion in the 'strategic enablers' section of each department's outcome delivery plan. It should also publicly respond to the OBR's annual *Fiscal Risks Report*, to further facilitate scrutiny.
 - Finally, the new prime minister must commit to making the UK better prepared for the next crisis than it was for Covid, as a key cross-government priority. They should appoint a powerful minister, such as the chancellor of the Duchy of Lancaster, to chair the new cabinet committee on cross-government risks and resilience.

The UK's current approach to managing catastrophic risks

The UK system had been considered among the best

Before the pandemic, the UK government had led on new approaches to managing risks and was second in the 2019 Global Health Security Index.¹ But the crisis exposed problems with the way it identifies, monitors and mitigates risks – in particular, extreme or 'catastrophic' risks (often known as 'tail risks'). These are events that are low-probability but high-impact, leading to significant loss of life or economic disruption across the globe.²

Currently the UK government identifies risks through the classified National Security Risk Assessment (NSRA). There is also an unclassified version of the NSRA, the National Risk Register (NRR). The NSRA is produced every two years and is overseen by the Civil Contingencies Secretariat (CCS) in the Cabinet Office. The NSRA does not try to detail every possible risk but instead to capture a wide range of possible impacts. It contains around 120 risks, spanning areas including environmental hazards, risks to animal and human health, malicious attacks and major accidents.

Departments and arm's length bodies (ALBs) are responsible for identifying future threats within their areas, bringing in input from other departments, agencies and local authorities. They identify potential risks and develop a 'reasonable worst-case scenario' for each. These scenarios are analysed by the CCS and examined by an expert challenge group. They are then updated by departments and reviewed by departmental chief scientific advisers (CSAs). The CCS scores each risk on its potential impact, according to the reasonable worst-case scenario, as well as how likely it is to occur over the next two years, and places them in a risk matrix, which is included in the NSRA and NRR. The government chief scientific adviser and deputy national security adviser review the NSRA and it is signed off by relevant ministers and the prime minister.

Each risk is assigned to a lead government department, with the secretary of state, board and accounting officer ultimately responsible. The CCS helps departments prepare for risks and plays a 'refereeing role' to ensure that departments are "engaging with risk management within their portfolios". It does not formally audit departmental preparedness or risk plans.³

As of June 2022 these arrangements are currently being reviewed by the Cabinet Office, which is developing a new National Resilience Strategy, something it committed to in the March 2021 Integrated Review of Security, Defence, Development and Foreign Policy. This will "outline an ambitious new vision" for national resilience and make the UK the "most resilient nation", with a "strengthened ability to assess and understand" risks and systems for managing those risks that are "more proactive, adaptable and responsive". The public consultation on the strategy highlighted the right broad issues,

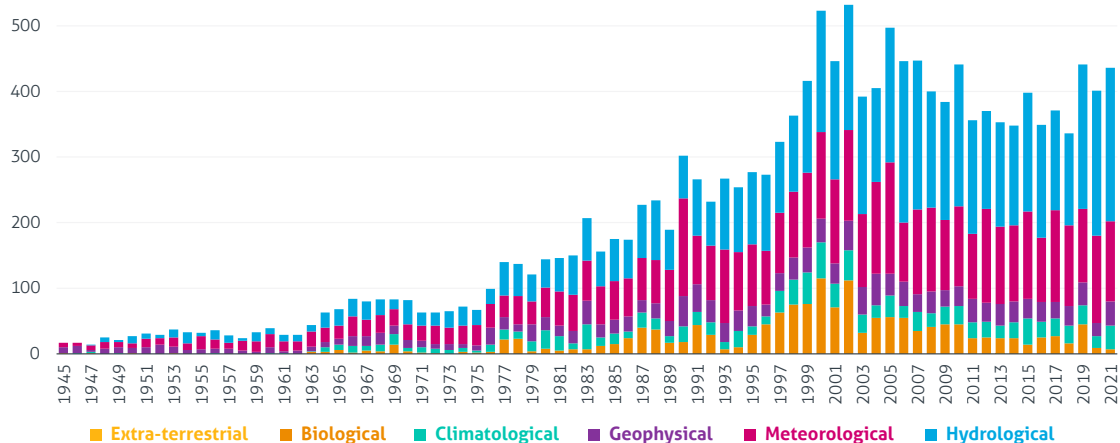
but it is as yet unclear what it will mean in practice.⁴ Although there have been periodic reviews following previous crises, their recommendations have generally only been partially implemented. The new strategy provides an opportunity for the government to assess its risk management system as a whole.⁵

The threat from catastrophic risks is increasing

The current moment is a good one to reassess the government’s approach to risk management, as catastrophic risks may be becoming more severe and more frequent. The Office for Budget Responsibility (OBR) pointed out in its 2021 *Fiscal Risks Report* that just two decades into the 21st century advanced economies have experienced two ‘once in a century’ shocks: the 2007–08 financial crisis and the pandemic. It also notes that reported severe weather and human infectious disease outbreaks have doubled and trebled respectively since the 1990s.⁶

The international disaster database similarly suggests that reported natural disasters increased significantly through the later part of the 20th century (see Figure 1).⁷ Some of this may be the consequence of increased surveillance and reporting, but probably not all – North Atlantic hurricanes, reliably tracked for decades, have, for example, become more frequent and more destructive over the last 50 years.⁸

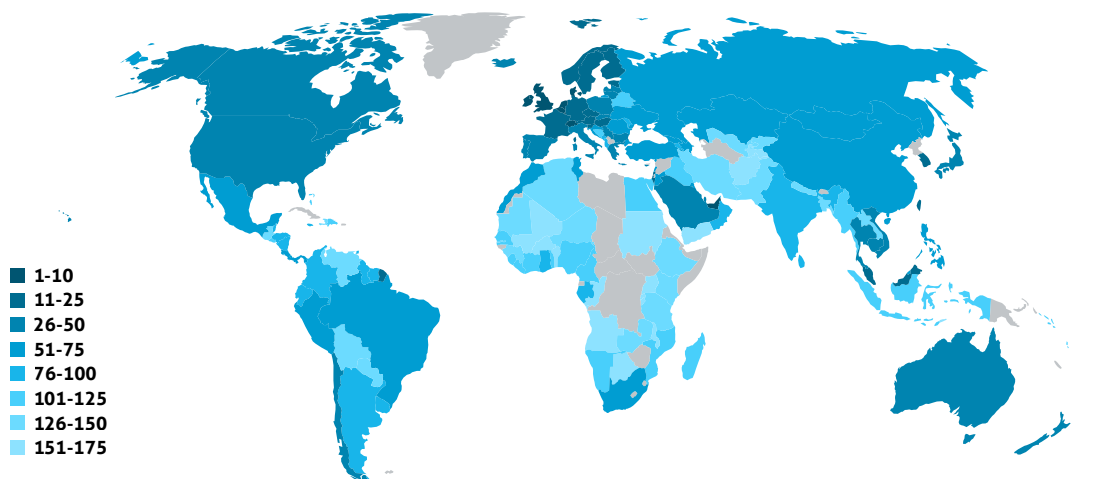
Figure 1 **Number of reported natural disasters worldwide**



Source: Institute for Government analysis of EM-DAT, the International Disaster Database. CRED/UCLouvain, 2022.

The world is also increasingly interconnected. Air passengers have increased seven-fold and international trade six-fold over the last 40 years. Supply chains are closely integrated and increasingly operate on ‘just in time’ models. Risks are therefore more likely to cross borders and impacts be felt globally, as made all too plain in the pandemic. This is particularly relevant for the UK, which is one of the most connected places in the world (see Figure 2).⁹

Figure 2 **Global connectedness, DHL connectivity index**



Source: Institute for Government analysis of *DHL Global Connectedness Index 2020 Country Book*, November 2020.

The kind of risks are also changing. Climate change and environmental degradation are creating new ecological stresses while increasing urbanisation means more people living on flood plains or close to isolated ecosystems. Rapid technological progress has also produced new risks, around biotechnology, for example. Distinguishing between malicious attacks and accidents has become more complex, with increasing cyber attacks and biosecurity threats.¹⁰

Even since the OBR's 2021 *Fiscal Risks Report*, the breadth of risks appears to have increased. Published in July 2021, it stated that "at least one important source of potentially catastrophic risk, that of armed conflict between states (especially nuclear powers and their close allies) appears to have diminished". Six months later Russia's invasion of Ukraine prompted serious talk of nuclear conflict for the first time in a generation.¹¹

That the risks facing the UK are changing and increasing is something that the then paymaster general, Penny Mordaunt, recognised in announcing the National Resilience Strategy consultation, stating:

"As we look out to a world facing climate change and an era of compound economic, environmental, geopolitical and technological risks, we can no longer take comfort that the systems and approaches that have served us reasonably well in the past, will keep us safe in the future."¹²

That too was before the war in Ukraine, though this only makes the case for a reassessment of how the government identifies and manages risks stronger.

Governments around the world find focusing on most risks hard

It is difficult to imagine catastrophic risks before they happen and attention is usually taken up by immediate and day-to-day issues. Ministers' focus – and in particular the prime minister's – is typically short-term. This makes it hard to devote attention and resources to threats that appear far-off and unlikely.

The incentive for governments as a whole to focus on catastrophic risks is also limited – individual risks are, on the balance of probability, unlikely to happen while any one government is in office so the pay-off for action is minimal, particularly when set against other pressures. It can also be difficult to prioritise between risks when deciding where to invest in prevention and preparedness, not least as many cut across policy and delivery areas, something the UK departmental model has long struggled with. Many are also global, requiring high-level international co-operation.¹³

Governments have often been better at preparing for risks they have recent experience of – to 'fight the last war'. After the 2008 financial crisis many advanced economies fiscally consolidated and cut preventative health spending. Some of this was useful in the pandemic – the financial system may have been stronger, while programmes established at that time, like business loan schemes, also proved helpful. But cutting preventative health spending might not have been the first choice with a greater focus on the risk of a pandemic.

Lived experience can be a factor. The UK has relatively few natural disasters compared to many other countries, with the exception of flooding, so there is often little to concentrate the minds of policy makers on risk.¹⁴ Many had experienced infrequent, relatively minor, short-term, or small-scale crises before Covid. For example, while swine flu, foot and mouth disease and BSE were important events that required a co-ordinated response, all involved one or a few departments over days, weeks, or months – a far cry from the whole-of-government response to the pandemic. Any increased attention after a crisis may also be short-lived – the Centre for the Study of Existential Risk (CSER) suggests that risk preparation increases in the immediate aftermath of a crisis but abates over time unless tied in by long term commitments.¹⁵

Policy makers are also subject to many of the same systemic biases as the rest of the population, including group reinforcement and optimism bias.¹⁶ While some identified pandemics as a risk, there was scepticism that one would materialise on the scale of the Covid crisis. The Lords Select Committee on Risk Assessment and Risk Planning found that the notion was largely met with "incredulity" before the Covid pandemic.¹⁷ The lack of experience in dealing with, or thinking about, extreme risks can become reflected in policy makers' mindsets. Interviewees highlighted that countries that are forced to consider some existential threats, such as the persistent threat of nuclear attack for South Korea, find it easier to focus on others.

Governments do seem to find some risks easier to focus on, however – particularly national security. Despite concern about the level of defence expenditure, the Ministry of Defence is arguably an entire department focused on preparing and mitigating this type of risk. The UK is committed to spending 2% of GDP on defence and £0.5 billion was spent on military operations in 2020/21.¹⁸ This does not seem to be solely the result of assessments of likelihood or severity – a flu pandemic was assessed as more likely with a higher potential impact than most of the malicious attacks (like terrorist attacks on infrastructure or chemical or biological attacks) identified in the 2017 NRR, but does not seem to have received as much funding.¹⁹

The pandemic highlighted weaknesses in the UK's risk management

The UK had led on developing approaches to risk management even though it, like other countries, suffered from some of the short-termism and other issues highlighted above when put into practice. But the coronavirus pandemic exposed key weaknesses in the UK's identification and management of risk.

Identifying and monitoring risks

The NSRA severely underestimated the impact of a novel infectious disease epidemic

While the NRR did identify a pandemic as a major threat, it estimated the reasonable worst-case scenario of an emerging disease pandemic at 100 deaths in 2017, far from the actual impact of Covid-19.¹

Some interviewees highlighted the importance of the NSRA in bringing people together to identify potential risks, but there are clearly weaknesses in its approach.

First, the NSRA has been criticised for being too closed, with too little external input. Some external challenge is facilitated, but the Lords Select Committee on Risk Assessment and Risk Planning argued that "much of the scrutiny is provided either by those within government or those appointed by the government" and is overly ad hoc.² This could have been a factor in the failure to correctly identify the potential impact of a emerging disease epidemic. While an assumption that future coronaviruses would follow the path of SARS or MERS would have been understandable, CSER references a "widespread view across academia" that a similar virus could have gone global and "that there was a reasonable probability of an emerging disease killing one billion or more people globally".³ The government is aware of this problem. Roger Hargreaves, head of the CCS, told the committee that injecting "independent challenge" was "probably our highest priority for the next round".⁴

The Lords committee also argued that the NSRA was overly classified, further impeding external scrutiny and public information sharing. We did hear that deciding what to classify has become more complex as it has become harder to draw the line between attacks and natural disasters, with the weaponisation of new areas, for example biological terror attacks, but this should not be a barrier to scrutiny.⁵

Second, the timeframe that the most recent NSRA (2019) covers is too short. The first NSRA was produced in 2010, looking at potential risks to national security over a five- to 20-year horizon. It was accompanied by a separate national risk assessment, which looked at core 'disaster' risks over a five-year period. In 2019 these were combined

into a single NSRA with a two-year timeframe.⁶ This has the potential to further entrench the short-termism in the UK's approach, risking serious threats that might not be likely in the next two years being missed.⁷

The NAO reported that this was to some extent the result of deliberate trade-offs made by the CCS as a shorter timeframe made the NSRA more useful as a tool for emergency planning by reducing uncertainty.⁸ However, the government has recognised the limitations in this approach, stating that some risks will be measured over five years instead in the next NSRA, while Roger Hargreaves told the Public Accounts Committee (PAC) that the intention was to move to live updates as soon as practically possible.⁹

In separating risks out, the design of the NSRA also makes it harder to examine how risks might combine or cascade, as each is treated as separate – for example, if a pandemic and a solar storm happened to coincide, or if a total electricity failure led to cascading risks.¹⁰ CSER suggested that the fact that food shortages were only listed as a potential consequence in the 2020 NRR rather than a risk in their own right was an example of this.¹¹

There are strengths to the NSRA process, particularly in bringing together key participants on a regular basis – but the real test is what types of behaviours and outcomes the process leads to.

Monitoring seems to have been varied once risks had been identified

While the NSRA takes place only every two years, it is crucial how risks are monitored in the intervening period. This has varied greatly.¹²

The government has said that it “already monitors Government and UK preparedness for risks, through our regular horizon-scanning process”, and the NAO states that departments and agencies are responsible for this in their areas.¹³ Some risks are monitored by dedicated teams or organisations. The Met Office and Environment Agency monitor weather conditions closely, providing advance warning of extreme weather events, and both terror threats and cyber risks also receive close monitoring, the latter through the National Cyber Security Centre. Other risks are spread across multiple agencies or primarily monitored by departments with input from stakeholders and local teams, while monitoring also takes place in the Cabinet Office and through the new National Situation Centre (SitCen).

However, a 2021 cross-government review of risk management by the Government Internal Audit Agency questioned the consistency of this.¹⁴ The NAO reported that pandemic preparations involved monitoring by Public Health England and the Human Animal Infections and Risk Surveillance Group, a cross-government multi-agency group.¹⁵ But the former Foreign Office official Suzanne Raine argues that pandemics have not been monitored as effectively as extreme weather or terror risks.¹⁶ Oliver Letwin, the former Cabinet Office minister, told the joint Health and Social Care and Science Technology Committee inquiry that a group of officials he set up tasked with identifying potential viruses during his time in government were redeployed elsewhere and that there was no such scanning unit of that kind in place

in 2020.¹⁷ The committee report also suggested that the CCS “did not have adequate resources to maintain a substantial standing capability to survey the development of potential threats”.¹⁸

The government has stated that the SitCen “allows data and analysis to be brought together to monitor and respond to risks identified through the NSRA” and that it has “structured its data collection around the NSRA risks using a systems approach to visualise connections between risks and the data [providing] the basis for a dynamic, data driven version of the NSRA” in future.¹⁹ However, Raine again has argued that although the SitCen is now bringing in more data it is still unclear who is responsible for analysing that data and issuing early warnings if necessary.²⁰

Pandemic preparedness focused heavily on flu

Perhaps following on from the potential impacts identified in the NSRA, planning and preparedness for a pandemic focused heavily on flu. Roger Hargreaves, head of the CCS, told the Lords select committee inquiry that “pandemic flu was the risk on which there was absolute consensus: this was the manifestation of a pandemic”.²¹

We heard that flu was used by many as a catch-all for a pandemic, and the government told the Joint Committee on the National Security Strategy that the initial response to Covid built on flu preparations – Hargreaves said the UK used “an awful lot” of its influenza planning.²² Several aspects of flu planning were used during Covid, including the draft Pandemic Influenza Bill, surveillance systems, and infection control guidelines.²³

However, focusing on flu rather than a coronavirus outbreak did have a negative impact on preparedness in some areas. In some cases preparations were still useful but suboptimal – PPE stockpiles did not, for example, contain gowns or visors, which are less important during a flu pandemic but proved key for preventing Covid transmission.²⁴ Others were more harmful – testing was less of a focus and flu plans assumed that at a certain volume of cases contact tracing would cease and anti-virals would be distributed. The UK did stop contact tracing as cases rose but at the start of the pandemic did not have anti-viral treatments available for coronavirus.²⁵

It should be noted that this was not an issue unique to the UK – many countries had prepared primarily for a flu pandemic. The former chief medical officer for England, Professor Dame Sally Davies, told the joint HSC/STC committee: “We all, in the UK, US and Europe, as experts and in policy, had a bias to flu, and planning for flu and diseases that had already occurred.”²⁶ The Department of Health and Social Care (DHSC) is now developing a wider range of pandemic scenarios.²⁷

Preparedness

Some departments did not appear adequately prepared for a pandemic

The mitigations and preparations suggested by pandemic planning were also applied unevenly by departments, with notable holes around education and economic planning.

A number of preparations were made in anticipation for a flu pandemic and used, sometimes in modified form, when the Covid pandemic hit, including the draft Pandemic Influenza Bill, surveillance protocols, PPE stockpiles and infection control guidance.²⁸ Work in preparation for a potential no-deal Brexit also appears to have helped. Amber Rudd suggested that one reason the Department for Work and Pensions (DWP) was able to withstand the demand pressure on Universal Credit during the pandemic was because of the preparations made for mass unemployment in the event of a no-deal Brexit.²⁹

Preparations were less evident in other areas. Plans for border checks and large-scale testing did not appear to be in place. PPE stockpiles were inadequate and contact tracing capacity quickly overwhelmed. Although the Biological Security Strategy emphasised the importance of detection, the Joint Committee on the National Security Strategy stated that the government had “failed seriously to consider how it might scale up testing, isolation and contact-tracing capabilities during a serious disease outbreak”. It also suggested the government had not anticipated the scale of demand and competition for PPE worldwide.³⁰

The Lords select committee inquiry stated that “many departments had done little specific planning for such an emergency [pandemic]” and concluded that planning was too siloed and departments were failing to prepare for risks where they were not the lead department.³¹ A 2020 review by a cross-government working group commissioned by the Civil Contingencies Committee (also known as COBR or COBRA) found that most plans (82%) for pandemic business continuity arrangements across government were unable to meet the demands of a real-life crisis.³²

The failure to plan for economic support and school closures stands out in particular. The Public Accounts Committee (PAC) found that before the pandemic the Treasury and the Department for Business, Energy and Industrial Strategy (BEIS) had not made plans for dealing with the economic impact of a pandemic, meaning that economic support schemes had to be designed from scratch, describing this as “astounding”. Some countries, like Germany and France, already had wage subsidy schemes to model economic support schemes on. The UK did not, making contingency plans even more important.³³ And while the Treasury pulled together its support schemes quickly, some were subject to fraud.³⁴ The Ministry of Housing, Communities and Local Government (MHCLG) did not have plans for financial support to local authorities either.³⁵

The Department for Education (DfE) had similarly not planned for exam cancellations or widespread school closures and told the think tank Reform: “As of and before November 2019, there was no specific DfE policy with regards to responding to a pandemic and, as such [the DfE could not share any] documents in relation to any internal planning.”³⁶

These gaps cannot be put down simply to planning for flu rather than a Covid-like virus. The potential economic effects were known – the 2011 influenza pandemic preparedness strategy estimated that a flu pandemic resulting in half the workforce being absent from work for 1.5 weeks would have led to a loss of £28bn.³⁷ The 2019 NSRA estimated that 20% of people would be off work during the peak weeks of a flu pandemic and would cause significant and long-lasting impacts.³⁸ Similarly, although the government’s 2011 and 2012 strategy and operational guidance for a flu pandemic stated that it was “unlikely that widespread school closures will be required except in a very high impact pandemic”, a 2014 review of the impact of school closures in a flu pandemic, carried out by the Department of Health, concluded that it was reasonable to consider school closures.³⁹

The government did project the significant potential disruption from pandemic flu, even if it did not identify the potential effects of a Covid-like pandemic. However, this was not clearly translated into preparations across departments, with particular gaps in preparations for education and economic support.

Risk management was not a priority in most departments and training not prioritised

One element of this may be that risk management has not been prioritised within departments and there are limited incentives for civil servants to develop risk management skills.

Earlier Institute for Government work on the Covid response found that the NSRA did not reach enough into the management of risk in departments or inform how they planned for or spent money on risks.⁴⁰ The National Preparedness Commission also highlighted serious weaknesses in the competence of staff in departments engaged in responding to the pandemic, “especially their lack of basic understanding of resilience structures, the role and status of Strategic and Tactical Co-ordinating Groups, and the basic principles of emergency management”.⁴¹ The Government Internal Audit Agency highlighted variable capability, capacity and engagement in relation to risk management across departments and teams.⁴²

There are limited incentives for policy makers to develop skills in risk management, which is often seen as a ‘niche’ area outside crises. This leads to a lack of specific skills in areas including risk analysis, modelling, systems and foresight thinking, biosecurity expertise, AI, and digital, and data and technology skills more generally.⁴³ Some of this is due to wider issues, including a workforce culture that does not encourage officials to stay in one area and develop specialist skills and expertise.⁴⁴ The government has

also acknowledged that recruiting individuals with digital, data and technology skills can be hard given pay competition from the private sector.⁴⁵ Locating policy makers with the right skills and an interest in working in this area can also be a problem – we heard that this was often reliant on personal networks remembered from previous crises.⁴⁶

Some work is already under way across government – the Treasury updated its Orange Book on risk management and has begun to set up a cross-government risk management profession as recommended by the Boardman review. This is a primarily finance and audit focused pathway, however.⁴⁷ The government also stated in its response to the Lords inquiry that it intends to propose a wider UK Resilience Academy to establish standards and learning pathways in crisis management and resilience building, along with adopting skills-based allowances, defined career pathways and “enhanced learning provision” to try to attract and retain digital and data skills.⁴⁸ Further details of these initiatives have not yet been released. Finally, the Government Office for Science has been working to improve foresight and systems thinking capability across government, including developing a systems thinking toolkit and BEIS has also set up an Emergency Response Academy.⁴⁹ Sustained focus on changing incentives will be needed to make these initiatives a success.

Ministerial skills and incentives are also important.⁵⁰ Ministers’ attention is taken up by short-term issues and, as Lord Sedwill told the Joint Committee on the National Security Strategy, individual secretaries of state must “balance off their pure departmental responsibilities and the national risks for which they are responsible”.⁵¹ The government stated in its response to the Lords inquiry that a ministerial training programme was up and running, including working with data and science in government and that it would look at developing ministers’ skill in monitoring departments’ resilience planning.⁵² This is welcome, but failures during the Covid pandemic suggest that wider cultural change within departments is also needed.

Oversight and co-ordination

The pandemic exposed weaknesses in how the centre worked with local and devolved government

Earlier Institute for Government research heard that the pandemic response showed “a fundamental breakdown” in the working relationship between central and local government across England and exposed “a basic lack of understanding of the make-up and functions of local government within Whitehall departments”, even the then Ministry of Housing, Communities and Local Government (MHCLG).⁵³

Lack of consistent communication and engagement from central government was also a problem for risk identification and preparedness. Representatives of Local Resilience Forums (LRFs) – the bodies responsible for resilience and crisis response in local areas – told inquiries by the Lords Select Committee on Risk Assessment and Risk Planning and NAO that communication with the CCS was limited and one-way and have suggested that more access to the NSRA and information on central government contingency plans would be welcome.⁵⁴ The Local Government Association (LGA) stated that it saw an “unwillingness by government departments/agencies to share

critical information that would assist local planning and response work, as well as to give councils forewarning of announcements that will impact their response work” during both Covid and Brexit preparations.⁵⁵

Risk assessment and planning is largely devolved and differs in each of the four nations. However, similar points have been made when it comes to interactions between the UK government and the devolved administrations, with limited understanding of devolution and poor communication. Shirley Rogers, director of organisational readiness in the Scottish government, told the Lords inquiry:

“There is a variable degree of understanding about what devolution settlements look like and what devolved administrations’ powers are [and that] there is a tendency to treat us as if we are a department and consult us on the things that people think we will need to know about, rather than the totality.”

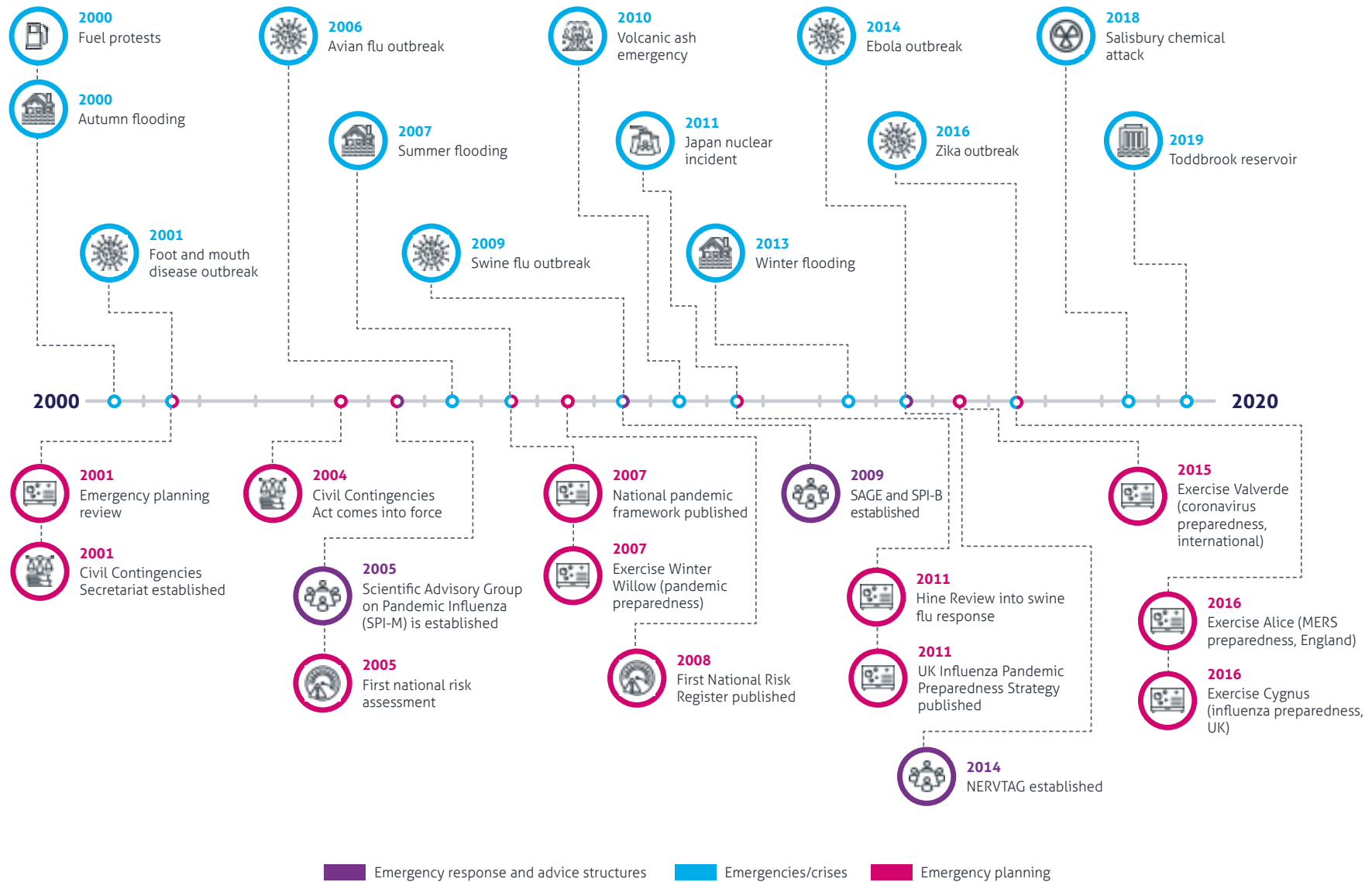
The Lords select committee concluded: “Engagement of the devolved administrations by the UK Government is superficial and ad-hoc and often an afterthought.”⁵⁶

The UK government stated in its response to the Lords inquiry that it was working with the devolved administrations on development of the Resilience Strategy and added: “Devolved colleagues are members of the Resilience Director Generals group which meets regularly to discuss and steer UK resilience activity, supplemented by four nations ‘Quad’ meetings at Ministerial and official level as mutually agreed.” It also stated that “devolved colleagues have been involved throughout the NSRA methodology review and the ongoing NSRA process and will have the complete NSRA shared with them upon completion”. However, it does not appear that these structures were felt to have been adequate during the pandemic, and the government did accept the recommendation for a refreshed set of communications structures.⁵⁷

Key lessons from stress testing were not implemented

Stress tests are one way that planning, capabilities and preparedness can be tested and both large-scale exercises and smaller desk-based simulations were used in the years leading up to the pandemic. Relevant exercises included Cygnus and Alice, both conducted in 2016, and before that Valverde, an international exercise simulating a coronavirus outbreak in 2015. Another pandemic exercise, Winter Willow, had taken place in 2007. However, only some of the lessons from these exercises were implemented.⁵⁸

Figure 3 **Timeline of selected emergencies and changes to emergency planning**



Source: Institute for Government analysis.

Exercise Cygnus simulated the effects of a major flu pandemic affecting 50% of the population and causing 200,000 to 400,000 excess deaths. It involved ministers, officials from central and local government, NHS organisations, prisons and local emergency response planners. However, it focused primarily on health care impacts – the business department reportedly did not know it was taking place, while the Treasury had limited input. It also focused specifically on the treatment and escalation phases of pandemic response, not detection or assessment, meaning it started from the assumption that a pandemic was already widespread, and did not look at how to avoid getting to that point.⁵⁹

The report of Exercise Cygnus concluded that the UK's preparedness was "currently not sufficient to cope with the extreme demands of a severe pandemic" and found "evidence of silo planning" and "a lack of understanding about the potential impacts of a pandemic". Demand for services also exceeded capacity in social care and the NHS.⁶⁰

Exercise Alice simulated a large outbreak of the coronavirus MERS. It drew several lessons that were clearly relevant to the Covid pandemic, including around: "quarantine versus self-isolation and the clarity required about the options" and "PPE level and the need for instruction on use".⁶¹

A more extensive exercise, Winter Willow, was conducted back in 2007. It included 5,000 participants and started from an earlier point, with the announcement of a pandemic by the World Health Organization. It simulated a flu pandemic that reached 100,000 cases and identified various improvements around crisis management, co-ordination, policy development and business continuity.⁶²

The Hine review into the 2009 swine flu pandemic response also found that pandemic preparedness was generally impressive but highlighted concerns about the use of reasonable worst-case scenarios.⁶³

Although some of the reforms suggested by these exercises were implemented, others were not. The Hine review resulted in the 2011 Influenza Preparedness Strategy but reasonable worst-case scenarios continued to be used. The NAO reported that pandemic plans were revised in 2017, informed by learning from the Winter Willow exercise, but it is not entirely clear why it took a decade for those lessons to be incorporated – or why key points from the more recent exercises Alice and Cygnus were not acted on. The NAO noted that concerns that had been identified in exercises emerged again in the response to the Covid pandemic and the PAC has stated that the government did not act upon exercises Valverde or Alice, resulting in a lot of stockpiled PPE that was "not suitable for Covid".⁶⁴

The government has stated that all recommendations from Exercise Cygnus were taken on board and that the Coronavirus Act 2020 was based on a draft influenza bill proposed by it, while a Pandemic Flu Readiness Board, co-chaired by the CCS and DHSC, was set up to improve pandemic preparedness. It has also stated that it helped

departments to strengthen resilience, led to the establishment of an expert advisory group on ethical issues in a pandemic and established better health and care plans for flexing systems and resources.

However, many of the problems highlighted emerged again during the Covid pandemic – demand did outstrip capacity in social care and the NHS, for example. Cygnus also noted that consideration should be given to the ability of staff to work from home but at the outset of the pandemic many departmental plans did not include arrangements for home working.⁶⁵

Brexit preparations, in particular those designed to weather a no-deal exit, may have helped government preparedness in some areas, but the process itself also absorbed a great deal of attention.⁶⁶ Dr Karen Reddin, senior lecturer in disaster management at Bournemouth University and a participant in Exercise Cygnus, told the Lords inquiry that there was a “lack of will” to implement the lessons of the exercise due to competing priorities, including Brexit, and that this failure may have contributed to problems like shortages in hospital surge capacity and the lack of co-ordination between the health and social care sectors.⁶⁷

There are also concerns around transparency and scrutiny of preparedness exercises. The findings of Exercise Cygnus were only released after a leak (once the Covid pandemic had started) and it was not mentioned in the 2018 Biological Security Strategy. The head of the CCS, Roger Hargreaves, told the Joint Committee on the National Security Strategy that there was a balance between sharing results and keeping exercises closed enough to protect the “safety and honesty” of participants, as well as of sensitive information. The recurrence of issues raised in previous exercises during the pandemic, however, suggests that something in the current balance is not working and that major issues raised by stress tests have not been grasped.⁶⁸

Resources have not been closely linked with risk assessment

Preparedness exercises can be resource-intensive, as can the reforms they suggest. This may be another barrier, especially with other demands on government resources. The NAO reported, for example, that the National Exercise Programme was “significantly scaled down” from 2017 due to the demands stemming from Grenfell Tower and Brexit work.⁶⁹

Securing consistent resources for risk management and mitigation can often be problematic for many of the general reasons outlined above – there are limited incentives for governments to invest in managing and mitigating risks that are highly unlikely to happen on their watch. The joint Health and Social Care and Science Technology Committee stated that “the experience has been that this investment in resilience is at risk of being trumped by the day-to-day pressures of Government”.⁷⁰ Preparations for Brexit also took up a huge amount of time and resources, both within the CCS and in the civil service more widely – as of March 2019, the CCS had 56 of its 94 full-time equivalent staff preparing for a no-deal exit, for example.⁷¹

Allocating resources is always difficult – there is a legitimate debate to be had about how much a government should spend on risks that may well not materialise versus more immediate priorities. As with threats like climate change, there is also an inter-generational question about how much utility current taxpayers are willing to forgo to mitigate risks that may seem to pose more of a threat to future generations.⁷²

The OBR has further suggested that, in the absence of perfect foresight, fiscal space – the economic room to change fiscal policy in a crisis – “may be the single most valuable risk management tool”, allowing the government quickly to access flexible resources. It argued that policy makers “must trade off making significant investments in the prevention of specific potential threats with preserving sufficient fiscal space to respond to those risks that it did not anticipate or could not prevent”.⁷³

However, some spending on risk could be good value overall – as has been seen with Covid, the cost of failing to mitigate a risk that does materialise can far outweigh the cost of better risk management.⁷⁴ CLTR, for example, estimated that updating the NSRA, applying the ‘three lines of defence’ model to risk management within government and installing a chief risk officer, would cost around £8.3 million annually, a tiny figure compared to the potential costs of poor preparation when crisis hits.⁷⁵

The other choice is where to allocate limited resources. It is difficult to obtain evidence on relative spending on different risk areas. However, Dr Jennifer Cole told the Defence Committee that preparedness activities for “non-man-made threats” have been particularly under-resourced since threats and hazards were separated in the National Risk Register. Certainly, spending on counter-terrorism seems higher than on pandemics, for example, with the CCS having a budget of £21m in 2019/20 compared to more than £1bn in 2020/21 for the Office for Security and Counter Terrorism in the Home Office.⁷⁶ The National Cyber Security Centre also had total funding of £359m in 2020–21, for example.⁷⁷ As discussed above, this does not seem to reflect a major difference in the assessed likelihood or impact of those risks.⁷⁸

Currently, resources for risk management and mitigation are allocated like other spending through the spending review. Resources allocated are dependent on departments and vulnerable to differences in ‘clout’ and the hierarchy of priorities within departments.⁷⁹ One interviewee noted that managing spending on cross-cutting risks is particularly hard under this system.

The three-year spending review time window is also not often well aligned with the long-term investment needed for mitigating catastrophic risks. Dr Kristen MacAskill, lecturer in sustainability, environment and engineering at the University of Cambridge, told the Lords inquiry that “funding mechanisms provide support following major events, but disincentivise up-front investment and planning”.⁸⁰ This is part of a much wider issue with institutionalised short-termism within the government as a whole and the Treasury in particular.⁸¹ Another interviewee suggested that the Treasury’s approach was poorly suited to the inherent uncertainty relating to extreme risks, pushing towards specific mitigation actions and against spending to build resilience across a range of risks.

This model also means that where resources are assigned they are not necessarily closely related to the risk likelihood and impact identified in the NSRA. One individual we spoke to suggested that a much more systematic process was needed. The former government chief scientific adviser, Professor Sir John Beddington, also suggested to the Lords inquiry that funding should be more closely linked to the NSRA – though the incumbent, Sir Patrick Vallance, has expressed concern about people directly reading across from the NSRA to funding priority.⁸²

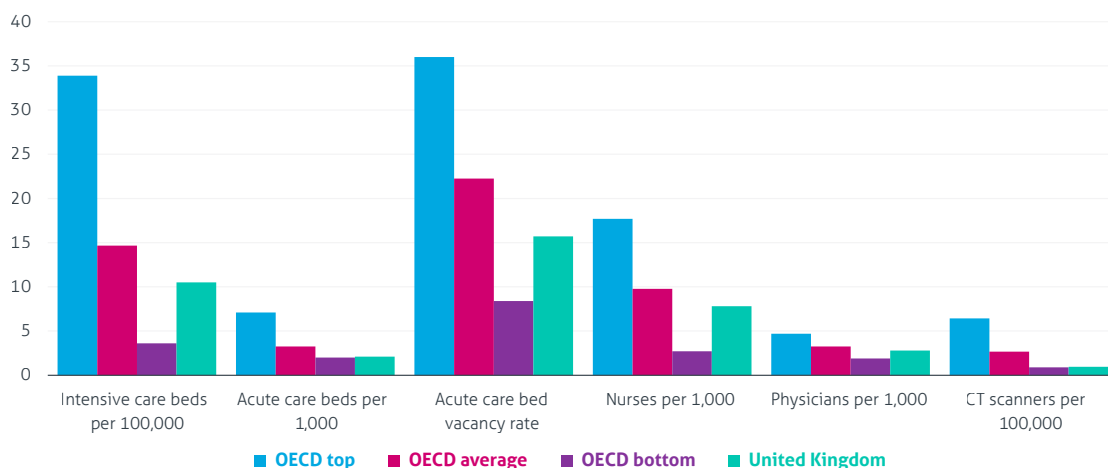
The process of deciding how much to invest in risk management and mitigation is complex and maintaining significant excess capacity across the public sector in case of a crisis is clearly not feasible within the current model. However, the cost of the Covid pandemic has highlighted the worth of strategic investments to mitigate extreme risks and it does not appear that the current system produced funding for pandemic preparedness that matched the potential risk. As previous Institute for Government work noted, it is important that the capacity to respond to shock events is considered and protected in the budget process and in ministers' plans for their departments.⁸³

Focusing on efficiency left services with limited capacity to respond

Resources for risk management are always constrained but in the UK over the last decade there was a particular focus on efficiency over excess capacity and preparedness. This can be seen in local authority spending on emergency planning which in 2018-19 was 35% lower in real terms than in 2009-10.⁸⁴

The UK went into the pandemic with lower levels of intensive care and acute beds, nurses and doctors per person than many comparator countries – a choice to focus on efficiency over excess capacity, but one that left hospitals with very limited capability to respond to the crisis.⁸⁵ Sir Mark Sedwill, cabinet secretary from June 2018 to September 2020, told the Science and Technology and Health and Social Care Select Committees' joint inquiry that "there is clearly an issue about capacity in our health system" because the UK is "in the bottom quartile per head for a whole range of capacity questions" including availability of critical care beds and demand for GPs' services.⁸⁶ The care sector was also "very fragile" going into the pandemic due to a combination of reductions in local government spending power of approximately 40% between 2010 and 2016 and the absence of a long-term funding solution for social care.⁸⁷ Going into the pandemic in 2019 the UK was below the OECD average on several key measures of health care capacity (see Figure 4).

Figure 4 **International comparisons of health care capacity, 2019**



Source: Institute for Government analysis of Office for Budget Responsibility, *Fiscal risks report* – charts and tables: Chapter 2, July 2021.

This was despite the fact that potential capacity issues in hospitals and social care had been identified by all the preparedness exercises discussed above. Adapting capacity (one of the ways to square the efficiency–resilience trade-off) also appeared to prove difficult – temporary Nightingale hospitals were built rapidly, but were not extensively used, with suggestions that operators struggled to find trained intensive care nurses to staff them.⁸⁸

There was a lack of centralised co-ordination and accountability

The difficult questions around where to allocate limited resources across risks and priorities are one reason why strong central co-ordination and accountability is vital. Prior to the Covid pandemic there was no agreed level of risk that ministers were willing to accept, meaning that the acceptable risk ‘envelope’, or appetite – which consequences of the pandemic were acceptable and which should be mitigated – changed as the crisis progressed. The lack of a central function also leaves it unclear who is responsible for risks that cut across multiple departments and left a lot of risk planning siloed – as evidenced, for example, in the lack of engagement of BEIS and the Treasury in Exercise Cygnus.⁸⁹

While Roger Hargreaves stated that the current risk assessment process was “pleasingly free of any sense of political interference”, the Lords Select Committee on Risk Assessment and Risk Planning also identified a “lack of ministerial engagement within risk assessment”.⁹⁰ Major General Jonathan Shaw told the Joint Committee on the National Security Strategy that there was an absence of direction from the centre in response to cross-departmental crises, comparing Whitehall to a “polo mint”.⁹¹ The PAC stated that “no one in government is tasked with forming an overarching view of whole system risks, ensuring that all departments are adequately prepared for them, and prompting departments to enhance their preparedness in the areas where they fall short”.⁹²

The disbanding of the Threats, Hazards, Resilience and Contingencies Subcommittee of the National Security Council (NSC) in July 2019 also perhaps demonstrates a lack of focus on risk management. Although the government has now established a new subcommittee, National Security Ministers, the Joint Committee on the National Security Strategy said in December 2020 that the lack of the subcommittee meant it was not clear where final accountability lay for activities to tackle pressing biological risks apart from Covid. It argued that “neither the National Security Council nor the Cabinet Office provides sufficient collective strategic leadership of departments’ work to address biological risks”.⁹³

There is no central function for ensuring that departments take action to mitigate risks. This was recognised by Penny Mordaunt, then paymaster general, who suggested to the Joint Committee on the National Security Strategy that the Cabinet Office could have a “more robust role in ensuring that the right things are being done”, not allowing departments to “mark their own homework” and developing “a more aggressive and interventionist... approach to certain departments”.⁹⁴ The consequences of this are clear in the variable level of pandemic preparedness across departments.

The CCS did not fill this central coordination gap

The CCS was set up in 2001 after the fuel protests, flooding and foot and mouth outbreak. It is asked to perform a wide range of tasks, but with limited resources. It employed around 90 staff and had a budget of £17.7m in 2018–19. By 2019–20 this had increased to £21m.⁹⁵

The director of the CCS, Roger Hargreaves, has stated that it plays a “refereeing role” to ensure that departments are engaging with risk management and told the PAC that the CCS was piloting some form of assessment of departmental performance around emergency planning.⁹⁶ However, it does not have the power to formally audit departments or interrogate their risk plans and some interviewees expressed concern about how effectively the CCS was able to assess departmental preparedness.⁹⁷

Some changes are being made to how the CCS operates – the government is moving to separate out resilience/preparedness from emergency response within the CCS to ensure that preparedness is not swamped by current crises. New National Resilience Standards were published in 2020 and the CCS is also developing standards for departmental capabilities.⁹⁸ The new resilience standards have been widely welcomed, although the National Preparedness Commission (NPC) recommended that they should be developed further in order to allow effective scrutiny by the CCS.⁹⁹ However, it is not clear that these will be sufficient to allow the CCS to effectively scrutinise departmental preparedness and risk management plans.

External scrutiny of government risk management ahead of the pandemic was limited

External scrutiny has also been lacking, meaning there is little external pressure to counteract limitations in central oversight and co-ordination.

When it comes to parliamentary oversight, risk areas are split across several select committees. However, the think tank Reform reported that the last select committee report on pandemic flu *not* written in response to a disease outbreak was in 2005. Some proactive scrutiny has taken place – the Environment, Food and Rural Affairs Committee reported on flood prevention in 2016 and 2021 – but overall this has been inconsistent and infrequent.¹⁰⁰ We heard that increased select committee scrutiny would be helpful but that currently they may lack the time or resources to provide this.

The NAO also scrutinises some aspects of risk management, with a major recent report, but it is primarily focused on public spending and value for money.¹⁰¹ Interviewees felt that it could offer closer scrutiny of government risk management.¹⁰²

The government has accepted the Lords inquiry’s recommendation to hold a yearly debate on the NSRA and stated that it “welcomes the scrutiny of both the National Audit Office, and any new Joint Select Committee created to democratise the UK’s risk planning approach”.¹⁰³ There are several routes to increasing external scrutiny, which will be discussed in more detail below.

Improving management of catastrophic risks

A change in the culture of government and how it approaches risk is needed to ensure that the UK is better prepared for the next crisis. The change in government in September 2022 could bring new momentum. But it will not be easy. The new government should begin by changing how risk management is organised, ensuring departments have the resources and capabilities they need and strengthening oversight and external scrutiny.

Risk management should be organised differently within government

The incoming government should start by adopting a new way of organising risk management, drawing on the 'three lines of defence' approach, as advocated by CLTR and highlighted by the PAC and NAO. This model has been standard practice across the non-financial private sector for around 20 years.¹ It identifies three key responsibilities – day-to-day risk management, oversight and assurance – and makes accountability for each clearer, mitigating some of the issues discussed above. In the private sector the three lines are generally:

- **individual teams and managers**, responsible for owning risks
- **risk and compliance functions**, which sit centrally and report up to a chief risk officer, who has overall responsibility for ensuring the quality of risk management across the organisation
- **internal audit**, which often reports directly to the chair of the company board and an audit committee.

A fourth line – external audit – is also sometimes added. The three lines model is already referenced in the Treasury's Orange Book, which sets out the government's approach to risk management, but currently these three roles are not clearly defined.² For example, the CCS does some of all three – monitoring some risks but also attempting to oversee departmental preparedness – while there is no clear audit function. Of course, this model cannot simply be dropped straight into government: the private sector has different structures and ways of working. The government also manages different risks: ultimately, it is often the government that acts as insurer of last resort.

However, if government were to adopt a modified version, it could help to strengthen accountability, co-ordination and scrutiny – providing a good framework for starting to tackle many of the shortcomings discussed in this report. The rest of this section explores how to improve the way risk management is organised within government and makes wider recommendations for strengthening the UK's approach.

Responsibility for risk management should primarily remain with departments

The first line of defence would remain departmental risk mitigation and preparedness. Interviewees were clear that although greater central oversight and co-ordination was needed, day-to-day risk preparedness work should remain with departments. Centralising this function would require a significant increase in capacity in the centre, and further remove officials working on this from those on the ground.

However, the culture around risk management within many departments needs to change. Ministers need to ensure preparing for extreme risks is a clear departmental priority and that resources for risk management are allocated and protected. Skills and capabilities also need to be improved. As set out above, the government is already taking some steps to improve risk management skills, but these will come up against systemic incentives against staying in one area and developing specific skills and expertise. It should continue to assess whether its initiatives are having an impact, or whether further work is needed.

There are some potential downsides to risk management remaining in departments, one of which is that officials continue to be pulled away from preparedness on to other pressing issues. One way to combat this would be to adopt CLTR's recommendation for small risk units within departments to lead on managing specific risks within the department's remit. This would have the advantage of creating a single point of contact and accountability for each risk.³ It is, however, important that thinking about risk management is embedded within departments – strong ministerial engagement will be key.

There is also the continuing risk that cross-cutting risks fall through the cracks as issues are siloed and co-ordination remains weak. A strong centre is needed to counteract these issues and ensure that ministers are focused on risk and aware it is a key element of their portfolio.

The CCS should be strengthened

The first part of the second line of defence is a central unit, based in the Cabinet Office and led by a director general or chief risk (or resilience) officer.⁴

It should be built out of the CCS but needs to be strengthened. The CCS is currently responsible for two important and distinct functions – identifying and preparing for risks and dealing with crisis response. These are both vital and the CCS needs to be set up to allow it to deliver both.

As the government is already pursuing, responsibility for crisis response should be clearly separated from risk management and preparedness within the CCS to ensure that current crises cannot overwhelm a focus on preparedness and resilience. The part responsible for resilience should continue to facilitate risk identification, support departments around skills and capabilities and co-ordinate departments around cross-cutting risks.⁵

However, it also needs more power to review departmental preparedness to prevent the variability in departmental responses revealed by the Covid pandemic and ensure that departments are preparing for all relevant risks, not just those on which they were lead department. Roger Hargreaves told the PAC that the CCS was piloting a form of assessment of departmental performance around emergency planning. It is important that the CCS involves itself more closely in reviewing departmental preparedness, although this should not be in place of a strengthened external audit function.⁶

The CCS should also ensure that it and departments are regularly engaging and co-ordinating with outside experts, LRFs and local and devolved governments. Earlier Institute for Government work on the pandemic response concluded:

"The UK's management of Brexit and the Covid-19 pandemic has reinforced the need for good policy to have broad, meaningful input from people across central, devolved and local government, the wider public sector, civil society, academia and businesses. The most effective aspects of the UK's policy response to the pandemic have incorporated this input."⁷

And finally, it needs to co-ordinate and ensure ongoing monitoring of different risks, which is currently spread across different agencies and departments. Identifying risks is only one part of the process; effective risk management requires an understanding of how risks are developing over time. One expert we spoke to also emphasised the importance of co-ordinating with the devolved administrations effectively, suggesting a consensus against having multiple risk monitoring and warning systems.

The commitment to move towards a more ongoing and dynamic NSRA process was a welcome step – the new administration should ensure this work continues. But as that happens a strong central team will be required to co-ordinate and ensure that this ongoing monitoring is taking place across a range of risk areas, departments and agencies, and being fed into the centre so that decisions about priorities can be taken and cross-cutting risks managed.⁸ A new assessment process should also consider looking at vulnerability as well as impact and likelihood, as is increasingly best practice in the private sector. This would allow an examination of the strength of existing mitigations and crisis management capabilities and provide a firmer basis for assessing departmental performance.⁹

Both enabling and supporting, while acting as a reviewing or assessment function, is a difficult balance, but it is clear that both more support and more central oversight and co-ordination of departmental risk management is required if management of risks across government is going to improve.

There should be a new cabinet committee to coordinate cross-government risk management

The second line of defence will also require ministerial participation. The government should create a cabinet committee for risk and resilience, which would have responsibility for decision making around risk management across government. This committee could sit alongside the National Security Committee, with the involvement of key cabinet ministers, including the chancellor.

This would bring ministers together and hold them to account for departmental preparedness and mitigation actions, increasing accountability and oversight from the centre, with the aim again of reducing the variability in departmental responses, co-ordinating around cross-cutting risks and starting to come to collective decisions on the most difficult trade-offs. It would also help to ensure that ministers engage with questions of risk management on an ongoing basis.

The chancellor needs to incentivise appropriate funding

Even if responsibilities around risk management were more clearly organised, there would still be strong forces, like the electoral cycle, which make managing long-term risks harder in government than the private sector. Although decisions around where to put resources for risk management are complex, and it is clearly not possible or sensible to pour unlimited resources into mitigation actions for all types of risk, ensuring adequate resourcing of risk management is a key part of this problem. The government recognised this in its response to the Lords inquiry, stating that the new Resilience Strategy “will consider the need for continued long-term focus and investment in addressing risks”.¹⁰ The attitude of the Treasury will be crucial.

The Treasury controls overall spending and holds many of the levers to incentivise departments to put proportionate resources into risk management. It does not seem currently to do this. While being aware of maintaining fiscal space, some investments in risk management across government are likely to represent excellent value for money. CLTR suggested, for example, that a great deal of progress could be made with investment “in the tens of millions”, focused on areas such as R&D funding around key risk areas, organisational changes, including implementing the three lines of defence model, and regular preparedness exercises.¹¹

Investing in generalised resilience and flexible capacity – where investments increase resilience against a range of risks simultaneously – may also be more efficient than trying to mitigate specific risks in some cases. The Lords inquiry concluded: “We consider that generalised resilience is the right response to the threat of increasingly unpredictable risk.”¹² Some examples might include training medical staff to work across a number of disciplines or organising flexible contracts and developing surge manufacturing capacity ahead of time.¹³ The Treasury should work with departments to identify the most efficient investments to increase generalised resilience.

The Treasury should also look at mechanisms to incentivise and facilitate appropriate investment in risk management as well as collaboration between departments on cross-cutting risks. The spending review should require departments to consider funding for risk preparedness explicitly in bids, alongside their other priorities, with a separate section on risk management. One way to do this might be through the Outcome Delivery Plans (ODPs) introduced at the 2020 spending review. Each department's ODP could include arrangements to ensure adequate risk preparedness within the plan's "strategic enablers". This should include explanations of how the department will plan for the impact of key risks across its services and priority outcomes, how it will assess and monitor its preparedness, and how it will co-ordinate with the centre of government and other departments in doing so.

To increase co-ordination and relate spending more closely to NSRA assessments – without falling into the trap of doing this mechanistically, as highlighted by Patrick Vallance and others – departments could use their ODPs to explain how their policy planning links with the NSRA and wider civil contingency planning.¹⁴

To facilitate departmental collaboration, the Treasury could also look at using cross-departmental spending allocations or bids, acknowledging that spending in one department may help mitigate risk to another department's budget – for example, spending in BEIS on vaccine development might be an effective mitigation against higher health spending in a future pandemic. Increased support for spending bids that provide mitigation against a range of risks would also be beneficial.

Internally, a better understanding of risks and their potential impact on the economy would give Treasury officials more information when making decisions about resource allocation and assessing departmental spending plans. Risk should also be considered in relation to other spending decisions, to ensure that government actions are increasing resilience not risk wherever possible. The Treasury has an economic risks team and we heard that they were thinking through economic risks more than previously. This should be continued. Requiring the Treasury to provide a response to the OBR's *Fiscal Risk Report* could also allow it to show more clearly how the government is mitigating the risks identified and draw a clearer link between effective risk management and fiscal health.

The new prime minister needs to make it clear that managing catastrophic risks is a priority

Impetus for changing the culture of the UK government in relation to risk will need to come from the top. The new prime minister should make it clear that better risk management is a priority for the government and a core part of departmental responsibilities by appointing a powerful minister, such as the chancellor of the Duchy of Lancaster, to chair the new cabinet committee on cross-government risks and resilience proposed above.

This would allow them to take a lead on navigating, or at least signalling, on some of the difficult trade-offs that need to be made – where limited resources are going to be allocated and which risks are going to be prioritised – as well as ensuring that ministers are co-ordinating on cross-cutting risks.

However, the prime minister, even more than officials and ministers, is always facing multiple urgent issues. While the tone needs to be set from the top, action by the prime minister is, of course, not going to be sufficient to improve UK management of extreme risks.

The government should look at creating an independent body tasked with evaluating UK resilience

The third and final line of defence is audit. In the private sector this is generally an internal but independent audit function, although sometimes a fourth line – external audit – is added. In its response to the Lords inquiry the government stated that it had “developed proposals for a standards-based assurance framework that would bring increased consistency and rigour to the development, assessment and improvement of departmental crisis plans and resilience capabilities” but is yet to give further detail about what this would look like.¹⁵

Current scrutiny of preparedness and resilience is too weak. Government does perform some internal audit and scrutiny, but has largely failed to expose flaws in preparedness or lead to changes. The CCS does not have the capacity, expertise or clout to properly scrutinise departmental plans, while internal processes within departments are limited. Such processes are typically weak within Whitehall, including in areas beyond risk, since the incentives are often against full co-operation or exposing departmental colleagues.

Some scrutiny is provided through parliamentary select committees and other organisations. But committees often struggle to focus on risk management alongside the many other policy debates. The NAO does good work on risk management, but due to its remit it looks at it primarily through a value-for-money lens, which is not always best suited to analysing trade-offs between long-term resilience and efficiency. Risk also receives relatively scant attention on the floor of the House.

It is welcome, therefore, that the government has accepted the Lords committee’s recommendation that it holds a yearly debate in parliament on the NSRA and government preparedness actions.¹⁶ Committing to publishing the outcomes of stress tests and preparedness exercises within a certain timeframe would also help to facilitate scrutiny.¹⁷

Parliament should go further in beefing up its approach to scrutinising risk preparedness. Departmental select committees should focus more on risk, and parliament should also create a new cross-cutting joint committee – drawing on the work of relevant committees – to hold the government to account. This committee could draw on the work of the NAO and others to become the focal point for parliamentarians to examine what the government is doing. The Johnson government stated it would support this move – the incoming government should too.¹⁸

This change would strengthen political scrutiny – but on its own it would not be sufficient to create a strong third line of defence as seen in the private sector. This is because parliamentary committees are always limited in terms of resources and capacity – and it is not clear that a single committee, even acting with support, would have sufficient capacity to produce a robust independent assessment of the state of government preparedness across a range of areas.

This suggests the government should examine the case for creating an external expert body. There are successful precedents – in particular, the CCC on climate and the OBR on fiscal policy – where creating a well-resourced, credible and independent expert institution has raised the quality of debate and helped to improve government performance.

In the case of risk, this could be an equivalent external body that could audit the entire process – risk identification, monitoring, departmental preparedness and mitigation actions. It would not need to be a large team, but it would need access to detailed information from departments about the actions being taken, and an agreed benchmark for preparedness and risk management quality. This could complement the NAO's work by bringing expert knowledge of extreme risks.¹⁹

This change may be the most difficult to secure political buy-in for: creating strong independent institutions can feel exposing for ministers. However, the precedent in other areas – and the difficulty governments have in focusing on improving risk management – suggest it is worth exploring as part of looking at how the UK could be better prepared for an event like Covid in future.

There are, of course, different forms an external body could take, ranging from an advisory committee to something with more formal powers to make annual recommendations the government has to respond to. But if the body was successful, it could be placed on a statutory footing, like the OBR and CCC, to ensure that progress and resourcing was maintained.

Conclusion

The UK had been seen as a leader in risk management and preparedness. This may even still be the case. But whatever the outside perception the pandemic exposed real weaknesses in its approach to identifying and monitoring risks.

The National Security Risk Assessment failed to correctly estimate the potential impact of a Covid-type pandemic, with preparedness measures focused primarily on flu. And even these varied heavily between departments. Important lessons from past, even recent, exercises were not applied and key services had limited spare or adaptable capacity when they entered the pandemic. The planning failures in education and for economic impacts were particularly damaging, while a lack of central co-ordination and oversight, as well as a lack of external scrutiny of preparedness, further harmed the UK's response.

A fundamental culture change is needed in how government approaches risk. This is a difficult process. But a good place to start would be introducing a modified version of the 'three lines of defence' model widely used by the private sector that takes in mitigation and preparedness, co-ordination and, finally, audit.

The last point is particularly important. Boris Johnson's resignation means the next crisis will be faced by a different government, with a general election two years after the new administration takes over – learning lessons from Covid and other events will be key. The new administration should look at establishing an independent body to provide expert advice and external scrutiny. The examples of the Office for Budget Responsibility and Climate Change Committee have shown the value of this model.

It will never be possible to mitigate all extreme risks, and it is not clear that the government should try to. However, the pandemic demonstrated why improvements to the management of catastrophic risks are so important, and the human and economic cost of failure laid bare. The new government should not miss this opportunity, when these lessons are clear in everyone's minds, to institutionalise a new approach to managing extreme risks.

References

Summary

- 1 National Audit Office, *The government's preparedness for the COVID-19 pandemic: lessons for government on risk management* (HC 735), 19 November 2021, www.nao.org.uk/wp-content/uploads/2021/11/The-governments-preparedness-for-the-COVID-19-pandemic-lessons-for-government-on-risk-management.pdf; Stock M and Wentworth J, *Evaluating UK natural hazards: the national risk assessment*, POSTbrief 31, UK Parliament POST, April 2019, <https://researchbriefings.files.parliament.uk/documents/POST-PB-0031/POST-PB-0031.pdf>; Nuclear Threat Initiative, *Global Health Security Index*, October 2019, www.ghsindex.org/wp-content/uploads/2019/10/2019-Global-Health-Security-Index.pdf
- 2 OECD, *National Risk Assessments: A Cross Country Perspective*, March 2018, www.oecd-ilibrary.org/governance/national-risk-assessments_9789264287532-en; Hilton S and Baylon C, *Risk management in the UK: What can we learn from COVID-19 and are we prepared for the next disaster?*, The Centre for the Study of Existential Risk, November 2020, www.cser.ac.uk/media/uploads/files/Risk_management_in_the_UK_What_can_we_learn_from_COVID-19_and_are_we_prepared_for_the_next_disaster_FINAL_VERSION_2.pdf; House of Commons Health and Social Care, and Science and Technology Committees, *Coronavirus: lessons learned to date Sixth Report of the Health and Social Care Committee and Third Report of the Science and Technology Committee of Session 2021–22* (HC 92), 12 October 2021, <https://committees.parliament.uk/publications/7496/documents/78687/default>
- 3 'Coronavirus (COVID-19) in the UK: Deaths in United Kingdom', GOV.UK, 16 June 2022, <https://coronavirus.data.gov.uk/details/deaths>
- 4 National Audit Office, *The government's preparedness for the COVID-19 pandemic: lessons for government on risk management* (HC 735), 19 November 2021, www.nao.org.uk/wp-content/uploads/2021/11/The-governments-preparedness-for-the-COVID-19-pandemic-lessons-for-government-on-risk-management.pdf; Timmins N, *Schools and coronavirus: The government's handling of education during the pandemic*, Institute for Government, August 2021, www.instituteforgovernment.org.uk/publications/schools-and-coronavirus; Thomas A and Clyne R, *Responding to shocks: 10 lessons for government*, Institute for Government, March 2021, www.instituteforgovernment.org.uk/sites/default/files/publications/responding_shocks_lessons_covid_brexit.pdf; Shilson-Thomas A, Rees S and Pickles C, *A State of preparedness: How government can build resilience to civil emergencies*, Reform, March 2021, https://reform.uk/sites/default/files/2021-03/A%20State%20of%20Preparedness%2C%20Embargoed%20Copy%2C%20Final_0.pdf
- 5 Shilson-Thomas A, Rees S and Pickles C, *A State of preparedness: How government can build resilience to civil emergencies*, Reform, March 2021, https://reform.uk/sites/default/files/2021-03/A%20State%20of%20Preparedness%2C%20Embargoed%20Copy%2C%20Final_0.pdf; PAC1; www.nao.org.uk/wp-content/uploads/2020/07/Implementing-employment-support-schemes-in-response-to-the-COVID-19-pandemic.pdf; House of Commons Committee of Public Accounts, *Government preparedness for the COVID-19 pandemic: lessons for government on risk: Forty-Sixth Report of Session 2021–22* (HC 952), 23 March 2022, <https://committees.parliament.uk/publications/9371/documents/160964/default>; Pope T and Shearer E, *The Coronavirus Job Retention Scheme: How successful has the furlough scheme been and what should happen next?*, Institute for Government, September 2021, www.instituteforgovernment.org.uk/sites/default/files/publications/coronavirus-job-retention-scheme-success.pdf; National Audit Office, *The Bounce Back Loan Scheme: an update* (HC 861), 3 December 2021, www.nao.org.uk/report/the-bounce-back-loan-scheme-an-update; House of Commons Committee of Public Accounts, *Bounce Back Loans Scheme: Follow-up Fiftieth Report of Session 2021–22* (HC 951), 27 April 2022, <https://committees.parliament.uk/publications/22002/documents/163618/default>; Thomas D, 'UK to lose at least £15bn on Covid support due to fraud and error, MPs warn', *Financial Times*, 23 February 2022, www.ft.com/content/Obd2d141-68ea-4d6b-aa81-9300a7ab27b9
- 6 National Audit Office, *The government's preparedness for the COVID-19 pandemic: lessons for government on risk management* (HC 735), 19 November 2021, www.nao.org.uk/wp-content/uploads/2021/11/The-governments-preparedness-for-the-COVID-19-pandemic-lessons-for-government-on-risk-management.pdf; Shilson-Thomas A, Rees S and Pickles C, *A State of preparedness: How government can build resilience to civil emergencies*, Reform, March 2021, https://reform.uk/sites/default/files/2021-03/A%20State%20of%20Preparedness%2C%20Embargoed%20Copy%2C%20Final_0.pdf; House of Lords Select Committee on Risk Assessment and Risk Planning, 'Corrected oral evidence: Risk Assessment and Risk Planning, Wednesday 25 November 2020 10.30 am', <https://committees.parliament.uk/oralevidence/1295/html>
- 7 House of Commons House of Lords Joint Committee on the National Security Strategy, *Biosecurity and national security: First Report of Session 2019–21* (HC 611, HL 195), 18 December 2020, <https://committees.parliament.uk/publications/4035/documents/40449/default>
- 8 Office for Budget Responsibility, *Fiscal risks report*, July 2021, https://obr.uk/docs/dlm_uploads/Fiscal_risks_report_July_2021.pdf

- 9 Shilson-Thomas A, Rees S and Pickles C, *A State of preparedness: How government can build resilience to civil emergencies*, Reform, March 2021, https://reform.uk/sites/default/files/2021-03/A%20State%20of%20Preparedness%2C%20Embargoed%20Copy%2C%20Final_0.pdf
- 10 House of Lords Select Committee on Risk Assessment and Risk Planning, *Preparing for Extreme Risks: Building a Resilient Society* (HL 110), 3 December 2021, <https://publications.parliament.uk/pa/ld5802/ldselect/ldrisk/110/110.pdf>; House of Commons Health and Social Care, and Science and Technology Committees, *Coronavirus: lessons learned to date Sixth Report of the Health and Social Care Committee and Third Report of the Science and Technology Committee of Session 2021–22* (HC 92), 12 October 2021, <https://committees.parliament.uk/publications/7496/documents/78687/default>; House of Commons, House of Lords Joint Committee on the National Security Strategy, *Biosecurity and national security: First Report of Session 2019–21* (HC 611, HL 195), 18 December 2020, <https://committees.parliament.uk/publications/4035/documents/40449/default>; House of Commons Committee of Public Accounts, *Government preparedness for the COVID-19 pandemic: lessons for government on risk: Forty-Sixth Report of Session 2021–22* (HC 952), 23 March 2022, <https://committees.parliament.uk/publications/9371/documents/160964/default>; House of Commons Defence Committee, *Manpower or mindset: Defence's contribution to the UK's pandemic response: Sixth Report of Session 2019–21* (HC 357), March 2021, <https://committees.parliament.uk/publications/5258/documents/52590/default>; Boardman N, *Boardman Review of Government Procurement in the COVID-19 pandemic*, 8 December 2020, https://assets.publishing.service.gov.uk/government/uploads/system/uploads/attachment_data/file/981939/Boardman_Review_of_Government_COVID-19_Procurement_final_report.pdf; Shilson-Thomas A, Rees S and Pickles C, *A State of preparedness: How government can build resilience to civil emergencies*, Reform, March 2021, https://reform.uk/sites/default/files/2021-03/A%20State%20of%20Preparedness%2C%20Embargoed%20Copy%2C%20Final_0.pdf; National Audit Office, *The government's preparedness for the COVID-19 pandemic: lessons for government on risk management* (HC 735), 19 November 2021, www.nao.org.uk/wp-content/uploads/2021/11/The-governments-preparedness-for-the-COVID-19-pandemic-lessons-for-government-on-risk-management.pdf; Hilton S and Baylon C, *Risk management in the UK: What can we learn from COVID-19 and are we prepared for the next disaster?*, The Centre for the Study of Existential Risk, November 2020, www.cser.ac.uk/media/uploads/files/Risk_management_in_the_UK_What_can_we_learn_from_COVID-19_and_are_we_prepared_for_the_next_disaster___FINAL_VERSION___2.pdf; Ord T, *Proposal for a New 'Three Lines of Defence' Approach to UK Risk Management*, Future of Humanity Institute, University of Oxford, 2021, www.fhi.ox.ac.uk/wp-content/uploads/three_lines_defence.pdf; Ord T, Mercer A and Dannreuther S, *Future Proof*, The Centre for Long-Term Resilience, June 2021, https://11f95c32-710c-438b-903d-da4e18de8aaa.filesusr.com/ugd/e40baa_c64c0d7b430149a393236bf4d26cdfdd.pdf; Mann B, Settle K and Towler A, *An Independent Review of the Civil Contingencies Act 2004 and its Supporting Arrangements*, National Preparedness Commission, March 2022, <https://nationalpreparednesscommission.uk/wp-content/uploads/2022/03/NPC-CCA-Report-FINAL-FOR-PUBLICATION-ON-24-MARCH-2022.pdf>; Thomas A and Clyne R, *Responding to shocks: 10 lessons for government*, Institute for Government, March 2021, www.instituteforgovernment.org.uk/sites/default/files/publications/responding_shocks_lessons_covid_brexit.pdf
- 11 Ord T, Mercer A and Dannreuther S, *Future Proof*, The Centre for Long-Term Resilience, June 2021, https://11f95c32-710c-438b-903d-da4e18de8aaa.filesusr.com/ugd/e40baa_c64c0d7b430149a393236bf4d26cdfdd.pdf
- 12 *Ibid.*

The UK's current approach to managing catastrophic risks

- 1 National Audit Office, *The government's preparedness for the COVID-19 pandemic: lessons for government on risk management* (HC 735), 19 November 2021, www.nao.org.uk/wp-content/uploads/2021/11/The-governments-preparedness-for-the-COVID-19-pandemic-lessons-for-government-on-risk-management.pdf; Stock M and Wentworth J, *Evaluating UK natural hazards: the national risk assessment*, POSTbrief 31, UK Parliament POST, April 2019, <https://researchbriefings.files.parliament.uk/documents/POST-PB-0031/POST-PB-0031.pdf>; Nuclear Threat Initiative, *Global Health Security Index*, October 2019, www.ghsindex.org/wp-content/uploads/2019/10/2019-Global-Health-Security-Index.pdf; OECD, *National Risk Assessments: A Cross Country Perspective*, March 2018, www.oecd-ilibrary.org/governance/national-risk-assessments_9789264287532-en; Hilton S and Baylon C, *Risk management in the UK: What can we learn from COVID-19 and are we prepared for the next disaster?*, The Centre for the Study of Existential Risk, November 2020, www.cser.ac.uk/media/uploads/files/Risk_management_in_the_UK_What_can_we_learn_from_COVID-19_and_are_we_prepared_for_the_next_disaster___FINAL_VERSION___2.pdf
- 2 Ord T, Mercer A and Dannreuther S, *Future Proof*, The Centre for Long-Term Resilience, June 2021, https://11f95c32-710c-438b-903d-da4e18de8aaa.filesusr.com/ugd/e40baa_c64c0d7b430149a393236bf4d26cdfdd.pdf; Avin S, Sundaram L, Whittlestone J and Maas M, 'Submission of Evidence to The House of Lords Select Committee on Risk Assessment and Risk Planning', The Centre for the Study of Existential Risk, January 2021, www.repository.cam.ac.uk/handle/1810/317070;jsessionid=FC51BC52COFFF10D3C39534F57AB2DF1

- 3 House of Lords Select Committee on Risk Assessment and Risk Planning, *Preparing for Extreme Risks: Building a Resilient Society* (HL 110), 3 December 2021, <https://publications.parliament.uk/pa/ld5802/ldselect/ldrisk/110/110.pdf>; Shilson-Thomas A, Rees S and Pickles C, *A State of preparedness: How government can build resilience to civil emergencies*, Reform, March 2021, https://reform.uk/sites/default/files/2021-03/A%20State%20of%20Preparedness%2C%20Embargoed%20Copy%2C%20Final_0.pdf; National Audit Office, *The government's preparedness for the COVID-19 pandemic: lessons for government on risk management* (HC 735), 19 November 2021, www.nao.org.uk/wp-content/uploads/2021/11/The-governments-preparedness-for-the-COVID-19-pandemic-lessons-for-government-on-risk-management.pdf
- 4 Cabinet Office, Rt Hon Penny Mordaunt MP, 'Speech: Paymaster General Speech on National Resilience Strategy delivered on 13 July 2021', 15 July 2021, www.gov.uk/government/speeches/paymaster-general-speech-on-national-resilience-strategy-delivered-on-13-july-2021; Cabinet Office, 'Consultation outcome: Public Response to Resilience Strategy: Call for Evidence', 15 December 2021, www.gov.uk/government/consultations/national-resilience-strategy-call-for-evidence/outcome/public-response-to-resilience-strategy-call-for-evidence; Ord T and Dannreuther S, 'Extreme risks and the UK National Resilience Strategy', The Centre for Long-Term Resilience, 17 July 2021, www.longtermresilience.org/post/extreme-risks-and-the-uk-national-resilience-strategy; Harris T, 'Strengthening the UK's National Resilience: The Tasks Ahead', RUSI, 8 April 2021, <https://rusi.org/explore-our-research/publications/commentary/strengthening-uks-national-resilience-tasks-ahead>
- 5 Cabinet Office, 'The National Resilience Strategy: A Call for Evidence', 2021, https://assets.publishing.service.gov.uk/government/uploads/system/uploads/attachment_data/file/1001404/Resilience_Strategy_-_Call_for_Evidence.pdf; House of Commons Public Accounts Committee, 'Oral evidence: Government preparedness for COVID-19 Pandemic: Lessons for Government on risk (HC 952)', 12 January 2022, <https://committees.parliament.uk/oralevidence/3291/default>
- 6 Office for Budget Responsibility, *Fiscal risks report*, July 2021, https://obr.uk/docs/dlm_uploads/Fiscal_risks_report_July_2021.pdf
- 7 'EM-DAT, the International Disaster Database', CRED/UCLouvain, 2022, <https://public.emdat.be>
- 8 Office for Budget Responsibility, *Fiscal risks report*, July 2021, https://obr.uk/docs/dlm_uploads/Fiscal_risks_report_July_2021.pdf
- 9 *Ibid.*; Altman S and Bastian C, *DHL Global Connectedness Index 2020 Country Book*, November 2020, www.dhl.com/content/dam/dhl/global/dhl-spotlight/documents/pdf/spotlight-g04-dhl-gci-2020-country-book.pdf
- 10 Office for Budget Responsibility, *Fiscal risks report*, July 2021, https://obr.uk/docs/dlm_uploads/Fiscal_risks_report_July_2021.pdf; House of Commons House of Lords Joint Committee on the National Security Strategy, *Bioresecurity and national security: First Report of Session 2019–21* (HC 611, HL 195), 18 December 2020, <https://committees.parliament.uk/publications/4035/documents/40449/default>; Ord T, Mercer A and Dannreuther S, *Future Proof*, The Centre for Long-Term Resilience, June 2021, https://11f95c32-710c-438b-903d-da4e18de8aaa.filesusr.com/ugd/e40baa_c64c0d7b430149a393236bf4d26cdfdd.pdf; Mann B, Settle K and Towler A, *An Independent Review of the Civil Contingencies Act 2004 and its Supporting Arrangements*, National Preparedness Commission, March 2022, <https://nationalpreparednesscommission.uk/wp-content/uploads/2022/03/NPC-CCA-Report-FINAL-FOR-PUBLICATION-ON-24-MARCH-2022.pdf>
- 11 Office for Budget Responsibility, *Fiscal risks report*, July 2021, https://obr.uk/docs/dlm_uploads/Fiscal_risks_report_July_2021.pdf. The 2022 Fiscal risks and sustainability report in contrast includes a whole chapter on rising geopolitical tensions: Office for Budget Responsibility, *Fiscal risks and sustainability* (CP 702), July 2022, https://obr.uk/docs/dlm_uploads/Fiscal_risks_and_sustainability_2022-1.pdf
- 12 Cabinet Office, Rt Hon Penny Mordaunt MP, 'Speech: Paymaster General Speech on National Resilience Strategy delivered on 13 July 2021', 15 July 2021, www.gov.uk/government/speeches/paymaster-general-speech-on-national-resilience-strategy-delivered-on-13-july-2021
- 13 Hilton S and Baylon C, *Risk management in the UK: What can we learn from COVID-19 and are we prepared for the next disaster?*, The Centre for the Study of Existential Risk, November 2020, www.cser.ac.uk/media/uploads/files/Risk_management_in_the_UK___What_can_we_learn_from_COVID-19_and_are_we_prepared_for_the_next_disaster___FINAL_VERSION___2.pdf; Global Catastrophic Risk Policy, 'How governments can better understand extreme risks', 3 June 2021, www.gcrpolicy.com/understand; School of International Futures, *Features of effective systemic foresight in governments around the world*, April 2021, https://assets.publishing.service.gov.uk/government/uploads/system/uploads/attachment_data/file/985279/effective-systemic-foresight-governments-report.pdf
- 14 Hilton S and Baylon C, *Risk management in the UK: What can we learn from COVID-19 and are we prepared for the next disaster?*, The Centre for the Study of Existential Risk, November 2020, www.cser.ac.uk/media/uploads/files/Risk_management_in_the_UK___What_can_we_learn_from_COVID-19_and_are_we_prepared_for_the_next_disaster___FINAL_VERSION___2.pdf
- 15 *Ibid.*

-
- 16 Hallsworth M, Egan M, Rutter J and McCrae J, *Behavioural Government: Using behavioural science to improve how governments make decisions*, The Behavioural Insights Team, The Institute for Government, July 2018, www.instituteforgovernment.org.uk/sites/default/files/publications/BIT%20Behavioural%20Government%20Report.pdf
 - 17 House of Lords Select Committee on Risk Assessment and Risk Planning, *Preparing for Extreme Risks: Building a Resilient Society* (HL 110), 3 December 2021, <https://publications.parliament.uk/pa/ld5802/ldselect/ldrisk/110/110.pdf>
 - 18 Kirk-Wade E, *UK defence expenditure*, House of Commons Library, 6 April 2022, <https://researchbriefings.files.parliament.uk/documents/CBP-8175/CBP-8175.pdf>
 - 19 House of Commons Defence Committee, *Manpower or mindset: Defence's contribution to the UK's pandemic response: Sixth Report of Session 2019–21* (HC 357), March 2021, <https://committees.parliament.uk/publications/5258/documents/52590/default>; Cabinet Office, *National Risk Register Of Civil Emergencies 2017 edition*, September 2017, https://assets.publishing.service.gov.uk/government/uploads/system/uploads/attachment_data/file/644968/UK_National_Risk_Register_2017.pdf

The pandemic highlighted weaknesses in the UK's risk management

- 1 Hilton S and Baylon C, *Risk management in the UK: What can we learn from COVID-19 and are we prepared for the next disaster?*, The Centre for the Study of Existential Risk, November 2020, www.cser.ac.uk/media/uploads/files/Risk_management_in_the_UK___What_can_we_learn_from_COVID-19_and_are_we_prepared_for_the_next_disaster___FINAL_VERSION___2.pdf
- 2 House of Lords Select Committee on Risk Assessment and Risk Planning, *Preparing for Extreme Risks: Building a Resilient Society* (HL 110), 3 December 2021, <https://publications.parliament.uk/pa/ld5802/ldselect/ldrisk/110/110.pdf>. See also: House of Commons Health and Social Care, and Science and Technology Committees, *Coronavirus: lessons learned to date Sixth Report of the Health and Social Care Committee and Third Report of the Science and Technology Committee of Session 2021–22* (HC 92), 12 October 2021, <https://committees.parliament.uk/publications/7496/documents/78687/default/>; Shilson-Thomas A, Rees S, Pickles C, *A State of preparedness: How government can build resilience to civil emergencies*, Reform, March 2021, https://reform.uk/sites/default/files/2021-03/A%20State%20of%20Preparedness%2C%20Embargoed%20Copy%2C%20Final_0.pdf
- 3 Hilton S and Baylon C, *Risk management in the UK: What can we learn from COVID-19 and are we prepared for the next disaster?*, The Centre for the Study of Existential Risk, November 2020, www.cser.ac.uk/media/uploads/files/Risk_management_in_the_UK___What_can_we_learn_from_COVID-19_and_are_we_prepared_for_the_next_disaster___FINAL_VERSION___2.pdf
- 4 House of Lords Select Committee on Risk Assessment and Risk Planning, *Preparing for Extreme Risks: Building a Resilient Society* (HL 110), 3 December 2021, <https://publications.parliament.uk/pa/ld5802/ldselect/ldrisk/110/110.pdf>; Shilson-Thomas A, Rees S and Pickles C, *A State of preparedness: How government can build resilience to civil emergencies*, Reform, March 2021, https://reform.uk/sites/default/files/2021-03/A%20State%20of%20Preparedness%2C%20Embargoed%20Copy%2C%20Final_0.pdf
- 5 House of Lords Select Committee on Risk Assessment and Risk Planning, *Preparing for Extreme Risks: Building a Resilient Society* (HL 110), 3 December 2021, <https://publications.parliament.uk/pa/ld5802/ldselect/ldrisk/110/110.pdf>; Hilton S and Baylon C, *Risk management in the UK: What can we learn from COVID-19 and are we prepared for the next disaster?*, The Centre for the Study of Existential Risk, November 2020, www.cser.ac.uk/media/uploads/files/Risk_management_in_the_UK___What_can_we_learn_from_COVID-19_and_are_we_prepared_for_the_next_disaster___FINAL_VERSION___2.pdf
- 6 House of Lords Select Committee on Risk Assessment and Risk Planning, *Preparing for Extreme Risks: Building a Resilient Society* (HL 110), 3 December 2021, <https://publications.parliament.uk/pa/ld5802/ldselect/ldrisk/110/110.pdf>; National Audit Office, *The government's preparedness for the COVID-19 pandemic: lessons for government on risk management* (HC 735), 19 November 2021, www.nao.org.uk/wp-content/uploads/2021/11/The-governments-preparedness-for-the-COVID-19-pandemic-lessons-for-government-on-risk-management.pdf; Mann B, Settle K and Towler A, *An Independent Review of the Civil Contingencies Act 2004 and its Supporting Arrangements*, National Preparedness Commission, March 2022, <https://nationalpreparednesscommission.uk/wp-content/uploads/2022/03/NPC-CCA-Report-FINAL-FOR-PUBLICATION-ON-24-MARCH-2022.pdf>

- 7 Hilton S and Baylon C, *Risk management in the UK: What can we learn from COVID-19 and are we prepared for the next disaster?*, The Centre for the Study of Existential Risk, November 2020, www.cser.ac.uk/media/uploads/files/Risk_management_in_the_UK_What_can_we_learn_from_COVID-19_and_are_we_prepared_for_the_next_disaster_FINAL_VERSION_2.pdf; Mann B, Settle K and Towler A, *An Independent Review of the Civil Contingencies Act 2004 and its Supporting Arrangements*, National Preparedness Commission, March 2022, <https://nationalpreparednesscommission.uk/wp-content/uploads/2022/03/NPC-CCA-Report-FINAL-FOR-PUBLICATION-ON-24-MARCH-2022.pdf>; National Audit Office, *The government's preparedness for the COVID-19 pandemic: lessons for government on risk management* (HC 735), 19 November 2021, www.nao.org.uk/wp-content/uploads/2021/11/The-governments-preparedness-for-the-COVID-19-pandemic-lessons-for-government-on-risk-management.pdf; Ord T, Mercer A and Dannreuther S, *Future Proof*, The Centre for Long-Term Resilience, June 2021, https://11f95c32-710c-438b-903d-da4e18de8aaa.filesusr.com/ugd/e40baa_c64c0d7b430149a393236bf4d26cdfdd.pdf
- 8 National Audit Office, *The government's preparedness for the COVID-19 pandemic: lessons for government on risk management* (HC 735), 19 November 2021, www.nao.org.uk/wp-content/uploads/2021/11/The-governments-preparedness-for-the-COVID-19-pandemic-lessons-for-government-on-risk-management.pdf
- 9 Cabinet Office, *Government response to Preparing for Extreme Risks: Building a Resilient Society* (CP641), 17 March 2022, <https://committees.parliament.uk/publications/9365/documents/160862/default>; House of Commons Public Accounts Committee, 'Oral evidence: Government preparedness for COVID-19 Pandemic: Lessons for Government on risk' (HC 952), 12 January 2022, <https://committees.parliament.uk/oralevidence/3291/default>
- 10 National Audit Office, *The government's preparedness for the COVID-19 pandemic: lessons for government on risk management* (HC 735), 19 November 2021, www.nao.org.uk/wp-content/uploads/2021/11/The-governments-preparedness-for-the-COVID-19-pandemic-lessons-for-government-on-risk-management.pdf; House of Lords Risk Assessment and Risk Planning Committee, 'Corrected oral evidence: Risk assessment and risk planning, Wednesday 23 June 2021, 11.20 am', <https://committees.parliament.uk/oralevidence/2448/pdf>
- 11 Hilton S and Shah S, 'Why are food shortages not listed as a risk in the National Risk Register?', The Centre for the Study of Existential Risk, 5 August 2021, www.cser.ac.uk/resources/food-shortages-NRR
- 12 House of Commons Health and Social Care, and Science and Technology Committees, *Coronavirus: lessons learned to date Sixth Report of the Health and Social Care Committee and Third Report of the Science and Technology Committee of Session 2021–22* (HC 92), 12 October 2021, <https://committees.parliament.uk/publications/7496/documents/78687/default>
- 13 Cabinet Office, *Government response to Preparing for Extreme Risks: Building a Resilient Society* (CP641), 17 March 2022, <https://committees.parliament.uk/publications/9365/documents/160862/default/>; National Audit Office, *The government's preparedness for the COVID-19 pandemic: lessons for government on risk management* (HC 735), 19 November 2021, www.nao.org.uk/wp-content/uploads/2021/11/The-governments-preparedness-for-the-COVID-19-pandemic-lessons-for-government-on-risk-management.pdf
- 14 House of Commons Committee of Public Accounts, *Government preparedness for the COVID-19 pandemic: lessons for government on risk: Forty-Sixth Report of Session 2021–22* (HC 952), 23 March 2022, <https://committees.parliament.uk/publications/9371/documents/160964/default>
- 15 National Audit Office, *The government's preparedness for the COVID-19 pandemic: lessons for government on risk management* (HC 735), 19 November 2021, www.nao.org.uk/wp-content/uploads/2021/11/The-governments-preparedness-for-the-COVID-19-pandemic-lessons-for-government-on-risk-management.pdf; UNISDR, EC, OECD, *United Kingdom Peer Review – Building resilience to disasters: Implementation of the Hyogo Framework for Action (2005-2015)*, 2013, www.unisdr.org/files/32996_32996hfaukpeerreview20131.pdf
- 16 Raine S, 'Half of the National Risk Register is Missing', RUSI, 22 January 2021, <https://rusi.org/explore-our-research/publications/rusi-newsbrief/half-national-risk-register-missing>
- 17 House of Commons Health and Social Care, and Science and Technology Committees, *Coronavirus: lessons learned to date Sixth Report of the Health and Social Care Committee and Third Report of the Science and Technology Committee of Session 2021–22* (HC 92), 12 October 2021, <https://committees.parliament.uk/publications/7496/documents/78687/default>
- 18 House of Commons Health and Social Care, and Science and Technology Committees, *Coronavirus: lessons learned to date Sixth Report of the Health and Social Care Committee and Third Report of the Science and Technology Committee of Session 2021–22* (HC 92), 12 October 2021, <https://committees.parliament.uk/publications/7496/documents/78687/default>
- 19 Cabinet Office, *Government response to Preparing for Extreme Risks: Building a Resilient Society* (CP641), 17 March 2022, <https://committees.parliament.uk/publications/9365/documents/160862/default>
- 20 Raine S, 'Half of the National Risk Register is Missing', RUSI, 22 January 2021, <https://rusi.org/explore-our-research/publications/rusi-newsbrief/half-national-risk-register-missing>

-
- 21 House of Lords Select Committee on Risk Assessment and Risk Planning, *Preparing for Extreme Risks: Building a Resilient Society* (HL 110), 3 December 2021, <https://publications.parliament.uk/pa/ld5802/ldselect/ldrisk/110/110.pdf>. See also: Ord T, Mercer A and Dannreuther S, *Future Proof*, The Centre for Long-Term Resilience, June 2021, https://11f95c32-710c-438b-903d-da4e18de8aaa.filesusr.com/ugd/e40baa_c64c0d7b430149a393236bf4d26cdfdd.pdf; House of Commons Health and Social Care, and Science and Technology Committees, *Coronavirus: lessons learned to date Sixth Report of the Health and Social Care Committee and Third Report of the Science and Technology Committee of Session 2021–22* (HC 92), 12 October 2021, <https://committees.parliament.uk/publications/7496/documents/78687/default>; Hilton S and Baylon C, *Risk management in the UK: What can we learn from COVID-19 and are we prepared for the next disaster?*, The Centre for the Study of Existential Risk, November 2020, www.cser.ac.uk/media/uploads/files/Risk_management_in_the_UK___What_can_we_learn_from_COVID-19_and_are_we_prepared_for_the_next_disaster___FINAL_VERSION___2.pdf; Shilson-Thomas A, Rees S and Pickles C, *A State of preparedness: How government can build resilience to civil emergencies*, Reform, March 2021, https://reform.uk/sites/default/files/2021-03/A%20State%20of%20Preparedness%2C%20Embargoed%20Copy%2C%20Final_0.pdf; House of Commons House of Lords Joint Committee on the National Security Strategy, *Biosecurity and national security: First Report of Session 2019–21* (HC 611, HL 195), 18 December 2020, <https://committees.parliament.uk/publications/4035/documents/40449/default>
- 22 House of Commons House of Lords Joint Committee on the National Security Strategy, *Biosecurity and national security: First Report of Session 2019–21* (HC 611, HL 195), 18 December 2020, <https://committees.parliament.uk/publications/4035/documents/40449/default>
- 23 National Audit Office, *The government's preparedness for the COVID-19 pandemic: lessons for government on risk management* (HC 735), 19 November 2021, www.nao.org.uk/wp-content/uploads/2021/11/The-governments-preparedness-for-the-COVID-19-pandemic-lessons-for-government-on-risk-management.pdf
- 24 Davies N, Atkins G, Guerin B and Sodhi S, *How fit were public services for coronavirus?*, Institute for Government, August 2020, www.instituteforgovernment.org.uk/sites/default/files/publications/how-fit-public-services-coronavirus.pdf; Hilton S and Baylon C, *Risk management in the UK: What can we learn from COVID-19 and are we prepared for the next disaster?*, The Centre for the Study of Existential Risk, November 2020, www.cser.ac.uk/media/uploads/files/Risk_management_in_the_UK___What_can_we_learn_from_COVID-19_and_are_we_prepared_for_the_next_disaster___FINAL_VERSION___2.pdf
- 25 House of Commons Health and Social Care, and Science and Technology Committees, *Coronavirus: lessons learned to date Sixth Report of the Health and Social Care Committee and Third Report of the Science and Technology Committee of Session 2021–22* (HC 92), 12 October 2021, <https://committees.parliament.uk/publications/7496/documents/78687/default/>; Cook C, 'The wrong kind of pandemic', Tortoise, 6 October 2020, www.tortoisemedia.com/2020/10/06/the-wrong-kind-of-pandemic/
- 26 House of Commons Health and Social Care, and Science and Technology Committees, *Coronavirus: lessons learned to date Sixth Report of the Health and Social Care Committee and Third Report of the Science and Technology Committee of Session 2021–22* (HC 92), 12 October 2021, <https://committees.parliament.uk/publications/7496/documents/78687/default>
- 27 Hilton S and Baylon C, *Risk management in the UK: What can we learn from COVID-19 and are we prepared for the next disaster?*, The Centre for the Study of Existential Risk, November 2020, www.cser.ac.uk/media/uploads/files/Risk_management_in_the_UK___What_can_we_learn_from_COVID-19_and_are_we_prepared_for_the_next_disaster___FINAL_VERSION___2.pdf; House of Commons Health and Social Care, and Science and Technology Committees, *Coronavirus: lessons learned to date Sixth Report of the Health and Social Care Committee and Third Report of the Science and Technology Committee of Session 2021–22* (HC 92), 12 October 2021, <https://committees.parliament.uk/publications/7496/documents/78687/default>
- 28 House of Commons House of Lords Joint Committee on the National Security Strategy, *Biosecurity and national security: First Report of Session 2019–21* (HC 611, HL 195), 18 December 2020, <https://committees.parliament.uk/publications/4035/documents/40449/default>; National Audit Office, *The government's preparedness for the COVID-19 pandemic: lessons for government on risk management* (HC 735), 19 November 2021, www.nao.org.uk/wp-content/uploads/2021/11/The-governments-preparedness-for-the-COVID-19-pandemic-lessons-for-government-on-risk-management.pdf
- 29 Thomas A and Clyne R, *Responding to shocks: 10 lessons for government*, Institute for Government, March 2021, www.instituteforgovernment.org.uk/sites/default/files/publications/responding_shocks_lessons_covid_brexit.pdf; www.instituteforgovernment.org.uk/ministers-reflect/person/amber-rudd; National Audit Office, *The government's preparedness for the COVID-19 pandemic: lessons for government on risk management* (HC 735), 19 November 2021, www.nao.org.uk/wp-content/uploads/2021/11/The-governments-preparedness-for-the-COVID-19-pandemic-lessons-for-government-on-risk-management.pdf
- 30 House of Commons House of Lords Joint Committee on the National Security Strategy, *Biosecurity and national security: First Report of Session 2019–21* (HC 611, HL 195), 18 December 2020, <https://committees.parliament.uk/publications/4035/documents/40449/default>
- 31 House of Lords Select Committee on Risk Assessment and Risk Planning, *Preparing for Extreme Risks: Building a Resilient Society* (HL 110), 3 December 2021, <https://publications.parliament.uk/pa/ld5802/ldselect/ldrisk/110/110.pdf>
-

-
- 32 National Audit Office, *The government's preparedness for the COVID-19 pandemic: lessons for government on risk management* (HC 735), 19 November 2021, www.nao.org.uk/wp-content/uploads/2021/11/The-governments-preparedness-for-the-COVID-19-pandemic-lessons-for-government-on-risk-management.pdf; House of Commons Committee of Public Accounts, *Government preparedness for the COVID-19 pandemic: lessons for government on risk: Forty-Sixth Report of Session 2021–22* (HC 952), 23 March 2022, <https://committees.parliament.uk/publications/9371/documents/160964/default>; House of Lords Select Committee on Risk Assessment and Risk Planning, *Preparing for Extreme Risks: Building a Resilient Society* (HL 110), 3 December 2021, <https://publications.parliament.uk/pa/ld5802/ldselect/ldrisk/110/110.pdf>
- 33 Shilson-Thomas A, Rees S and Pickles C, *A State of preparedness: How government can build resilience to civil emergencies*, Reform, March 2021, https://reform.uk/sites/default/files/2021-03/A%20State%20of%20Preparedness%2C%20Embargoed%20Copy%2C%20Final_0.pdf; PAC1; www.nao.org.uk/wp-content/uploads/2020/07/Implementing-employment-support-schemes-in-response-to-the-COVID-19-pandemic.pdf; House of Commons Committee of Public Accounts, *Government preparedness for the COVID-19 pandemic: lessons for government on risk: Forty-Sixth Report of Session 2021–22* (HC 952), 23 March 2022, <https://committees.parliament.uk/publications/9371/documents/160964/default>; Pope T and Shearer E, *The Coronavirus Job Retention Scheme: How successful has the furlough scheme been and what should happen next?*, Institute for Government, September 2021, www.instituteforgovernment.org.uk/sites/default/files/publications/coronavirus-job-retention-scheme-success.pdf
- 34 National Audit Office, *The Bounce Back Loan Scheme: an update* (HC 861), 3 December 2021, www.nao.org.uk/report/the-bounce-back-loan-scheme-an-update; House of Commons Committee of Public Accounts, *Bounce Back Loans Scheme: Follow-up Fiftieth Report of Session 2021–22* (HC 951), 27 April 2022, <https://committees.parliament.uk/publications/22002/documents/163618/default>; Thomas D, 'UK to lose at least £15bn on Covid support due to fraud and error, MPs warn', *Financial Times*, 23 February 2022, www.ft.com/content/0bd2d141-68ea-4d6b-aa81-9300a7ab27b9
- 35 Thomas A and Clyne R, *Responding to shocks: 10 lessons for government*, Institute for Government, March 2021, www.instituteforgovernment.org.uk/sites/default/files/publications/responding_shocks_lessons_covid_brexit.pdf; Shilson-Thomas A, Rees S and Pickles C, *A State of preparedness: How government can build resilience to civil emergencies*, Reform, March 2021, https://reform.uk/sites/default/files/2021-03/A%20State%20of%20Preparedness%2C%20Embargoed%20Copy%2C%20Final_0.pdf
- 36 National Audit Office, *The government's preparedness for the COVID-19 pandemic: lessons for government on risk management* (HC 735), 19 November 2021, www.nao.org.uk/wp-content/uploads/2021/11/The-governments-preparedness-for-the-COVID-19-pandemic-lessons-for-government-on-risk-management.pdf; Timmins N, *Schools and coronavirus: The government's handling of education during the pandemic*, Institute for Government, August 2021, www.instituteforgovernment.org.uk/publications/schools-and-coronavirus; Thomas A and Clyne R, *Responding to shocks: 10 lessons for government*, Institute for Government, March 2021, www.instituteforgovernment.org.uk/sites/default/files/publications/responding_shocks_lessons_covid_brexit.pdf; Shilson-Thomas A, Rees S and Pickles C, *A State of preparedness: How government can build resilience to civil emergencies*, Reform, March 2021, https://reform.uk/sites/default/files/2021-03/A%20State%20of%20Preparedness%2C%20Embargoed%20Copy%2C%20Final_0.pdf
- 37 National Audit Office, *The government's preparedness for the COVID-19 pandemic: lessons for government on risk management* (HC 735), 19 November 2021, www.nao.org.uk/wp-content/uploads/2021/11/The-governments-preparedness-for-the-COVID-19-pandemic-lessons-for-government-on-risk-management.pdf
- 38 *Ibid.*; Department of Health, *UK Influenza Pandemic Preparedness Strategy 2011*, 10 November 2021, https://assets.publishing.service.gov.uk/government/uploads/system/uploads/attachment_data/file/213717/dh_131040.pdf
- 39 National Audit Office, *The government's preparedness for the COVID-19 pandemic: lessons for government on risk management* (HC 735), 19 November 2021, www.nao.org.uk/wp-content/uploads/2021/11/The-governments-preparedness-for-the-COVID-19-pandemic-lessons-for-government-on-risk-management.pdf
- 40 Thomas A and Clyne R, *Responding to shocks: 10 lessons for government*, Institute for Government, March 2021, www.instituteforgovernment.org.uk/sites/default/files/publications/responding_shocks_lessons_covid_brexit.pdf
- 41 Mann B, Settle K and Towler A, *An Independent Review of the Civil Contingencies Act 2004 and its Supporting Arrangements*, National Preparedness Commission, March 2022, <https://nationalpreparednesscommission.uk/wp-content/uploads/2022/03/NPC-CCA-Report-FINAL-FOR-PUBLICATION-ON-24-MARCH-2022.pdf>
- 42 National Audit Office, *The government's preparedness for the COVID-19 pandemic: lessons for government on risk management* (HC 735), 19 November 2021, www.nao.org.uk/wp-content/uploads/2021/11/The-governments-preparedness-for-the-COVID-19-pandemic-lessons-for-government-on-risk-management.pdf
- 43 House of Lords Select Committee on Risk Assessment and Risk Planning, *Preparing for Extreme Risks: Building a Resilient Society* (HL 110), 3 December 2021, <https://publications.parliament.uk/pa/ld5802/ldselect/ldrisk/110/110.pdf>; Ord T, Mercer A and Dannreuther S, *Future Proof*, The Centre for Long-Term Resilience, June 2021, https://11f95c32-710c-438b-903d-da4e18de8aaa.filesusr.com/ugd/e40baa_c64c0d7b430149a393236bf4d26cdfdd.pdf
-

-
- 44 Sasse T and Thomas A, *Better policy making*, Institute for Government, March 2022, www.instituteforgovernment.org.uk/sites/default/files/publications/better-policy-making.pdf
- 45 Cabinet Office, *Government response to Preparing for Extreme Risks: Building a Resilient Society* (CP641), 17 March 2022, <https://committees.parliament.uk/publications/9365/documents/160862/default>
- 46 House of Lords Select Committee on Risk Assessment and Risk Planning, *Preparing for Extreme Risks: Building a Resilient Society* (HL 110), 3 December 2021, <https://publications.parliament.uk/pa/ld5802/ldselect/ldrisk/110/110.pdf>
- 47 National Audit Office, *The government's preparedness for the COVID-19 pandemic: lessons for government on risk management* (HC 735), 19 November 2021, www.nao.org.uk/wp-content/uploads/2021/11/The-governments-preparedness-for-the-COVID-19-pandemic-lessons-for-government-on-risk-management.pdf; Government Finance Function, 'The Risk Management Profession', accessed on 20 June 2022, <https://gff.civilservice.gov.uk/risk-management/the-risk-management-profession/#>; 'Letter from Alex Chisholm, Civil Service Chief Operating Officer and Cabinet Office Permanent Secretary, and Catherine Little, Director General, Public Spending and Head of Government Finance Function, to Dame Meg Hillier, Chair Public Accounts Committee, 29 April 2022', Cabinet Office, HM Treasury, <https://committees.parliament.uk/publications/22166/documents/164461/default>; House of Commons Committee of Public Accounts, *Government preparedness for the COVID-19 pandemic: lessons for government on risk: Forty-Sixth Report of Session 2021–22* (HC 952), 23 March 2022, <https://committees.parliament.uk/publications/9371/documents/160964/default>; Boardman N, *Boardman Review of Government Procurement in the COVID-19 pandemic*, 8 December 2020, https://assets.publishing.service.gov.uk/government/uploads/system/uploads/attachment_data/file/981939/Boardman_Review_of_Government_COVID-19_Procurement_final_report.pdf
- 48 Cabinet Office, *Government response to Preparing for Extreme Risks: Building a Resilient Society* (CP641), 17 March 2022, <https://committees.parliament.uk/publications/9365/documents/160862/default>. See also: Government Finance Function, *Risk Management Skills and Capability Framework*, August 2021, https://assets.publishing.service.gov.uk/government/uploads/system/uploads/attachment_data/file/1009387/Risk_Management_Skills_and_Capabilities_Framework_Final.pdf
- 49 School of International Futures, *Features of effective systemic foresight in governments around the world*, April 2021, https://assets.publishing.service.gov.uk/government/uploads/system/uploads/attachment_data/file/985279/effective-systemic-foresight-governments-report.pdf; Hilton S and Baylon C, *Risk management in the UK: What can we learn from COVID-19 and are we prepared for the next disaster?*, The Centre for the Study of Existential Risk, November 2020, www.cser.ac.uk/media/uploads/files/Risk_management_in_the_UK___What_can_we_learn_from_COVID-19_and_are_we_prepared_for_the_next_disaster___FINAL_VERSION___2.pdf; Mann B, Settle K and Towler A, *An Independent Review of the Civil Contingencies Act 2004 and its Supporting Arrangements*, National Preparedness Commission, March 2022, <https://nationalpreparednesscommission.uk/wp-content/uploads/2022/03/NPC-CCA-Report-FINAL-FOR-PUBLICATION-ON-24-MARCH-2022.pdf>
- 50 Hilton S and Baylon C, *Risk management in the UK: What can we learn from COVID-19 and are we prepared for the next disaster?*, The Centre for the Study of Existential Risk, November 2020, www.cser.ac.uk/media/uploads/files/Risk_management_in_the_UK___What_can_we_learn_from_COVID-19_and_are_we_prepared_for_the_next_disaster___FINAL_VERSION___2.pdf
- 51 House of Commons House of Lords Joint Committee on the National Security Strategy, *Biosecurity and national security: First Report of Session 2019–21* (HC 611, HL 195), 18 December 2020, <https://committees.parliament.uk/publications/4035/documents/40449/default>; Hilton S and Baylon C, *Risk management in the UK: What can we learn from COVID-19 and are we prepared for the next disaster?*, The Centre for the Study of Existential Risk, November 2020, www.cser.ac.uk/media/uploads/files/Risk_management_in_the_UK___What_can_we_learn_from_COVID-19_and_are_we_prepared_for_the_next_disaster___FINAL_VERSION___2.pdf; House of Commons Health and Social Care, and Science and Technology Committees, *Coronavirus: lessons learned to date Sixth Report of the Health and Social Care Committee and Third Report of the Science and Technology Committee of Session 2021–22* (HC 92), 12 October 2021, <https://committees.parliament.uk/publications/7496/documents/78687/default>; House of Lords Select Committee on Risk Assessment and Risk Planning, *Preparing for Extreme Risks: Building a Resilient Society* (HL 110), 3 December 2021, <https://publications.parliament.uk/pa/ld5802/ldselect/ldrisk/110/110.pdf>
- 52 Cabinet Office, *Government response to Preparing for Extreme Risks: Building a Resilient Society* (CP641), 17 March 2022, <https://committees.parliament.uk/publications/9365/documents/160862/default>
- 53 Thomas A and Clyne R, *Responding to shocks: 10 lessons for government*, Institute for Government, March 2021, www.instituteforgovernment.org.uk/sites/default/files/publications/responding_shocks_lessons_covid_brexit.pdf. See also: Mann B, Settle K and Towler A, *An Independent Review of the Civil Contingencies Act 2004 and its Supporting Arrangements*, National Preparedness Commission, March 2022, <https://nationalpreparednesscommission.uk/wp-content/uploads/2022/03/NPC-CCA-Report-FINAL-FOR-PUBLICATION-ON-24-MARCH-2022.pdf>; House of Commons Public Accounts Committee, *Whole of Government Response to COVID-19 Thirteenth Report of Session 2019–21* (HC 404), 23 July 2020, <https://committees.parliament.uk/publications/2024/documents/22788/default>

- 54 House of Lords Select Committee on Risk Assessment and Risk Planning, *Preparing for Extreme Risks: Building a Resilient Society* (HL 110), 3 December 2021, <https://publications.parliament.uk/pa/ld5802/ldselect/ldrisk/110/110.pdf>; National Audit Office, *The government's preparedness for the COVID-19 pandemic: lessons for government on risk management* (HC 735), 19 November 2021, www.nao.org.uk/wp-content/uploads/2021/11/The-governments-preparedness-for-the-COVID-19-pandemic-lessons-for-government-on-risk-management.pdf
- 55 Local Government Association, 'National resilience strategy call for evidence Local Government Association response - September 2021', 28 September 2021, www.local.gov.uk/parliament/briefings-and-responses/national-resilience-strategy-call-evidence-local-government
- 56 House of Lords Select Committee on Risk Assessment and Risk Planning, *Preparing for Extreme Risks: Building a Resilient Society* (HL 110), 3 December 2021, <https://publications.parliament.uk/pa/ld5802/ldselect/ldrisk/110/110.pdf>
- 57 Cabinet Office, *Government response to Preparing for Extreme Risks: Building a Resilient Society* (CP641), 17 March 2022, <https://committees.parliament.uk/publications/9365/documents/160862/default>
- 58 National Audit Office, *The government's preparedness for the COVID-19 pandemic: lessons for government on risk management* (HC 735), 19 November 2021, www.nao.org.uk/wp-content/uploads/2021/11/The-governments-preparedness-for-the-COVID-19-pandemic-lessons-for-government-on-risk-management.pdf
- 59 House of Commons Public Accounts Committee, *Whole of Government Response to COVID-19 Thirteenth Report of Session 2019–21* (HC 404), 23 July 2020, <https://committees.parliament.uk/publications/2024/documents/22788/default>; House of Commons Health and Social Care, and Science and Technology Committees, *Coronavirus: lessons learned to date Sixth Report of the Health and Social Care Committee and Third Report of the Science and Technology Committee of Session 2021–22* (HC 92), 12 October 2021, <https://committees.parliament.uk/publications/7496/documents/78687/default/>; National Audit Office, *The government's preparedness for the COVID-19 pandemic: lessons for government on risk management* (HC 735), 19 November 2021, www.nao.org.uk/wp-content/uploads/2021/11/The-governments-preparedness-for-the-COVID-19-pandemic-lessons-for-government-on-risk-management.pdf; House of Lords Select Committee on Risk Assessment and Risk Planning, *Preparing for Extreme Risks: Building a Resilient Society* (HL 110), 3 December 2021, <https://publications.parliament.uk/pa/ld5802/ldselect/ldrisk/110/110.pdf>
- 60 Department of Health and Social Care, 'Annex B: Exercise Cygnus Report', 5 November 2020, www.gov.uk/government/publications/uk-pandemic-preparedness/exercise-cygnus-report-accessible-report
- 61 National Audit Office, *The government's preparedness for the COVID-19 pandemic: lessons for government on risk management* (HC 735), 19 November 2021, www.nao.org.uk/wp-content/uploads/2021/11/The-governments-preparedness-for-the-COVID-19-pandemic-lessons-for-government-on-risk-management.pdf; House of Lords Select Committee on Risk Assessment and Risk Planning, *Preparing for Extreme Risks: Building a Resilient Society* (HL 110), 3 December 2021, <https://publications.parliament.uk/pa/ld5802/ldselect/ldrisk/110/110.pdf>
- 62 House of Commons House of Lords Joint Committee on the National Security Strategy, *Biosecurity and national security: First Report of Session 2019–21* (HC 611, HL 195), 18 December 2020, <https://committees.parliament.uk/publications/4035/documents/40449/default>; National Audit Office, *The government's preparedness for the COVID-19 pandemic: lessons for government on risk management* (HC 735), 19 November 2021, www.nao.org.uk/wp-content/uploads/2021/11/The-governments-preparedness-for-the-COVID-19-pandemic-lessons-for-government-on-risk-management.pdf; House of Commons Health and Social Care, and Science and Technology Committees, *Coronavirus: lessons learned to date Sixth Report of the Health and Social Care Committee and Third Report of the Science and Technology Committee of Session 2021–22* (HC 92), 12 October 2021, <https://committees.parliament.uk/publications/7496/documents/78687/default>
- 63 Hine D, *The 2009 Influenza Pandemic: An independent review of the UK response to the 2009 influenza pandemic*, July 2010, https://assets.publishing.service.gov.uk/government/uploads/system/uploads/attachment_data/file/61252/the2009influenzapandemic-review.pdf; House of Commons Health and Social Care, and Science and Technology Committees, *Coronavirus: lessons learned to date Sixth Report of the Health and Social Care Committee and Third Report of the Science and Technology Committee of Session 2021–22* (HC 92), 12 October 2021, <https://committees.parliament.uk/publications/7496/documents/78687/default>
- 64 House of Commons House of Lords Joint Committee on the National Security Strategy, *Biosecurity and national security: First Report of Session 2019–21* (HC 611, HL 195), 18 December 2020, <https://committees.parliament.uk/publications/4035/documents/40449/default>; National Audit Office, *The government's preparedness for the COVID-19 pandemic: lessons for government on risk management* (HC 735), 19 November 2021, www.nao.org.uk/wp-content/uploads/2021/11/The-governments-preparedness-for-the-COVID-19-pandemic-lessons-for-government-on-risk-management.pdf; Shilson-Thomas A, Rees S and Pickles C, *A State of preparedness: How government can build resilience to civil emergencies*, Reform, March 2021, https://reform.uk/sites/default/files/2021-03/A%20State%20of%20Preparedness%2C%20Embargoed%20Copy%2C%20Final_0.pdf; House of Commons Committee of Public Accounts, *Government preparedness for the COVID-19 pandemic: lessons for government on risk: Forty-Sixth Report of Session 2021–22* (HC 952), 23 March 2022, <https://committees.parliament.uk/publications/9371/documents/160964/default>; House of Lords Select Committee on Risk Assessment and Risk Planning, *Preparing for Extreme Risks: Building a Resilient Society* (HL 110), 3 December 2021, <https://publications.parliament.uk/pa/ld5802/ldselect/ldrisk/110/110.pdf>

-
- 65 Shilson-Thomas A, Rees S and Pickles C, *A State of preparedness: How government can build resilience to civil emergencies*, Reform, March 2021, https://reform.uk/sites/default/files/2021-03/A%20State%20of%20Preparedness%2C%20Embargoed%20Copy%2C%20Final_0.pdf; House of Lords Select Committee on Risk Assessment and Risk Planning, *Preparing for Extreme Risks: Building a Resilient Society* (HL 110), 3 December 2021, <https://publications.parliament.uk/pa/ld5802/ldselect/ldrisk/110/110.pdf>
- 66 National Audit Office, *The government's preparedness for the COVID-19 pandemic: lessons for government on risk management* (HC 735), 19 November 2021, www.nao.org.uk/wp-content/uploads/2021/11/The-governments-preparedness-for-the-COVID-19-pandemic-lessons-for-government-on-risk-management.pdf; House of Lords Select Committee on Risk Assessment and Risk Planning, *Preparing for Extreme Risks: Building a Resilient Society* (HL 110), 3 December 2021, <https://publications.parliament.uk/pa/ld5802/ldselect/ldrisk/110/110.pdf>
- 67 House of Lords Select Committee on Risk Assessment and Risk Planning, *Preparing for Extreme Risks: Building a Resilient Society* (HL 110), 3 December 2021, <https://publications.parliament.uk/pa/ld5802/ldselect/ldrisk/110/110.pdf>
- 68 Shilson-Thomas A, Rees S and Pickles C, *A State of preparedness: How government can build resilience to civil emergencies*, Reform, March 2021, https://reform.uk/sites/default/files/2021-03/A%20State%20of%20Preparedness%2C%20Embargoed%20Copy%2C%20Final_0.pdf
- 69 National Audit Office, *The government's preparedness for the COVID-19 pandemic: lessons for government on risk management* (HC 735), 19 November 2021, www.nao.org.uk/wp-content/uploads/2021/11/The-governments-preparedness-for-the-COVID-19-pandemic-lessons-for-government-on-risk-management.pdf
- 70 House of Commons Health and Social Care, and Science and Technology Committees, *Coronavirus: lessons learned to date Sixth Report of the Health and Social Care Committee and Third Report of the Science and Technology Committee of Session 2021–22* (HC 92), 12 October 2021, <https://committees.parliament.uk/publications/7496/documents/78687/default>
- 71 House of Commons House of Lords Joint Committee on the National Security Strategy, *Biosecurity and national security: First Report of Session 2019–21* (HC 611, HL 195), 18 December 2020, <https://committees.parliament.uk/publications/4035/documents/40449/default>; National Audit Office, *The government's preparedness for the COVID-19 pandemic: lessons for government on risk management* (HC 735), 19 November 2021, www.nao.org.uk/wp-content/uploads/2021/11/The-governments-preparedness-for-the-COVID-19-pandemic-lessons-for-government-on-risk-management.pdf
- 72 Ord T, Mercer A and Dannreuther S, *Future Proof*, The Centre for Long-Term Resilience, June 2021, https://11f95c32-710c-438b-903d-da4e18de8aaa.filesusr.com/ugd/e40baa_c64c0d7b430149a393236bf4d26cdfdd.pdf
- 73 Office for Budget Responsibility, *Fiscal risks report*, July 2021, https://obr.uk/docs/dlm_uploads/Fiscal_risks_report_July_2021.pdf
- 74 Hilton S and Baylon C, *Risk management in the UK: What can we learn from COVID-19 and are we prepared for the next disaster?*, The Centre for the Study of Existential Risk, November 2020, www.cser.ac.uk/media/uploads/files/Risk_management_in_the_UK_What_can_we_learn_from_COVID-19_and_are_we_prepared_for_the_next_disaster_FINAL_VERSION_2.pdf; Ord T, Mercer A and Dannreuther S, *Future Proof*, The Centre for Long-Term Resilience, June 2021, https://11f95c32-710c-438b-903d-da4e18de8aaa.filesusr.com/ugd/e40baa_c64c0d7b430149a393236bf4d26cdfdd.pdf
- 75 Ord T, Mercer A and Dannreuther S, *Future Proof*, The Centre for Long-Term Resilience, June 2021, https://11f95c32-710c-438b-903d-da4e18de8aaa.filesusr.com/ugd/e40baa_c64c0d7b430149a393236bf4d26cdfdd.pdf
- 76 UK Parliament, 'Civil Contingencies Secretariat: Question for Cabinet Office, UIN 68390, tabled on 2 July 2020', <https://questions-statements.parliament.uk/written-questions/detail/2020-07-02/68390>; Home Office, *Home Office annual report and accounts: 2020 to 2021*, May 2022, www.gov.uk/government/publications/home-office-annual-report-and-accounts-2020-to-2021; Shilson-Thomas A, Rees S and Pickles C, *A State of preparedness: How government can build resilience to civil emergencies*, Reform, March 2021, https://reform.uk/sites/default/files/2021-03/A%20State%20of%20Preparedness%2C%20Embargoed%20Copy%2C%20Final_0.pdf
- 77 National Audit Office, *Progress of the 2016–2021 National Cyber Security Programme* (HC 1988), 15 March 2019, www.nao.org.uk/wp-content/uploads/2019/03/Progress-of-the-2016-2021-National-Cyber-Security-Programme.pdf
- 78 House of Commons Defence Committee, 'Oral evidence: Defence contribution to the UK's pandemic response, HC 357, Tuesday 14 July 2020', <https://committees.parliament.uk/oralevidence/690/pdf>; House of Commons Defence Committee, *Manpower or mindset: Defence's contribution to the UK's pandemic response: Sixth Report of Session 2019–21* (HC 357), March 2021, <https://committees.parliament.uk/publications/5258/documents/52590/default>; House of Commons House of Lords Joint Committee on the National Security Strategy, *Biosecurity and national security: First Report of Session 2019–21* (HC 611, HL 195), 18 December 2020, <https://committees.parliament.uk/publications/4035/documents/40449/default>

-
- 79 House of Commons House of Lords Joint Committee on the National Security Strategy, *Biosecurity and national security: First Report of Session 2019–21* (HC 611, HL 195), 18 December 2020, <https://committees.parliament.uk/publications/4035/documents/40449/default>
- 80 House of Lords Select Committee on Risk Assessment and Risk Planning, *Preparing for Extreme Risks: Building a Resilient Society* (HL 110), 3 December 2021, <https://publications.parliament.uk/pa/ld5802/ldselect/ldrisk/110/110.pdf>; House of Lords Risk Assessment and Risk Planning Committee, 'Corrected oral evidence: Risk assessment and risk planning, Wednesday 9 June 2021 10.15 am', 9 June 2021, <https://committees.parliament.uk/oralevidence/2346/pdf>
- 81 House of Lords Select Committee on Risk Assessment and Risk Planning, *Preparing for Extreme Risks: Building a Resilient Society* (HL 110), 3 December 2021, <https://publications.parliament.uk/pa/ld5802/ldselect/ldrisk/110/110.pdf>; Sasse T and Thomas A, *Better policy making*, Institute for Government, March 2022, www.instituteforgovernment.org.uk/sites/default/files/publications/better-policy-making.pdf
- 82 House of Lords Select Committee on Risk Assessment and Risk Planning, *Preparing for Extreme Risks: Building a Resilient Society* (HL 110), 3 December 2021, <https://publications.parliament.uk/pa/ld5802/ldselect/ldrisk/110/110.pdf>; House of Lords Risk Assessment and Risk Planning Committee, 'Corrected oral evidence: Risk assessment and risk planning, Wednesday 23 June 2021, 11.20 am', <https://committees.parliament.uk/oralevidence/2448/pdf>
- 83 Thomas A and Clyne R, *Responding to shocks: 10 lessons for government*, Institute for Government, March 2021, www.instituteforgovernment.org.uk/sites/default/files/publications/responding_shocks_lessons_covid_brexit.pdf
- 84 Davies N, Atkins G, Guerin B and Sodhi S, *How fit were public services for coronavirus?*, Institute for Government, August 2020, www.instituteforgovernment.org.uk/sites/default/files/publications/how-fit-public-services-coronavirus.pdf
- 85 House of Lords Select Committee on Risk Assessment and Risk Planning, *Preparing for Extreme Risks: Building a Resilient Society* (HL 110), 3 December 2021, <https://publications.parliament.uk/pa/ld5802/ldselect/ldrisk/110/110.pdf>; House of Commons Health and Social Care, and Science and Technology Committees, *Coronavirus: lessons learned to date Sixth Report of the Health and Social Care Committee and Third Report of the Science and Technology Committee of Session 2021–22* (HC 92), 12 October 2021, <https://committees.parliament.uk/publications/7496/documents/78687/default/>; <https://committees.parliament.uk/publications/7496/documents/78687/default/>; Office for Budget Responsibility, *Fiscal risks report*, July 2021, https://obr.uk/docs/dlm_uploads/Fiscal_risks_report_July_2021.pdf
- 86 House of Commons Science and Technology Committee, Health and Social Care Committee, 'Oral evidence: Coronavirus: lessons learnt', (HC 877), 2 December 2020, <https://committees.parliament.uk/oralevidence/1323/pdf/>; Thomas A and Clyne R, *Responding to shocks: 10 lessons for government*, Institute for Government, March 2021, www.instituteforgovernment.org.uk/sites/default/files/publications/responding_shocks_lessons_covid_brexit.pdf
- 87 Thomas A and Clyne R, *Responding to shocks: 10 lessons for government*, Institute for Government, March 2021, www.instituteforgovernment.org.uk/sites/default/files/publications/responding_shocks_lessons_covid_brexit.pdf; Care Quality Commission, *The state of health care and adult social care in England 2019/20* (HC 799), 15 October 2020, www.cqc.org.uk/sites/default/files/20201016_stateofcare1920_fullreport.pdf
- 88 Thomas A and Clyne R, *Responding to shocks: 10 lessons for government*, Institute for Government, March 2021, www.instituteforgovernment.org.uk/sites/default/files/publications/responding_shocks_lessons_covid_brexit.pdf; House of Commons Health and Social Care, and Science and Technology Committees, *Coronavirus: lessons learned to date Sixth Report of the Health and Social Care Committee and Third Report of the Science and Technology Committee of Session 2021–22* (HC 92), 12 October 2021, <https://committees.parliament.uk/publications/7496/documents/78687/default/>; Anandaciva S, 'Was building the NHS Nightingale hospitals worth the money?', The King's Fund, 5 May 2021, www.kingsfund.org.uk/blog/2021/04/nhs-nightingale-hospitals-worth-money

- 89 House of Commons Committee of Public Accounts, *Government preparedness for the COVID-19 pandemic: lessons for government on risk: Forty-Sixth Report of Session 2021–22* (HC 952), 23 March 2022, <https://committees.parliament.uk/publications/9371/documents/160964/default>; House of Commons House of Lords Joint Committee on the National Security Strategy, *Biosecurity and national security: First Report of Session 2019–21* (HC 611, HL 195), 18 December 2020, <https://committees.parliament.uk/publications/4035/documents/40449/default>; House of Commons Public Accounts Committee, *Whole of Government Response to COVID-19 Thirteenth Report of Session 2019–21* (HC 404), 23 July 2020, <https://committees.parliament.uk/publications/2024/documents/22788/default>; House of Commons Health and Social Care, and Science and Technology Committees, *Coronavirus: lessons learned to date Sixth Report of the Health and Social Care Committee and Third Report of the Science and Technology Committee of Session 2021–22* (HC 92), 12 October 2021, <https://committees.parliament.uk/publications/7496/documents/78687/default>; National Audit Office, *The government's preparedness for the COVID-19 pandemic: lessons for government on risk management* (HC 735), 19 November 2021, www.nao.org.uk/wp-content/uploads/2021/11/The-governments-preparedness-for-the-COVID-19-pandemic-lessons-for-government-on-risk-management.pdf; House of Lords Select Committee on Risk Assessment and Risk Planning, *Preparing for Extreme Risks: Building a Resilient Society* (HL 110), 3 December 2021, <https://publications.parliament.uk/pa/ld5802/ldselect/ldrisk/110/110.pdf>
- 90 House of Lords Select Committee on Risk Assessment and Risk Planning, *Preparing for Extreme Risks: Building a Resilient Society* (HL 110), 3 December 2021, <https://publications.parliament.uk/pa/ld5802/ldselect/ldrisk/110/110.pdf>
- 91 House of Commons House of Lords Joint Committee on the National Security Strategy, *Biosecurity and national security: First Report of Session 2019–21* (HC 611, HL 195), 18 December 2020, <https://committees.parliament.uk/publications/4035/documents/40449/default>
- 92 House of Commons Committee of Public Accounts, *Government preparedness for the COVID-19 pandemic: lessons for government on risk: Forty-Sixth Report of Session 2021–22* (HC 952), 23 March 2022, <https://committees.parliament.uk/publications/9371/documents/160964/default>
- 93 House of Commons House of Lords Joint Committee on the National Security Strategy, *Biosecurity and national security: First Report of Session 2019–21* (HC 611, HL 195), 18 December 2020, <https://committees.parliament.uk/publications/4035/documents/40449/default>; Cabinet Office, *Government response to Preparing for Extreme Risks: Building a Resilient Society* (CP641), 17 March 2022, <https://committees.parliament.uk/publications/9365/documents/160862/default>
- 94 House of Commons House of Lords Joint Committee on the National Security Strategy, 'Corrected oral evidence: Biosecurity and national security, Monday 9 November 2020, 4 pm', <https://committees.parliament.uk/oralevidence/1168/html>; House of Commons House of Lords Joint Committee on the National Security Strategy, *Biosecurity and national security: First Report of Session 2019–21* (HC 611, HL 195), 18 December 2020, <https://committees.parliament.uk/publications/4035/documents/40449/default>
- 95 UK Parliament, 'Civil Contingencies Secretariat: Question for Cabinet Office, UIN 68390, tabled on 2 July 2020', <https://questions-statements.parliament.uk/written-questions/detail/2020-07-02/68390>; Shilson-Thomas A, Rees S and Pickles C, *A State of preparedness: How government can build resilience to civil emergencies*, Reform, March 2021, https://reform.uk/sites/default/files/2021-03/A%20State%20of%20Preparedness%20%20Embargoed%20Copy%2C%20Final_0.pdf
- 96 House of Lords Select Committee on Risk Assessment and Risk Planning, 'Corrected oral evidence: Risk Assessment and Risk Planning, Wednesday 25 November 2020 10.30 am', <https://committees.parliament.uk/oralevidence/1295/html>; House of Commons House of Lords Joint Committee on the National Security Strategy, *Biosecurity and national security: First Report of Session 2019–21* (HC 611, HL 195), 18 December 2020, <https://committees.parliament.uk/publications/4035/documents/40449/default>; National Audit Office, *The government's preparedness for the COVID-19 pandemic: lessons for government on risk management* (HC 735), 19 November 2021, www.nao.org.uk/wp-content/uploads/2021/11/The-governments-preparedness-for-the-COVID-19-pandemic-lessons-for-government-on-risk-management.pdf; House of Commons Public Accounts Committee, 'Oral evidence: Government preparedness for COVID-19 Pandemic: Lessons for Government on risk (HC 952)', 12 January 2022, <https://committees.parliament.uk/oralevidence/3291/default/>
- 97 National Audit Office, *The government's preparedness for the COVID-19 pandemic: lessons for government on risk management* (HC 735), 19 November 2021, www.nao.org.uk/wp-content/uploads/2021/11/The-governments-preparedness-for-the-COVID-19-pandemic-lessons-for-government-on-risk-management.pdf; House of Lords Select Committee on Risk Assessment and Risk Planning, *Preparing for Extreme Risks: Building a Resilient Society* (HL 110), 3 December 2021, <https://publications.parliament.uk/pa/ld5802/ldselect/ldrisk/110/110.pdf>
- 98 National Audit Office, *The government's preparedness for the COVID-19 pandemic: lessons for government on risk management* (HC 735), 19 November 2021, www.nao.org.uk/wp-content/uploads/2021/11/The-governments-preparedness-for-the-COVID-19-pandemic-lessons-for-government-on-risk-management.pdf
- 99 Mann B, Settle K and Towler A, *An Independent Review of the Civil Contingencies Act 2004 and its Supporting Arrangements*, National Preparedness Commission, March 2022, <https://nationalpreparednesscommission.uk/wp-content/uploads/2022/03/NPC-CCA-Report-FINAL-FOR-PUBLICATION-ON-24-MARCH-2022.pdf>

-
- 100 House of Commons Environment, Food and Rural Affairs Committee, *Future flood prevention: Second Report of Session 2016–17* (HC 115), 2 November 2016, <https://publications.parliament.uk/pa/cm201617/cmselect/cmenvfru/115/115.pdf>; House of Commons Environment, Food and Rural Affairs Committee, *Flooding: Fourth Report of Session 2019–21 Report, together with formal minutes relating to the report* (HC 170), 8 February 2021, <https://committees.parliament.uk/publications/4601/documents/46603/default>; Shilson-Thomas A, Rees S and Pickles C, *A State of preparedness: How government can build resilience to civil emergencies*, Reform, March 2021, https://reform.uk/sites/default/files/2021-03/A%20State%20of%20Preparedness%2C%20Embargoed%20Copy%2C%20Final_0.pdf
 - 101 National Audit Office, *The government's preparedness for the COVID-19 pandemic: lessons for government on risk management* (HC 735), 19 November 2021, www.nao.org.uk/wp-content/uploads/2021/11/The-governments-preparedness-for-the-COVID-19-pandemic-lessons-for-government-on-risk-management.pdf
 - 102 See also: House of Lords Risk Assessment and Risk Planning Committee, 'Corrected oral evidence: Risk assessment and risk planning, Wednesday 9 June 2021 10.15 am', 9 June 2021, <https://committees.parliament.uk/oralevidence/2346/pdf>
 - 103 Cabinet Office, *Government response to Preparing for Extreme Risks: Building a Resilient Society* (CP641), 17 March 2022, <https://committees.parliament.uk/publications/9365/documents/160862/default>

Improving management of catastrophic risks

- 1 HM Government, *The Orange Book: Management of Risk – Principles and Concepts*, 2020, https://assets.publishing.service.gov.uk/government/uploads/system/uploads/attachment_data/file/866117/6.6266_HMT_Orange_Book_Update_v6_WEB.PDF; Chartered Institute of Internal Auditors, 'Internal audit, risk and corporate governance – the Three Lines of Defence Model', March 2015, www.iaa.org.uk/media/1042665/three-lines-of-defence-march-2015.pdf; Deloitte, *Modernising the three lines of defence model: An internal audit perspective*, 2020, <https://www2.deloitte.com/content/dam/Deloitte/uk/Documents/risk/deloitte-uk-modernising-the-three-lines-of-defence-model.pdf>
- 2 HM Government, *The Orange Book: Management of Risk – Principles and Concepts*, 2020, https://assets.publishing.service.gov.uk/government/uploads/system/uploads/attachment_data/file/866117/6.6266_HMT_Orange_Book_Update_v6_WEB.PDF
- 3 Ord T, Mercer A and Dannreuther S, *Future Proof*, The Centre for Long-Term Resilience, June 2021, https://11f95c32-710c-438b-903d-da4e18de8aaa.filesusr.com/ugd/e40baa_c64c0d7b430149a393236bf4d26cdfdd.pdf
- 4 Ord T, Mercer A and Dannreuther S, *Future Proof*, The Centre for Long-Term Resilience, June 2021, https://11f95c32-710c-438b-903d-da4e18de8aaa.filesusr.com/ugd/e40baa_c64c0d7b430149a393236bf4d26cdfdd.pdf; Hilton S and Baylon C, *Risk management in the UK: What can we learn from COVID-19 and are we prepared for the next disaster?*, The Centre for the Study of Existential Risk, November 2020, www.cser.ac.uk/media/uploads/files/Risk_management_in_the_UK___What_can_we_learn_from_COVID-19_and_are_we_prepared_for_the_next_disaster___FINAL_VERSION___2.pdf
- 5 House of Lords Select Committee on Risk Assessment and Risk Planning, *Preparing for Extreme Risks: Building a Resilient Society* (HL 110), 3 December 2021, <https://publications.parliament.uk/pa/ld5802/ldselect/lrisk/110/110.pdf>
- 6 House of Commons Public Accounts Committee, 'Oral evidence: Government preparedness for COVID-19 Pandemic: Lessons for Government on risk (HC 952)', 12 January 2022, <https://committees.parliament.uk/oralevidence/3291/default>. See also: National Audit Office, *The government's preparedness for the COVID-19 pandemic: lessons for government on risk management* (HC 735), 19 November 2021, www.nao.org.uk/wp-content/uploads/2021/11/The-governments-preparedness-for-the-COVID-19-pandemic-lessons-for-government-on-risk-management.pdf
- 7 Thomas A and Clyne R, *Responding to shocks: 10 lessons for government*, Institute for Government, March 2021, www.instituteforgovernment.org.uk/sites/default/files/publications/responding_shocks_lessons_covid_brexit.pdf
- 8 House of Commons Committee of Public Accounts, *Government preparedness for the COVID-19 pandemic: lessons for government on risk: Forty-Sixth Report of Session 2021–22* (HC 952), 23 March 2022, <https://committees.parliament.uk/publications/9371/documents/160964/default>; Raine S, 'Half of the National Risk Register is Missing', RUSI, 22 January 2021, <https://rusi.org/explore-our-research/publications/rusi-newsbrief/half-national-risk-register-missing>
- 9 Hilton S and Baylon C, *Risk management in the UK: What can we learn from COVID-19 and are we prepared for the next disaster?*, The Centre for the Study of Existential Risk, November 2020, www.cser.ac.uk/media/uploads/files/Risk_management_in_the_UK___What_can_we_learn_from_COVID-19_and_are_we_prepared_for_the_next_disaster___FINAL_VERSION___2.pdf; Ord T, Mercer A and Dannreuther S, *Future Proof*, The Centre for Long-Term Resilience, June 2021, https://11f95c32-710c-438b-903d-da4e18de8aaa.filesusr.com/ugd/e40baa_c64c0d7b430149a393236bf4d26cdfdd.pdf

-
- 10 Cabinet Office, *Government response to Preparing for Extreme Risks: Building a Resilient Society* (CP641), 17 March 2022, <https://committees.parliament.uk/publications/9365/documents/160862/default>
 - 11 Ord T, Mercer A and Dannreuther S, *Future Proof*, The Centre for Long-Term Resilience, June 2021, https://11f95c32-710c-438b-903d-da4e18de8aaa.filesusr.com/ugd/e40baa_c64c0d7b430149a393236bf4d26cdfdd.pdf. See also: Hilton S and Baylon C, *Risk management in the UK: What can we learn from COVID-19 and are we prepared for the next disaster?*, The Centre for the Study of Existential Risk, November 2020, www.cser.ac.uk/media/uploads/files/Risk_management_in_the_UK___What_can_we_learn_from_COVID-19_and_are_we_prepared_for_the_next_disaster___FINAL_VERSION___2.pdf
 - 12 House of Lords Select Committee on Risk Assessment and Risk Planning, *Preparing for Extreme Risks: Building a Resilient Society* (HL 110), 3 December 2021, <https://publications.parliament.uk/pa/ld5802/ldselect/ldrisk/110/110.pdf>
 - 13 Shilson-Thomas A, Rees S and Pickles C, *A State of preparedness: How government can build resilience to civil emergencies*, Reform, March 2021, https://reform.uk/sites/default/files/2021-03/A%20State%20of%20Preparedness%2C%20Embargoed%20Copy%2C%20Final_0.pdf; Boardman N, *Boardman Review of Government Procurement in the COVID-19 pandemic*, 8 December 2020, https://assets.publishing.service.gov.uk/government/uploads/system/uploads/attachment_data/file/981939/Boardman_Review_of_Government_COVID-19_Procurement_final_report.pdf; House of Commons Health and Social Care, and Science and Technology Committees, *Coronavirus: lessons learned to date Sixth Report of the Health and Social Care Committee and Third Report of the Science and Technology Committee of Session 2021–22* (HC 92), 12 October 2021, <https://committees.parliament.uk/publications/7496/documents/78687/default>; House of Commons House of Lords Joint Committee on the National Security Strategy, *Biosecurity and national security: First Report of Session 2019–21* (HC 611, HL 195), 18 December 2020, <https://committees.parliament.uk/publications/4035/documents/40449/default>; House of Lords Select Committee on Risk Assessment and Risk Planning, *Preparing for Extreme Risks: Building a Resilient Society* (HL 110), 3 December 2021, <https://publications.parliament.uk/pa/ld5802/ldselect/ldrisk/110/110.pdf>; RF
 - 14 House of Lords Select Committee on Risk Assessment and Risk Planning, *Preparing for Extreme Risks: Building a Resilient Society* (HL 110), 3 December 2021, <https://publications.parliament.uk/pa/ld5802/ldselect/ldrisk/110/110.pdf>; House of Lords Risk Assessment and Risk Planning Committee, 'Corrected oral evidence: Risk assessment and risk planning, Wednesday 23 June 2021, 11.20 am', <https://committees.parliament.uk/oralevidence/2448/pdf>
 - 15 Cabinet Office, *Government response to Preparing for Extreme Risks: Building a Resilient Society* (CP641), 17 March 2022, <https://committees.parliament.uk/publications/9365/documents/160862/default>. See also: House of Commons Committee of Public Accounts, *Government preparedness for the COVID-19 pandemic: lessons for government on risk: Forty-Sixth Report of Session 2021–22* (HC 952), 23 March 2022, <https://committees.parliament.uk/publications/9371/documents/160964/default>
 - 16 Cabinet Office, *Government response to Preparing for Extreme Risks: Building a Resilient Society* (CP641), 17 March 2022, <https://committees.parliament.uk/publications/9365/documents/160862/default>
 - 17 House of Commons House of Lords Joint Committee on the National Security Strategy, *Biosecurity and national security: First Report of Session 2019–21* (HC 611, HL 195), 18 December 2020, <https://committees.parliament.uk/publications/4035/documents/40449/default>
 - 18 House of Lords Select Committee on Risk Assessment and Risk Planning, *Preparing for Extreme Risks: Building a Resilient Society* (HL 110), 3 December 2021, <https://publications.parliament.uk/pa/ld5802/ldselect/ldrisk/110/110.pdf>; Cabinet Office, *Government response to Preparing for Extreme Risks: Building a Resilient Society* (CP641), 17 March 2022, <https://committees.parliament.uk/publications/9365/documents/160862/default>
 - 19 House of Lords Risk Assessment and Risk Planning Committee, 'Corrected oral evidence: Risk assessment and risk planning, Wednesday 9 June 2021 10.15 am', 9 June 2021, <https://committees.parliament.uk/oralevidence/2346/pdf>; Ord T, Mercer A and Dannreuther S, *Future Proof*, The Centre for Long-Term Resilience, June 2021, https://11f95c32-710c-438b-903d-da4e18de8aaa.filesusr.com/ugd/e40baa_c64c0d7b430149a393236bf4d26cdfdd.pdf

About the authors

Rosa Hodgkin

Rosa is a researcher working on policy making. She recently completed a PhD in economic history looking at how attitudes to tax changed in Britain between 1945 and 1992. During that time, Rosa spent six months on secondment in the Cabinet Office Open Innovation Team. She has previously worked as an analyst for the climate think tank InfluenceMap.

Tom Sasse

Tom is an associate director at the Institute for Government. His research has covered government outsourcing, civil service reform and policy making, including recent work on net zero and the coronavirus crisis. He also delivers the Institute's training programme on how government works. Previously Tom worked at the Open Data Institute, where he advised governments and businesses on data policy, and the think tank Reform, where he researched health and criminal justice.

The Institute for Government is the leading think tank working to make government more effective.

We provide rigorous research and analysis, topical commentary and public events to explore the key challenges facing government.

We offer a space for discussion and fresh thinking, to help senior politicians and civil servants think differently and bring about change.



 instituteforgovernment.org.uk

 enquiries@instituteforgovernment.org.uk

 +44 (0) 20 7747 0400  +44 (0) 20 7766 0700

 [@instituteforgov](https://twitter.com/instituteforgov)

**Institute for Government, 2 Carlton Gardens
London SW1Y 5AA, United Kingdom**

© Institute for Government 2022

The Institute for Government is a registered charity in England and Wales (No.1123926) with cross-party governance. Our main funder is the Gatsby Charitable Foundation, one of the Sainsbury Family Charitable Trusts.