



SEAN GALLUP/GETTY

The United Kingdom will have a new arrangement with the European Union from 1 January.

BREXIT'S BACK: FOUR ISSUES THAT WILL SHAPE SCIENCE

Europe's political shake-up is approaching – for researchers, key factors such as immigration and funding hang in the balance.

By Holly Else & Elizabeth Gibney

Many researchers might wish they could forget about Brexit. But they can't. The United Kingdom has left the European Union, and for the past ten months it has been in a 'transition period' during which little changed. On 1 January 2021, that will end, bringing changes to public life and policy – including that governing research.

UK and EU negotiators are still trying to agree a trade deal that will determine their future relationship. But with only weeks left, talks have stalled. The alternative 'no deal' scenario is widely predicted to cause chaos, because regulations would change abruptly overnight.

Whatever happens, the consequences for research are far-reaching. Scientists have long

feared the impact of Brexit on collaboration and funding in particular, and years of uncertainty over how it will turn out have already damaged the community.

Progress has been made on some fronts: a new immigration system will dictate how researchers travel between Britain and the EU for collaborations and jobs. But most nerve-racking for UK scientists is the lack of clarity over whether they will be able to benefit from prestigious EU funding programmes. Many see this as crucial to the future of British science. *Nature* runs through the key issues that will change research.

Immigration: special talent visa

Much progress has been made on changing the immigration system, and policymakers have created special measures for scientists.

If any of the roughly 14.4 million scientists and engineers in the EU wish to work in the United Kingdom after 1 January, they can apply through a new points-based system for skilled workers. Applications from EU citizens will be processed alongside those from people in the rest of the world, a significant change from when EU citizens could move freely to and from the United Kingdom. Scientists who show particular potential can apply for a Global Talent visa, which offers a quicker path to permanent settlement than does the skilled-worker route.

The challenge now will be attracting scientists to the United Kingdom, says geneticist Paul Nurse, director of the Francis Crick Institute in London. "Although we say we are open, it doesn't look that way when we are separating from our closest neighbours."

Cost could be another stumbling block. The United Kingdom has one of the most expensive immigration systems in the world, says James Tooze, who works in policy at the UK Campaign for Science and Engineering, a science-advocacy group in London. “For a scientist to come to the UK with a partner and two children, up-front costs for the family will be over £17,000 for a five-year visa,” he says.

Any special dispensation for UK-based scientists wanting to emigrate to another EU country will depend on the outcome of UK–EU talks. If no agreements are made, scientists will have to follow individual nations’ immigration rules.

Funding: UK access to EU programmes is still uncertain

Top of UK scientists’ wish lists is some kind of membership of the EU’s next flagship research programme, Horizon Europe, which starts on 1 January 2021. UK politicians have repeatedly stated their intention for the country to join the €80-billion (US\$88-billion) scheme as an ‘associate member’, which would enable researchers based in the United Kingdom to participate in the same way as those in the EU. But this depends on striking an overall deal by roughly the end of October.

“There is serious intent to make it work,” says Beth Thompson, head of UK and EU policy at biomedical charity Wellcome in London.

Price is a sticking point. Historically, the United Kingdom has received more in grants from the fund than it paid in, and it doesn’t want to pay too much for access. The EU is suggesting a financial correction in its own favour, which would mean that the United Kingdom pays a lump sum into Horizon Europe. Under these terms, the EU would receive a rebate if UK scientists took out more than they paid in, but the United Kingdom would not be entitled to any rebate if it took out less than it put in. Thompson feels that the United Kingdom should make a “low to moderate net contribution” to Horizon Europe.

Joining Horizon Europe is the best option, agrees Robert Lechler, president of the UK Academy of Medical Sciences. But Lechler is involved in contingency plans. In the event of a no-deal Brexit, the UK government is planning to launch a Discovery Fund that would replace prestigious EU science-funding streams, such as the European Research Council (ERC). Autonomy is key if the fund is to be seen as a viable alternative, say observers. “It needs to be truly independent from government in a similar way to [how] the ERC is with its scientific council,” says Peter Mason, policy manager for Europe at Universities UK International.

Researchers at UK institutions will still be able to collect the funding from the current EU research programme, Horizon 2020, if their bids were successful. Although the programme formally ends this year, some grants will be paid out after 1 January. After the Brexit vote,

the United Kingdom saw its annual funding from Horizon 2020 decline (see ‘Losing out’). A large part of this was because of a fall in funding for UK-based businesses, says Jochen Pierk, a business economist at Erasmus University in Rotterdam, the Netherlands. In some cases, this is because businesses chose to bid using EU-based entities, rather than UK ones, to avoid uncertainty when applying for projects.

Regulations, data and clinical trials: equal standards wanted

Clinical trials could face severe disruption if the United Kingdom and the EU fail to forge a ‘mutual recognition’ agreement to accept each other’s standards relating to medicines and trials, as part of an overarching deal.

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Without this, the millions of medicines and trial drugs that enter the EU from the United Kingdom each year would face extra quality and safety checks. This could cause delays that disrupt patient care and clinical trials, says Emlyn Samuel, head of policy development at Cancer Research UK in London. Without specific provisions as part of a mutual recognition agreement, UK-led trials that span several European countries will need to hire

an individual or organization in the EU to act as a legal representative. To avoid disruption, many universities and charities have already done this, which is “costing them enormously”, says Samuel.

Not having a deal would also hinder data exchange between researchers. The United Kingdom is waiting for the EU to decide whether its data-protection regulations are “adequate”, so that UK institutions can continue to freely receive personal data from EU countries after 1 January. Without this, EU researchers who are collaborating with UK scientists would need to add clauses to contracts that cover sending data to the United Kingdom. This is burdensome and makes the country harder to work with, says Thompson.

Research facilities: UK centres make contingency plans

Weather and nuclear-research facilities are among those that scientists are trying to protect from Brexit disruption. The UK-based European Centre for Medium-Range Weather Forecasts, headquartered near Reading, is an independent, membership-based organization, but its activities include running high-profile EU science projects, such as parts of the Copernicus Earth-observation programme. It is founding a new facility so that it can continue its EU activities, should the terms of Brexit bar them from being conducted from its UK headquarters. Countries in the EU are bidding to host this new site, and a decision is due in December.

Cash flow is another key worry: many UK research facilities could be left short if they don’t get funding from Horizon Europe. In a survey conducted in 2017, 84% of 135 UK research facilities reported receiving funding from EU sources.

The UK government has made no guarantees to cover lost EU funding for these facilities in the future, says Roger Webb, director of the UK National Ion Beam Centre, which provides small particle accelerators for use in research and manufacturing. One-quarter of the centre’s users come through a Horizon 2020-funded project. More worrying than losing cash, however, would be a loss of interaction with European partners and the knowledge they bring, says Webb.

The Joint European Torus (JET) Laboratory near Oxford is also funded mainly by EU sources. Its future was thrown into doubt by Brexit, but this month it secured another stay of execution. The lab – which is a test bed for the world’s largest nuclear-fusion experiment, ITER – struck an agreement with the European Commission that ensures funding until October 2021, regardless of whether there is a Brexit deal. Ian Chapman, chief executive of the UK Atomic Energy Authority, which hosts JET, says he is confident that further agreements will be made with the commission to allow the lab to run until 2024.

LOSING OUT

Britain’s annual share of funding from the European Union’s Horizon 2020 research programme has fallen since the vote to leave the EU in 2016.

