# SCIENCE ADVICE IN THE UK

**Anna Hopkins, Sarah Foxen, Kathryn Oliver and Gavin Costigan**

September 2021

**A report commissioned by the UK Science and Innovation Network**

# About the authors

**Anna Hopkins** is Senior Researcher with Transforming Evidence
anna@transforming-evidence.org; transforming-evidence.org/

**Sarah Foxen** is Knowledge Exchange Lead at the Parliamentary Office of Science and Technology, UK Parliament
foxens@parliament.uk; parliament.uk/research-impact

**Kathryn Oliver** is Associate Professor of Sociology and Public Health at the London School of Hygiene and Tropical Medicine
Kathryn.Oliver@lshtm.ac.uk; www.lshtm.ac.uk

**Gavin Costigan** is Chief Executive of the Foundation for Science and Technology
Gavin.costigan@foundation.org.uk; www.foundation.org.uk

## To cite or use this report

## Acknowledgements

*The opinions expressed within this report are those of the authors, and do not necessarily reflect the opinions of the UK Government.*

---

[1]  https://creativecommons.org/licenses/by-nc/4.0/

# Table of contents

# Figures

# Boxes

# Foreword

The UK has a long-standing and highly respected ecosystem of evidence-based policy making that draws from our world leading research and innovation base in academia, industry and the charitable sectors and has been a pillar of UK prosperity and security for nearly a century. This report lays out this rich tapestry, its history and deep foundations and eloquently describes its dynamic evolution and agility.

The current pandemic has brought science advice in all of its guises into the public view, propelling scientists and science advisers to global fame and giving society – from journalists to members of the public - unprecedented direct access to our world-leading experts. These experts from across fields of physical, biological and medical science, engineering, social science and psychology, to name a few, have been working under relentless pressure and at pace to advance our understanding at the frontiers of knowledge and uncertainty during this rapidly evolving and unpredictable global pandemic.

And whilst this global pandemic is still unfolding and countries work in different ways to mitigate it, it is clear that other even more daunting challenges face us. Indeed, the magnitude of the impacts of climate change and the urgent need to tackle them now dwarf the social, economic and health implications of the current pandemic.

The report shows the critical importance of deep, diverse and well-established systems of evidence-based advice, scrutiny and challenge for the development of robust long-term strategies, horizon scanning and responses to complex national or international crises. But more broadly, the value of science as an independent and reliable policy driver to accelerate economies and guide them to be more sustainable, resilient and inclusive cannot be overstated.

My hope is that this comprehensive report will act as a starting point to catalyse conversations between governments, agencies, universities and citizens; that it offers an invaluable guide to other nations who wish to step up and develop their own national systems of science advice and evidence-based policy making and to evolve international standards on evidence, data and scientific collaboration.

The UK stands ready to provide leadership and share its experience as it continues to develop its own systems to meet tomorrow's opportunities and threats.

*Professor Carole Mundell is Chief International Science Envoy at the Foreign, Commonwealth and Development Office in the UK*

For centuries, science has been one of the few common global languages. Regardless of their origin, scientists and researchers from around the world have collaborated to expand the frontiers of knowledge and bring innovative solutions to improve people's lives.

The UK has been renowned for our research, academic institutions and innovation. However, it was only in recent decades, as set out in this report, the UK fully integrated this expertise in science into our policymaking. Now, more than ever, this ecosystem has proven to be the best tool for the design of effective policies. It is often in crises that the need for science-based policymaking comes to the fore. The climate crisis has shown how the use of science and evidence is vital to plan and implement an effective response. The COVID-19 pandemic has challenged every country but the policies used to incentivise innovation have enabled the world to develop vaccines at speed and at scale.

The world is facing many challenges, but there remain opportunities, which, if approached in a strategic manner guided by scientific evidence, will allow the emergence of more sustainable, inclusive and resilient economies.

One of the ways the UK has sought to integrate science into policymaking has been the creation of the Science and Innovation Network (SIN). Based in over 40 countries SIN officers help to embed science expertise into the operations of British Embassies and Consulates, including mine in Santiago. I am delighted that the Science and Innovation Network has been able to collaborate with the Chilean government to produce this report.

With this report, we hope to share more than 70 years of experience in using science advice in government and parliament. I hope it will be a valuable tool to support other countries, which, like Chile, are developing similar research and innovation ecosystems, and in the long term promote shared prosperity and development.

*Louise de Sousa is the British Ambassador to Chile*

# Executive summary

This report examines the science advice system in the UK. It is a well-established and well-regarded system, which derives its strength from its ongoing evolution – often in response to crises. The report was commissioned by the British Embassy in Santiago, as part of the work of the Science and Innovation Network, which jointly sits in the UK Foreign, Commonwealth and Development Office (FCDO) and in the department of Business Energy and Industrial Strategy (BEIS).

The report aims to inform other governments about the evolution and function of science advice in the UK, illustrating how structures and processes have been developed and embedded, highlighting key strengths and attributes, as well as articulating where the tensions and challenges lie. More broadly, it aims to stimulate reflection and dialogue amongst those working in research and policy – and at their intersection – on what has been learnt in the UK so far. The report draws on insights from current and former scientific advisers, civil servants, evidence 'brokers' and intermediaries, and academics. Because it focuses on science advice for the UK Government, it does not address the complexities of how the devolved governments draw on science and evidence, and in this sense provides a partial picture.

The UK's science advice system is complex, dynamic and non-linear. It involves changing relationships and mechanisms for dialogue, including at many levels of Government as well as in Parliament. It is required to respond to an ever-changing backdrop of events, priorities, possibilities and challenges. It sits within an equally complex and evolving research and innovation landscape, which involves many public, private and third sector actors. Over the past two decades, UK research and policy have become interconnected in more complex ways, as Government has sought to enhance its engagement with science and research, universities and researchers have worked to influence policy, and research funders have sought new ways to maximise the impact of research.

Whilst this report traces the historical development of science advice in the UK through to the present day, it recognises that the system is in a constant state of evolution. After this report is published, it will quickly become 'out of date'. The ability of the UK science advice system to adapt and evolve has been central to its success. The global Coronavirus (COVID-19) pandemic has brought into sharp relief the need for effective, responsive and transparent science advice in nations and communities around the world. In the current moment it is critical that we continue to learn from evidence and experience.

## Structure of the report

Following an introduction to the UK science advice system, the report is structured around the key bodies operating within it. Each section focuses on a different set of actors and organisations, locating them within the wider system and detailing their role and remit, as well as evolving practices and priorities. The final section explores cross cutting issues and learnings from across the system.

Throughout the report, boxes highlight particularly interesting or innovative examples and cases, and the most pertinent lessons learnt are summarised at the end of each section. An overview of each section is presented below.

### Section 1: Introduction

Section 1 provides an overview of the science advice system in the UK, as well as its evolution, setting the scene for the more detailed sections which follow. It outlines the place of scientific evidence in policymaking, and how academic research and advice is taken into consideration by Government alongside other factors that may be social, ethical, political, legal or technological. The section also introduces key actors in the advisory system, such as the Government Office for Science, Government Chief Scientific Adviser, Science and Engineering Profession, Parliament, research funders and universities, and indicates how their roles, remits and interactions have evolved over time.

### Section 2: The Government Office for Science and Government Chief Scientific Adviser

Section 2 presents the Government Office for Science; the body in Government responsible for leading national scientific strategy and overseeing scientific capability within Government, outlining its scope and core activities. The position of Government Chief Scientific Adviser, who leads the Government Office for Science and advises the Prime Minister and Cabinet Office, is also laid out.

### Section 3: Science advice in Government Departments

Section 3 illustrates how science advice is mobilized and used in Government departments. It describes who leads and who uses research in departments – including Departmental Chief Scientific Advisers – and how departments interact with external researchers and universities. The section also outlines the challenges departments face in benefiting from science advice, as well as steps they have taken to improve evidence-informed policymaking, including by strengthening how they commission research, establishing partnerships and secondment schemes, and generating Areas of Research Interest.

## Section 4: Science Advisory Committees

Section 4 examines the role of science advisory committees. It presents the two main kinds of advisory bodies: Science Advisory Councils and Science Advisory Committees, and details their roles and functioning. The section is illustrated with examples of science advisory committee activity, in particular the Scientific Advisory Group for Emergencies (SAGE) and its work in previous crises, as well as the COVID-19 pandemic. This section also discusses the scrutiny and criticism that committees can receive.

## Section 5: The Science and Engineering Profession in Government

Section 5 discusses the Science and Engineering Profession, a body of approximately 20,000 civil servants working across Government with a professional background and/or qualification in science and engineering. It provides an overview of previous and future activity to develop the Profession, including knowledge and skills about how to draw on research and evidence in government. It also covers how this Profession interacts with others across Government.

## Section 6: Science advice in the UK Parliament

Section 6 explores how science advice is used in Parliament, detailing the actors in Parliament who draw on science advice, and the mechanisms through which it is sought or provided. It presents the Parliamentary Office of Science and Technology: Parliament's in-house science advice mechanism, as well as committees and Libraries. It also highlights activities over recent years to build connections between Parliament and the research community and strengthen the role of research evidence in parliamentary scrutiny, legislation and debate.

## Section 7: The role of Government research funders

Section 7 presents UK Research and Innovation (UKRI) – the public body which brings together the UK's research councils and innovation agency, and lays out how research is funded in the UK. It situates UKRI in the wider science advice system and details the contribution of research councils to strengthening the flow of research evidence into policy. These include supporting relationships and collaborations as well as skills development, creating specific funding streams to support knowledge exchange activities, and developing research evaluation frameworks which recognize the value of researcher engagement with and impact on policy.

## Section 8: Universities

Section 8 gives an overview of the governance and structures of universities. It then details the considerable development over recent years in connections and collaborative activity between Government, Parliament and universities. The section also outlines some of the structures supporting the increased dialogue between Government and researchers, such as university policy support units and the Universities Policy Engagement Network, as well as specific policy-engagement activities universities support and deliver, such as networking, capacity building and secondments.

## Section 9: Other evidence generators and brokers

Section 9 recognises there are various actors other than those in Government and academic research that play important roles in the science advice system. It gives an overview of intermediary organisations such as the members of the What Works Network, national academies and learned societies. It also highlights national laboratories, charities, think tanks and NGOs, as well as recognising the role of industry in the wider system.

## Section 10: Cross cutting issues and lessons learnt

Finally, Section 10 identifies key issues which cut across the science advisory system, and the lessons that have been learnt in those areas. The section begins by unpicking challenges around equality, diversity and inclusion, and presents examples of activity to attempt to address these. It then highlights the challenges posed by disciplinary barriers, and the need to integrate expertise and insights from diverse research disciplines in order to tackle complex policy problems. The section also reflects on the notions of transparency and scrutiny, where the challenges are, and why they are important. The amount and availability of data presents both challenges and opportunities for science advice and evidence-informed policymaking, and some of these are explored in this section. Finally, the section recognises that whilst there are well established mechanisms to 'pull' science advice into Government, there remains a need to support skills development, build collaborations, strengthen infrastructure, and with it bring about a culture shift in how science and evidence are used in policy.

## BOX 1: TERMINOLOGY USED IN THIS REPORT

Many of the key terms used in this report are subject to diverse interpretation by those working in research and policy, as well as wider society. Throughout this report, reference is made to 'evidence', 'science', 'science advice', 'evidence-based policy', 'evidence-informed policy', 'researchers' and 'academics'. These are defined below.

### Evidence

The term 'evidence' has various interpretations, which generally differs across sectors. In the criminal justice system, it will readily be understood to mean information given to a court or jury to inform its thinking. In the scientific domain, however, it is generally understood as information that has been derived from research conducted in a methodologically robust way and which has been subject to peer review and published. In policymaking and scrutiny on the other hand, it is often understood as relevant and available information and data, which may come from multiple sources – not just scientific research. This report examines the use of scientific evidence in a policy context, and so its usage reflects the duality of meaning and understanding in both the research and policy spheres.

### Science

For many, the term 'science' denotes the natural sciences, such as the life sciences and physical sciences. However, for others it has a broader meaning, more reflective of the meaning of the Latin word from which it is derived: scientia, meaning 'knowledge'. It is this second definition which applies to the word 'science' in this report. At times, we use the phrases 'research evidence' and 'scientific evidence' interchangeably, although we recognise that the meaning of 'science' is contested. In places, we do refer to specific subject areas, such as the social sciences. It is worth noting that in the UK Government, both meanings of this word are sometimes used, and this can cause confusion and some variation in practice at times – for example considering which areas of evidence a Chief Scientific Adviser provides advice on.

### Science advice

In this report, 'science advice' refers to the structures, mechanisms and processes through which the UK Government and Parliament accesses scientific evidence to inform decision-making, policymaking and scrutiny. This includes both where specific advice, recommendations or policy options are given, as well as where scientific evidence is presented to a policy audience but without recommendations. As with the definition of 'science', above, it is worth noting that within government, there is not always agreement on the breadth of evidence included in 'science advice'.

### Evidence-based policy and evidence-informed policy

The term 'evidence-based policy' was popularised in the 1990s, and broadly speaking refers to the idea that policymakers develop policies based on the best available research evidence. In recent years, the term 'evidence-informed policy' has grown in popularity and usage, as it recognizes that scientific evidence is just one of the factors that is taken into consideration when

policy is formulated and decisions are made. It is the second of these terms which is used in this report, and can be understood as an outcome of 'effective' science advice.

**Researchers and academics**
In this report, both the terms 'researcher' and 'academic' are used. The second of these terms has narrower parameters, generally referring only to those researchers who are based in academic institutions, rather than, for example, researchers working in industry or independent research organisations. Generally, both terms are used in this report to refer to those based in academic institutions, though it is recognised that Government frequently engages with researchers based in many other organisations.

# Section 1: Introduction

The UK has pioneered the use of science advice in government, over the last 70 years expanding a system seeded in 1855 with the appointment of England's first Chief Medical Officer. Today, the Government Office for Science, led by the Government Chief Scientific Adviser and supported by network of Chief Scientific Advisers, forms the core of a system that attracts considerable attention around the world. The past two decades have witnessed efforts across policy domains to improve how science and evidence inform government. For academic institutions, an emphasis on 'impact' has encouraged researchers and universities to engage with or influence policy. Within government, ministers, departments and civil servants have sought to more effectively 'pull' science and evidence into policymaking.

The UK spends billions of pounds on research and development (R&D) each year, seeing this investment as central to growth within a globally competitive knowledge economy[2]. It is home to many of the world's top universities and institutes[3]. From the design of our built environment, to the safety of the food we eat, science advice impacts on all of our lives. The UK's science advice mechanisms sit within a research and innovation system that is complex and multi-dimensional, involving many public, private and third sector bodies and actors, working at national, regional and local levels.

This report examines science advice in the UK Government, contextualising it within this complex landscape. It focuses on the development of formal mechanisms for informing policy with science, touching upon broader interventions that support 'evidence-informed policy-making'. Some of the activities discussed are small-scale and ad hoc, while others are long-standing, cross-governmental efforts in which significant energy and resource has been invested.

The report also looks at science advice within the UK Parliament. The UK has well established mechanisms for ensuring scientific advice to Parliament, primarily through the Parliamentary Office of Science and Technology (POST), established in 1989. The role of POST has grown and expanded since its formation, and in recent years has seen a significant increase in its links across the academic community, including partnering with funding organisations to identify opportunities for closer collaboration.

A central theme of this report is how UK science advice has evolved in response to crises. Episodes of emergency – from the outbreak of bovine spongiform encephalopathy (BSE, or 'mad cow disease') in the 1990s to the H1N1 'swine flu' pandemic in 2009 - have shaped the

mechanisms, roles and structures that make up the system today, as well as informing the expertise of our science advisers. The current Coronavirus (COVID-19) crisis has brought into sharp focus the critical importance of effective, responsive and transparent science advice for nations and communities around the world. The pandemic has precipitated a crisis of different scale and scope to those in the past, with severe and ongoing impacts on life, livelihoods, wellbeing and the economy. Response to the crisis has been international, involving collaboration between scientists around the world and contrasting national policy responses dissected and shared with the public through global media.

This report was commissioned by the British Embassy in Santiago. It aims to inform other governments about the development and function of UK science advice, as well as providing an opportunity for those working on science and evidence in policy to reflect on lessons learnt so far. The current moment presents a chance for governments to learn from the successes and failures of our responses to date. In this context this report takes a historical look at science advice in the UK, identifying how structures and processes have been developed and embedded, as well as highlighting where key attributes, strengths and tensions lie. The report draws on published information, as well as the insights of key actors in UK science advice, gathered through interviews for the purpose of this report.

One interviewee spoken to while making this report described the UK's system as "the Rolls Royce of science advice". It is a system that operates on the principle of scientific consensus but relies on the work of the skilled individuals who act as bridges between the worlds of academia and policy. The competencies of these individuals, and the relationships that are central to their work, is a theme that runs throughout this report. The final section, which draws out key lessons, highlights how the influence of individual science advisers is central to the success of the system, but is also a weakness. It summarises emerging efforts to more effectively embed scientific advice within the day-to-day processes of academia and government, highlighting pressing issues of diversity, equality and inclusion within science, research and evidence-informed policy.

One thing which emerges from this report is that the UK's system of science advice is constantly changing, responding to events. National crises, in particular, test the UK Government's ability to get the right advice at the right time, and lessons learnt have fed into improvements into the system. Without doubt, further changes will take place, especially as the UK identifies what went well and less well during the COVID-19 pandemic.

## The role of science in policy

Science advice and evidence are one of many inputs into policymaking. Policy decisions are influenced by changing social, ethical, political, legal and technological issues, financial considerations, capacity for delivery, and so on. As this report focuses on science advice, it sometimes emphasises mechanisms for supporting learning from the natural sciences, technologies and medicine. However, it looks at how policy is being informed by other

subject-areas, principally the social sciences, as part of the movement for evidence-informed policy and in response to the need for interdisciplinary thinking to tackle the complex problems faced by government.

Researchers – from universities and other research organisations – can contribute both expertise (research-informed advice) and evidence (from the findings of research or evaluation studies) to support policy[4]. The skillsets and experience involved in providing both are related but distinct. This report emphasises advice: how academics can inform policy on the basis of their knowledge of a research specialism or field. At times, it touches upon the different ways in which this advice is supported by evidence and the processes put in place to allow the sharing and use of research findings. The second half of this report (Sections 7–9), covers the role of research institutions and intermediary organisations in providing research and evidence to support policy and the relationship this has to advice processes. Within government (Sections 2–6), particular attention is paid to the role that academics and scientists play providing formal advice, as science advisers and civil servants, or as academics serving on committees and councils, where they can act to support, critique or challenge policy.

In her book *How Does Government Listen to Scientists?*[5] Professor Claire Craig outlines the key dynamics and characteristics that shape UK science advice. Using the example of the 2011 Fukushima emergency, in which many thousands of people lost their lives, she describes a series of key moments, tensions and priorities that shaped government engagement with science. The primary concern of experts was to reach agreement on how to define and describe the level of risk in conditions of great urgency. They also needed to summarise the degree of confidence and certainty that they had in their evidence about the disaster and its effects. Determining these effects was a systemic issue that went beyond the risk of radiation to include multiple complex consequences, such as widespread human displacement and impact on mental health. For experts and advisers grappling with these issues, it was essential that they drew on and integrated knowledge from multiple disciplines. From the perspective of a decision-maker, however, the crisis was approached differently. Policymakers needed to frame and address the systemic effects arising from the crisis in contrasting ways. For policy practitioners, science does not determine the outcome of policy and the boundaries of scientific disciplines do not determine which policy questions are posed and how. Seeking greater alignment between those who ask policy questions and those who might answer them is a central challenge for science advice and evidence-informed policy more generally. In part for this reason, science advice requires a distinct set of what Professor Craig terms "craft skills", alongside subject-specific expertise. Our exploration of UK science advice highlights how knowledge about providing advice is held by advisers, emphasising the importance of the relational work of advice, efforts to strengthen it, as well as the limitations this poses.

Advice and evidence from academia is only one way in which research informs policy. Government creates and commissions science and evidence of many kinds in support of its operations and to inform policy development. Research and development in the UK is funded by government, private companies and charitable organisations, with research across these sectors interconnected.

## DIAGRAM 1: SCIENCE ADVICE IN THE UK

**Science Advice**
in the UK

Council for Science and Technology (CST)

Scientific Advisory Group for Emergencies (SAGE)

Government Science and Engineering Profession

Science Advisory Committees

Departmental Research and Horizon Scanning

Departmental Chief Scientific Advisors (CSAs)

Government Office for Science

Government Chief Scientific Advisor

Cabinet Office / Prime Minister

Departmental Ministers

Open Innovation Team

What Works Network National Advisor

■ Formal science advice mechanism in government

||||| Independent advice from academic council and committees

■ Advice from government units specialising in research and evidence

A wide variety of bodies are active in the UK research and innovation system, including national laboratories and think tanks, which are mentioned in Section 9 but not covered in detail. For academic research institutions and funders there is a particular set of opportunities and challenges surrounding the public use of academic knowledge. Some of these were articulated in the 2015 Nurse Review of Research Councils[6], which set out the role that academic institutions can play in producing knowledge to support society and providing the skills and people able to use it. Nurse suggested that the UK needs "an effective dialogue and understanding between research scientists, politicians and the public" to support the use of knowledge for public good[7]. How the UK has built and aims to improve this dialogue is at the core of this report.

## An overview of UK science advice

Attempts to describe science advice systems necessarily involve simplification. In reality, both science advice and the wider policymaking system are deeply complex and dynamic. Science and evidence are not 'inputs' that can be fed in to a linear (or neatly cyclical) policy process; policymaking is 'messy'. It involves changing relationships between multiple actors, at many levels of government, according to differing rules and norms, responding to changing policy conditions, patterns of issue framing, and changing priorities and events. Policymakers have limited capacity to understand and solve policy problems and academic engagement occurs in environments over which no one has control[8]. There are some areas of policy where the use of academic expertise may be more straightforward than others (see Robert Peilke Jr's discussion of Tornado vs Abortion politics[9]) and at times of crisis science advice has an expanded role to play.

Diagram 1 indicates the components that lie at the core of this multi-dimensional system. At

**BOX 2: SCIENCE ADVICE IN THE DEVOLVED NATIONS**

Science advice in Scotland, Wales and Northern Ireland respond to unique national contexts and distinct research needs. Both Scotland and Wales have Chief Scientific Advisers who lead on science capability and coordination with the wider UK. In Wales, the Science and Innovation Advisory Council advises the Chief Scientific Adviser for Wales on strategic issues pertinent to Welsh social and economic development. In Scotland, the Scottish Science Advisory Council (SSAC), a broad-based group including both practitioners and users of science, provides independent advice and recommendations on science strategy, policy and priorities to the Scottish Government. At the time of writing, no Chief Scientific Adviser is currently in post in Northern Ireland.

There are some examples of good practice within devolved administrations, including the Wales Centre for Public Policy, whose joint work programme with the Welsh Government has built on close relationships across Welsh public policy (we return to their work in Section 9). Scotland has pioneered a distinct 'Scottish approach to evidence' focused on participative policymaking and aiming to foster consensus about research use in the public sphere. The Royal Society of Edinburgh, for example, launched in 2020 a Post-COVID-19 Commission aimed at supporting Scotland's recovery and bringing together a diverse group of practitioners and researchers. [10]

its centre is the Government Office for Science, a body responsible for leading national scientific strategy and overseeing scientific capability within government. The Government Office for Science is headed by the Government Chief Scientific Adviser (GCSA), who reports to the Cabinet Office and Prime Minister. Scientific capabilities and advice are coordinated across the work of 22 departments and administrations by a network of Chief Scientific Advisers (CSAs). Across government, the role of science and engineering is embedded by the Science and Engineering Profession (the network of science and engineering staff across the Civil Service – see Section 5), supported by the Government Office for Science and the Heads of the Profession. In addition to these bodies within government, academics feed in to policymaking in direct ways, through Science Advisory Councils (SACs) and Committees (SAComms) set up to inform departments and ministers. Because this report focuses on the Government at Whitehall and UK Parliament, it provides only a partial account of science advice and evidence in policymaking in the UK. While Scotland and Wales each have a Chief Scientific Adviser who coordinates cross-national work, there are important differences, as well as similarities, in how science advice and evidence are delivered in the three devolved governments (see Box 2).

Science and research feed into this system at other points too. Building on the work of the National Institute for Health and Care Excellence, created in 1999, a growing number of evidence centres provide policy support through the work of the What Works Network National Adviser and a team at Cabinet Office. The Open Innovation Team (OIT), see Box 3 below, created in 2016, plays a new and unique role in deepening collaboration between officials and academics.

UK Research and Innovation (UKRI), a body created in 2018 and funded by the Department of Business, Energy and Industrial Strategy, aims to provide connectivity across the research and innovation landscape and coordinates UK research funding. The role of research

---

**BOX 3: THE OPEN INNOVATION TEAM**

An interesting example of a policy brokerage team set up inside government is the Open Innovation Team[11], established in the Cabinet Office but working across all government departments.

It was set up as a pilot in 2016, with the core funding provided by four UK universities, the host department, and charges made to other parts of government for specific policy projects. Having proved the concept, in 2019 it was renewed for a further three years, with funding coming from a different group of universities. It has started experimenting with other partnerships, including an event series with McKinsey & Company. The diverse funding sources provide the permanent civil service staff in the team, who are supplemented by cohorts of PhD students on three-month secondments, funded by their home institutions.

The team responds rapidly to the evidence 'demands' of projects across government, identifying and engaging the most relevant mix of experts (typically academics). The academics (and the PhD students on secondment) are drawn from all UK universities, not just the ones who provide financial support. The four partner institutions have a closer relationship with the Open Innovation Team, also benefitting from policy training, visits by Open Innovation Team staff to their campuses, presentations to their academics, a place on the Partner Board, profile-raising and impact reports. This helps those universities build their policy impact capabilities and raise their research profile to policy audiences. Since the team's founding in 2016, 877 different experts, from 257 different global organisations, have 'contributed' or 'collaborated' (the latter being more intensive) to 68 completed or current projects. Many more experts have just been 'identified' or 'contacted' – less intensive forms of engagement.

---

funders, universities and brokerage organisations in providing science advice and supporting evidence-informed policy is explored in the second half of this report. The curiosity-driven research generated by funding councils sits alongside the research activities of individual government departments and public agencies, charitably supported research, international sources of research funding, and R&D conducted in the private sector.

## Endnotes

2  Government Office for Science (2019) *Realising our ambitions through science: a review of Government Science Capability*, Government Office for Science, HM Government

3  See for example Times Higher Education (2021) *World University Ranking*

4  Sasse, T. & Haddon, C. (2018) *How government can work with academia*, Institute for Government

5  Craig, C. (2019) *How does government listen to scientists?*, Palgrave Policy Essential, London: Palgrave Macmillan

6  Nurse, P. (2015) *Ensuring a successful research endeavour: review of the UK research councils*, Department for Business, Innovation & Skills, HM Government

7  Nurse, P. (2015) *Ensuring a successful research endeavour: review of the UK research councils,* Department for Business, Innovation & Skills, HM Government

8  Cairney, P. (2021) *The politics of policy analysis*, London: Palgrave Macmillan

9  Pielke Jr., R. (2007) *The honest broker: making sense of science in policy and politics*, Cambridge: Cambridge University Press

10  Coutts, P and Brotchie, J. (2017) *The Scottish approach to evidence: a discussion paper*, London: Alliance for Useful Evidence & Dunfermline: Carnegie UK Trust; The Royal Society of Edinburgh (2020) What lies beyond? Post-COVID-19 Commission formed by the RSE to support a positive future

11  Find out more on the Open Innovation Team's Blog

# Section 2: The Government Office for Science and GCSA

The role of the Government Chief Scientific Adviser (GCSA) was created in 1964, although previous governments sought advice from individual scientists since at least the Second World War. During the War, there was a debate on the boundaries between political and scientific advice and the impact of these on wartime policy. Increasingly, it was recognised that scientific advisers should be appointed independently from politics and that they should act as a conduit for scientific consensus. The first GCSA, Solly Zuckerman, was appointed by Harold Wilson's Labour Government. Zuckerman was a zoologist and pioneer of operational research who taught and wrote extensively on the role of science in government and public life, including in his book Scientists and War[12] and collected lectures Beyond the Ivory Tower[13]. The role of the GSCA continues to be an influential one that combines providing advice to the Prime Minister and Cabinet, leading national science strategy, and acting as an ambassador for science within government. Sir Patrick Vallance, the UK's twelfth GCSA, was appointed in 2018.

In addition to the formal reviews that have informed the evolution of science in government, the UK science system has responded to the experience of crisis and emergency, as well as changing government support for spending on research. In the late 1980s, the Thatcher Government supported a shift in UK science policy that emphasised the value of curiosity-driven research, and laid out a new approach to both 'science for policy' and 'policy for science', a message which Thatcher outlined in a speech to the Royal Society in 1988[14]. In 1993 the White Paper Realising our Potential[15], led by Lord William Waldegrave, precipitated the reorganisation of science management and the creation of the Office of Science and Technology, the progenitor of the Government Office for Science. From the late 1990s the New Labour Government, led by Tony Blair, popularised the idea of evidence-based policy in the UK, a 1999 White Paper on Modernising Government outlining an approach to policymaking "shaped by evidence"[16]. Crisis response in the 2000s also played a significant role in changing how science was used in government. As explored in Section 4, episodes such as the Foot and Mouth pandemic of 2001 changed how GCSAs drew on a range of scientific advice and evidence. In 2007, the Sainsbury Review of the science and innovation system proposed a need for stronger leadership, knowledge transfer, and investment. The Government accepted the recommendations of the review and established the Government Office for Science, an office that would advise the Government on long-term, strategic thinking.

Since the 1993 Waldegrave Report, a cornerstone of the UK's approach has been the need for separation between the ownership and commissioning of science and technology, to ensure

efficiency and competitiveness. In 2019 the Government Office for Science published a review Realising our Ambition through Science[17] which challenged the assumption that science capability could be entirely outsourced, arguing that this was damaging science leadership within government. In the context of a rapidly changing policy and research landscape, including the internet, technology and data revolutions, and the rise of mission-oriented research funding and open science, the review proposed that in the twenty-first century science needed to be part of the conversations that inform government leadership and strategy. It emphasised the need for retaining internal scientific capability within government to ensure it can be an 'intelligent customer' of research.

The senior science advisers and civil servants spoken to as part of this report emphasised the importance of political support to the ongoing work of the Government Office for Science and to past efforts to improve science advice in government. Ensuring political will meant gaining the support of the senior members of the Civil Service, as well as ministers and prime ministers.

> *"It was really when prime ministers have realised the need for scientific advice, whether that was Winston Churchill, or Tony Blair, and others, that has really made an absolutely key difference in terms of improving scientific advice mechanisms."*

The Government Office for Science's emphasis on better leadership and delivery of science, as well as greater use of science in departments, reflects a growing consensus about what might support more effective advice and evidence use – including the need for timely access to relevant research, skills-building for policymakers, and the centrality of trusting relationships[18]. While continuing to uphold the importance of the Haldane Principle[19] (which states that decisions on individual research proposals are best taken by researchers themselves through peer review, and not by government) stakeholders inside and outside of government have proposed that greater connectivity and communication between research and policy is central to good advice and evidence[20].

## The role of the GCSA

The job of the Government Chief Scientific Adviser (GCSA) is to advise the Prime Minister and the Cabinet directly on scientific issues. S/he is a permanent secretary, the equivalent grade to the most senior civil servant role in a government department, and reports direct to the Prime Minister and Cabinet Secretary. Although appointed by the Prime Minister of the day, the GCSA is a civil servant and is not a political appointment – they do not change as the Prime Minister or governing party changes. The role of the GCSA involves overseeing science advice as a cross-cutting agenda, acting as a bridge between government and academia, and as an ambassador of science at the highest level of government.

The role of the GCSA includes:

- *Providing science advice to the Prime Minister and other ministers:* drawing on evidence and expertise from a variety of sources (in emergencies, this includes SAGE, the Scientific Advisory Group for Emergencies – see Section 4).
- *Leading the Government Office for Science:* Based in the Department for Business, Energy and Industrial Strategy (BEIS), this agency works across government to promote and support use of science in policymaking. It operates through formal and informal networks within government, and liaises with external partners such as UKRI and the national academies to ensure the best evidence is available to the Policy Profession and to ministers.
- *Being head of the Government Science and Engineering Profession (GSE):* Many scientists and engineers work within government. Alongside the Policy Profession, which is the part of the Civil Service focused on policy development, the GSE supports senior decision-makers and ministers to access science and evidence where needed.
- *Chairing the Chief Scientific Advisers Network:* Most government departments now have a Chief Scientific Adviser, and the CSA Network now meets at least weekly to discuss key issues, share updates and support the GCSA.
- *Chairing the Scientific Advisory Group for Emergencies (SAGE) and co-chairing the Council for Science and Technology:* The GCSA steers these advisory bodies which advise the Prime Minister and leaders of devolved administrations on emergencies and cross-cutting scientific issues (see Section 4 on Scientific Advisory Councils).
- *Speaking directly to the public about the scientific evidence informing policy decisions:* The GCSA speaks directly to the press, gives evidence to Parliamentary committees, and is a public face for science in government.
- *Networking internationally*, including with Chief Science Advisers, science offices, universities and governments around the world.

All GCSAs seek to embed science at the heart of government. The current GCSA, Sir Patrick Vallance, initiated a science capability review, to assess how many scientists and analysts were employed in different parts of government and arms-length bodies, and how their work could be better supported. In January 2020, the Government Office for Science published a series of recommendations, summarised in Box 4[21].

Importantly, the GCSA's view was that these structural and capacity building efforts needed to be accompanied by a "cultural shift" in Government to embed science at the heart of decision-making. The Johnson administration has been receptive to these proposals, granting the Government Office for Science a budgetary uplift in 2020 and working closely with the GCSA throughout the COVID-19 pandemic to create funding structures to support science and technological innovation, such as the proposed new Advanced Research and Invention Agency (ARIA) and the Futures Fund for business R&D, although recent investments have been focused on innovation and more concentrated in some areas of science than others[22].

> **BOX 4: KEY RECOMMENDATIONS FROM REALISING OUR AMBITIONS FOR SCIENCE**
>
> ● Every department should have a clearly defined science system, set out in a single document which incorporates the entire range of that department's science activity
> ● All departments should publish annual Areas of Research Interest documents to encourage collaboration and commissioning of Research and Development (R&D).
> ● The government should make greater use of public laboratories as leaders in directed R&D programmes.
> ● Departmental submissions to HM Treasury as part of spending reviews should include a statement of research and development need together with costed plans for meeting those needs.
> ● For important cross-government areas of science, shared governance models should be established to improve co-ordination and to maximise funding opportunities.
> ● Plans should be developed to ensure the Civil Service has the scientific skills it needs and the mechanisms to deploy them effectively, including remedies for any skills shortages.

The GCSA leads strategic scientific thinking about risk at the highest level, as one interviewee put it, *"A big part of the job of the GCSA is to be the person who is asking those really difficult questions about the future, and putting those questions to the people who matter."* This involves drawing on Foresight Programmes (discussed below) to tackle issues of future importance and improve preparedness. The GCSA's strategic role is also an international one, involving collaboration with scientific advisers around the world on global policy issues. For example, the G8 group of Chief Science Advisers supported the development of the Paris Agreement on climate change, signed by 196 parties at COP 21 (the 21st Conference of the Parties to the United Nations Framework Convention on Climate Change) in 2015.

*Relationship building and informal aspects of the role*

Many aspects of the GCSA role are informal, embedded in very human relationships and dynamics. These aspects, many interviewees articulated, are critical to the success of the role. A central aim of the GCSA is to facilitate communication between research and policy. One former GCSA explained:

> *"[T]he first thing that I discovered going into government is that I was essentially a channel of communication between what is being developed in the universities, the state of knowledge as it is now, and functions in government to assist in their development using the most modern available technologies in science and technology."*

The ability to act as a bridge between current developments in science and technology and the political system relies upon the GCSA being a strong communicator. One interviewee stated this was learning to *"communicate complex science to intelligent people, without using private scientific language"*. The GCSA needs to understand politics and how decisions are

taken in Whitehall, and be well-networked. As the role of GCSA involves pulling in and coordinating expertise and advice from academia, the need for strong communication skills and networks goes both ways. Network building across research was also described as central to the ability of GCSAs to pull in the best scientific evidence.

One example of an informal role of the GCSA and the network of departmental CSAs (see Section 3) is in supporting the development and assessment of the National Risk Assessment. Co-ordinated by another part of government (the Civil Contingencies Secretariat), evidence and expertise from science and other disciplines are hugely important to this exercise in understanding risks, and in helping to develop detailed scenarios of how those risks might crystalise and can be mitigated. Former GCSAs interviewed for this project emphasised the critical importance of their key office staff, who hold key communication and networking skills.

Whatever individual scientific background a GCSA has, it cannot of course cover all or even many of the areas with which they will need to deal. So, another key skill is to quickly master information and data from different disciplines. In order to do that, they need access to the right specialists, both inside and outside government. The Government Office for Science (described below) provides some of that expertise and contacts with other specialists. As one former GCSA remembered, the questions he asked himself were: *"…what is the key issue here? Now, how the hell do we deal with that? … who are the key players? Who have I got to see?"*

Multiple interviewees emphasised the centrality of successful relationship building to the role of the GCSA. They emphasised that this required work on both sides – from both ministers and advisers. There have been varied examples of relationship styles through the history of the role and it is clear that personalities and communication styles play a role. Influential GCSAs – from the first, Solly Zuckerman – have sought to foster a relationship of trust with the Prime Minister that permits challenge, open dialogue and scrutiny. But GCSAs have adopted different styles; John Beddington and David King, for example, adopting the role of an 'open challenger', and Mark Walport that of a 'trusted confidant'[23]. Interviewees also expressed that the nature of the relationship with the GCSA could have wide implications for science advice – with successful informal relationship building able to *"smooth the wheels"* of advice work across government.

Several interviewees highlighted the importance of trust. As one put it, based on a Dutch proverb, *"trust arrives on foot, but leaves on horseback"*. Building trust is a central task for senior science advisers. Trust is central to many of the tasks of science advice: to the personal relationships through which advice is transmitted, to bridging research and policy communities, and to leadership at times of emergency.

Many of the civil servants and academics spoken to as part of this report acknowledged that the UK system rests heavily on the role of individual science advisers and the GSCA as the most senior. This was seen as both a strength and a weakness. On the one hand, interaction with a trusted individual provides policymakers with decisiveness and a singular focal point. On the other, minister-adviser relationships are challenging to navigate; and from the perspective of a

diverse research community, it is difficult for individuals to act as effective conduits for a broad spectrum of science and evidence. Interviewees also emphasised that the influence of GCSAs – and by extension that of science in government – was often heavily dependent on how the Prime Minister chooses to use the relationship.

## The Government Office for Science

The Government Office for Science is an independent office which, although it is physically located in the Department of Business, Energy, Innovation and Skills (BEIS), works across all Whitehall departments. The Government Office for Science hosts important research and planning teams such as the Foresight and Futures teams, who conduct in-depth reviews into topics of current and future priority to inform strategic planning. Examples include the high-profile obesity report, Tackling Obesities: Future Choices[24], conducted in the 2010s.

The Government Office for Science works through formal and informal networks, and also supports many of the committees and advisory bodies through which GCSA works. These include:

- *Chief Scientific Advisers (CSAs) Network:* Chief Scientific Advisers (CSAs) sit within government departments and the devolved administrations and are discussed in more details in Section 3 below. The Government Chief Scientific Adviser (GCSA) meets weekly with a network of these advisers.
- *CSACs, Chair of the Science Advisory Committees:* all chairs from the Science Advisory Committees meet twice yearly with the GCSA to discuss key insights and develop strategic plans for the science system.
- *Chief Scientific Advisers (CSAs) Officials network:* each CSA is supported by a lead official. These officials meet fortnightly to discuss topical issues.
- *Areas of Research Interest (ARI) Officials:* the Areas of Research Interest are a statement of departmental research need, covered in Section 3. Officials within departmental teams lead on the writing of departmental ARIs, with input from the Analysis Function and Policy Professions.
- *Science Advisory Councils and Committees:* some departments have overarching councils which provide a strategic steer and advice on all science matters. There are also about 70 committees throughout government which advise on particular topics. Their different forms and function, and some influential examples, are discussed in Section 4.
- *Council for Science and Technology (CST)*: the Prime Minister's Council for Science and Technology advises on relevant policy issues across government. The secretariat is in the Government Office for Science (see Box 9).

The Government Office for Science also holds important liaison roles with colleagues in BEIS and UK Research and Innovation (UKRI), the arms-length body which oversees

spending on higher education and university-based research. UKRI and the seven research councils it supports are covered in detail in Section 7. Like the GCSA, the Government Office for Science supports important 'bridging' functions, bringing together priorities, input and advice from across research and policy. This requires a staff with mixed skills and an ability to think systematically. One former leader within the Government Office for Science emphasised:

> "You need people who have the skills to mesh those two systems [policy and research] together… both sides need to learn; civil servants need to learn how to talk to universities, and research institutes and scientists, but also, critically, the scientists need to present advice in a way which is useful to ministers."

Recent work at the Government Office for Science has aimed to strengthen and formalise the relational aspects of advice work, and better embed processes within the day-to-day business of government. This has focused on the strengthening of the CSA Network and fostering stronger cross-departmental collaboration and leadership on science. One former science adviser interviewed for this report reflected that the COVID-19 response has demonstrated the success of these efforts, with the Government Office for Science able to provide responsive leadership for science advice across government.

## Foresight

One way in which the UK Government has sought long-term scientific input is via the Foresight Programme. Foresight projects existed before Sir David King became GCSA, but he substantially developed and expanded the programme. Under his model, foresight projects would last two years or more, and include over 100 scientists, to look at issues that could pose risk or opportunity in the future. Those scientists would come from inside and outside government. Some Foresight Programmes have been influential in long-term government planning. For example, the 2004 Future Flooding report[25] examined how the risk of flooding and coastal erosion would change in the UK in the next 100 years, and what the options were for responding to the changes. This report modelled climate change until 2100, and has allowed the UK to plan for and mitigate floods, and significantly influenced the work of the Environment Agency in planning.

An important feature of those early projects was that there was a named minister who was the 'customer' of the report, and who was kept fully engaged with the project as it progressed. Then when the report was completed, they had a greater feeling of ownership of it, leading, in theory, to a higher likelihood that the findings would feed into policy.

Over the years, since 2003, a large number of foresight reports have been published on issues ranging from land use to obesity, and from manufacturing to the future of cities[26]. The style and shape of foresight work has developed over the years, but projects typically look at major issues 20-80 years into the future.

In recent years, the Government Office for Science has also increased its role to promote strategic, long-term thinking across the Civil Service, through the Emerging Technologies, Futures and Projects team. This team provides tools and training to support futures work, in collaboration with the Horizon Scanning Programme Team located in the Cabinet Office, and in 2017, produced a Futures Toolkit[27] for use across the Civil Service.

## The Government Office for Science's disciplinary scope

The responsibility that the Government Office for Science has beyond natural sciences and engineering has been variable and depends, in part, on the tone struck by the GCSA. Sir John Beddington who was GCSA from 2007 to 2013 emphasised the need to support high-level championing of the social sciences, as did Sir Mark Walport his successor. In general, however, the CSA Network and work of the Government Office for Science is dominated by natural sciences and engineering. There are separate parts of government focussing on some other disciplines (such as the Government Economic Service and Government Social Research Service), and other disciplines may not have an explicit home in government. There is a question about whether in the future the Government Office for Science may play a wider role in championing and stewarding knowledge and expertise from a wider range of disciplines and how it links with these other networks. This is particularly pressing given the need for multi-disciplinary perspectives to more effectively tackle complex policy problems.

## Endnotes

12  Zuckerman, S. (1966) *Scientists and war: the impact of science on military and civil affairs*, London: H. Hamilton

13  Zuckerman, S. (1970) *Beyond the Ivory Tower: functions of public and private science*, Littlehampton Book Services Ltd

14  Agar, J. (2019) *Science policy under Thatcher*, London: UCL Press

15  Cabinet Office (1993) *Realising our potential: a strategy for science, engineering and technology*, Cabinet Office, HM Government

16  Cabinet Office (1999) Modernising Government, Cabinet Office, HM Government

17  Government Office for Science (2019) Realising our ambition through science: a review of Government Science Capability, Government Office for Science, HM Government

18  Oliver, K., Innvar, S., Lorenc, T. *et al*. (2014) *A systematic review of barriers to and facilitators of the use of evidence by policymakers*, *BMC Health Serv. Res.* 14, 2 https://doi.org/10.1186/1472-6963-14-2

19  Department of Business, Innovation and Skills (2010) Written ministerial statements, Department of Business, Innovation and Skills, HM Government

20  See for example Walker *et al* (2019) Understanding and navigating the landscape of evidence-based policy recommendations for improving academic-policy engagement, Bath: University of Bath Institute for Policy Research

21  Government Office for Science (2019) Realising our ambitions through science: a review of Government Science Capability, Government Office for Science, HM Government

22  See for example Campaign for Science and Engineering (CaSE) (2021) CaSE responds to the 2021 Spring Budget; Department for Business, Energy & Industrial Strategy (2021) Advanced Research and Invention Agency (ARIA): policy statement, Department for Business, Energy & Industrial Strategy, HM Government

23  Haddon, C., Sasse, T. and Nice, A. (2020) Science advice in a crisis, London: Institute for Government

24  Government Office for Science and Department of Health and Social Care (2007) Tackling obesities: future choices, Department of Health and Social Care, HM Government

25  Government Office for Science (2004) Future flooding, Government Office for Science, HM Government

26  See on gov.uk *Collection: Foresight Projects*

27  Government Office for Science (2017) The Futures Toolkit, Government Office for Science and Waverley Consultants

**BOX 5: KEY MESSAGES: LEARNING FROM THE GOVERNMENT OFFICE FOR SCIENCE AND THE GCSA.**

- The UK science advice system has been shaped by responses to crises. During a crisis, the GCSA has the attention of senior politicians including the Prime Minister, and the case for working across boundaries is clear and hard to dispute.
- The success of the UK system relies on the influence of key individuals – such as the GCSA – and the ability they have to build relationships at departmental, ministerial and Cabinet levels. Previous GCSAs noted that direct access to the Prime Minister had been vital. At present, access to the Prime Minister is not formalised in the UK, meaning that individual Prime Ministers can set the tone of the relationship.
- The GCSA must be trusted both by government and by the public and other stakeholders. There must be a degree of independence, allowing the GCSA to communicate directly with the public and the press.
- In many ways, the UK system has developed through 'trial and error', drawing on the experience of both those in government and those providing advice. Both formal policy reviews, and the writing of academics, has informed the development of the system. It is underpinned by core principles, but the Government Office for Science has not been afraid to make the case for innovation.
- Improving the use of science and evidence in government requires a cultural shift. Embedding this change is the responsibility of the Government Office for Science, and is championed by the GCSA, who must be visible.
- The status and influence of science advisers was described by some as a strength of the UK system. However, many acknowledged how this can also be a weakness. The system relies on a small number of individuals, and functions well when they have power, authority and influence. The system functions less well when they do not, and ensuring effective function is made additionally complex due to the inter-personal, networked and political nature of the role.
- The reliance of the UK system on a small number of individuals also poses a challenge to its diversity and inclusiveness. In general, science advice relies on influential people, informal networks and relationships of trust. These networks and relationships are more open to some groups of people than others. See Section 10 for more details on equality, diversity and inclusion.
- The Government Office for Science has primary responsibility for supporting the evidence to policy process for disciplines in the natural sciences and engineering. Many disciplines are needed to inform successful policy, and some links are made across disciplines, but there also are potential issues at the boundaries. Making clearer links across subject-area contributions is an issue discussed further in Section 10.

# Section 3: Science advice in Government Departments

Many government departments have long histories of collaboration with university researchers. The Foreign, Commonwealth and Development Office (FCDO), Department for Environment, Food and Rural Affairs (Defra), and Department of Health and Social Care (DHSC), all provide strong but contrasting examples of the different ways in which departments engage with advice and evidence. The FCDO has for many years engaged in joint funding calls with research councils, while Defra has an extensive network of science advisory bodies and strong internal leadership on science and evidence, described in Box 6. The DHSC maintains close relationships with the National Institute for Health Research (NIHR), which it funds, and has developed a programme of research partnerships to support policy development: the Policy Research Units (PRUs). Government departments have taken very different approaches to 'pulling in' scientific advice and evidence and operate in highly divergent circumstances. As a result, processes for gaining and using evidence and advice are varied, and investment uneven. It is clear that the use of science and evidence within government departments remains varied[28].

Within departments, Chief Scientific Advisers (CSAs), chief analysts and departmental heads of professions all play a role in support the use of science. The process of obtaining and using departmental scientific advice is addressed in the Guidelines on the Use of Scientific and Engineering Advice in Policy Making[29]. These propose that departments should:

- think ahead and identify early the issues on which they need scientific advice and public engagement, and where the current evidence base is weak and should be strengthened
- seek a wide range of advice from the best sources, particularly when there is uncertainty
- publish the evidence and analysis and all relevant and available papers where possible.

The Government Office for Science 2019 Capability Review highlighted the need for departments to establish an ambition and vision on science, improve their internal and external connectivity, embed challenge and critical reflection in their work, manage value for money, and develop clear science strategies[30]. It also emphasised the need for a stronger departmental science leadership, rooted in the role of CSA, and supported by an effective system of science commissioning, in particular through the publishing of Areas of Research Interest (see below). In 2020 the Government Office for Science published updated guidance outlining strengthened support for CSAs and their officials[31].

Departments have their own research functions, including horizon scanning and futures

work, which CSAs lead. Horizon-scanning aims to identify systemic issues, future trends and possible risks, as well as steer longer-term, strategic thinking. In recent years considerable foresight capacity has been taken on by the Government Office for Science who focus on issues of cross-government, strategic importance.

Departments face many challenges in benefiting from science advice and supporting research evidence use. These include high staff turnover and resulting weak institutional memory; downward pressure on Research and Development (R&D) budgets and the growing concentration of spending power in just a few departments; professional cultures that may or may not facilitate evidence use; barriers accessing research and evidence; and the need to coordinate work across policy, analytical and advice professions[32]. Many wider initiatives focused on evidence-informed policymaking aim to improve how departments draw on and use science and evidence.

## Departmental CSAs

The Foot and Mouth crisis of 2001 saw the then Government Chief Scientific Adviser (GCSA, Sir David King) advising the Prime Minister on a daily basis. This was before the establishment of the Scientific Advisory Group for Emergencies (SAGE), and before there were departmental Chief Scientific Advisers (CSAs) across many government departments – though there were already some, for example in the Ministry of Defence. The crisis showed the lack of a role to coordinate the right scientific input into the Ministry of Agriculture, Fisheries and Food (MAFF – which later became part of the Department of Environment, Food and Rural Affairs: Defra), and a lack of structure to join up scientific advice and knowledge across government departments. Following the Foot and Mouth crisis, the GCSA recommended to the Prime Minister that CSAs should be appointed in government departments. MAFF immediately hired a CSA, and other departments who did not already have a CSA followed. Former GCSAs did have to work harder to persuade some departments than others to recruit CSAs, and a key aspect of achieving this is that the GCSA reports to the Prime Minister and Cabinet Secretary. That gave (and still gives) GCSAs access to all senior government ministers, and the ability to explain directly to them that they are delivering what the Prime Minister has asked for. Since 2011, all departments have been expected to appoint a CSA.

Most CSAs are recruited from academia or industry and work part-time, bringing with them their own expert networks and backgrounds, although some are recruited from within the Civil Service. The role of CSAs is to provide advice to ministers, support the use of science within their department and work together as part of the CSA Network to address cross-departmental issues. They are line managed within their own department, and provide key science advice to their own department's ministers. The GCSA provides pastoral line management for all CSAs and works through the Government Office for Science to support their recruitment and induction. CSAs are employed at director general or director level, the second or third most senior position for a civil servant in UK Government departments, sitting just below a permanent secretary.

The role of the CSA is a challenging one and a central focus of the Government Office for Science has been to strengthen the influence and connectivity of CSAs through their network. Both the CSA role, and the network that links them across government, is a unique strength of the UK advice system. The role of CSAs differ, but their position has both an 'outside-in' and 'inside-out' quality: they work to build bridges and relationships between government and the wider worlds of science and academia, playing the role of a "licensed dissident" and providing challenge and leadership at the centre of the department[33]. The responsibilities of a CSA include:

- Advising the Secretary of State and ministers in their own department, and ensuring that they receive adequate and high-quality science advice from others.
- Leading the production of departmental science plans, an overview of the department's science proposals for the year, including expenditure and R&D. These were introduced by the Science Capability Review[34], which sought to increase the impact and reach of science in government.
- Being responsible for the publication of departmental Areas of Research Interest (ARIs): public-facing statements of evidence need, refreshed annually by departments.
- Leading the CSA office and, in some departments, analytical teams (these sometimes report through to a different senior civil servant, such as a chief economist)
- Chairing departmental Science Advisory Committees, such as the Department of Health and Social Care's New and Emerging Viral Threats Advisory Group (NERVTAG)
- Being Head of the Science and Engineering Profession (HOSEP) within their department (see Section 5).

*Departmental influence and relationship building*

It is clear that the power and influence that CSAs hold within departments is varied. *"Some are very well integrated and wield significant influence"*, according to one interviewee. A 2018 Institute for Government report found, however, that many CSAs remain comparatively "less integrated" and "marginal"[35]. One interviewee highlighted that differences in levels of support and resource for CSAs across departments caused real challenges. While expectations for all CSAs are the same, some are operating with far less resource and departmental capability. In these cases, it was explained, the personal influence of the CSA is even more critical. Defra provides a strong example of an effective CSA role, supported by a departmental Chief Scientific Adviser's Office (CSAO), a large body of staff and a significant budget (see Box 6, page 32). In this department, as in others, the role of the CSA is to ensure this body of departmental staff is vibrant, interconnected across research and policy, and has access to the scientific expertise it needs.

Across departments, CSAs have a variety of different relationships with, and access routes to, ministers. As well as hearing from internal scientific advisers, ministers also receive advice and/ or are lobbied by stakeholder groups – this may take place either formally (for example, through submissions to departmental consultations) or informally. CSAs provide evidence that can support ministers to assess different sources of input in policymaking. Many of our interviewees emphasised that, to be effective, CSAs must be included in high-level conversations about the

strategic direction and day-to-day business of policy. CSAs are most valuable when they can contribute to departmental discussions and policy formulation at an early stage, and must be put in a position that supports them to challenge, question and pro-actively offer advice[36].

To do this well, CSAs need to be good communicators, and effective communication between research and policy must be supported by effective collaboration within departments. As one current CSA explained to us, this is *"the challenge [of] bringing the scientific evidence and thinking close enough to the policy interface that it actually makes sense to the policy teams and can be used. There's no point putting graphs in front of ministers if the minister doesn't understand the graph. So, the communication issue is quite a central challenge".*

*Key skills and experience*

The skill set required of CSAs is varied. They must have status within the academic community in order to reach out to scientists beyond government to build partnerships and understanding. They need in-depth research skills and subject-area expertise, as well an effective approach to synthesising evidence and presenting this effectively to inform decision-making at all levels. But the expertise required by a CSA goes beyond subject area expertise and analytical skills. Several former CSAs and senior civil servants in the Government Office for Science emphasised the value of being able to think in a systemic way. One, who had a background in systems biology, said

> *"I immensely valued the training I had in systems. Because, in government, what you really need is that eagle-eye view. Government is a complex system, and ultimately, you need to be able to look at it from a distance and draw connections that others can't".*

Another emphasised the value of strategic and systemic thinking: *"this is the (CSA's) ability to use foresight and horizon scanning; to anticipate change in the system, the trade-offs that are involved".* Several former CSAs highlighted the centrality of crisis response to the CSA role. One former CSA stated *"the CSA comes to the fore in a major incident. It is your responsibility to anticipate events as far as possible, and to manage the incident. That is the task that, at the bottom line, the CSA must be able to cope with".*

A further important quality that interviewees emphasised as critical was good interpersonal skills and the ability to be "a people person". In the same way that university policy support teams (Section 8) and national academies (Section 9) act as 'evidence brokers' from the academic side, CSAs and their teams are increasingly acting as internal evidence brokers. They develop and maintain links with universities and individual academics, and they understand both the academic and policy world and can 'translate' between the two. An important skill for advisers coming from outside of the Civil Service is the ability to navigate Whitehall and Westminster politics, where processes and cultures can be very different to academic institutions[37].

## Improving evidence-informed policymaking in departments

Over the past two decades, many departments have invested considerable energy in improving how they access and use evidence in order to overcome challenges in benefiting from scientific advice and research. Efforts have been made to improve the commissioning of research, develop more effective partnerships, and embed new roles and infrastructures. Outlined here are three overarching strategies adopted by UK departments.

### 1. Improving evidence 'pull'

New short-term commissioning processes:

- The Department for Education Analytic Associate Pool established in 2014 is a pool of consultant researchers who have been through a recruitment process and are able to respond flexibly to tenders for smaller pieces of research.
- The Cross-Government Trial Advice Panel, led by the What Works Network (see Section 9), which support departments to commission evaluation and advice from experts across academia and government, providing a free service for all civil servants.

Establishing or funding research and evidence centres:

- Several departments have provided support for specialist evidence centres who work to synthesise existing evidence and disseminate it in useful formats for decision-makers. The What Works Centres are a unique example of this in the UK, and have a variety of relationships with departments, some operating at greater distance from government and others engaged in more responsive dialogue with policy stakeholders (see Section 9 below).

### 2. Supporting relationships, collaborations and skills

Establishing research partnerships with universities:

- Partnerships with universities are emerging as a more collaborative approach to generating science and evidence to support policy. One example of this in the UK is the National Institute for Health Research's (NIHR) Policy Research Units (PRUs)[38]. There are currently 15 PRUs, some of which build on a past iteration of the model funded by NIHR in the 2000s. The PRUs offer a strong example of commissioning best practice within the Department of Health and Social Care, who have worked closely with NIHR and the PRUs themselves. Commissioning priorities are shaped by the department's R&D committee, which is chaired by the CSA. Each PRU conducts research to address short- and long-term policymaking needs through an agreed work programme and a rapid response service. While their governance is varied, each PRU has a degree of joint management infrastructure that aims to bring together departmental input with academic. This

## BOX 6: SCIENCE AND EVIDENCE-INFORMED POLICY IN DEFRA

The Department for Environment, Food and Rural Affairs (Defra) provides a good example of departmental evidence use and science advice. Science advice in Defra is supported by strong internal capacity and a substantial R&D budget: £72 million in 2021−22. The department is responsible for environmental protection, food production and standards, agriculture, fisheries and rural communities in the UK and has thirty-three arm's length bodies (ALBs). The Scottish Government, Welsh Government and Northern Ireland Executive have devolved responsibilities in Defra's policy areas, which are set out in frameworks for cooperation.

Defra was formed in 2001 and its current science advice structures are the result of years of effort and change within the department. Its policy agenda is closely connected to many long-term and multi-dimensional challenges, such as climate change. In 2004 a team within the department began work on a new Evidence and Innovation Strategy, aiming to realign evidence needs around five strategic priorities[47]. This exercise highlighted the need to strengthen the processes driving evidence use, which were later introduced by the department.

Defra's current CSA, Professor Gideon Henderson, describes his role as having two functions. On the one hand, it involves challenge and contribution to policy: ensuring that Defra and its ALBs have the expertise they need and providing high-quality advice to ministers and officials. On the other, the role involves supporting and nurturing science: leading the science enterprise, driving innovation in the way that science is used, supporting and championing professional scientists. *"There's an intrinsic balance between challenge and delivery built into the role."*

Defra has aimed to embed science in policymaking, and improve communication across professions, by embedding scientists in policy teams. The CSA has his own team, the Chief Scientific Adviser's Office (CSAO), of about 45 people. The CSAO aims to integrate science and evidence across Defra and its ALBs, drive cross-cutting innovation and oversee relationships with the scientific community. The CSAO has close contact with scientists embedded in policy teams and immersed in specific policy landscapes. The role of the CSAO is to provide these embedded colleagues with advice, support and leadership. It also works to support good collaborative working between scientists, analysts and policy colleagues to provide integrated evidence. Importantly, the CSAO has a key role in budget allocation, through which it is able to influence what evidence is sourced and from where. The SCAO allocates the evidence budget to policy teams on the basis of annual bids, and works with them to monitor their ongoing expenditure on evidence. The CSAO also retains a small proportion of the overall evidence budget for its own strategic work.

One challenge that the CSAO contends with is the need to encourage policy teams to recruit for and value scientific posts. The GSE Champions Network develops career pathways, provides mentoring, and advocates for scientists in Defra. An Evidence Community Development Plan supports work across the evidence professions and has five focus areas, including: equality, diversity and inclusion, capability, credibility, community and impact.

The CSAO benefits from formalised relationships with ministers. A junior minister has a responsibility for science in Defra's portfolio and the CSA meets regularly with that minister

**BOX 6: SCIENCE AND EVIDENCE-INFORMED POLICY IN DEFRA (CONT.)**

one-to-one. In addition, meetings with other ministers and the Secretary of State are arranged, in collaboration with relevant policy teams, to provide advice on specific policy issues. Professor Henderson describes his role as both proactive and reactive. At times when he is concerned about a particular issue, or about the quality of scientific advice in a certain area, he is able to write directly to the relevant minister or the Secretary of State. At other times, a minister might approach the Office about an issue of current policy concern – biodegradable plastics for example – and request advice.

Defra has a unique process in place to monitor science and evidence use in the department. For each new policy submission, there are sign-off boxes for science and analysis. Anyone making a policy submission must, in theory, consider whether there are scientific implications and, if there are, seek sign-off from the lead scientist in their directorate. If the lead scientist is unhappy with the nature of the science or wants further input, it will be passed to the CSAO.

Defra has a complex network of Science Advisory Committees (SAComms, see Section 4) and many ALBs. The department's Science Advisory Council (SAC) acts to coordinate and support its advisory structure. The SAC has a challenge function: it can add things to the agenda and raise issues of importance. It is supported by two subgroups, one focused on exotic diseases and another on social science. The SAC interacts with over 30 expert groups across the department, some of which have formal legal roles, such as the Advisory Committee on Releases to the Environment (ACRE) which provides statutory advice to ministers on the risks to health and the environment from the release of genetically modified organisms (GMOs). ALBs and Public Sector Research Establishments (PSREs) provide an important interface with industry, commerce and regulation, as well as academia. Defra's research group encompasses environmental regulators and agencies – including, for example, the Environment Agency and Natural England– who have a broad range of interests across the R&D spectrum, as well as their own science advisory bodies.

A further way in which Defra interacts with external science is through the expertise of its scientists and by commissioning research. Specialist scientists in the department, who have close links with academic communities, provide a route of access to the latest scientific thinking. Through the R&D budget, the department commissions across the whole of the UK science and engineering base to support and deliver programmes. Professor Henderson reflects that *"at the cutting edge of our work, commissioning helps us drive things forward"*. Publishing the department's research priorities, through the Areas of Research Interest (see below), as well as in their R&D strategy, supports connectivity with UK Research and Innovation (UKRI), research councils and individual academics. The department also maintains close relationships with brokering and intermediary organisations (see Section 9) and operates internship and secondment schemes to build connections across science and policy.

Professor Henderson comments that Defra's policy remit makes it a good candidate for strong science use. In part, because it is relatively politically easy for the department to be transparent about what it does. But there remain many ongoing challenges. For example, how best to support policy professionals to improve their skills, and ensure integrated science and evidence.

is supported through roles such as a departmental liaison officer, who supports the development of a policy-relevant work programme and acts as a knowledge broker.

- A number of data partnerships have also recently been supported by departments, often in partnership with research councils, including the Ministry of Justice's Data First Programme. The importance of data sharing, and the barriers that exist within departments were highlighted at the start of the COVID-19 response, with the creation of the Joint Biosecurity Centre (JBC) in May 2020 aiming to address barriers for scientists needing to access data for essential modelling[39].

Secondment schemes:

- Secondments of researchers to government departments aim to support learning for both researchers and policy colleagues. Until the mid-2010s secondment opportunities were concentrated in particular departments such as the Department for Business, Energy and Industrial Strategy (BEIS), policy areas such as defence and within the Government Office for Science. Recent efforts to expand opportunities include those created by the Foreign, Commonwealth and Development Office (FCDO), the Open Innovation Team (see Box 3), as well as in partnership with UKRI. As well as improving how departments are accessing academic knowledge, they aim to help researchers learn about real-world policymaking through co-working in departments. Individual universities have activities in place to promote established secondments and to secure additional ones – see Section 8.

*3. Infrastructure and roles*

Some initiatives aim to address more systemic barriers to effective science and evidence use. Examples include:

- The Areas of Research Interest (ARIs), addressed in detail in the section below, are an important example of a strategic approach to improving alignment between departmental demand and academic supply. ARIs aim to improve how research need is articulated by departments and addressed by academic research stakeholders.
- GCSA Sir Patrick Vallance has created a dedicated team within the Government Office for Science to support departments with their R&D statements when submitting spending review bids to the Treasury, which should closely align with, and enable departments to address, their ARIs.
- The strengthening of the CSA Network, discussed below.
- The creation of new research roles within government, including senior research fellows, who support FCDO's Research Advisory Committee while continuing to work in universities.
- Internal science and evidence strategies supported by dedicated teams and led by CSAs. A strong example here is provided by Defra, described in Box 6.

## Areas of Research Interest

The Areas of Research Interest (ARI) process is the result of several years of effort within departments to improve long-term thinking about the commissioning and use of research. Responding to the findings of the 2015 Nurse Review of UK research councils, which found weaknesses in the UK's research-policy interface, UK government departments were asked to identify and publish priority evidence gaps called Areas of Research Interest (ARIs)[40]. ARIs aim to improve how government departments:

- align scientific and research evidence from academia with policy development and decision-making
- access a wide range of suppliers
- engage with researchers
- access stronger policy evidence bases at better value for money

ARIs present an opportunity for government to engage academics in conversations about how to meet their evidence needs. The exercise has developed considerably since it was first run in 2016. The effective articulation of a department's research needs is not an easy task. Both Defra's and the Department for Work and Pensions' (DWP) recent documents were the product of two years' intensive work. ARIs are a vehicle for deeper culture change, which place an awareness of science and research at the centre of strategic policy thinking[41]. One interviewee described this culture change as follows:

> *"What government does or doesn't know is politically complex. Government is not meant to not know things. That is why the ARIs were such a breakthrough. It allowed government to admit there are things they don't know. And to publish them"*.

At the time of writing, 18 Government departments and 3 non-ministerial departments had published ARIs[42]. As well as issues of specific interest to each department, there are a number of themes which emerge across several ARI documents. This is prompting a discussion on how departments can work together to tackle some of these needs. Some cross-cutting issues identified include:

- Technology and innovation
- Data usage and measurement
- Preparedness and long-term planning
- Investment and productivity
- Multidisciplinary research

The ARI model has begun to stretch beyond government. In October 2020, the UK Parliament (see Section 6) published ARIs in 20 topics related to COVID-19, of interest to parliamentarians.[43] Similarly, in May 2020, the Centre for Ageing Better (one of the What Works Centres, see Section 9) published a list of ARIs on COVID-19 and the implications for individuals aged 50–70[44].

Universities are using the ARIs as a potential mechanism for engaging with government on evidence to policy activities, and the Universities Policy Engagement Network (See Section 7) published a review on ARIs from the university sector.[45] They saw the ARIs as an important starting point for a discussions between universities and government on the demand and supply of future evidence, but noted that such discussions needed careful curation, and that the right incentives are needed to align evidence supply and demand.

In 2019, the Economic and Social Research Council (ESRC) and the Government Office for Science came together to set up two one-year fellowships as an intervention to improve academic engagement with ARIs. A summary of learning so far from these fellowships in provided in Box 7. In 2020 these fellows ran an extensive consultation to support policy development and identify cross-cutting themes in the academic response to ARIs, in light of COVID-19. The programme resulted in a report Rebuilding a Resilient Britain, published by the Government Office for Science[46].

## Endnotes

[28]  Rutter, J. & Gold. J (2015) *Evidence Transparency Framework*, London: Institute for Government

[29]  Government Office for Science (2010) *Guidelines on the use of scientific and engineering advice in policy making*, Government Office for Science, HM Government

[30]  Government Office for Science (2019) *Realising our ambitions through science: a review of Government Science Capability*, Government Office for Science, HM Government

[31]  Government Office for Science (2020) Guidance for government Chief Scientific Advisers and their officials, Government Office for Science, HM Government

[32]  Sasse, T. & Haddon, C. (2018) *How government can work with academia*, Institute for Government; Government Office for Science (2019) *Realising our ambitions through science: A review of Government Science Capability*, Government Office for Science, HM Government

[33]  Government Office for Science (2019) *Realising our ambitions through science: A review of Government Science Capability*, Government Office for Science, HM Government

[34]  Government Office for Science (2019) *Realising our ambitions through science: A review of Government Science Capability*, Government Office for Science, HM Government

[35]  Sasse, T. & Haddon, C. (2018) *How government can work with academia*, Institute for Government

[36]  Campaign for Science and Engineering (2017) *Improving use of evidence in UK government policymaking*, London: Campaign for Science and Engineering

[37]  Rutter, J. (2013) 'A better formula: will Civil Service reform improve Whitehall's use of expert advice?' in *Future Directions for Scientific Advice in Whitehall*, Eds. Doubleday & Wilson, London: Alliance for Useful Evidence

[38]  See NIHR's Policy Research Programmes

[39]  Haddon, C., Sasse, T. and Nice, A. (2020) *Science advice in a crisis*, London: Institute for Government

[40]  Nurse, P. (2015) *Ensuring a successful research endeavour: review of the UK research councils*, Department for Business, Innovation & Skills, HM Government

[41]  Government Office for Science (2019) *Realising our ambitions through science: A review of Government Science Capability*, Government Office for Science, HM Government

[42]  See on gov.uk Areas of Research Interest Collections

[43]  See POST (2020) COVID-19 Areas of Research Interest

[44]  See the Centre for Ageing Better (2020) Areas of Research Interest for COVID-19 and its impact for individuals aged 50-70

[45]  Heckels, N. (2020) *Engaging with UK Government Areas of Research Interest: learning and insights from the Universities Policy Engagement Network*, UPEN

[46]  See on gov.uk Rebuilding a Resilient Britain Collection

[47]  Shaxon, L., Harrison, M. & Morgan, M. (2009) *Developing an evidence-based approach to environmental policy making: insights from Defra's Evidence and Innovation Strategy*

[48]  Boaz, A. & Oliver, K. (2020) 'Building new bridges between research and policy during a national lockdown', LSE Impact Blog

## BOX 7: THE AREAS OF RESEARCH INTEREST FELLOWSHIPS

In 2019, the Economic and Social Research Council (ESRC) and the Government Office for Science set up two one-year fellowships aiming to improve academic engagement with ARIs. By March it was clear that government was turning its attention to the growing COVID-19 crisis and that their operational and research priorities were shifting towards thinking through responses to the pandemic. UK Research and Innovation (UKRI) funders were also keen to play their part by funding COVID-19 relevant research. Working closely with the Chief Scientific Advisers (CSAs) and their teams, ARI fellows adapted their programme of work and revisited the ARIs that had been prioritised by government departments.

Revisiting the ARIs showed that many existing priorities had been made more urgent by the pandemic, for example around how to support low-carbon working, or how digital services could be used to support vulnerable communities. It was also clear that departments often shared similar or related priorities, and there was scope to avoid duplication and explore cross-government research and policy creation through the COVID-19 response.

For each theme, the fellows identified ongoing programmes of work (such as the British Academy's seminar series and working group on vulnerable populations), key organisations, and key investments relevant to the ARIs. They worked with colleagues in the Universities Policy Engagement Network (UPEN), UKRI, the What Works Centres and the national academies to draw up lists of potential experts to join 9 task-and-finish groups. The groups included representatives from policy, analytic professions, the CSA Network, academia and intermediary organisations.

Each group met multiple times and eventually produced substantial reports summarising the evidence, which are all available free to download. Those involved committed hours of time during a busy and stressful working period. The fellows worked with groups to ensure these reports were produced in a format that was – according to the literature – most likely to assist decision-makers: short, navigable, neat, policy-focused, evidence-led summaries.

The process itself has increased connections between policy and academic communities, providing opportunity for repeated and sustained conversation. Identifying potential participants is skilled and time-consuming work: populating working groups meant deciding who should be part of the conversations. Decisions had to be made about who had been proposed, how to filter them down, and what mix of people, disciplines, career stages, geography, backgrounds and approaches might be most useful. Participants reported multiple impacts, such as improved systems to produce ARIs within government; contributions to large funding bids through the Strategic Priorities Fund; and on how government departments request money for their own research needs through the spending review[48].

### BOX 8: KEY MESSAGES: LEARNING FROM UK GOVERNMENT DEPARTMENTS

- Government departments have built a wide variety of relationships with academic stakeholders. These are determined by multiple factors including the policy area, spending power and history of the department. There is no 'one-size-fits-all' approach and departments need to be supported in different ways.

- The CSA Network, which provides leadership, support and coordination for science advice, is unique to the UK. It provides a way to strengthen science use across government.

- A 2019 report highlighted the need for improved lines of responsibility and leadership in departments. While this is being partially addressed by efforts to strengthen the CSA Network, in many departments confusion may remain about who has ultimate responsibility for or oversight of who engages with academics and how policy draws on evidence and expertise. This highlights the need for leadership from the top: CSAs must be supported by the Government Office for Science, provided with adequate resources, and accorded status and influence.

- Departments are innovative in how they aim to support evidence use. Interventions have aimed to improve evidence 'pull', build skills and relationships, and create infrastructure and roles. The ARIs represent an important strategic initiative at a more systemic level.

- The complexity of departments, as well as factors like staff turnover, poses a challenge to continuity in the use of evidence and science advice. There is scope to draw on digital infrastructures to ensure that knowledge about past research, policy rationales and relationships is better held institutionally.

# Section 4: Science Advisory Committees

The work of government departments is informed by a wide range of advisory bodies and committees that bring together experts from academia, often alongside stakeholders from business, industry, charities and other areas. There are currently about 70 formal advisory councils and committees supporting departments, and the structure, function and nature of the input they provide is varied. In some cases, these are standing bodies that are well-integrated into an overarching departmental science advice infrastructure. Others are mobilized or commissioned on a temporary basis or to address specific policy issues.

The highest profile example of a responsive advisory body is the Scientific Advisory Group for Emergencies (SAGE), which we cover below, while another example is the Academic Panel convened by the Ministry of Housing, Communities and Local Government (MHCLG) in 2018 to advise on homelessness and rough sleeping. The Home Office has seven advisory bodies addressing policy areas including migration, drug use and policing. Other advisory bodies support the Prime Minister and Cabinet directly, including the Council for Science and Technology (or CST, see Box 9) which informs national science and technology policy.

There are two overarching types of advisory bodies, although many sub-types within them:

- Science Advisory Councils (SACs), which in general provide broad advice, aim to inform Ministerial decision-making and/or have some share of responsibility for departmental R&D strategy.
- Science Advisory Committees (SAComms), which in serve a narrow and more technical advisory purpose, usually working independently from each other.

Both SACs and SAComms work on the principles of independence, objectivity and consensus. The Code of Practice for Scientific Advisory Committees[49] or CoPSAC stipulates that advisory bodies should play a role in setting their own agenda as well as responding to issues raised by their sponsoring departments. Whether acting proactively or reactively, SACs should operate free from the influence of sponsor department officials or Ministers, and their function is wider than simply providing evidence solely to support policy. We explore some of these issues around independence in relation to SAGE below.

All UK advisory bodies operate on the basis of consensus: reaching and articulating scientific consensus is the objective of their work. Where it is not possible to reach

---

**BOX 9: COUNCIL FOR SCIENCE AND TECHNOLOGY (CST)**

The CST is a non-governmental advisory body which advises the Prime Minister and leaders of devolved administrations on cross-cutting scientific issues. It is sponsored by the Department of Business, Energy & Industrial Strategy (BEIS) and has membership drawn from universities, industry, and research funders. The CST often holds inquiries into particular issues, for example, on the role of science, technology and innovation in 'Levelling Up', the Johnson government's policy to create a more regionally-balanced economy. The CST is co-chaired by the Government Chief Scientific Adviser (GCSA) and supported by the Government Office for Science, which provides the secretariat.

---

consensus, advisory bodies are asked to record the majority and minority positions, explaining the differences and reasons for them. SACs and SAComms support their sponsoring bodies to access, interpret and understand the full range of relevant scientific information, and to make judgements about its relevance and use. They can review, and sometimes commission, research, as well as offering independent expert judgement, highlight where facts are missing and where uncertainty or disagreement exists. Depending upon their remit, they may also seek to address how their advice takes account of social, ethical, public and stakeholder concerns. In addition, advisory bodies play a role in monitoring risk and possible future threats, and they may draw on or contribute to departmental horizon scanning. To identify, examine, debate and explain the nature of risk, SACs must use a transparent framework – another issue returned to in the paragraphs on SAGE below.

Each SAC is supported by a secretariat which includes staff with relevant technical and scientific expertise. Secretariats should aim to include both 'generalists' who understand the policy development process and 'specialists' who are familiar with the technical content of the SACs work. The secretariat must respect the SAC's independent role, acting as an "impartial and disinterested reporter"[50]. These, and other central principles, are set out in the *Principles of Scientific Advice to Government*[51]. Another key area in terms of the accountability of SACs is how they appoint members. Usually, the Chair leads the appointment process, supported by the secretariat, and is asked to consider the diversity of membership, including gender, age and ethnicity. There is little uniform recruitment or induction support for Chairs or advisers in place across advisory bodies.

## Scientific Advisory Group for Emergencies – SAGE

The UK's Scientific Advisory Group for Emergencies (SAGE) is an influential and increasingly visible part of national science advice. During COVID-19, the Group has played an expanded role and has been subject to increased public, media and academic scrutiny. SAGE operates on the principle of scientific consensus, which it aims to arrive at via a large and flexible membership, and communicates to government at the highest level.
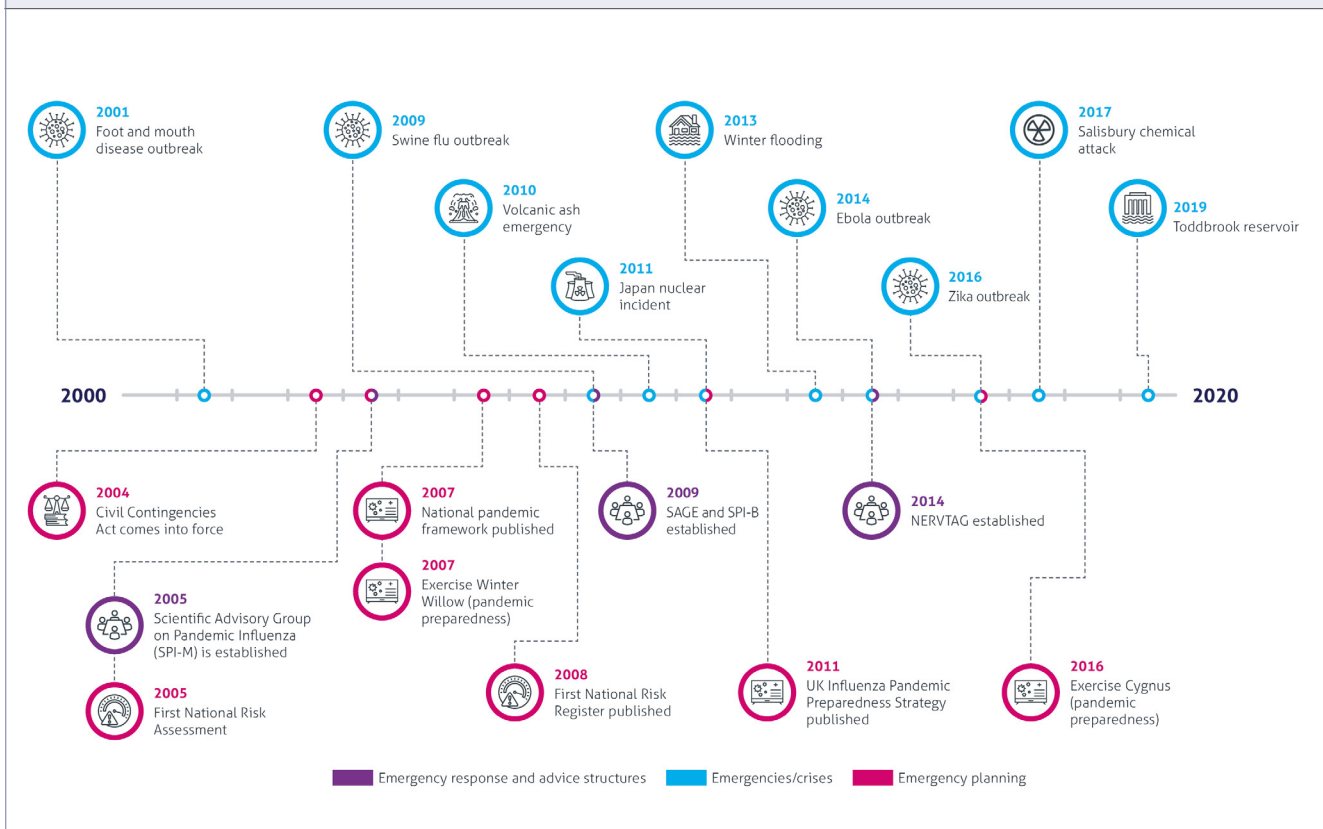
Since the 1960s the GCSA has been responsible for coordinating scientific advice in an emergency, drawing on the expertise of a group of advisers. This was formalised in 2009 with the creation of SAGE, an expert group that could be activated at the start of a crisis and able to integrate scientific research, evidence and analysis, drawing on expertise from academia and government. It was envisioned as a flexible body, with members appointed by the GCSA in response to the crisis faced, co-chaired by the Chief Medical Officer (CMO) during crises in public health. SAGE responds to requests for advice based on specific questions that are posed by the Civil Contingencies Committee (COBR), which is chaired by the Prime Minister and responsible for steering the government's emergency response.

This responsive model evolved out of the experience of major disease outbreaks and emergencies over the last decades. In the 1990s, bovine spongiform encephalopathy (BSE, or 'mad cow disease'); foot and mouth disease (FMD) in 2001; in 2010 the ash cloud caused by the eruption of the Eyjafjallajökull volcano; epidemics abroad, such as Zika and Ebola; and winter flooding in 2013 (see Diagram 2). Scientific advice played a crucial role in all of these emergencies, but in each there were controversies over how advice was communicated and used in decision-making. During the BSE crisis Ministers initially reassured the public that British beef was safe to eat, with the Minister for Agriculture John Gummer famously photographed eating a beef burger with his daughter. In 1996 the government acknowledged a link between BSE in cattle and a neurological disease (vCJD) in humans, resulting in the slaughter of approximately 4.4. million cattle, an EU ban on British beef that would last a decade, and at least 178 deaths attributed to vCJD[52].

During the outbreak of Foot and Mouth Disease in 2001, the then GCSA Sir David King was keen to ensure that scientific advice was responsive to changes that had taken place in the structure and practice of British farming since the last outbreak in the late 1960s. To do this, he formed a broad-based committee including epidemiologists, virologists, vets and other specialists. Due to the possible scale of the outbreak, the Ministry of Defence was also engaged to support the operational response. The Foot and Mouth episode highlighted to the then Prime Minister – Tony Blair – and wider Government the critical role that science could play in coordinating the response to an emergency. The approach taken to tackling the pandemic – based on a policy of pre-emptive culling not only of infected cattle but also those in adjacent areas – was effective in reducing the spread of the disease but also highly controversial, resulting in the slaughter of 6 million cattle and considerable damage to rural communities and economies[53].

At the time of the 2009 outbreak of Swine Flu, which it was feared could have dramatic impact in the UK, it was clear that a more formal and transparent processes was needed that could more effectively address the interplay between science and decision-making, as well as public trust. However, during the crisis the newly formed SAGE faced criticism about the kinds of expertise represented on it. At the time, SAGE was dominated by medical expertise and modelling, at the expense of wider public health and social science expertise, including only one behavioural scientist. In response to criticism, the first sub-group of SAGE was formed, the Scientific Pandemic Insights Group on Behaviours (SPI-B). SAGE now draws

**DIAGRAM 2: TIMELINE OF SELECTED EMERGENCIES AND EMERGENCY PLANNING**

**2001** Foot and mouth disease outbreak

**2009** Swine flu outbreak

**2013** Winter flooding

**2017** Salisbury chemical attack

**2010** Volcanic ash emergency

**2014** Ebola outbreak

**2019** Toddbrook reservoir

**2011** Japan nuclear incident

**2016** Zika outbreak

**2000** ——————————————————————————————— **2020**

**2004** Civil Contingencies Act comes into force

**2007** National pandemic framework published

**2009** SAGE and SPI-B established

**2014** NERVTAG established

**2005** Scientific Advisory Group on Pandemic Influenza (SPI-M) is established

**2007** Exercise Winter Willow (pandemic preparedness)

**2005** First National Risk Assessment

**2008** First National Risk Register published

**2011** UK Influenza Pandemic Preparedness Strategy published

**2016** Exercise Cygnus (pandemic preparedness)

■ Emergency response and advice structures   ■ Emergencies/crises   ■ Emergency planning

on a large secretariat in the Government Office for Science and a team who liaise with academic communities across its multiple sub-groups, including epidemiologists, clinicians, therapeutics and vaccine expertise, public health experts, virologists, environmental scientists, data scientists, mathematical modellers and statisticians, genomic experts, and behavioural and social scientists[54].

Since 2009, SAGE has been mobilized nine times and is informed by multiple sub-groups. SAGE also works flexibly with other advisory bodies, such as SPI-M, the Scientific Pandemic Influenza Group on Modelling, and NERVTAG, New and Emerging Respiratory Virus Threats Advisory Group, which has been made a sub-group of SAGE during the COVID-19 pandemic. A key challenge for SAGE is to distil this wide range of evidence and expertise into a single view and communicate it effectively to the Cabinet Office and Prime Minister.

*SAGE and COVID-19*

SAGE was mobilised at the start of the pandemic and has played a central role in providing large volumes of ongoing advice to support policy, and has been extremely influential in government decision-making. Experience over the past year has demonstrated the value of the UK's agile, responsive model and its ability to adapt to the changing context of the crisis and draw on expertise from across the UK. The prolonged mobilisation of SAGE, which met

over 70 time in 2020, has also exposed it to new scrutiny, and revealed tensions and sticking points.

In the early stages of the crisis, the Government Office for Science increased resource for SAGE's secretariat, which between January 2020 and February 2020 increased from 7 staff to over 100. SAGE and its subcommittees produced 360 working papers between January and December 2020[55]. The Government Office for Science stepped in to cover the costs of the academic duties of members. The SAGE membership has had to cope with a gruelling workload, with some reporting continued work on evenings and weekends. These issues, as well as others, stem from the fact that SAGE is a temporary group currently acting in a semi-permanent capacity. In part, this stems from the fact that the government made a decision to disband Public Health England (PHE), who would usually take over responsibility during a long-term crisis, during the Summer of 2020. This has allowed the government to retain greater centralised control, but has also raised several challenges around collaboration with existing public health infrastructures, local governments and departments.

One member of SAGE interviewed for this report made clear that their ability to adapt quickly the changing situation, collaborate with colleagues in other institutions, and provide high-quality advice, was the result of past experience serving on advisory committees or on SAGE during past crises. In an Institute for Government report examining SAGE's work during COVID-19, it was highlighted that teams at leading universities who had worked together on past outbreaks were able to collaborate in more agile as well as critical ways[56].

*Scrutiny and criticism*

A controversy that has generated debate in both research communities and the media is the extent to which SAGE has managed to effectively draw on expertise from different disciplines and integrate these insights meaningfully. Some interviewees described this as a separate skillset. As one put it *"you don't just need eminent scientists, you need people who are good at bringing different points of view together"*. Others view it as an issue of process. Interviewees raised questions about how well some of the sub-committees were used, with some feeling that their work was not drawn on transparently and that there was a lack of effective feedback loops. Some academics have also pointed to the continued dominance of a narrow set of disciplines and have proposed this is at the root of less-than-adequate policy responses in areas such as mental health, as well as in how measures and policy changes were communicated (failing to draw on behavioural science, for example)[57]. A recent report published by the British Academy and commissioned by the Government Office for Science has highlighted the need for input from SHAPE (social sciences, humanities and the arts for people and the economy) disciplines to support recovery from the pandemic[58]. In a wide range of key policy areas, including skills and employment, communities and culture, and health and well-being, the report outlines how insights from the social sciences, humanities and arts should play a role in responding to the complex social and economic effects of the pandemic[59].

---

**BOX 10: EMERGING LESSONS FROM COVID-19**

The lessons to be learnt from COVID-19 parallel points of tension experienced in past crises. Several interviewees from across science advice and policy studies felt that the crisis has brought about a change in the visibility of science and science advisers within government as well as in the public eye. They highlighted how important it would be for the community to learn from this experience.

- Improved mutual understanding is needed across scientific and policy communities about the role that science advice can play in decision-making. This will help ensure that evidence and advice play an appropriate role, and help the GCSA and other advisers to protect their independence.
- The relationship between ministers and scientific advisers is essential and also challenging. Our interviewees highlighted the centrality of trust and credibility but also the role of unpredictable interpersonal dynamics.
- Ministers and officials have often not found it easy to engage with and interrogate evidence and advice. This sometimes had a negative impact on the ability of the government's emergency committee (COBR) to effectively commission advice, with advisers struggling to provide answers to poorly formulated questions[63].
- There is a need to ensure the right balance of expertise on SAGE and design sufficient challenge into all SACs. This will help prevent bias or 'groupthink' and support SAGE to more effectively address multifaceted and systemic policy issues which demand diverse and interdisciplinary expertise. Alongside this, there is a need to consider the inclusiveness and diversity of government science advice.
- Effective communication has been a critical issue. In particular, it has proved challenging to communicate scientific advice in ways that address uncertainty and builds public trust.
- New mechanisms are needed to support better integrated long-term advice functions, including arrangements for collaboration with the new UK Health Security Agency and improved coordination with government departments.  It is important that advisory mechanisms effectively support, rather than circumvent, wider government science systems.
- SAGE is a responsive mechanism and is not a substitute for preparedness. The UK has pioneered the national risk assessments and the National Risk Register is published publicly. The risk register has ranked pandemic influenza (a different strand of virus) as posing the greatest risk for several years, which reduced national preparedness for COVID-19.

In August 2020 a government report summarised work undertaken to understand how COVID-19 was impacting on health inequalities[60]. Researchers, the public and the media have suggested that a lack of diverse expertise – as well as diverse membership – of SAGE restricted their ability to respond effectively to emerging evidence about worsening health inequities. These were issues picked up by Independent SAGE, a group of scientists working together to provide independent scientific advice to the UK government and public, led by former GCSA Sir David King, which has drawn on an initially wider range of disciplinary expertise, particularly from within public health[61]. In this context, an article published by policy theorist Paul Cairney, drawing on an analysis of SAGE meeting

minutes, has explored how minister-adviser relationships are characterised by an insider/outside dynamic, conditional on the willingness of advisers to follow the "rules of the game" within a wider political and policymaking context. This means that, in practice, advice relationships are limited to a small group of government scientific advisers, with scientists who are unaware of, or unwilling to, 'follow the rules' unable to maintain insider status over the long-term[62].

Finally, COVID-19 has done much to expose to the politics of science advice to wider scrutiny. Repeated government messaging on 'following the science' has highlighted the risk that such a narrative can provoke fears over an assumed over-reliance on scientific advice at the expense of more integrated decision-making, as well as a risk to science advisers of being blamed for unsuccessful or unpopular policy choices. Box 10 brings together some of these lessons.

## Endnotes

49  Government Office for Science (2011) *Code of Practice for Scientific Advisory Committees*, Government Office for Science, HM Government

50  Government Office for Science (2011) *Code of Practice for Scientific Advisory Committees*, Government Office for Science, HM Government

51  Government Office for Science (2010) *Scientific advice to government: principles*, Government Office for Science, HM Government

52  Haddon, C., Sasse, T. and Nice, A. (2020) *Science advice in a crisis*, London: Institute for Government

53  Haddon, C., Sasse, T. and Nice, A. (2020) *Science advice in a crisis*, London: Institute for Government

54  Cabinet Office (2020) *Enhanced SAGE Guidance*, Cabinet Office, HM Government

55  Haddon, C., Sasse, T. and Nice, A. (2020) *Science advice in a crisis*, London: Institute for Government

56  Haddon, C., Sasse, T. and Nice, A. (2020) *Science advice in a crisis*, London: Institute for Government

57  Bavel, J.J.V., Baicker, K., Boggio, P.S. *et al*. (2020) 'Using social and behavioural science to support COVID-19 pandemic response', *Nat. Hum. Behav.* 4, 460–471 https://doi.org/10.1038/s41562-020-0884-z

58  See British Academy (2021) COVID 19 and Society

59  Shah, H. (2021) 'COVID-19 recovery: science isn't enough to save us', *Nature* 591, 503, doi: https://doi.org/10.1038/d41586-021-00731-7

60  Public Health England (2020) *Disparities in the risk and outcomes of COVID-19*, London: Public Health England

61  See Independent SAGE's website and their report (2020) on COVID-19 and Health Inequality

62  Cairney, P. (2021) *The UK Government's COVID-19 Policy: What Does "Guided by the Science" Mean in Practice*? *Front. Polit. Sci.*, 15, doi https://doi.org/10.3389/fpos.2021.624068

63  Haddon, C., Sasse, T. and Nice, A. (2020) *Science advice in a crisis*, London: Institute for Government

64  Haddon, C., Sasse, T. and Nice, A. (2020) *Science advice in a crisis*, London: Institute for Government

**BOX 11: KEY MESSAGES: LEARNING FROM UK SACS AND SACOMMS**

- SACs and SAComms must be underpinned by a clear and transparent process that protects their independence and governs their relationship with their sponsoring body. Secretariats have a key role to play in supporting Chairs in implementing these.
- While recruitment guidelines for science advisers are included in the CoPSAC, it is likely much recruitment happens on the basis on informal networks. The Government Office for Science may have a role to play in supporting Secretariats and Chairs on recruitment. Both Chairs and Secretariats are likely to need support in order to more effectively consider diversity, inclusivity and equity.
- There is a need to consider support, induction, training and resources for academics providing ongoing advice.
- SACs and SAComms aim to reach consensus, but also need mechanisms to build in challenge and disagreement. One approach to building this is 'red-teaming', where sub-groups are tasked with providing challenge[64].
- SAGE was designed as a committee structure to meet only occasionally as needed when an emergency arises. It was not designed for a long-term crisis like Covid 19, and like many other aspects of Government, has been severely tested over a prolonged period during the pandemic.

# Section 5: The Science and Engineering Profession in Government

## The GSE Profession in context

The Government Science and Engineering (GSE) Profession is made up of approximately 20,000 individuals with a professional background and/or qualifications in science and engineering. Levels of experience and qualification are highly varied, but in different ways this group of professionals provide a link between government policymaking, scientific communities, industry and academia. There is a wealth of expertise across government embedded in this profession and efforts to support it have focused on how best to strengthen career pathways, share good practice, ideas and resources[65]. The GSE Profession is supported by Heads of Science and Engineering Professions (HoSEPs) within departments. Each HoSEP is responsible for delivering the GSE strategy within their department.

The GSE Profession works alongside others including the Government Economic Service (GES), the Government Statistical Service (GSS), the Government Operational Research Service (GORS) and the Policy Profession. It has a distinct role and set of characteristics. These stem from the prominent strategic role of science in government, the leadership role of Chief Scientific Advisors (CSAs) within departments, the scale of expenditure on science and research, as well as the diversity of specialisms, scale of the workforce and various arms-length bodies[66]. The Government Analysis Function includes those professionals working in economics, operational research, statistics, social research and other areas, and is complementary to science and engineering expertise.

Across the Professions, many initiatives have aimed to strengthen and improve contributions to policymaking. The Fulton Report[67] published in 1968 emphasised the importance of the specialist skillset in a civil service previously dominated by the generalist. Since its publication, the Government Economic Service (GES) has become a strong force within Whitehall, represented in key discussions taking place throughout departments and well-embedded within day-to-day policymaking. Until the mid-2010s, science and engineering were widely seen as the domain of specialist delivery agencies operating at arms-length from government. By the late 2010s it became clear that a key challenge for government was to become a more effective commissioner of research and that a greater proportion of internal specialist skill was needed to support this[68]. As one of our interviewees, a former leader within the Government Office for Science, reflected:

> *"[O]ne of the challenges was to try and make sure that economic evidence was not the only kind of evidence which was taken into account when policy was being formulated."*

Work to strengthen the GSE Profession has proceeded from a low base in the mid-to-late 2000s. It is still not known exactly how many members of the Profession exist across government, and formal initiatives to support it are relatively recent. One former Government Chief Scientific Adviser (GCSA) described taking up his post in the 2000s:

> *"When I went into the job, I assumed that I would be able to say: 'Okay, I'm head of the science and engineering profession: do we have files on the scientists and engineers throughout the civil service?' But there was a shuffling of feet and coughing. There was nothing, absolutely nothing, in terms of the origin and skills of the individuals on anything like a central database."*

A further challenge relates to how the GSE Profession works with others within Departments. This applies to relationships between scientific and analytic professions - as well as between research and policy colleagues. Within Departments, analysts tend to perform a brokering role, informing policymakers on the basis of research and evidence and building links with experts. How both scientists and analysts work with policy colleagues is affected by the departmental organisation: in some departments scientists and analysts work within policy teams; in others scientists, analysts and policy colleagues carry out their work separately; and in some it is a mix of both[69]. Several initiatives have aimed to strengthen science and evidence across government Professions, while the Government Office for Science have worked to strengthen the GSE Profession and embed its contribution more widely.

### Initiatives to strengthen science and evidence in the civil service Policy Profession

Since the late 1990s several civil service initiatives have aimed to support evidence-informed policymaking and, since the 2010s, aimed to make policy more transparent and open to external input and critique. A series of Policy Profession reforms in the 2010s built on the report Twelve Actions to Strengthen Policymaking[70] and established the Policy Profession Support Unit. This was followed in 2017 by a set of professional standards which set out evidence competencies and their role in professional development. Alongside this, the Open Policymaking Agenda produced national action plans on open government and established an independent commission on freedom of information[71]. In 2014 Policy Lab was established from the Cabinet Office, a design lab aiming to upskill civil servants on open policymaking using collaborative approaches and develop toolkits to help civil servants engage with open policy, innovation and evidence[72].

Within the Policy Profession work to improve policy officials' understanding of research and evidence has been included in the Fast Stream, a graduate recruitment programme, as well as part of wider Civil Service learning programmes. These efforts have been supported

by the What Works Network (see Section 9) and specialist evidence intermediaries such as the Alliance for Useful Evidence[73].

In 2014 the Government Office for Science created an online directory of key departmental contacts and in 2016 conducted a consultation of its professional community to develop its strategy. In response to findings, it developed a network of 'champions' in departments who aim to support Heads of Science and Engineering Professions, alongside a blog to help share ideas across the profession. In 2015 the Government Office for Science relaunched the Science and Engineering Fast Stream, focused on applicants with a masters degree or doctorate in a relevant subject. A focus on building skills within the Profession was taken up by the current GCSA Sir Patrick Vallance, who has argued for the need to improve skills and capability across government. Vallance has also emphasised the need to further embed science within day-to-day policymaking – as one interviewee put it:

> *"We already know there should be an economist at every table. But where we need to get to is that at each table where there is an economist, there should also be a scientist."*

Many of our interviewees emphasised that this was work in progress. One current departmental CSA highlighted the need to support the Policy Profession as a key priority:

> *"The biggest thing we need to fix at the moment in the UK system is that our policy professionals don't understand science and don't understand how best to use and interact with scientists."*

### Developing the GSE Profession

Over the past two years, several formal publications have outlined a new strategy for the GSE Profession. The new Government Skills and Curriculum Unit (GSCU) is aiming to take a more integrated approach to steering and delivering training[74]. The Government Office for Science support for the GSE Profession has been expanded to include an induction process for CSAs and HoSEPs and a Primer Course on Futures, which aims to help policymakers and civil servants use futures techniques (approaches to thinking about the future and exploring factors that could give rise to future characteristics, events and behaviours). GSE Policy roles have been integrated into the policy professions career framework and new professional development opportunities include science advice and systems thinking apprenticeships. A capability-based pay framework has also been introduced to provide clearer career profession and development pathways for GSE professionals.

The 2020 Government Science and Engineering Career Framework outlines the skills, knowledge and experience required to be an effective scientist or engineer in government[75]. It presents 4 job families that describe the different GSE roles across government with suggested development pathways (see Box 12).

---

**BOX 12: SKILLS AND OPPORTUNITIES IN THE GOVERNMENT SCIENCE AND ENGINEERING CAREER FRAMEWORK (2020)**

**GSE Technical Skills:**
- Building and applying knowledge
- Communicating science & engineering (S&E) for government
- Developing the GSE community
- Technical oversight and management
- Broad thinking

**Job families and skillsets:**
- GSE Affiliate: This job family covers all job roles that are not directly related to technical science and engineering and exists for people who want to stay connected to the Government Science and Engineering (GSE) Profession.
- Cross discipline: This job family covers roles that apply scientific or engineering knowledge to a broad number of topics.
- Specialist: This job family covers all roles that apply specialist knowledge or training in a science and engineering related area across many contexts.
- Deep specialist: This job family covers all roles that require a high level of science or engineering training in a specific area and the core element of their role is to utilise and develop that knowledge and experience daily.

**Examples of career development opportunities:**
- Apprenticeships: There are a number of GSE apprenticeships including the Systems Engineer (Degree) Apprenticeship, the Systems Thinking (level 7) Apprenticeship and the Science Adviser Apprenticeship.
- The Science and Engineering Fast Stream: This is a 3-year Civil Service leadership scheme for high potential individuals trained in science or engineering, open to both internal and external Civil Service applicants
- Leadership Academy: This is open to those new, existing or external to the Civil Service and offers a range of talent management programmes.
- Positive Action Pathway: This is for Civil Servants in under-represented groups, specifically LGBT+, BAME, women, and disabled colleagues.

The Government has announced a number of future plans for development of the GSE Profession[76]. These include:

- The development of induction to profession for all GSE Professionals, including induction for senior officials/ministers on use of science and evidence.
- A 'Science 101' course for policy makers and generalists and a programme of loans and secondments for scientists to other professions.
- Clear models of science leadership, including targeted leadership training for specialists and deep specialists.

- An approach to addressing technical skill gaps through mentorships and secondments, using accreditation and a chartership approach.

---

**BOX 13: LEARNING FROM THE GSE AND OTHER PROFESSIONS IN GOVERNMENT**

- Work to support and strengthen the GSE Profession is ongoing and a current priority for the Government Office for Science. The GSE Profession is highly varied, including professionals with different types and levels of experience. High-quality data about the membership of the Profession is still being gathered.
- The GSE Profession works alongside many other Professions within Government and supporting the use of science and evidence across these is complex, involving overlap and coordination.
- Other Professions, including the Government Economic Service (GES), have been more fully formalised. In the case of the GES, the Government Office for Science is seeking to learn from the success of embedding economists in day-to-day policymaking.
- An evolving focus on skills has characterised the UK's approach. The improved specification and support of different GSE skill sets, job roles, competencies and career pathways are central to current efforts to strengthen the profession.
- The Government Office for Science is playing a central role in creating and coordinating opportunities across the GSE and other Professions.

---

## Endnotes

65 Campaign for Science and Engineering (2017) *Improving use of evidence in UK government policymaking*, London: Campaign for Science and Engineering

66 Government Office for Science (2019) *Realising our ambitions through science: A review of Government Science Capability*, Government Office for Science, HM Government

67 HMSO Cmnd 3638 (1968) *The Civil Service Volume 1 Report of the Committee 1966-1968 [Fulton Report]*

68 Government Office for Science (2019) *Realising our ambitions through science: A review of Government Science Capability*, Government Office for Science, HM Government

69 Sasse, T. & Haddon, C. (2018) *How government can work with academia*, Institute for Government

70 Policy Profession Board (2013) *Twelve Actions to Strengthen Policy Making*, Civil Service, HM Government

71 See Cabinet Office (2016) *UK Open Government National Action Plan 2016-18* , Cabinet Office, HM Government

72 Find out more on Policy Lab's website

73 Find out more on the Alliance for Useful Evidence website

74 Government Skills and Curriculum Unit (2021) *Better Training, Knowledge and Networks: the New Curriculum and Campus for Government Skills*, Civil Service HR, Cabinet Office, HM Government

75 Government Office for Science (2020) *Government Science and Engineering Career Framework*, Government Office for Science, HM Government

76 Government Skills and Curriculum Unit (2021) *Better Training, Knowledge and Networks: the New Curriculum and Campus for Government Skills*, Civil Service HR, Cabinet Office, HM Government

# Section 6: Science advice in the UK Parliament

The UK Parliament comprises three parts: the Crown (Monarch), the House of Commons and the House of Lords. The House of Commons is the lower chamber. It comprises 650 elected Members of Parliament (MPs), who each represent a small region of the United Kingdom. The House of Lords is the upper chamber. It comprises about 800 members, or 'Peers'; these Peers have either been appointed to the position because of long service in a political party or an esteemed career (as is the case for the majority of Peers), or inherited the title, and are then chosen by the House to serve in the role. It also comprises 26 of the most senior members of the Church of England. The Monarch plays a constitutional role, opening Parliament, dissolving Parliament, and approving bills.

The role of the UK Parliament is to:

- Represent the people
- Check and challenge the work of the government (scrutiny)
- Make and change laws (legislation)
- Debate the most important issues of the day (debating)
- Check and approve Government spending (taxes and budgets)

Within Parliament, scientific information and expertise is sourced and used by a number of different offices, to help Parliament carry out its functions:

- The Parliamentary Office of Science and Technology (POST)
- Select committees and public bill committees
- The House of Commons Library and the House of Lords Library
- All-Party Parliamentary Groups (special interest groups)
- Individual Members and Members offices

Various external stakeholders feed scientific information and expertise into these offices, including research funders (Section 7), universities (Section 8) and national academies (Section 9).

## The Parliamentary Office of Science and Technology (POST)[77]

POST is the in-house science advice mechanism in the UK Parliament, which bridges research and policy. It serves both the House of Commons and House of Lords. Organisationally, POST is situated in the House of Commons Research and Information (R&I) Directorate and sits alongside the House of Commons Library.

POST is one of the oldest legislative science advice mechanisms in the world. POST was created in 1989, although the idea came about a few years earlier than that. In 1985, Members of the Parliamentary and Scientific Committee (an All-Party Parliamentary Group) visited the US to see the congressional science advice office: the Office for Technology Assessment. Following their visit, they decided they wanted to create a science advice office to serve the UK Parliament, so set up a charity to raise funds to create one.

Following successful fundraising, including support from the Nuffield Foundation and the Gatsby Charitable Trust, POST was officially created in 1989 as an office external to Parliament. It began with one director and one secretary but, through further funding from the Wellcome Trust, Leverhulme Trust and UK Centre for Economic and Environmental Development, expanded to bring in three advisers: one covering biological sciences and health, one covering physical sciences and computing, and one covering the environment. Early briefings POST produced gave parliamentarians access to rigorous and reliable evidence on key societal issues at the time, such as genetically modified organisms and BSE (bovine spongiform encephalopathy or 'mad cow disease'), and new technologies such as optical fibre networks and renewable energy.

POST became an internal office of Parliament in 1992. It was made permanent in 2000 and then expanded to include three more advisers. About that time, POST began welcoming PhD students to carry out three-month placements funded by research councils, charitable trusts and foundations, and learned societies. The scheme continues today, and is one of the longest-running PhD policy internship programmes in the UK.

POST has always worked closely with research councils; however, in 2013 POST entered into a formal collaboration with the Economic and Social Research Council (ESRC) and University College London (UCL) to create the social science section within POST. The aims of the collaboration were to embed social science in POST and more widely across offices and the work of Parliament, and also to study the use of research in Parliament. The output of the study, a report published by POST in 2017[78], provided key insights including that parliamentarians, their staff and parliamentary staff found research useful to their work and used it for a number of different purposes: to support effective scrutiny, inform policy, provide background knowledge, inform opinions, substantiate pre-existing views or hypotheses, provide balance, provide credibility, and score political points. However, the study also found that people in Parliament "generally did not distinguish between different types of research" and that academic research was "not cutting through", with more written and oral evidence submissions to committees from the voluntary sector than higher

education sector. Another survey, conducted with the research community in 2017, found that academics' greatest perceived barriers to parliamentary engagement were: lack of knowledge or guidance on how to engage with Parliament, lack of confidence, lack of time, perception of exclusivity of Parliament, and lack of incentive or recognition[79].

In response to the findings of the 2017 reports, the work of POST has continued to evolve over recent years. POST plays an important role in raising awareness about the role of science and research evidence in parliamentary processes both internally and externally. POST provides an increasing amount of support to select committees and libraries across Parliament to enable them to engage more with evidence, including through building internal capacity in Parliament to access, engage with and appraise research evidence, and use social science research methods to analyse information. As another response to the findings of the 2017 report, in 2018 POST created the Knowledge Exchange Unit to increase the flow of academic research into Parliament, as well as strengthen connections between the two communities (see below).

Today, POST is the office in Parliament which bridges research and policy. It has a staff of 13, including scientific advisers and knowledge exchange staff, and the Head of POST is the principal scientific adviser to Parliament. The following sections lay out the work of POST in more detail.

*POST Briefings and horizon scanning*

POST's principal activity is to produce briefings on topics in science, technology and the social sciences. It produces three kinds of briefings, all of which provide impartial, accessible syntheses of research evidence:

- **POSTnotes:** these are POST's flagship products. They are timely, forward-looking, four-page evidence syntheses, which review emerging areas of research. The principal customers of POSTnotes are parliamentarians, however, they are also used by lots of other stakeholders, including the Government, media and third sector. Their production includes a literature review, stakeholder interviews and internal and external peer review. They generally take about three months to produce and the majority are written by PhD fellows (see below).
- **POSTbriefs:** these are strategic evidence syntheses on a particular topic. POSTbriefs are produced rapidly in response to major developments in current affairs or select committee inquiries. POSTbriefs usually take about a month to write and are reviewed by several experts during production.
- **Rapid responses:** these are online-only briefings. Their production is responsive to current needs, and they are produced very rapidly to brief parliamentarians on important research developments. POST developed this kind of briefing to be able to maximise its support to Parliament in the context of the COVID-19 pandemic.

In addition to these briefings, POST conducts horizon scanning activities and generates reports to help inform Parliament about forthcoming developments, threats and opportunities.

Over the years, POST's briefings have had varied impacts on the work of Parliament and have fed into scrutiny, legislation and debate. Examples include usage by stakeholders in the development and passing of the Autism Act 2009 (POSTnote #302: Autism[80]), usage by a Member to draft a Private Member's Bill on Forensic Linguistic Standards (POSTnote #509: Forensic Language Analysis[81]), usage by the Environmental Audit Committee to inform the inquiry on the environmental impact of microplastics (POSTnote #528: Marine Microplastic pollution[82]). POST's briefings, which are all publicly available, are also readily used by stakeholders external to the parliamentary community, including the media, judiciary, industry, practitioners and researchers.

*Events*

POST holds a variety of events across the year, from private breakfast briefings through to large public report launches. Events are designed to enable members of the parliamentary community to grow their understanding around a particular topic, but also to enable the development of networks between diverse stakeholders.

*Strengthening and diversifying Parliament's use of scientific research evidence*

As detailed above, since 2013, POST has partnered with the ESRC and UCL on a collaborative project to embed the use of social science research in Parliament and strengthen and diversify Parliament's use of scientific research evidence. As part of this, a core activity of POST staff is to help members of the parliamentary community to better engage with research evidence and other sources of information. To do this POST conducts capacity building activities, and produces resources, to support staff working in libraries and select committees. POST also offers training to parliamentarians and their staff, to help them better understand and engage with scientific research.

In addition to this collaboration, POST is a partner on several initiatives and bodies designed to strengthen and diversify the use of research evidence in Parliament, including the Universities Policy Engagement Network and Capabilities in Academic Policy Engagement project (see Section 8)[83]. POST also provides support to other offices in Parliament with their own programmes supporting the use of research evidence, academic and public engagement.

*Knowledge Exchange*

POST is home to UK Parliament's Knowledge Exchange Unit (KEU)[84]; the team in Parliament

---

**BOX 14: IMPROVING HOW SCIENTISTS' INSIGHTS ARE HEARD IN PARLIAMENT**

At the beginning of the COVID-19 pandemic, to ensure that Parliament had rapid access to expertise to inform its work, as well as to provide an open means of engagement for academics, the Knowledge Exchange Unit launched a call through its networks and social media for all those with scientific insights and expertise relevant to COVID-19 to sign up to a database of experts. Within a week, the database had gained 4000 members, and the call was closed a couple of months later with nearly 5,500 experts.

As well as identifying individuals from the database to support teams in Parliament with specific work, POST also surveyed the members of the database on their short-, medium- and long-term concerns around the impacts of the pandemic, as well as the data and information they wanted to see the Government release to understand its decisions and approach[95]. Over 1100 experts responded to the survey, and the analysis of insights led to the production of 16 thematic briefings.

The expertise and insights from the database and survey fed into the work of approximately 30 offices across Parliament. This approach enabled Parliament access to the 'wisdom of the crowds' and provided a route for more scientists wishing to engage with policy to have their voice heard. Further, an analysis of the institutional backgrounds of those who responded to the survey revealed that it had enabled more diverse institutional engagement with Parliament than had previously been seen in committee engagement[96].

This innovative method enabling inclusive consultation of the research community was subsequently taken up by the Scottish Parliament, Welsh Parliament and Government's Open Innovation Team. Further, POST has since used a similar methodology to ensure Parliament had access to expertise and insights to inform its work around COP26: the UN Climate Change conference[97].

---

which works to strengthen and enable the flow of information and expertise between Parliament and the research community. It is the first known unit of its kind in the world. The KEU is an outward facing team, which works with higher education and other stakeholders to support knowledge and collaboration between Parliament and researchers. At the heart of the KEU is the drive to diversify the body of researchers who feed into the work of Parliament, in terms of demographic, research discipline and institutional background.

To achieve its aims, the KEU runs training for researchers, produces web content and resources[85] to support engagement, promotes dialogue and opportunities through networks and Twitter[86], brokers contacts, and develops and embeds mechanisms for knowledge exchange, such as academic fellowships. To address barriers to engaging with Parliament identified by researchers (see above), the KEU puts a high value on being open and available to support the research community, sharing its contact details widely, and positioning itself as an approachable and available team. One of the key ways the KEU conducts its work is by collaborating with knowledge brokers in universities, learned societies and professional associations across the UK to share opportunities and support engagement. Through its informal network of approximately 350 knowledge brokers, it estimates it has the potential to reach approximately 90% of university-based researchers.

Another important aspect of the programme of the KEU is the work it does with various stakeholders across research and policy to raise awareness of the importance of academic engagement and knowledge exchange with Parliament. It works very closely with research councils and Research England (Section 7), as well as learned societies, professional associations and university representation bodies, to ensure that parliamentary engagement and impact are understood, valued and recognised across the sector, and notably in national research assessment frameworks and activities such as the Knowledge Exchange Framework, Knowledge Exchange Concordat and Research Excellence Framework (Section 7).

*Fellowships*

POST runs two kinds of fellowship programmes: for doctoral students, and for established academics. Both programmes are designed to enable and increase Parliament's access to – and use of – science and evidence, though they have distinct aims.

Doctoral fellowships, which POST has been running for approximately 20 years (see above), enable PhD students to work in POST for three months, to produce a POSTnote. Students may also be placed with a select committee or library where they will contribute to the work of the respective team. A report commissioned by POST, and published in 2021[87], shows these fellowships generate valuable outcomes and impacts, including broadening the access that Parliament has to cutting edge research, and are also a unique learning experience for fellows, improving researchers' policy engagement skills.

Fellowships for established academics enable Parliament to access diverse and specialist research expertise. Established academics are appointed to conduct projects in Parliament which may comprise: contributing to core work, filling gaps in expertise, building staff capacity and skills, informing parliamentary scrutiny, analysing and evaluating parliamentary practices, or helping to grow Parliament's academic networks. POST fellowships are funded by a number of different bodies, including research funders, charities and academies.[88]

*The POST Board*

POST is accountable to a Board. The POST Board is made up of 14 parliamentarians from both Houses and all main parties, and four leading experts from the research community, nominated by the four main national academies in the UK: the Royal Society, the British Academy, the Academy of Medical Sciences, and the Royal Academy of Engineering. Representatives of the House of Lords administration, and the Research & Information team and Select Committee Team of the House of Commons, also sit on the Board.

## Select committees and public bill committees

Select committees are small cross-party groups of MPs or Peers that perform a scrutiny role or are set up to investigate a particular issue. House of Commons select committees mainly focus on scrutinising the work of Government departments, and there is a select committee for each department which examines spending, policies and administration. Other select committees focus on cross-cutting issues. In the House of Lords there are two main types of committees: committees that cover broad subject areas, and special inquiry committees, which investigate a specific current issue and complete their work within a year. There are also several joint committees, made up of members of both Houses. Committees are supported by a secretariat made up of clerks (procedural experts), committee specialists or policy advisers (policy specialists) and secretarial staff.

The principal way that select committees scrutinise the work of Government is by conducting inquiries. Once a committee has decided it wants to investigate a particular issue, it defines a series of questions for which it would like answers ('Terms of Reference'). It then puts out a public call for people to submit written information relating to the questions posed. This information is known as 'evidence' in Parliament, however it does not just relate to scientific evidence, but encompasses all information received through the inquiry. Anyone can submit written evidence to a select committee inquiry, including individual members of the public, charities, industry bodies or researchers.

Often, as part of the inquiry, the committee holds oral evidence sessions, where it invites specific individuals to answer questions and share information relating to the inquiry (a process known as 'giving oral evidence'). Once the committee has closed its call for written evidence, and finished collecting oral evidence, it uses the information to write a report on the issue. As part of the report, the committee will make recommendations, which the Government usually has 60 days to respond to.

A public bill committee is a committee that is set up by the House of Commons to examine a particular Bill. As part of the committee's work in scrutinising the Bill, it can also take evidence from the public.

Scientific research evidence is a key source of information that committees draw on through their inquiry process and wider work. Research evidence is welcomed and encouraged when public calls for evidence are put out. Committees often also call on scientists to give oral evidence as part of an inquiry, to help them further their understanding of an issue. Where a committee is engaging with a particularly complex or technical issue, and adequate information is not readily available, a committee can appoint a specialist adviser to assist it with an inquiry or over a period of time. Specialist advisers are often academics. Select committees also collaborate with academics through POST's Parliamentary Academic Fellowship scheme, who provide specific expertise and insights for specific projects or periods of time.

---

**BOX 15: IMPROVING THE EFFECTIVENESS OF THE SELECT COMMITTEE SYSTEM**

In 2019, to coincide with the 40-year anniversary of the departmental select committees in the House of Commons, the 2017–2019 Liaison Committee of the House of Commons conducted an inquiry into the effectiveness and influence of the select committee system. The inquiry looked into various aspects of the system, including the work of committees, how they communicate their work, and the use of evidence, engagement and research.

The Liaison Committee made a number of recommendations, including: closer collaboration between POST, the Committee Office and funders to build better structures for cooperation; greater upstream engagement with the research sector in the planning of committee work; the development of committee Areas of Research Interest (Section 3); the conducting of evidence checks by committees; and work to increase the diversity of witnesses called to give oral evidence to committees[98]. The Committee also recommended that the publically funded research sector should continue to recognise the value of academic contributions to public debate and parliamentary scrutiny, and should reward this, and that funders consider building thematic research transmission hubs which proactively prepare readily available meta-analyses and syntheses that committees can draw on.

Staff in both the Committee Office and POST have been working towards implementation of the recommendations, including the publication in October 2020 of Parliament's first Areas of Research Interest relating to COVID-19[99].

---

POST's Knowledge Exchange Unit also ensures that calls for evidence are widely distributed. University policy support units (see Section 8) monitor these calls and encourage and support their academics to respond.

## Libraries

Both the House of Commons[89] and House of Lords[90] have libraries. The Libraries provide an impartial research and information service for parliamentarians and their staff. They provide this service through the production of briefing material, and through answering requests for information and conducting bespoke analysis. The libraries publish datasets, dashboards and other data tools and resources to support parliamentarians' work and provide access to books and e-journals.

In the House of Commons, the Library is divided into broad subject sections, and staff focus on specific areas of policy, whilst in the House of Lords, parliamentary staff are generalists and provide support in all policy areas.

When preparing briefings or responses to specific requests from parliamentarians, library staff draw on a wealth of different sources of information, including scientific research evidence and POST briefings. Libraries also collaborate with academics through POST's Parliamentary Academic Fellowship Scheme, who provide specific expertise and

insights for specific projects or periods of time.

## All-Party Parliamentary Groups (special interest groups)

All-Party Parliamentary Groups (APPGs) are informal, cross-party groups that have no official status within Parliament. They are special interest groups, based around a specific topic or country. There are presently approximately 700 APPGs[91]. APPGs are run by and for parliamentarians; however, they may also engage with individuals and organisations outside of Parliament in their activity and administration.

APPGs conduct various activities to raise awareness or learn more about a topic or issue, such as holding events, conducting inquiries (distinct from those of select committees) or writing reports. As part of their activities, APPGs may engage with researchers. In some cases, the secretariat of APPGs is provided by external, interested organisations such as charities and NGOs.

A particularly relevant group is the Parliamentary and Scientific Committee, which was created in 1939 and aims to provide links between Parliament and those working in scientific and engineering bodies in industry and academia, as well as to ensure that Members of Parliament are informed on topics at the intersection of science and politics.

## Individual parliamentarians and their offices

MPs and some Peers appoint a small body of staff to help them carry out their duties. Parliamentarians or their staff may engage with one of Parliament's libraries or POST to seek specific information, including science advice. They may also engage with the research unit of their political party, or engage directly with experts or bodies such as learned societies.

Beyond the formal and informal structures in Parliament detailed above, there are various other mechanisms and bodies which bring parliamentarians and scientists and their respective work closer together. Notable examples include: the Royal Society Pairing Scheme,[92] which has been running for twenty years, and which pairs parliamentarians and civil servants with 30 research scientists, enabling them to learn about the work of the other through time spent in each other's places of work; the work of the Industry and Parliament Trust[93] – an "independent, non-lobbying, non-partisan charity that provides a trusted platform of engagement between Parliament and UK business" through fellowships, events and training; and, over past few years, an annual 'Evidence Week' in Parliament, led by Sense about Science[94] – an "independent charity that champions the public interest in sound science and ensures evidence is recognised in public life and policy making".

## BOX 16: KEY MESSAGES: LESSONS FROM UK PARLIAMENT

● Members of the academic and parliamentary communities can face challenges in engaging with each other's work. Academics may lack knowledge about how Parliament works and how best to feed insights in, as well as the time to engage and confidence to do so. Members of the parliamentary community may lack knowledge and confidence in evidence appraisal, as well as time to engage with research evidence.

● For science and evidence to feed into the work of Parliament, different stakeholders in the UK research and science system need to work together. Both academics and members of the parliamentary community need to have the skills and/or knowledge to engage with the other, as well as an understanding of the value of evidence-informed parliamentary scrutiny, legislation and debate. Funders, on the other hand, need to understand the evidence needs of Parliament and support activity to meet those needs. Universities also have a role to play in enabling and rewarding parliamentary engagement and impact (see Section 8 on REF/KEF)

● A parliamentary science advice mechanism can occupy multiple roles. As well as producing reactive and forward-facing briefings and insights it can play a broader bridging role between Parliament and the research community. In this bridging role it may also convene different stakeholders across the landscape to enable discussion leading to alignment of priorities and activities.

● Open consultation with academics, working with knowledge brokers and drawing on diverse networks and social media, can enable a wider pool of researchers to feed their insights into the work of Parliament.

## Endnotes

77  See POST's website

78  Kenny, C., Rose, D.C., Hobbs, A., Tyler, C. & Blackstock, J. (2017) *The Role of Research in the UK Parliament Volume One*, London, UK, Houses of Parliament

79  See POST Academics' perceptions of barriers to engaging with Parliament

80  POST (2008) *Autism, February 2008*, POSTnote, POST, UK Parliament

81  POST (2015) *Forensic Language Analysis*, POSTnote, POST, UK Parliament

82  POST (2015) *Marine Microplastic Pollution*, POSTnote, POST, UK Parliament

83  See CAPE's website

84  See the Knowledge Exchange Unit at parliament.uk. Their two year report KEU (2020) *Celebrating two years of the Knowledge Exchange Unit in UK Parliament: our achievements, learnings and next steps*, KEU, UK Parliament

85  See parliament.uk Research Impact at UK Parliament

86  Find the Knowledge Exchange Unit on Twitter @UKParl_Research

87  Parry, J. (2021) *Understanding the outcomes and impacts from PhD policy fellowship schemes*, University of Southampton

88  Find out more about POST Fellowships at parliament.uk

89  Find out more about the Commons Library at parliament.uk

90  Find out more about the Lords Library at parliament.uk

91  See the Register of APPGs at Parliament.uk

92  See the Royal Society Pairing Scheme

93  See the Industry and Parliament Trust

94  Find out more about Sense about Science's Evidence Week

95  POST (2020) COVID-19 outbreak: What are experts concerned about?, Horizon Scanning, POST, UK Parliament

96  Saint, N. & Foxen, S. (2020) 'Strength in diversity – Changing the shape of expert engagement with the UK parliament', LSE Impact Blog

97  POST (2020) COP-26 expert database, Horizon Scanning, POST, UK Parliament

98  House of Commons Liaison Committee (2019) *The effectiveness and influence of the select committee system*, House of Commons
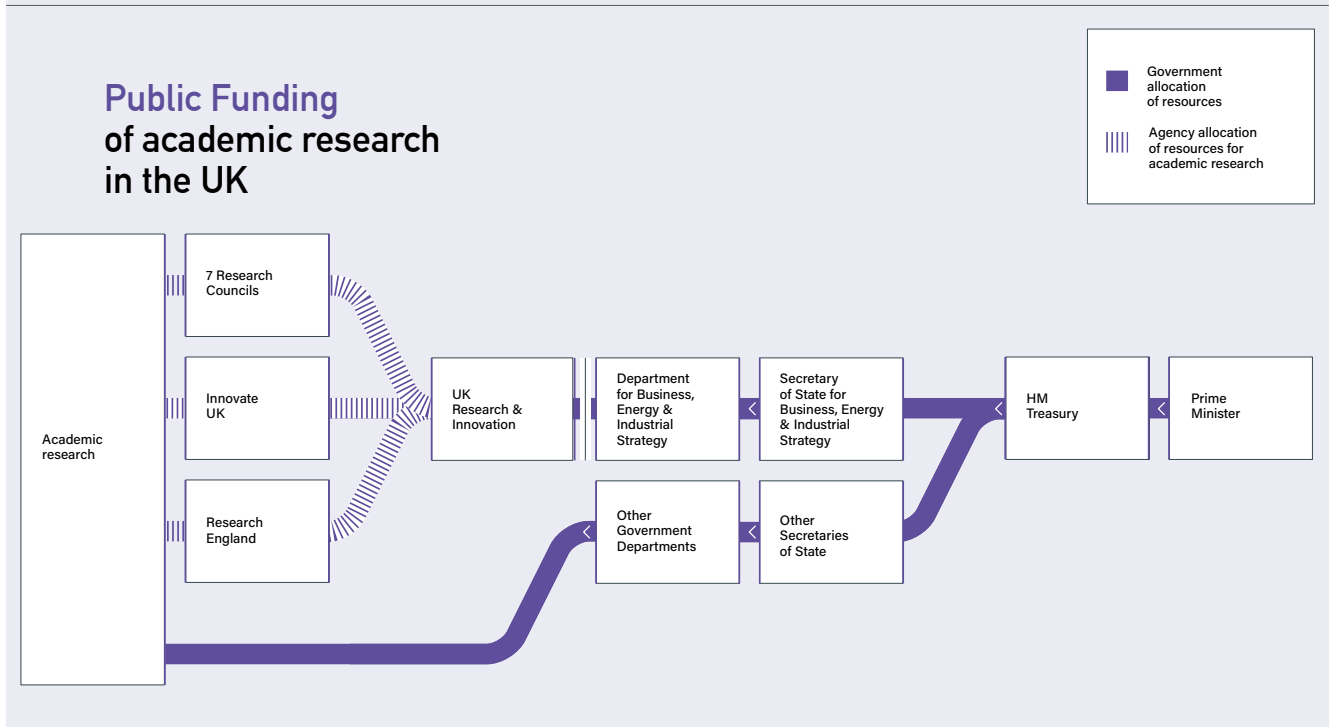
99  POST (2020) COVID-19 Areas of Research Interest, POST, UK Parliament

# Section 7: The role of Government research funders

The Medical Research Council (MRC) was the first publicly-funded UK research council, established following the First World War in the wake of Lloyd George's National Insurance Act, which proposed that "a penny per working person per year be set aside for the purposes of research."[100] Before the MRC was created, the Haldane Report suggested that Government departments should oversee specific research but that wider research should be under the control of autonomous research councils. This established the Haldane Principle: that academics, and not politicians, should make decisions about the allocation of research funding[101]. This remains a core principle of the UK's changing funding environment. The research council system has facilitated the UK's fostering of one of the most productive research communities in the world. There are now 7 research councils through which public money is allocated to academic research, coordinated by an overarching body, UK Research and Innovation (UKRI). Government funding is allocated to UKRI by the Secretary of State for Business, Energy and Industrial Strategy (BEIS), advised by the Minister for Science, Research and Innovation (see Diagram 3).

UKRI is the successor to Research Councils UK, founded in 2002 to support connections across the seven councils and improve communication with Government to support the coordination of science policy. Building on the recommendations of the Nurse Review, which highlighted the need for this function to be strengthened, UKRI was launched in 2018. UKRI brings together the research councils with Research England (formerly the Higher Education Funding Council for England) and Innovate UK. Research England oversees funding and core functions for higher education and knowledge transfer in England – including the Research Excellence Framework (REF) and the Knowledge Exchange Framework (KEF), which are discussed below. Innovate UK, the UK's public innovation agency, was developed out of the Technology Strategy Board, an advisory group established in 2004 to support the then Department of Trade and Industry (DTI), that became an independent body in July 2007. The Technology Strategy Board reconfigured the major funding mechanisms for technology transfer and innovation, created the Knowledge Transfer Networks and Partnerships and set up an Advisory Board made up of 12 people from business, venture capital and regional government. In addition, UKRI coordinates with the Scottish Funding Council (SFC) and Higher Education Funding Council for Wales (HEFCW). In Northern Ireland the Higher Education Division of the Department of Economy fulfils the roles of both a government department and a funding council.

**DIAGRAM 3: ENGAGEMENT WITH EXTERNAL EXPERTISE IN THE UK**



## The role of UKRI and the Research Councils

UKRI is a non-departmental public body sponsored by the Department for Business, Energy and Industrial Strategy (BEIS). It makes independent decisions about how to allocate its funds to the 7 research councils.

- Arts and Humanities Research Council (AHRC)
- Biotechnology and Biological Sciences Research Council (BBSRC)
- Engineering and Physical Sciences Research Council (EPSRC)
- Economic and Social Research Council (ESRC)
- Medical Research Council (MRC)
- Natural Environment Research Council (NERC)
- Science and Technology Facilities Council (STFC)

Research councils play a role in the strategic leadership of research, ensuring excellence and quality in research, training researchers, and providing mechanisms for funding discovery, applied and translational research. Councils also play a critical role in supporting the connectivity of the UK research base and linking knowledge with innovation and social benefit[102]. Their objectives are outlined in their Royal Charters, summarised in Box 17.

UKRI aims to support strategic connections between universities, research organisations, businesses, charities and government. As a convenor, it stimulates and invests in collaboration.[103] In response to the 2019 Government Science Capability Review[104] UKRI has

---

**BOX 17: THE CORE MISSION OF THE UK RESEARCH COUNCILS**

"To provide strategic leadership to the UK research endeavour, building and maintaining national research capability and international competitiveness for the benefit of society, by:
● Advancing the frontiers of knowledge through investing in the highest quality research, and where necessary by employing researchers and running facilities, across and between the full breadth of disciplines;
● Promoting the dissemination and translation of research, and supporting the training and career development of researchers, for the widest possible social and economic benefit;
● Engaging the public with research and advising Governments to inform national research strategy and priorities."[115]

---

developed a number of funding mechanisms and levers to support research on government priorities. Within the disciplinary councils, funders have invested in a number of different initiatives to support policy engagement, from those that focus on disseminating and communicating academic research, through to more collaborative approaches.

## Improving engagement with policy

*Evidence 'push'*

Several Research Councils have made significant contributions over the past decade to making research more useful and accessible to decision-makers. The Economic and Social Research Council (ESRC), for example, has supported the UK Centre for Evidence Based Policy and Practice which, in the 2000s, supported a national system of Evidence Network Nodes and provided a sustained funding stream for research on evidence production and use, which laid much of the groundwork for the UK's current evidence-informed policy and practice landscape. The ESRC has also supported the International Public Policy Observatory, and the What Works Centres (see Section 9). Other examples include the Arts and Humanities Research Council (AHRC) Policy and Evidence Centres (PECs).

*Supporting relationships, collaborations and skills*

UKRI and its individual research councils have a responsibility to help develop skills to support the evidence to policy process. This can be divided into the work they do in-house, to support the skills of those in funding organisations, and the work to support skills development in those they fund, particularly in universities.

*Skills development in-house*

A specific focus on public policy impact is relatively new within UKRI and its constituent councils. For example, the Public Policy team in the ESRC was only created in 2020. The

ESRC has established a year-long capability and awareness-raising programme called Think Policy, through which they are bringing academics and policymakers into the organization, to talk about the role of evidence and research capability in the policy making process. They are aiming to get their staff thinking about the role that policy plays in their investments, and to ensure that policy is included in wider ESRC strategies.

*Promoting policy-related skills development in the academic community*

Research councils promote policy-related skills in the academic community both directly and by providing funding for specific activities. An example of direct work with academics is hosting 'crucibles', where the research council brings a group of academics together to work on a specific challenge. The ESRC, for example, will bring in policy stakeholders to set out a challenge in such a crucible for the academic community to discuss. This helps the academic community understand and explore real issues of interest to a Government department, and supports civil servants to engage directly with academics. The hope is to build understanding and networking between the two communities. Another example is AHRC's Engaging with Government training, a 3-day course for Early Career Researchers run with the Institute for Government[105].

UKRI and its research councils provide funding for policy internships and placements. One example is NERCs Policy Placement Fellowship Scheme which allows researchers and other staff involved in environmental science research to work closely with policymakers within government and other public and third sector organisations in the UK[106].

Another way that UKRI and its constituent research councils promote policy-related skills is through the funding they provide to universities, primarily to support PhD studentships. Research councils fund a large number of PhD studentships in UK universities, through programmes known variously as Doctoral Training Centres, Centres for Doctoral Training and Doctoral Training Partnerships. All seven UK research councils have one or more schemes, with slight variations in the rules. Many of these schemes place a requirement on universities to provide training to help PhD students develop their skills for engaging with users to maximise the impact of their research – which can include training on engaging with policymakers. Some of these schemes have a built-in expectation that PhD students will go on a secondment during their doctorate. Most of these secondment schemes fund placements in a whole range of different types of organisation, including policymaking organisations, and in addition there are also some opportunities specifically targeted at policy (e.g. the Policy Internship Scheme). This structured way of supporting PhD secondments avoids some of the problems described in the section on university activities (see Section 8).

In 2018, UKRI launched the Future Leaders Fellowship[107], which aims to "develop the next wave of world-class research and innovation leaders in academia and business". Future Leaders are offered both core and optional training opportunities over their time on the scheme, and training on policy engagement is one element within that.

*Networks and partnerships*

Research councils have invested in networks of varied size to support policy engagement. Some of these are small scale and informal, while others are larger collaborations. Examples include:

- EPSRC's 'Living with Environmental Change' (LWEC) programme, which involves a cross-government consortium of 22 partners, including several Departments, and serves as a forum for joint working in environmental sciences.
- NERC funding for a number of environmental partnerships and collaborations including the Regional Impact from Science of the Environment (RISE) programme.
- The AHRC and ESRC joint investment in a £10 million Modern Slavery Policy and Evidence Centre, which brings together academics, policymakers, businesses, civil society, survivors and the public to collaborate on solving the global challenge of modern slavery and improve the effectiveness of law and policy.

## Funding for evidence to policy activities

The UK's Science and Research budget is delivered through a 'dual system' consisting of the research councils on the one hand, and the devolved higher education funding bodies on the other. Research councils provide competitive funding to research institutions for research projects, programmes, fellowships and studentships. In contrast, Research England, the Scottish Funding Council (SFC) and Higher Education Funding Council for Wales (HEFCW) provide block grants to institutions on the basis of past performance, now assessed through Research Excellence Framework (REF – see below).

UKRI funding aims to support stronger connections across councils. The UKRI's Strategic Priorities Fund (SPF) was launched in 2018, and one of its aims is to fund projects that support research and development relevant to Government's wider priorities. Building on this UKRI is developing response-mode funding, most recently in relation to COVID-19 (see Box 18).

As discussed in the next section, UK universities are independent companies and charities, and Government stimulates a level of activity in universities on the evidence to policy process through a series of financial incentives provided by UKRI. These incentives relate to both research and to PhD training. Some of the key funding streams are described below.

*Research Excellence Framework (REF)*

Quality-Related or QR funding, one aspect of the 'dual support' funding system, is allocated to universities based on the outcome of an exercise every five to seven years to assess the quality of research in the previous seven-year period. This exercise is organised by Research England, in collaboration with its sister organisations in Scotland, Wales and Northern Ireland.

---

**BOX 18: UKRI COVID 19 RAPID RESPONSE CALLS**

UKRI launched a series of rapid-response open call for ideas that address COVID-19, delivered by a cross-council team and steered by a task force of research and innovation leaders, including Chief Scientific Advisers and the devolved administrations.

To facilitate this, UKRI simplified application forms and introduced an accelerated review process to provide feedback in less than two weeks. Researchers submitting more than 1,400 applications and UKRI invested £25 million within the first 10 weeks in high-potential-impact projects.[116]

---

The exercise was first run in 1986, and there were six rounds of what was called the Research Assessment Exercise, the last being in 2008. The next iteration of this process was renamed the Research Excellence Framework (REF) and was held in 2014. There was one major difference: 20% of the QR funding allocated from the 2014 REF was allocated on the basis of the quality of the impact of the research, not the quality of the research itself. Impact was defined as "an effect on, change or benefit to the economy, society, culture, public policy or services, health, the environment or quality of life, beyond academia"[108].

This change followed consultation with the academic community. The proposal to include impact was welcomed by some, but less so by others. When it came to REF 2014, universities had to write Impact Case Studies as part of their submissions, and describe the impact achieved. An analysis of the Impact Case Studies showed that many had elements of policy impact: 20% indicated impacts on 'informing government policy' and 17% indicated impacts on 'parliamentary scrutiny'[109]. Importantly, the inclusion of impact assessment in the REF meant universities now had a direct financial incentive to support policy impact.

There was a sense amongst those involved in preparing Impact Case Studies for REF2014 that there was a lack of clarity around what constituted 'REF-able' impact, or impact that would be recognised by REF; a challenge linked to wider discussions in the sector around defining research impact. Following the outcome of the 2014 exercise, numerous individuals and organisations conducted analyses of the Impact Case Studies, to understand how impacts had been valued by the assessors. This gave those involved in the activity greater clarity in preparation for the next REF, in 2021, for which the percentage allocated to impact rose from 20% to 25%.

To support understanding of policy impact in REF 2021, Research England consulted with policy organisations[110] to develop guidance on what constituted policy impact and how such impact could be evidenced. This effort has been complimented by work within academic disciplines to better understand and measure research impact on policy (see Box 19 on "Measuring Policy Impact").

The impact agenda in REF has been a key driver in motivating many universities to establish, expand and professionalise their public policy support activities (see the Universities Section

## BOX 19: MEASURING EVIDENCE TO POLICY IMPACT

As the UK has invested increasing resources in achieving policy impact from science and research evidence, it has wrestled with the issue of how to measure the effectiveness of evidence to policy activities. Like every area of public investment, measurement is important to assess the value for money of public resources expended. In the UK system, where much of the funding for evidence to policy activity comes from competitive processes, it is also important in helping to select which projects and activities go forward.

The Research Excellence Framework 2021 guidance requires universities to submit Impact Case Studies which are then assessed for "reach and significance" by the relevant assessment panel. The Case Studies can be up to 5 pages in length, much of which involves a narrative to describe the policy impact. There is more clarity in REF 2021 as to what constitutes policy impact and how it can be measured, compared to REF 2014, but it remains complex and hard to measure. Guidelines for REF 2021[117], for example, define the following as impacts:

- "Policy debate has been stimulated or informed by research evidence, which may have led to confirmation of policy, change in policy direction implementation or withdrawal or policy"
- "The quality, accessibility, acceptability or cost-effectiveness of a public service has been improved"
- "Research is used to change current processes or services, or identify new services to be provided"
- "Research help parliamentarians and staff to identify inquiry topics, shape the focus of inquiries, inform questioning of witnesses, and underpin recommendations"

To provide further support to researchers, some universities have produced their own guidance on how to evidence policy impact[118], whilst the four UK legislatures produced a joint briefing on Research Impact and Legislatures, which informed the REF 2021 guidelines[119].

A feature of the UK system is that a substantial part of the funding for knowledge exchange – viewed as a precursor to impact – comes in the same funding envelope, and is assessed alongside other forms of knowledge exchange, including business impact and public engagement impact. Many of these forms of knowledge exchange have established metrics for measurement and assessment, and many of those relate to income generated. However, most evidence to policy activities conducted by academics are not remunerated, which means that often evidence to policy activities are not captured in assessments, so cannot be recognised or rewarded, or contribute to generating more income for researchers.

To reflect the growing importance of knowledge exchange as a precursor to impact, Research England has been developing formal assessment framework. The Knowledge Exchange Framework (KEF)[120] takes a more nuanced look at activities beyond the metrics that have previously been used, and attempts to recognise all forms of knowledge exchange. However, to minimise burden on universities, it draws on data which is already collected. When it comes to interactions with policy bodies, this is primarily contract and consultancy income from public sector bodies. However, this means that the majority of evidence to policy activities are not captured, and Research England and policy organisations are working together to identify

---

**BOX 19: MEASURING EVIDENCE TO POLICY IMPACT (CONT.)**

how such activity might be better captured in future iterations of the KEF. However, policy knowledge exchange can be difficult to describe qualitatively, and even harder to measure quantitatively.

There are a number of reasons why both policy knowledge exchange and impact are hard to capture, including the non-linear nature of impact, the challenges of attributing policy impacts to specific inputs (given that policy makers must take into account many different pieces of evidence) and the confidential nature of parts of the policy process. While research evaluation has been the key way in which researchers and funders have thought about this dilemma, impacts have rarely been assessed using robust social research methods[121]. Recent scholarship has highlighted the need for a more robust approach, and has provided insight into the contexts of impact in the social sciences and humanities[122]. Scholars have also made proposals for improved ways to think about impact beyond citations, proposing a shift away from narrow instrumental measures and to wider, and more realistic, ways of understanding the role that science and evidence play in policy[123]. However, how to justify and allocate resources for evidence to policy activities remains a challenge, especially when tensioned against other priorities.

---

below). However, some have argued that the REF drives an industry within universities, who spend huge amounts of time and effort on REF impact case studies and developing the best narrative for them, perhaps even at the expense of going out and securing more impact.

*Other research-related funds*

UKRI and its constituent research councils have also provided targeted funding sources for impact, and universities have used some of this on developing public policy impact. Two of the more important funds in recent years have been the Higher Education Innovation Fund (HEIF) and Impact Acceleration Accounts.

Higher Education Innovation Fund (HEIF)

HEIF is a funding mechanism given to universities "to support and develop a broad range of knowledge-based interactions between higher education providers (HEPs) and the wider world, which results in benefits to the economy and society."[111] Much of this funding is used by universities to support knowledge exchange with industry, but an increasing amount is being used to support evidence to policy activities. Universities have reasonable flexibility in how they deploy their HEIF funding.

Impact Acceleration Accounts (IAAs)

The Impact Acceleration Account is a funding mechanism used by some of the UK research councils to fund knowledge exchange activities and "to respond to opportunities in flexible,

responsive and creative ways, aligned to their institutional strategies and opportunities."[112] They are multi-year block awards which, like HEIF, have reasonable flexibility in how they are deployed. Rules vary slightly between the different research councils. Universities have used these funds in a number of ways, including on policy impact events and secondments. They have been a particularly important funding source for universities to support placements on the Parliamentary Academic Fellowship Scheme (see Section 6), for example, with more than half of all academics on the scheme funded through this route.

Impact funding included as part of research grants

As well as the block grant funding schemes above, the research councils have increasingly required information on impact activities to be included in regular research grant applications – with those activities costed into proposals. For several years, a separate "Pathways to Impact" statement was required, forcing applicants to specify how they would seek impact as part of the research project. The requirement for a separate impact statement was dropped in 2020, but impact is now expected and integrated into grant proposals. This again means that universities have a direct financial incentive to seek policy impact.

Joint funding with Government departments

In a small number of cases, research councils have established co-funded programmes with Government departments, with established structures for peer review and project selection.

*Awards and prizes*

Recently, research councils have introduced a small number of awards and prizes to support the profile of and provide recognition for impact, including policy impact. Examples include:

- The ESRC's Celebrating Impact Prize[113]
- The BBSRC's Excellence with Impact competition[114]

*Research Council Institutes*

As well as supporting the evidence to policy process in their headquarters functions and at UK universities, UKRI and its constituent councils also fund a number of institutes, several of whom directly provide policy evidence and expertise to government. This part of the evidence to policy system is described in Section 9 on National Laboratories.

> **BOX 20: KEY MESSAGES: LEARNING FROM UK RESEARCH FUNDERS**
>
> ● UK research funders play a key role in the research and innovation system. As well as funding research, they provide specific funds to support evidence to policy activities, and to build up the skills of researchers to understand and engage with policymakers.
>
> ● Funders engage and co-ordinate with government, arranging activities that bring experts and policymakers together, and using the Areas of Research Interest (ARIs) as a guide to priorities (see Section 3). To help with this, they have started to build up their own skills in policy engagement.
>
> ● Funders have developed a variety of specific schemes to incentivise specific activities, for example, awards and prizes to reward policy impact.
>
> ● Another important activity is the funding of research and evidence centres who have a specific aim to improve evidence production and use; and of knowledge mobilization infrastructure, such as the What Works Centres (covered in Section 9) and the Knowledge Exchange Unit in Parliament.
>
> ● While there are many differences of opinion in UK academia about the Research Excellence Framework, it has been instrumental in incentivising work on the public and policy impact of research.

## Endnotes

[100] Nurse, P. (2015) *Ensuring a successful research endeavour: review of the UK research councils*, Department for Business, Innovation & Skills, HM Government

[101] Nurse, P. (2015) *Ensuring a successful research endeavour: review of the UK research councils*, Department for Business, Innovation & Skills, HM Government

[102] Nurse, P. (2015) *Ensuring a successful research endeavour: review of the UK research councils*, Department for Business, Innovation & Skills, HM Government

[103] UKRI (2020) *Corporate Plan 2020-21*, UKRI

[104] Government Office for Science (2019) *Realising our ambitions through science: A review of Government Science Capability*, Government Office for Science, HM Government

[105] See AHRC's Engaging with Government programme

[106] See the NERC Policy Placement Scheme here

[107] See the UKRI Future Leaders Fellowships

[108] HEFCE (2012) *Research Excellence Framework: Assessment framework and guidance on submissions*, Bristol: HEFCE

[109] King's College London and Digital Science (2015) *The nature, scale and beneficiaries of research impact: An initial analysis of Research Excellence Framework*, Bristol: HEFCE

[110] See UK Parliament (2015) Research Impact and Legislatures

[111] Find out about HEIF on UKRI's Research England website

[112] Find out more on UKRI's website

[113] Find out more about the ESRC's Celebrating Impact Prize

[114] Find out more about the BBSRC's Excellence with Impact Competition

[115] Nurse, P. (2015) *Ensuring a successful research endeavour: review of the UK research councils*, Department for Business, Innovation & Skills, HM Government

[116] UKRI (2020) *Corporate Plan 2020-21*, UKRI

[117] See UK Parliament (2015) Research Impact and Legislatures

[118] Cambridge Public Policy (2017) *How to Evidence and Record Policy Impact*, Cambridge: University of Cambridge

[119] See UK Parliament (2015) Research Impact and Legislatures

[120] For more on the KEF, see https://kef.ac.uk/about

[121] Smith, K., and Stewart, E. (2017) 'We Need to Talk about Impact: Why Social Policy Academics need to Engage with the UK's Research Impact Agenda', *Journal of Social Policy*, 46(1), 109-127. doi:10.1017/S0047279416000283

[122] Bastow, S, Dunleavy, P. and Tinkler, J. (2014) *The Impact of the Social Sciences: How Academics and their Research Make a Difference*, London: SAGE Publishing Ltd

[123] Gunn, A. and Mintrom, M. (2017) 'Evaluating the non-academic impact of academic research: design considerations', *Journal of Higher Education Policy and Management*, 39:1, 20-30, DOI: 10.1080/1360080X.2016.1254429; Derrick, G. (2018) *The Evaluators' Eye: Impact Assessment and Academic Peer Review*, London: Palgrave Macmillan; Pedersen, D. B., Grønvad, J. F., and Hvidtfeldt, R. (2020). 'Methods for mapping the impact of social sciences and humanities – a literature review'. *Research Evaluation*, 29(1), 4-21. https://doi.org/10.1093/reseval/rvz033
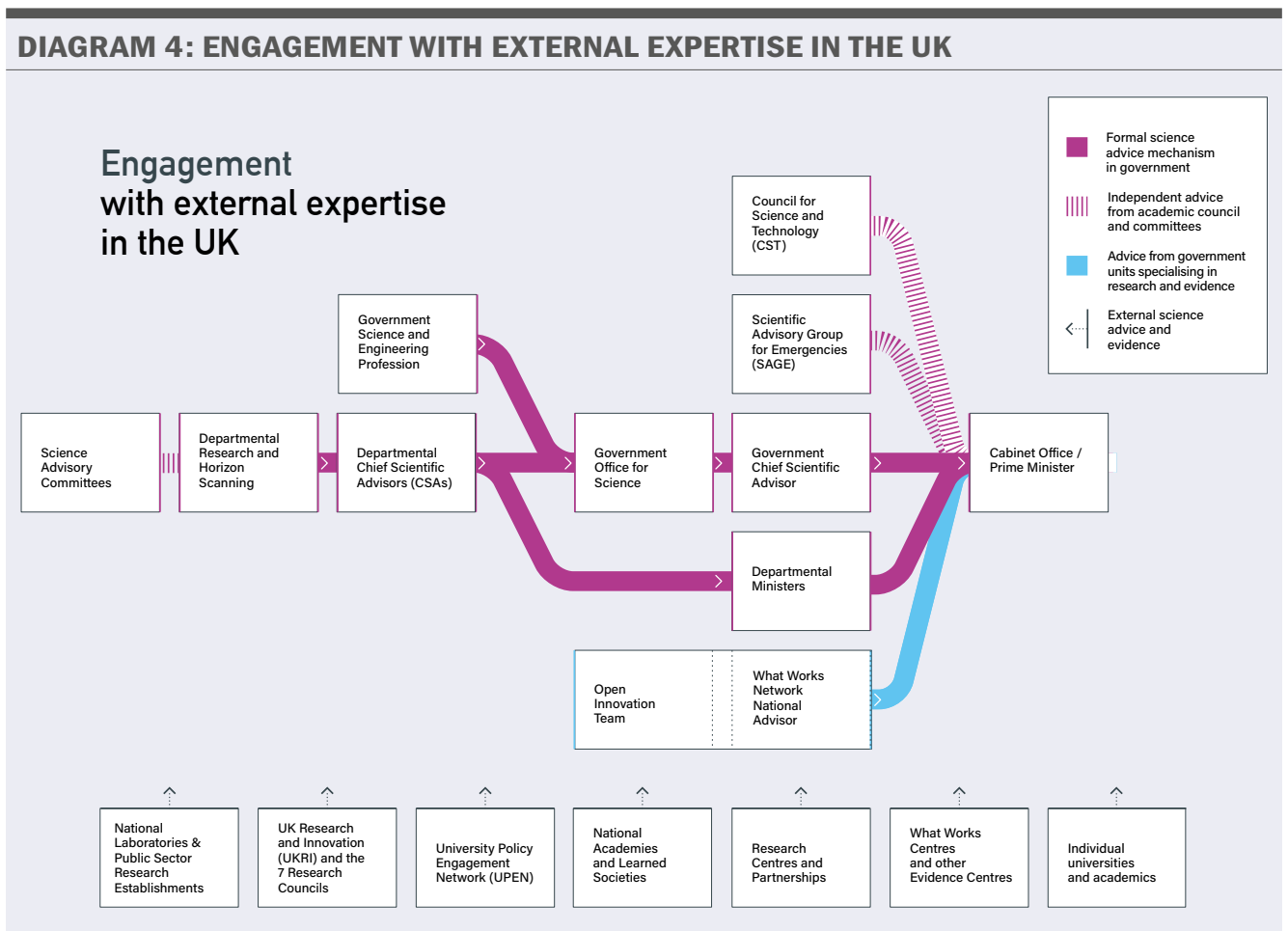
# Section 8: Universities

There have been many examples of individual academics collaborating with policymakers for decades, and Government, Parliament and local authorities have been supported by academic expertise in a number of ways. There are now multiple routes through which academics and their institutions aim to contribute advice and evidence to government, shown in Diagram 4. But until the last 20 years or so, the forging of connections was reliant on individual academics and based more on happenstance than systematic processes. Some disciplines (in particular economics, statistics and medicine) have a longer tradition of academics in a position to offer advice, whereas this may be less true of the natural sciences, engineering and other areas of social science.

The historical lack of systematic processes has meant that there was a tendency for both Government and Parliament to seek advice from the same, relatively small, cadre of experts. Whilst they were known, trusted and reliable partners, they were not necessarily the best people to address specific issues, and did not represent the diversity of potential talent in UK universities. Particular challenges exist for Early Career Researchers, who are more likely to be from under-represented groups, to inform Government and Parliament. These challenges range from less mature networks, disincentives to invest time in building connections with policy (such as a lack of recognition in promotion structures), lack of confidence or perceived influence, and/or the lack of practical skills. Early Career Researchers with care giving responsibilities are particularly disadvantaged in network building opportunities which are often held outside of business hours and in the capital.

Over recent years, in addition to activities on an individual academic basis, there has been a greater focus on university-level activities to support and increase academic participation in the evidence to policy process. This sits well with the overall purpose of universities. The University of Manchester, for example, has as its overall purpose "[t]o advance education, knowledge and wisdom for the good of society"[124], and similar visions and aims can be found across most UK universities. Knowledge and wisdom are less likely to be used for the betterment of society if those taking decisions on behalf of society are unaware or unable to access the breadth of research expertise available.

**University governance and structure**

In the UK, most universities are autonomous companies and charities, not part of the state, and

**DIAGRAM 4: ENGAGEMENT WITH EXTERNAL EXPERTISE IN THE UK**



academic staff are not public servants. Whilst for most universities, UK public funding accounts for a large proportion of their income, money also comes from student fees (national and international), from industry, from international sources (particularly EU research programmes and internationals funders, such as Bill and Melinda Gates Foundation) and from research charities, amongst others. There is a much lower amount of philanthropic funding within the UK university sector than in some other countries (such as the United States).

This means that universities earn their funding in a competitive environment, and this translates into pressure on academic colleagues to 'earn back their salary' – by taking on funded teaching, by winning research grants, and by carrying out key academic leadership roles. The key constraint in most UK universities is academic time.

How academics, and universities themselves, respond to this is not just financial, however. There are aspects of research culture, career progression, and esteem, which are important drivers in academic careers. Traditionally, more junior academic colleagues build their careers and reputation by publishing papers, speaking at conferences, and winning some grants, as well as taking on significant teaching loads. Not all are knowledgeable or interested in pursuing the policy impact of their evidence, and it was not long ago that those that were keen to work in this space were actively discouraged from doing so by the system and the culture.

Those that did nonetheless enter this space did so without support structures in their universities, without any training and in many cases with limited understanding of the culture they were engaging with. Some of course were successful, but they managed this despite, rather than because of, the environment they were in.

It is worth contrasting this situation with how UK academics work with business. Thirty years ago, there was still a very big divide between universities and industry, and real cultural as well as practical barriers for academics to work with companies or in innovation/spin-out activities. That has been transformed in the last three decades. Universities have put in place professional support units, and academic culture has shifted, meaning that academics can successfully develop careers with a large proportion of enterprise activity. Part of this change has come from Government incentives, which have been consistent and grown in scale. Universities have also actively sought to change how time spent on such activities is viewed within an academic career, to make it something expected of their staff, and one of the criteria for assessing promotion.

Similar incentives from Government have been introduced in recent years in the UK to encourage policy impact, and these incentives are beginning to drive a similar trend. This has combined with a feeling in many areas of academia that more engagement with policymakers is desirable – perhaps driven by an appreciation of the importance of good scientific evidence to tackle issues such as climate change. Universities are now introducing policy engagement as an expectation for academic careers and promotion. [125]

However, there are still challenges. One of the most useful functions for policymakers is evidence synthesis, yet it is hard to secure funding for this, and academically, is often held in less esteem than carrying out new research which leads to publication in high impact journals. Similarly, many more incentives exist for academics to carry out research than to seek policy impact from it. More often what policymakers need is an academic's expertise, their knowledge of the current state-of-the-art in a particular field, rather an individual's specific or most recent research findings. Many of the people spoken to while writing this report emphasised the ongoing challenge of aligning interests, perspectives, priorities and timing across academia and government.

## University policy support units

An increasing number of UK universities have established policy support units in the last 10 years. The increased financial incentives, especially the Research Excellence Framework (Section 8) leading to long-term financial benefits in the form of Quality Research funding allocation, were driving forces in establishing such units. The emergence of these teams in universities across the UK represents effort to think at a more institutional and strategic level about how to build connectivity between academic research and policy.

*Structure within universities*

There is not yet established best practice for how these policy support units are structured, and different universities have experimented with different models. Some have one team covering the whole university, whereas sometimes a team is set up to support a particular faculty. Some are linked with academic research (for example in the area of public policy) and others are free-standing support functions.

However, a unifying feature is that they have staff who are not academics themselves and have a role to support academic staff in the evidence to policy process. A number of universities (such as the University of Nottingham and the University of Southampton) appointed former senior civil servants with direct experience of policymaking and government, and this trend is likely to continue.

*Activities*

The typical activities of university support units fall broadly into seven categories: policy 'pull', evidence 'push', networking, capacity building, secondments, supporting grant-winning, and the REF and other policy reporting. While some of these activities are rooted in a 'linear' conceptions of how evidence moves from universities into government, others are focused on building two-way relationships and skills, and developing more strategic approaches[126].

Policy 'Pull'

University policy support units actively identify what evidence policymakers need, and seek to bring these opportunities to academics with relevant evidence and expertise. This involves monitoring published evidence requests (for example, Government consultations, parliamentary inquiries, Areas of Research Interest), and developing relationships with policymakers to explore what their needs are. Policy support units are also involved in helping draft or review responses to consultations, inquiries and other policy 'pull' requests.

Policy teams may organise visits of policymakers to their universities, or visits to by academics to policymakers, to meet and discuss current policy issues and potential evidence needs.

The policymakers that these teams engage with include those in UK national Government, Parliament, local authorities, devolved authorities in the UK nations, and other policy bodies. They can also include international bodies such as the EU and the UN. Since no one university will have the capacity to engage with all of these, university policy support units focus on areas where they have academic expertise and often also where they have some established links.

Evidence 'Push'

University policy support units work with individual academics and research groups to bring

their evidence and expertise to policymakers. Activities include stakeholder mapping, developing a policy impact plan, directly approaching policy stakeholders and brokering meetings, attending such meetings and supporting follow up. Support units also work with academics to produce their evidence in a way helpful for policymakers, such as drafting one-page policy briefs.

In some cases, universities are seeking to ensure that policymakers have the right evidence to take decisions. In other cases, they may be going further, seeking to shape and influence the policy debate and provide 'thought leadership' – in a similar way to a think tank, for example – but with the advantage of having academic expertise directly at hand, and arguably a greater degree of neutrality.

When policy support teams bring academics together via policy 'pull' and evidence 'push', they often play an important role in relationship building, to avoid misunderstandings and provide 'translation' between the two sides. A knowledge of the different drivers and ways of working is helpful, as is an understanding of language differences that can hamper mutual understanding (words such as evidence, uncertainty and risk). The Areas of Research Interest (see Section 3) potentially offer a different kind of conversation between academics and government, one focused on widening channels of communication, developing shared understandings about how research can address policy problems, and putting in place more systemic mechanisms that might better support relationship building.

Networking

In order to be able to support both policy 'pull' and evidence 'push', university policy support teams build and maintain an active network across policymaking bodies and others in the evidence to policy system. It takes time to build up trust and working relationships, and given a relatively rapid turnover in civil service roles, keeping networks active requires ongoing work. Policy support teams also need to keep their finger on the pulse in terms of the policy cycle in key areas where their academics have expertise, to help bring that expertise to policymakers at the time when they are most receptive to receiving it.

Capacity Building

Policy support units provide training, both to groups of academics and to individuals, covering topics such as what the policy process is, how to find relevant policymakers, how to engage with them, and how to write policy briefs. Some training they provide themselves, while other opportunities are provided by policymakers and contacts developed through networking activities. Units can also support individuals to plan and practice before high profile engagements (such as appearing before a Parliamentary Select Committee – see Section 6).

Some policy support units have also engaged with policymakers to build their understanding of how universities work, and what academic drivers are, which are not always well known and understood amongst policy officials.

Secondments

An important way for academics and PhD students to understand more about the policy world is via secondments into policymaking bodies. University policy support units can help organise and, in some cases, fund these opportunities. As described in earlier sections, there are an increasing number of established and funded schemes for secondments for both PhD students and academic staff into specific policymaking organisations, and university policy support units identify and promote these opportunities and support applications.

In other cases, such as in a number of Doctoral Training Centres (see Section 7), funding is available for secondments but it is up to PhD students to identify a secondment opportunity. University policy support units have contacts across policymaking bodies and can often create these opportunities.

Policy support units work to try and establish other secondment opportunities which they set up themselves. In general, policymaking bodies do not have funds available to support secondments. Policy support units help to identify budgets for such activities, some of which (such as Impact Accelerator Accounts, IAAs) may already be held within the university. Some policy units hold an element of the university's IAA funds directly, and have powers to select and award secondments from that funding.

There are some barriers to achieving successful secondments, both cultural and practical, which universities and policy organisations have encountered.

As described above, the view of the benefits of engaging in evidence to policy activities is changing within universities, but it is still the case that for early career researchers, it is better for their career to ensure they publish papers, win research grants and speak at conferences, and many also have significant teaching loads. Senior academics potentially have less need as they are already established, but are often heavily committed. It is easier to second PhD students, though it remains the case that some supervisors are not convinced of the value of secondments, which might delay the work of a research group.

In practical terms, with the exception of organised schemes, many secondment opportunities emerge at relatively short notice, and academic staff often have teaching and research commitments already set out over a period of months. PhD students are often the easiest people to arrange secondments for, as they are mainly funded on timed grants which can be suspended for the duration of the secondment. That sometimes leads to practical issues (when a PhD student suspends their studies, the university is no longer employing them, for example) and international PhD students are not usually able to suspend their studies due to visa regulations. Schemes such as the Doctoral Training Partnerships avoid this, as secondments are envisaged within the programme, though not all PhD students are funded through this route.

Location is also an issue. Whilst universities are located all over the country, many

policymaking secondment opportunities are in London or a small number of other cities. Staff from universities in or near these cities can more easily take up opportunities (and at lower cost) than those for whom they would have to move or pay expensive additional travel costs.

Supporting grant-winning

Many university policy support units help individual academics write policy impact plans for research grant proposals.  Those units also work to support bids to impact-related university funding (such as HEIF and IAAs, see above) and to monitor activities under those grants, provide update reports, etc. As noted above, some policy support units directly hold and allocate some funds. However not all universities have access to IAAs and allocations of these funds vary across institutions, making this source of funding variable across the sector.

The REF and other policy engagement reporting

As a major driver for the formation of these units was the Research Excellence Framework, many policy support units work to develop, strengthen and review the Impact Case Studies that are submitted from their universities. They can also be involved in similar submissions, for example for the Knowledge Exchange Framework and the Knowledge Exchange Condordat[127]. More generally, they often have responsibility for telling the university's story when it comes to policy engagement, both externally and internally.

## The Cambridge Centre for Science and Policy

One of the earliest and best-established university-wide initiatives is the Centre for Science and Policy (CSaP) at the University of Cambridge, established in 2008. At the core of CSaP's work is its Policy Fellowship, launched in 2011, in which senior civil servants from national, local and devolved governments (and in later years, also policy professionals from business and the third sector) spend 5 days exploring policy issues in a series of bespoke one-to-one meetings with academic experts. They also have access to a number of events hosted by CSaP over a two-year period, and build networks and connections both across the evidence/policy divide, and also with other policy fellows.

Those participating are on the fellowship scheme for two years, following which they become alumni, and continue to be invited to events organised by CSaP.

This scheme has developed and expanded over the years. There is now a Junior Policy Fellowship, aimed at early-career policy makers, with the same format as the main fellowship. There is also a Policy Leaders Fellowship, which engages with some of the most senior civil servants and policy leaders, who spend two days per year in one-to-one meetings and roundtable discussions. The University of Cambridge have also joined forces with a number of other associate universities, allowing policy fellows an additional day of visits for meetings

---

**BOX 21: PUBLIC POLICY | SOUTHAMPTON**

---

Public Policy | Southampton[132] (PPS) is the university policy support unit at the University of Southampton, and provides a good example of university activity in this area.

PPS was started in 2014 with a single administrator appointed to help academics in the social sciences faculty achieve greater policy impact, inspired by the requirements to demonstrate impact in the REF focused specifically on the dissemination of 'policy relevant' research findings. For two years it was led by academic staff, as a small part of their overall duties, before a full time Director was appointed in 2016. That Director was a former senior civil servant, and was able to bring both knowledge of the civil service and specific contacts.

The unit grew, making use of central funding provided by the university, some HEIF and IAA monies and small elements of research council grants. It also made use of students in the university working part-time on placements. There was a constant need to justify resources in an uncertain period financially for UK universities, but it has become an established part of the academic support function within the university. PPS was a founder member of the Universities Policy Engagement Network (UPEN) and an associate university for Cambridge University's Centre for Science and Policy Fellowship network (see below). It was also of the funders of the first stage of the Cabinet Office's Open Innovation Team (see Section 1, Box 3).

PPS carries out all of the activities listed in the section above. Like many UK universities, as well as links with national Government and Parliament, it also has close links with the local authorities in its areas (in this case, Southampton City Council and Hampshire County Council) and has helped them directly with evidence and expertise (for example, in monitoring air quality in and around Southampton port and developing a clean air strategy).

---

with academic experts in other universities.

Unusually amongst university policy engagement activities, the policy fellows pay a fee to participate. This fee is currently £4,800 for civil service and third sector participants, and £9,800 for business participants.

In addition to the Fellowship Programme, CSaP also provide support to University of Cambridge academics who wish to engage with policymakers and seek policy impact from their research, for example through training workshops. They also showcase policy-relevant research via podcasts and blogs. During the COVID-19 pandemic, they have a facilitated a rapid response service from academic experts to questions from policymakers.

## Universities Policy Engagement Network (UPEN)

UPEN was established by a group of around ten universities in September 2018[128]. There had been an informal network of university policy support teams holding occasional meetings for a year or two before its formation, which was already starting to swap information and share best practice. As well as a desire for more formal sharing and collaboration between the

members, it became clear that policy officials in both Government and Parliament were keen to engage with an organisation that could draw in expertise from multiple universities.

Government incentives to encourage universities to engage had been successful in some ways, and as a result had generated new activity, which meant that on occasions policy officials were being contacted multiple times, by different universities. The idea of UPEN was appealing – it created a 'one-stop shop' for policy officials. While UPEN addresses some of the challenges of an increasingly competent, confident and incentivised university sector to provide evidence there is a need for enhanced clarity about what policymaking bodies' 'ask' of the research community is, as well as adequate resourcing to respond to this flow of evidence. This has been particularly acute during the initial stages of the COVID-19 crisis, as researchers en masse re-directed their expertise to provide evidence to Government and Parliament.

As this evidence brokerage role was new to UK universities, with most not starting work in this space until 2010 or later, there was no established good practice for what university policy support teams should do, no obvious career progression, and no professional development. Equally, small policy teams in each university were regularly having to justify their work, with few established frameworks for doing so. UPEN also aims to improve skills, generate collaboration across universities and foster a community of university evidence brokers.

The initial ten universities decided to establish UPEN without formal governance or any legal identity and with no costs for universities who wanted to join. It therefore had no centralised budget, with the University of Southampton providing the first Chair and the Secretariat using funding they already had. This allowed it to be created very quickly, without long discussions or applications for funding. Its membership has risen from ten universities in 2018 to 66 in 2021, demonstrating the value of the model. This growth is also leading to developments within UPEN, which is likely to develop more formalised structures to enable it to represent this larger group of universities.

## Capabilities in Academic Policy Engagement (CAPE)

Another recent development is the Capabilities in Academic Policy Engagement (CAPE) project[129]. Funded by Research England, one of the constituent parts of UK Research and Innovation (UKRI), it is a four-year project between five universities, the Government Office for Science (see Section 2), the Parliamentary Office for Science and Technology (POST, see Section 6), an intermediary organisation the Alliance for Useful Evidence[130] and the Transforming Evidence research collaboration[131].

The CAPE project aims to:

- Build capacity and capabilities through training programmes and skills development;

- Develop activities and mechanisms to promote engagement and knowledge exchange;
- Develop evidence and a knowledge base of activities in this areas; and
- Incubate a new centre for universities and public policy

---

### BOX 22: KEY MESSAGES: LEARNING FROM UK UNIVERSITIES

- Some academics have had close connections with policymakers for decades, but there has been a transformation in activity at the university level in the last 10-15 years.
- This transformation has been partly driven by financial incentives provided by the government through UKRI, via REF and funds specifically for impact.
- Many universities have introduced professional policy support units, who act as 'evidence brokers' and translators between policymakers and the university.
- Those teams have themselves formed a network, the Universities Policy Engagement Network (UPEN), to achieve greater impact and develop best practice.
- Providing scientific advice is in keeping with the stated missions of universities, and yet there remain cultural and practical barriers which need to be overcome. In general, academics are not incentivised to engage with policy and the skillsets required are not well-supported by academic institutions. Recent developments, such as university policy units may provide a more strategic approach.
- Most engagement activities focus on the role of individual academics, encouraging them to seek impact in highly complex and dynamic policymaking environments. In the future, there may be a need to consider the balance of support directed at individuals and institutions, as well as how and to whom these opportunities are provided[133].

---

## Endnotes

[124] See University of Manchester website 'Our Future'

[125] See for example University College London's Academic Careers Framework

[126] Hopkins *et al* (2021) 'Are research-policy engagement activities informed by policy theory and evidence? 7 challenges to the UK impact agenda.' *Policy, Design and Practice RPDP, Special Issue: Impact in to Practice*, doi: https://doi.org/10.1080/25741292.2021.1921373

[127] See the Knowledge Exchange Concordat

[128] See Universities Policy Engagement Network (UPEN)

[129] See cape.ac.uk

[130] Find out more about the Alliance for Useful Evidence

[131] Find out more about Transforming Evidence

[132] See Public Policy | Southampton

[133] Hopkins et al (2021) 'Are research-policy engagement activities informed by policy theory and evidence? 7 challenges to the UK impact agenda.' Policy, Design and Practice RPDP, Special Issue: Impact in to Practice, doi: https://doi.org/10.1080/25741292.2021.1921373

# Section 9: Other evidence generators and brokers

Section 8 examined the role that universities play in the evidence to policy process. There are a number of other types of organisations in the UK who either directly produce new evidence, synthesise existing evidence, support the sharing of evidence with policymakers, or build links between different stakeholders. This section looks at five of these: intermediary organisations, academies and learned societies, national laboratories, charities and NGOs, and industry.

## Intermediary organisations

The UK is home to a number of formal intermediary organisations who exist to better connect research with policy. Central among these is the UK What Works Network[134].

The What Works Network is made up of nine independent What Works Centres, 3 affiliate members and one associate member, linked by a team based at the Cabinet Office led by the What Works Network National Adviser. What Works Centres aim to increase the supply of policy-relevant evidence, provide advice and tailor outputs to the needs of decision-makers. The network represents one of the first attempts to take a national approach to prioritising the use of evidence in public policy decision-making and has drawn considerable global attention. It has also learnt from initiatives elsewhere, including the US What Works Clearinghouses.

Based on the model of the National Institute for Health and Care Excellence (NICE), established in 1999, the What Works Centres have aimed to apply the methods of evidence-informed medicine, including evidence synthesis and experimental trials, to many areas of social policy including ageing, crime reduction, wellbeing and local economic growth. Centres in Scotland (What Works Scotland, now discontinued) and Wales (the Wales Centre for Public Policy) have taken a different approach to working with policy, focusing on participative approaches to evidence and a joint work programme with government respectively.

In general, the centres' activities include:

- collating existing evidence and producing synthesis reports and systematic reviews
- filling gaps in the evidence base by commissioning new trials and evaluations

- disseminating findings in an accessible way through reports, toolkits, guides and events
- supporting practitioners, commissioners and policymakers to use these findings to inform their decisions

What Works Centres are funded in a variety of ways. NICE is a non-departmental public body, sponsored by the Department of Health and Social Care (DHSC), while the Education Endowment Foundation (EEF) was set up with a £125 million 15-year endowment from the Department for Education (DfE). Several centres are charitable foundations and others are consortia of universities and other bodies, including businesses.

A review of the What Works Centres completed in 2018 identified their shared focus on improving research production and engagement, represented the blue shaded area in Diagram 5 below, and highlighted the need for centres to work more closely with Government and take a more strategic approach[135].

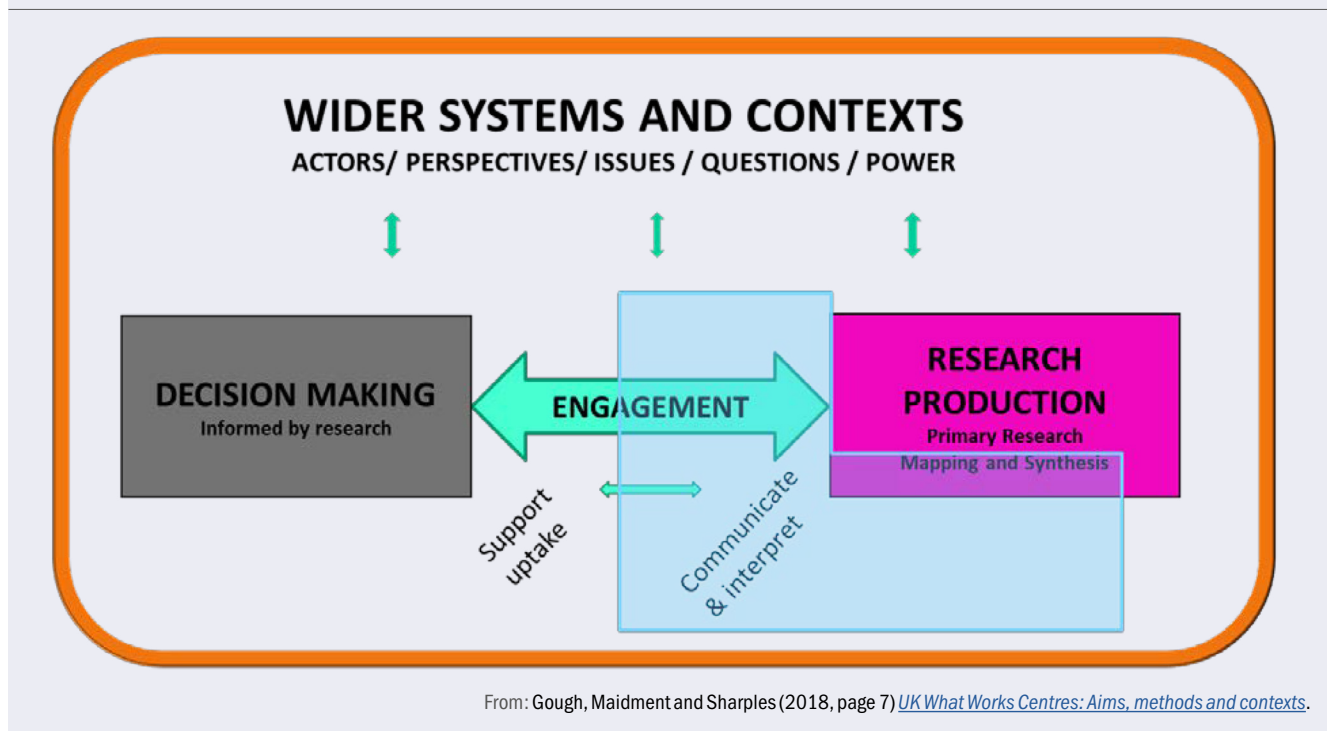## National academies and learned societies

Many national academies and learned societies have missions which involve both promoting excellence in one or more disciplines, and ensuring that those disciplines are of use to society. Examples taken from mission statements include:

- The Royal Society: "to recognise, promote, and support excellence in science and to encourage the development and use of science for the benefit of humanity."[136]
- The Royal Academy of Engineering: "to deliver public benefit through engineering excellence and technology innovation."[137]
- The Academy of Medical Sciences: "to advance biomedical and health research and its translation into benefits for society."[138]
- The British Academy: "to understand the world and shape a brighter future."[139]

As well as the four academies mentioned above, there are national academies for the devolved nations of Scotland, Wales and Northern Ireland. They have close links with the devolved parliaments in those countries. There are also many academies focussing on specific disciplines, some of whom are also actively involved in policy brokerage activities.

Many academies have engaged in a number of activities to provide evidence to government and other policymaking organisations. Examples of work carried out include publishing policy reports and briefings, convening high-profile discussion events and public dialogues, and responding to consultations. Most large academies have policy units, and some have set up specialist policy centres, such as the National Engineering Policy Centre.[140] Academies have had these roles for many years, but the level of activity in evidence brokerage has risen over the last 10-15 years. This is at least partly driven by an increasing effort from Government to engage more

**DIAGRAM 5: WHAT WORKS NETWORK ACTIVITIES ACROSS RESEARCH USE ECOSYSTEM**



From: Gough, Maidment and Sharples (2018, page 7) *UK What Works Centres: Aims, methods and contexts*.

externally with the research community, and vice-versa. In recent years the Royal Society, for example, has set up thematic teams, to build up expertise and networks in specific policy areas. Another recent trend has seen greater co-operation between academies, and with smaller, more specialist institutes.

A key attribute of national academies is their convening power. They can bring together a wide variety of people - from different research disciplines, from different parts of government, from industry and the third sector. If done well, they can create a space for discussion around policy in the early stages of its development, when government is thinking through a challenge, rather than just afterwards when it is looking to test and validate its ideas.

Academies work both proactively and reactively. For proactive work, they engage with UK Government officials at early stages of the development of new programmes and projects (through meetings and workshops) to help identify and understand the policy issues and evidence needs. Evidence synthesis for policy is a key part of this, and they have developed principles and guidance for such synthesis,[141] which has been used to support work on specific issues, such as future land policy[142].

Reacting to urgent government requests (for example during the COVID-19 pandemic) is a newer role, and academies have had to work hard to create systems that can efficiently draw on expertise and networks. Sometimes, rapid response draws directly on evidence synthesis from previous, proactive activities. In other cases, academies have provided the secretariat for rapid response groups, who have generated and synthesised new evidence.

Like all evidence brokers, academies need staff with key skills: in convening across sectors, in 'translating' between people with different expertise, and in framing problems in useful and accessible ways. Some academies have appointed former senior civil servants to key roles to support this work.

## National laboratories

There are a number of different organisations in the UK which could be broadly classified as national laboratories. They have a variety of different governance statuses: some are public executive agencies, some are institutes of research councils, some are Government-owned companies, and some are independent companies or charities with a significant percentage of public funding. There is no fixed definition of a national laboratory and therefore no definitive list, although UKRI maintains a list of "approved research organisations" for funding purposes[143].

The laboratories have a number of different roles, often combining elements of research with the delivery of services. National laboratories act as both evidence providers and policy brokers, and often hold critical expertise that can be directly used to help shape government policy and decision-making. For example, the Atomic Weapons Establishment (AWE)[144] provides expertise on nuclear and radiological threats facing the UK, and the British Geological Survey[145] provides a wide range of advice on issues such as sustainable management of resources, land use, water and energy.

This advice can be related to regional, national and international policy. The British Antarctic Survey[146], for example, provides expert advice to key members of the UK Government delegation to the annual Antarctic Treaty Consultative Meeting, and to its related bodies.

The types of policy activities which national laboratories are involved in include emergency response, ad hoc briefings, membership of working groups and committees, responses to Government consultations and parliamentary inquiries, science briefing papers on policy-relevant topics, factsheets and technical guidance, and secondments. They are both proactive and reactive, often providing commissioned work to policymakers on request.

## Charities, think tanks and NGOs

Charities, think tanks and non-governmental organisations (NGOs) play a variety of roles in the evidence to policy process. Some of these organisations, in particular large medical research charities, can be major funders of research, and have a similar role to the UK's research councils. As well as funding research to help answer policy questions, they often have expert staff who will engage directly with Government on key issues, respond to consultations, sit on committees, and have significant networks and the ability to convene expertise. The Wellcome Trust[147], for example, is a large research charity focussing on three

worldwide health challenges: mental health, global heating and infectious diseases. Across these three broad areas, it is engaged in a whole range of policy activities.

Some charities and NGOs are funded directly by Government to deliver public services, and often have the evidence and expertise on the ground to feed directly into policy discussions.

As well as engaging with Government, many charities and NGOs seek to provide evidence and expertise to Parliament, for example by providing the secretariat to All Party Parliamentary Groups, or responding actively to parliamentary inquiries. In such roles, they are often acting as a broker, bringing expertise from elsewhere (e.g. a UK university) together with policymakers.

Think tanks typically carry out analyses of evidence, hold events and publish reports aimed at influencing the policy debate. They usually have specific areas of interest and expertise, and have excellent networks amongst the policy community. Some have large networks in academia, while others rely more on in-house expertise. Many think tanks aim to be politically neutral, but some are linked to individual political parties, and help bring evidence to shape policy debates within those parties.

It is worth noting the boundary between advice and advocacy. Often, charities and NGOs work to advance certain goals, aiming to bring evidence to policy makers for the express purpose of influencing a decision in a particular direction. This can affect the specific interaction that they have with policymakers, but that does not mean that the evidence they bring or their work as brokers cannot be hugely important to helping policymakers take well-informed decisions. They often possess key skills for engaging with policymakers, and strong networks, which individual academics, for example, might not to the same extent. One interviewee described this as *"the ability to pull evidence together in a way that is more sensitive to the political and policy context, the competing pressures in a department on policymakers"*.

## Industry

Individual companies, and industry representative bodies, have evidence and expertise that feeds into the policy process. In some cases, this will be evidence commissioned and paid for by the policymaker. In other cases, industry is a research partner with universities, and they engage policymakers together with the results of that research. Industry also plays a vital role in policy discussions on future regulation or technology development. A good example is in developing policies to achieve the Government's long-term goal of achieving Net Zero carbon emissions by 2050. Industry, transport and society as a whole need to decarbonise. Much of the expertise on how this can be achieved, and by when, lies in industry. To achieve positive change, government needs to introduce both regulations and incentives that give business confidence to make necessary investments, and they need industrial expertise to make the best decisions.

An example of industry bringing expert technical evidence into policy is the Hydrogen

Advisory Council[148]. Co-chaired by a senior Government minister and a senior industrialist, the Council brings together a range of expertise, including industrial, to help plan the development of the hydrogen economy in the UK over the coming decades.

There are many different ways in which industry provides evidence and expertise to policymakers. Some are similar to charities and NGOs, and some similar to researchers and national laboratories. Larger companies and industry representative bodies often have specific staff brokering government relations. Many of these companies and organisations employ former civil servants (or in some cases, former politicians) with knowledge of the policy process. The same comments on the boundary between advice and advocacy (set out above in the paragraphs on charities and NGOs) can of course apply to industry.

---

### BOX 23: KEY MESSAGES: LEARNING FROM UK EVIDENCE BROKERS

● The network of What Works Centres is unique to the UK and has attracted considerable attention internationally. The network is linked to government by the What Works Network National Adviser based in the Cabinet Office. Relationships with policy are varied across centres. A strong example of a close relationship is provided by the Wales Centre for Public Policy.

● National academies are a critical brokering organisation in the UK policy environment. Some academies have considerable convening power and have built good working relationships with policymakers, whilst retaining their independence.

● Many national laboratories provide specialist advice and evidence to Government and policymakers in their specific areas of expertise.

● Charities, NGOs and industry are all involved in the process of providing science advice – as funders, as evidence brokers and as experts with evidence.

---

### Endnotes

134  Find out more about the What Works Network on gov.uk

135  Gough D, Maidment C, Sharples J (2018). *UK What Works Centres: Aims, methods and contexts*, London: EPPI-Centre, Social Science Research Unit, UCL Institute of Education, University College London. ISBN: 978-1-911605-03-4

136  See the Royal Society's Mission

137  Royal Academy of Engineering (2020) *Strategy 2020–2025: Engineering for a sustainable society and inclusive economy*, London: Royal Academy of Engineering

138  Academy of Medical Sciences (2017) *Strategic Plan 2017-2021*, London: Academy of Medical Sciences

139  See the British Academy

140  Find out more about the Royal Academy of Engineering's policy work

141  Royal Society (2018) *Evidence Synthesis for Policy : A Statement of Principles*, London: Royal Society

142  See the Royal Society's work on Living Landscapes

143  See UKRI's approved list of research organisations

144  Find out more about AWE

145  Find out more about the British Geological Survey's work with policy

146  Find out more about the British Antarctic Survey's science into policy

147  See the Wellcome Trust's work on policy and advocacy

148  See full details of the Hydrogen Advisory Council on gov.uk

# Section 10: Cross cutting issues and lesson learnt

## Equality, diversity and inclusion

As the UK has worked to increase the flow of science evidence and expertise to policymakers over the last two decades, one of the challenges has been ensuring a wide range of experts contribute, from different backgrounds. Improving equality, diversity and inclusion at the interface of research and policy remains a central challenge, and one that is additionally pressing at times of crisis and emergency. As one senior civil servant put it to us:

> *"One of the things I am really concerned about diversity and inclusion. And this becomes more important at times of crisis. This is when people fall back on those who are most trusted, on those they already know. This makes the networks informing government science smaller."*

As this report has highlighted, the influence of individual science advisers and the relationships and networks in which they are embedded are a cornerstone of the UK science advice system. Closed networks and exclusive relationships limit the potential contribution made by scientists and the ability of science advice to address the needs and priorities of diverse publics. A smaller group of people are simply less likely to have all the expertise that would be helpful to policymakers, and may be being asked to input on topics beyond their direct expertise. They may also represent a narrow range of scientific and technical viewpoints where a wider view could provide further and challenging insights. Scientific Advisory Committees (See Section 4) can easily fall into this problem of 'groupthink', unless there are dissenting voices able to challenge and question.

It is clear that there is no quick fix to solving these systemic issues, and that constant attention is needed, combined with specific initiatives. Activities are underway in both Parliament and Government to support a wider range of people engaging with policy. Within research institutions, initiatives are also underway to improve equality, diversity and inclusion (EDI) within organisations and in research policy.

In Parliament, they have carried out surveys to understand barriers to engagement, and held separate specific events to discuss the issues with female researchers, researchers with disabilities and researchers from ethnic minorities. This work has shown the importance of training for academics, the need for Parliament to reach out, and the benefits (introduced during the COVID-19 pandemic) for engaging with Parliament remotely.

The UK Parliament are putting their findings into practice[149] – delivering training, building a wider range of relationships and reviewing the Parliamentary Academic Fellowship Scheme to maximise inclusivity. As shown in Box 14 in Section 6, their public call for experts in COVID-19 generated 5500 sign-ups, with evidence subsequently drawn from a much wider range of viewpoints than for previous activities.

The UK Government are looking at the issue of EDI in UK science more generally, and the ability to attract and retain talent from all backgrounds. That was a key part of the 2020 R&D RoadMap[150], and a group has been set up to develop a new R&D People and Culture Strategy[151], due to be published in Spring 2021. UKRI have also recently published two evidence reviews on equality, diversity and inclusion[152], which will feed into their next five-year plan.

The Government Chief Scientific Adviser (GCSA) and departmental Chief Scientific Advisers (CSAs) are extremely important roles in the UK science advisory system, and the recruitment process for these roles seeks to ensure applicants from diverse backgrounds. It is unsurprising however that all GCSAs to date have been men predominantly from White/Caucasian backgrounds. At time of writing, of the 22 CSAs in post 4 are women (with one more appointed and shortly to take up her post), and there is very little racial/ethnic diversity within the network. As well as focusing on recruitment for posts in Government, it is clear that attention is needed on how Science Advisory Councils and Committees appoint members. Chairs are encouraged to consider the diversity of membership. However, enhanced guidance and support on recruitment and induction may be helpful.

In addition, embedding a more diverse science system across Government will require formalising networks of expertise and improving their transparency. As a civil servant within the Government Office for Science said to us: *"We need to make the science and evidence networks more resilient, so that they are recognizable by more than one person, so that they can be understood by anyone, to ensure the widespread use of expertise, diversity of thought and diversity of people."*

## Disciplinary diversity and integration

As well as diversity in the people providing scientific evidence and expertise, another issue is diversity across disciplines. Policy problems are not limited by disciplinary boundaries, yet advice can be dominated by experts in certain disciplines, and people co-ordinating advice won't always see the importance of advice from disciplinary areas which they are less familiar with. This can be particularly important when dealing with crises – in previous crises and the present COVID-19 pandemic, combining advice and expertise from different disciplines within advisory groups has proven a real challenge. Yet disciplinary diversity is essential to providing an holistic crisis response. Those both giving and receiving scientific advice need a systems perspective, and a sense of where and how different subject areas can contribute.

These challenges can be tackled by good leadership in scientific adviser roles, careful

chairing of meetings, and an openness to challenge. Where adequate resources exist, the task of integrating insights from different disciplines may be better served. As noted in the description of science advice in the Department of Environment, Food and Rural Affairs (Box 9 in Section 3), the provision of integrated evidence may require the support of specialist staff and embedded teams. Training is also important, for both academics and civil servants, and academics in particular who are regularly engaging with policymakers need multi-disciplinary and cross-sector skills.

Policy evidence brokers – in universities, academies, research funders and policy making bodies themselves – may have an important role to play, in helping identify experts from a wide variety of disciplines, and equipping them with some of the skills and knowledge for bringing their knowledge and expertise into the policy sphere. It is likely over the coming years that this brokerage role will be more widely recognised and embedded into the science advisory system.

## Transparency and scrutiny

Transparency is central to public trust. In the current COVID-19 pandemic, which has impacted the lives of everyone in the UK and led to restrictions to freedoms which in normal times would be unthinkable, people won't just accept the message that policymakers are "following the science" – they want to know what that science is, and the advice on which the Government is then basing its decisions. At the start of the pandemic, it was not common practice to publish either the names of the experts attending SAGE meetings, nor the advice they were giving to Government. That led to criticism, and has changed, but that lack of transparency was one of the driving forces behind a group of researchers, led by former GCSA Sir David King, to set up "Independent SAGE"[153] early in the pandemic.

Science advice does not always have to be made public at the same moment as it is given to government – there are good arguments that government needs some time to discuss and understand the advice and formulate policy choices before having to explain those choices and the advice driving them – but there should be agreed processes in place for how and when science advice is made public. There may also be some reasons and some policy areas where science advice should remain confidential, for example areas involving national security or military capability. But these should be the exception, not the rule, and guidelines should be in place to address these exceptions.

Science advice should be as much open to scrutiny as the policy it is informing. There is an important responsibility on those who scrutinise and report on that advice, in particular the media. This project identified the importance of the GCSA role being able to talk directly to the media, discussing and explaining the science advice – whilst being clear that it was up to politicians to make policy choices informed by that advice.

Central both to effective science advice and public transparency is clear and digestible

communication about uncertainty. This poses challenges in both research and policy. Policymakers may expect greater levels of certainty than current evidence can provide; and researchers may face challenges in successfully communicating the nature and level of uncertainty or risk in ways that are useful and/or meaningful. The challenge of communicating uncertainty is one which has been central to the topic of climate change for a number of years[154] and, during the COVID-19 pandemic, has attracted criticism. Organisations such as the Winton Centre for Risk and Evidence Communication[155] are aiming to improve how quantitative evidence in particular is communicated for a range of stakeholders.

In the current crisis an unusual amount of public attention has been focused on scientific advice. In the past, and in many policy areas still, it is participating researchers who may play a role in assessing which advice and evidence is being taken up and how. However, transparency for researchers providing advice is often limited. What is often missing is a feedback loop – in many cases, researchers have no idea how and whether advice or evidence has contributed to policy thinking. Improving feedback, both on advice given and the systems for delivering it, might improve the willingness of researchers to engage, as well as providing evidence for academics seeking to fund evidence to policy activities – but it could also be a significant time commitment for policymakers.

It should be noted that there are good reasons why policymakers may choose not to follow a particular piece of scientific advice, and science is only one of many inputs that inform policy. It is not possible, or desirable, for any Government to simply "follow the science" in its decision-making. Science is not static, and policy involves many factors beyond scientific ones. What the current crisis in particular has shown is the need to be open about such policy decisions and choices.

## Data

Some areas of science advice, easily illustrated by the current COVID-19 pandemic, require understanding and processing large quantities of data. There are a number of issues here. The data need to be of sufficient quality and quantity to draw conclusions – though often decisions will need to be taken before an ideal quantity or quality of data are available. The current pandemic has seen very significant public investment in collecting large amounts of data from across the country, to help inform decision making. Drawing conclusions from datasets from multiple sources, each with their own limitations and biases, and sometimes apparently contradictory, is a skilled role, and data without expert interpretation can be misleading. At the very simplest level, some data provide leading indicators, and other lagging indicators.

There are specific skills needed to collect, manipulate and interpret data, and it is an important role of higher education to train the data scientists and statisticians of the future. The need for skilled practitioners in this area – in academia, industry and government – will continue to grow. As discussed in Section 5, there are skill shortages within government that will need to be addressed.

Another key aspect of data is privacy, and linked to that, security. Large, anonymised datasets are vital to tackle many issues, whether in a crisis (such as the current pandemic) or not. It is right that the government and those providing scientific advice can access overall datasets, to help benefit society as a whole, but limitations are needed to protect individual privacy, ensure the quality of data, and the right systems and structures need to be in place. Health data has potentially some of the greatest benefits when it comes to aggregation, and some of the greatest concerns at an individual level, and the UK has yet to solve all these issues.

There has been a positive trend over the last decade for the UK Government and other policymakers to make more of the anonymised datasets they hold open and available. This initiative towards open data has been driven by policy aims well beyond science advice – to enable individuals and companies to design new services for commercial and societal benefit, and to improve existing ones. But the availability of these large datasets does allow researchers to identify important new evidence from existing data – avoiding the time and expense of collecting new data. An example of Government making such large datasets available is the Open Data Platform of the Ministry of Housing, Communities and Local Government.[156]

## Embedding science and evidence: systems, skills, and roles

This report has covered a wide variety of processes and initiatives that aim to inform policy with advice and evidence. Science advice is one of the oldest mechanisms to 'pull' science in to government. In recent years, both the scientific community and the Government Office for Science have recognised that a focus on skills and collaborations are needed to support a 'culture shift' in government, and that new infrastructure is required to ensure that high quality science and evidence can be more routinely and appropriately used in policymaking.

The importance of skills was highlighted by many people spoken to when making this report. There are the skills needed by policymakers to access scientific evidence, to be sufficiently intelligent customers, to ask the right questions and interrogate science, and to integrate science advice into other advice and evidence to formulate policy choices. Several senior science advisers and civil servants noted that policy colleagues did not need to be experts themselves, but they did need to have or develop an understanding of key aspects of scientific evidence (for example, confidence intervals; lagging indicators; data limitations; and systematic reviewing). The Government Office for Science and the GCSA have a continuing role to play in embedding these skills and supporting the Government Science and Engineering Profession (GSE).

We also found that the mixed skillsets of science advisers are central to their ability to do their role well, but are often gained through unconventional career paths. Science advisers valued systems perspectives, experience working across sectors, and inter-personal, as well as research and analytic expertise. It is a feature of the UK system that the GCSA and departmental CSAs are almost always recruited from outside of the civil service. Over time, the UK is beginning to see individuals making careers where they move from research

into policy and vice-versa, and one of the best ways to develop the skills and perspectives needed to interact across the boundary is to have worked on both sides of it. As a senior leader in the Government Office for Science put it to us:

*"Over time, one would hope that people within government more often would be able to develop into Chief Scientific Advisers for departments, might be involved in going in and out of academia along the way, having more flexible career paths. That's been an issue for civil servants more widely, as well as just scientists and engineers. So I think there are big ambitions in terms of developing career paths, which we are probably still some way off achieving."*

The GCSA and CSAs play a vital brokering role in government, with other evidence brokers emerging in UK universities and national academies. Brokering and intermediary roles require good knowledge of both policy and research environments. It is a relatively new skillset, often poorly supported by research institutions. Many researchers engaging with policy also need knowledge of policy and the skills to engage with policy processes, civil servants and Ministers. Those skills have not traditionally been part of an academic skillset, but this report notes several initiatives aiming to support their development in researchers from different disciplines (See Section 7).

Improving the dialogue between research and policy requires broader, more systemic approaches too. Experience and knowledge on engaging in such dialogue exist, but is not yet embedded into regular systems and practice - though there are efforts underway to do this. Routine incentives can have a significant effect. On the policymaker side, examples include requirements for departmental spending bids to report an evidence base, and the use of evidence checks by parliamentary committees. The Areas of Research Interest (ARIs), as well as research-policy partnerships, provide more strategic approaches to bringing together those who ask policy questions with those who can answer them. Partnerships between departments and funding councils, such as the Policy Research Units (see Section 3), provide a way for research to influence and support longer-term policy development, and for researchers to develop relationships with departmental staff. The process of producing ARIs involves effort within departments to think through policy problems from a science and evidence perspective, collaborate and build links with academia. At present, however, there remains much work to be done to improve connectedness, coordination and participation across the many actors who contribute to and have a stake in efficient and responsive science advice in the UK.

## Endnotes

149  UK Parliament (2021) Working to support more diverse and inclusive engagement between UK Parliament and researchers

150  HM Government (2021) *UK Research and Development Roadmap*, HM Government

151  See the R&D People and Culture Strategy Steering Group on gov.uk

152  Guyan, K. and Oloyede, F. (2021) *Equality, diversity and inclusion in research and innovation: UK review*, Advance HE and UKRI

153  See Independent SAGE

154  Scientific uncertainty (2019) *Nat. Clim. Chang.* 9, 797 https://doi.org/10.1038/s41558-019-0627-1

155  See the Winton Centre for Risk and Evidence

156  Find out more about the MHCLG's Open Data Platform