

Supplementary Materials

for

”Everything’s harder” but “the spirit of science is still there”:

Understanding how the new UK-EU relationship affects global collaboration in cancer research

By Hatch and Cancer Research UK

2025



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A. Methods

B. Scoping Review

A well-known use of a scoping review is to identify key characteristics or factors related to a concept [ref]. The aim of the review was to identify key challenges or opportunities being faced by the UK research community in relation to collaboration beyond the UK and any particular nuances of relevance to cancer research and cancer care delivery. As such, the scoping review method lends itself well to providing a systematic structure in order to map concepts around challenges and opportunities as reported in the academic and grey literature. The protocol for the scoping review was developed with CRUK.

B.I Inclusion criteria

- English language
- Published between 1st January 2021 - 30th June 2023
- All document and article types (except protocols)
- International literature
- Across the curative cancer care pathway (including prevention)
- UK perspective
- Related to the UK-EU Trade and Cooperation Agreement and associated factors

B.II Sources

Academic and grey literature sources were searched as it was believed that, given the time to publish in academic sources, the number of articles meeting the inclusion criteria would be low, and that to ensure that views and perspectives from beyond the research community, who may not publish in academic sources, were included in the review. See Table 1 below for a list of sources searched.

Table 1: Sources searched for evidence review

Source	Coverage	Date searched
Embase Classic+	1947-2023	25.05.2023
MEDLINE	0.0	25.05.2023
CINAHL	XX	25.05.2023
Web of Science	XX	25.05.2023
Google Scholar	First 100 hits by relevance	June 2023
Google	First 100 hits by relevance	June 2023
Wonkhe website	NA	June 2023
The Conversation	NA	June 2023
Nuffield Trust	NA	June 2023
LSE Brexit Blog	NA	June 2023

B.III Search Strategy

The search strategy was developed through collaboration between Hatch and CRUK and was peer-reviewed by a University of Southampton librarian. The strategy was adapted to meet the requirements for each of the academic databases and other sources. An example search is provided for the Embase database as per below:

1. European Union.mp. or exp European Union/
2. international.mp.
3. Great Britain.mp. or exp Great Britain/
4. United Kingdom.mp. or exp United Kingdom/
5. Northern Ireland.mp. or exp Northern Ireland/
6. exp malignant neoplasm/
7. neoplas*.mp.
8. cancer.mp.
9. oncolog*.mp.
10. exp oncology/
11. research.mp. or exp research/
12. exp epidemiology/ or epidemiology.mp.
13. funding.mp. or exp funding/
14. Brexit.mp. or UK-EU trade.mp or EU-UK trade.mp.

15. 1 or 2 (i.e. All International)
16. 3 or 4 or 5 (i.e. All UK)
17. 15 and 16 (i.e. UK and International)
18. 14 or 17 (i.e. UK and International and Brexit)
19. 6 or 7 or 8 or 9 or 10 or 11 or 12 or 13 (i.e. cancers or research or epidemiology or funding)
20. 18 and 19 and 2021:2023.(sa_year).

B.IV Selection of sources and evidence

In summary, one Hatch reviewer undertook the search of the academic and grey literature sources. Firstly, the retrieved records were deduplicated by Rayyan. Further checking for duplicates was undertaken manually. Two Hatch reviewers blind-screened the retrieved records from the academic databases in Rayyan. Retrieved documents were then reviewed in Endnote by two Hatch reviewers against the eligibility criteria, which were then recorded in Rayyan. Any discrepancies between reviewers at screening and eligibility testing were resolved through the team and with CRUK colleagues. The inclusion of grey literature based on the searches was undertaken pragmatically and using the best endeavours by one Hatch reviewer. The records included in the scoping review have not been subject to a formal quality assessment.

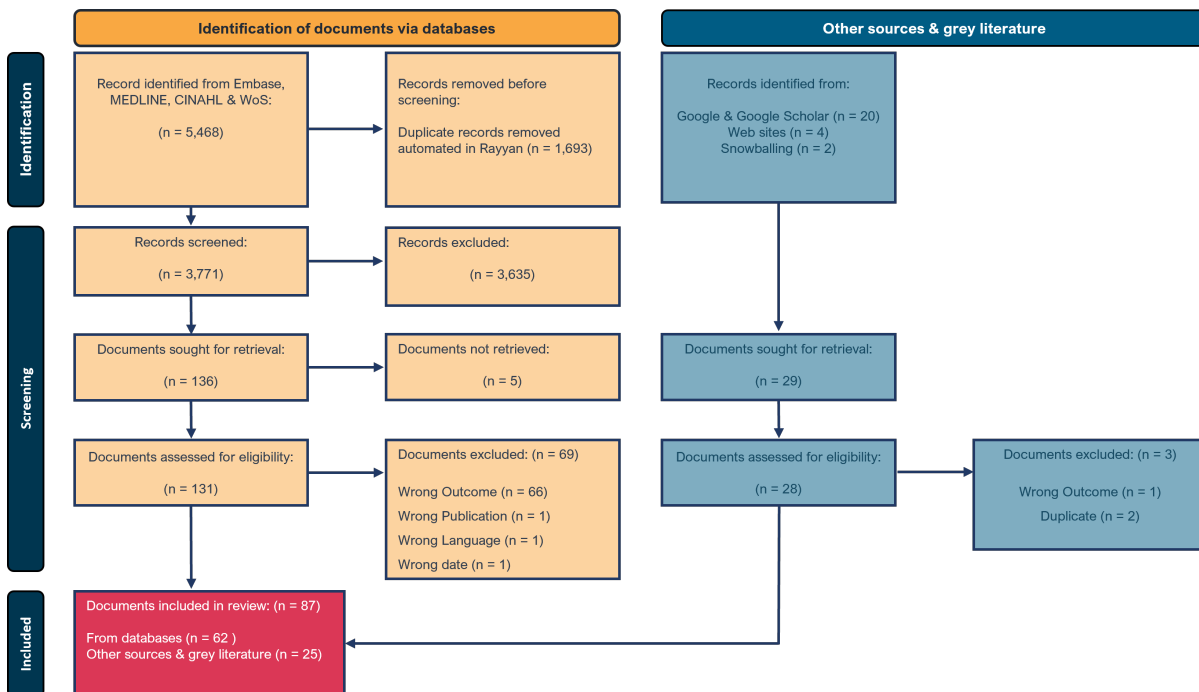


Figure 1: PRISMA Flow Diagram

B.V Data Charting and Synthesis of Results

All included documents from the evidence review were uploaded into NVivo for thematic analysis and coded by two Hatch reviewers. Data were charted according to three categories: (1) scientific research excluding cancer, (2) cancer research, including scientific research with a specific focus on cancer, and (3) cancer care delivery. This categorisation informed the synthesis of themes across the included studies.

C. Interviews with the CRUK research community

12 Semi-structured 30-minute interviews were undertaken with a purposive sample of key stakeholders from the CRUK research community. The CRUK research community was defined as:

Any person involved in a project in receipt of funding from CRUK since 1st January 2021 (when the UK-EU Trade and Cooperation Agreement came into effect).

The stakeholders were selected to give a range of perspectives from across the cancer research ecosystem and included those working in clinical, discovery, translational and population health research and practice. A mix of professional role types was also targeted to provide a mix of perspectives and included those working as senior investigators, clinicians, trial managers and early career researchers.

A semi-structured interview framework (see Appendix G) was designed to explore the following aspects of UK-EU collaboration in cancer research:

- What's working well, what's working less well, what could be improved?
- What areas are stakeholders concerned could change (positively or negatively) in the future that could impact UK-EU collaboration in cancer research?
- Which other countries outside the EU are most important for their collaborations?

Table 2: Summary of Study Participants by Country and Research Area

Country	Research Area
Wales	Radiotherapy trials
England	Paediatric clinical trials
England	Radiotherapy and oncology
England	Translational and trials related to Immunotherapy
England	Chemo-Prevention
England	Small RNAs research (Discovery)
Scotland	Discovery
England	Prevention and population health research
Spain, Netherlands (EU) and USA, Canada, UK (non-EU)	OPTIMISTICC cancer grand challenge; genomics, microbiology, genetics, immunology, biology, epidemiology, and pathology
Northern Ireland	Clinical trials
England	Oncology and Haematology Clinical Trials (OHCT)
England	Consultant in Medical Oncology

D. Workshops with CRUK research community and CRUK staff

Three one-hour online workshops were conducted to explore a range of views in small groups. The format of the workshops followed a similar structure to the interview framework but allowed for the range of perspectives across a research project or research funding activity to be captured and encouraging discussion among the participants:

- Two workshops with researchers and support staff who were in receipt of or support CRUK-funded research. These workshops involved groups involved in two different parts of the cancer research pathway, a clinical trial and discovery research, to draw comparisons and understand any differences that may exist depending on the type of research being conducted.
- One workshop with CRUK staff who were involved in funding research that involves bilateral and multilateral relationships with project teams based in the EU and globally (e.g. Grant applications and partnerships teams). The purpose of the CRUK staff workshop was to explore unique challenges from a funders perspective (e.g. establishing multinational partnerships with other funders based in the EU and elsewhere outside of the UK).

E. Secondary analysis of CRUK global collaboration survey data

Between 8th June - 26th July 2023 CRUK undertook a survey amongst their subscribers (including CRUK grantees) to gather intelligence to inform a CRUK communications piece about the extent to which cancer scientists are experiencing issues or perceive challenges to global collaboration in cancer research. Given the topic of this survey, the inclusion of open-ended responses, and the availability of data, a secondary qualitative analysis of a sub-set was undertaken. Secondary data analysis focused on analysing responses from those meeting the 'CRUK Research Community' definition being applied in this research and consented to third-party sharing of their anonymous survey data.

F. Analysis and Triangulation

Qualitative thematic analysis [1] was undertaken to triangulate the evidence sources (the review, interviews, workshops and survey data) to identify key themes arising that relate to the challenges and opportunities being faced by the CRUK Research Community since the 1st January 2021.

G. Interview Framework

Study Title: Stakeholder perspectives of the UK's future bilateral and multilateral relationships, particularly the EU, in cancer research

Preamble

Hatch interviewer to start recording, where interview is being recorded

Before we begin, I'd like to remind you that this interview is being recorded. The full interview transcript will be kept strictly confidential between yourself, Hatch and CRUK. We will aggregate findings from all our interviews in a report for CRUK which is expected to be published on their website and/or in a peer-reviewed journal and may include anonymised quotes from you. CRUK may wish to develop further communications materials and reports that include named quotes, but they will contact you separately to obtain additional consent for such use.

You can choose to stop the interview at any point and you are free to completely withdraw from the study up to two weeks after this interview. If you withdraw after this two week time period (and before we have prepared the draft final report) we will not be able to exclude your data from the analysis but we will not include any quotes from you.

We do not need or wish to know how you voted in the Brexit referendum.

The interview will last approximately 30 minutes; if you need to take a comfort break, we can pause the interview and pick up again when ready. Are you comfortable and happy to begin?

1. We understand that you are involved in cancer research, and specifically research which has been funded or supported by the charity, Cancer Research UK (CRUK). Please can you briefly tell us about the research you are involved in and your role?

Other possible prompt depending on answers given: Are you involved in or have any leadership roles with pan-European or global groups or associations?

2. To what extent does [the research activity – (phrase depending on answer at Q1)] you are undertaking/planning to undertake involve collaboration, materials or other interactions with individuals or organisations based in the EU and elsewhere globally?

Prompt: For example does the research involve access to data, medicines, devices or collaboration with researchers or other professionals based outside of the UK?

3. From your perspective, what's working less well in relation to [the research activity (phrase depending on answer at Q1)]? Specifically thinking about [phrase depending on answer at Q2 (type of collaboration)]?

Prompt: Are there specific examples of things that are particularly working less well or have changed for the worse since 1st January 2021 (when the UK-EU Trade and Cooperation Agreement came into effect)?

Other prompts depending on role/answers given:

- a) Where exactly is the problem located within the project cycle? E.g. supplies of kit, equipment, products used in trials/experiments?
- b) Does [answer at Q4] continue to be an issue either in the example given or other projects you are working on?
- c) Based on answer at Q1, - Is there anything working less well in relation to [Insert answer

from prompt at Q1 re: any leadership roles with pan-European or global groups or associations]?

d) Does this make working with EU countries now or in the future less likely versus other countries? – If no, Why is the EU so important to collaborate with?

4. What could be done to address the issues you've mentioned?

Other possible prompts:

a) If participant suggests reversing Brexit then say: And if that wasn't possible, what else could be done?

b) If participant gives multiple issues, ask "Of the issues discussed, what matters most to you and your work to find a resolution to?"

5. From your perspective what's working well in relation to [the research activity – (phrase depending on answer at Q1)]? Specifically thinking about [phrase depending on answer at Q2 (type of collaboration)]?

Prompt: Is there anything that's particularly working well or that has changed for the better since 1st January 2021 (when the UK-EU Trade and Cooperation Agreement came into effect)?

Other possible prompt depending on role/answers given:

a) Based on answer at Q1, - Is there anything working well in relation to [Insert answer from prompt at Q1 re: any leadership roles with pan-European or global groups or associations]?

6. We're aware that this is a rapidly changing area. So is there anything else you are aware of or keeping track of that could change in the future, either positively or negatively, in relation to your involvement with EU and other countries for the purposes of cancer research?

Other possible prompts depending on role/answers given:

a) Is the fact that the EU granted the UK "data adequacy" something that matters to you? What impact would it have on your work, if that were withdrawn and new data-sharing agreements created?

b) [If Clinical specialism] What impact if any have they seen from the UK not being part of the new EU Clinical Trials Information System/portal (CTIS)?

c) [If Clinical specialism] Do they think new EU regulations will affect their work e.g. if the EU puts in place new regs around paediatric and orphan medicines?

d) (In Northern Ireland only): What's the impact of putting in place separate data-sharing agreements for each activity?

7. Finally, do you have anything else you would like to say about UK-EU collaboration or collaboration with other countries outside of the UK, in cancer research that you've not already mentioned?

8. Thank you very much for your time today. Do you have any further questions for us about this study?

If there are no further questions we will end this interview recording. Thank you once again for your time answering our questions, we will be analysing the data to produce a report for CRUK by December 2023. I hope you have a lovely rest of the day.

Hatch interviewer to stop recording

H. Additional quotes from interviews

The table below provides additional quotes related to the themes discussed in the report. These quotes have been selected based on their ability to offer further insight or contextual depth. Some themes do not have additional quotes listed, which reflects the selection process rather than the strength or importance of the theme. The quotes included here were chosen for their added insight or context.

Theme	Subtheme	Quote
1. Access to EU research funding and collaboration	1.1 Access to Horizon Europe funding	<p>"The Horizon program and the ERC [European Research Council] are the flagship programs covering almost 500 million citizens. No UK-based program can come close to this scale, ambition, and prestige."</p> <p>Survey Respondent UK based June 2023</p>
	1.2 Access and commitment towards EU-UK collaboration and beyond	<p>"Northern Ireland's small but is advanced with regard to clinical trials, whereas the South of Ireland have a larger population but haven't got the infrastructure to support the clinical trials."</p> <p>"As part of the All-Island Cancer Consortium we link in with partnerships within South of Ireland. So in the context of our collaboration, it means that we have access to these trials that otherwise wouldn't be available, with access to drugs via the those partnerships."</p> <p>Interview Participant UK Based October 2023</p> <p>"Part of it is just purely Brexit and the UK wanting to separate themselves from the rest of the European Union has not done us favours at all in terms of collaboration I think around Europe when it comes to clinical trials...I think part of it again was around Horizon and being excluded again... I think that's put us in a bad position to start with and then when it comes to trying to do something ...because of our regulatory rules, let's say [we] needed to share protocols and UK was being difficult about it..., it immediately creates negative feelings towards UK...and it's difficult to come back from that...So we've been working hard to try and make sure we can be as receptive as possible when the opportunities arise."</p>

Theme	Subtheme	Quote
		<p>Interview Participant UK Based October 2023</p> <p>“Nearly all our trials are international and involving, we were very closely knit with a network in Europe.”</p> <p>Interview Participant UK Based August 2023</p> <p>[A study on rare cancers] “Instead of having a biopsy on one patient, we have 10 biopsies across Europe. That starts to not only clinically be meaningful because we can get actually the N equals that we need, but also it’s also meaningful from a translational perspective”</p> <p>Workshop Participant UK Based October 2023</p> <p>“Those relationships have been maintained and enhanced, but they haven’t been enhanced because of the Brexit. They’ve been enhanced despite of Brexit”</p> <p>Interview Participant UK Based August 2023</p> <p>“Feels like the clinical space has been more impacted than maybe more basic discovery research. And certainly I think you know the UK is still seen, as you know, a key partner, with particular expertise in translation. And so whether it’s EU or international partners, I think there’s still very much an interest to engage.”</p> <p>Interview Participant UK Based August 2023</p> <p>“Collaboration is absolutely essential”</p> <p>Interview Participant UK Based August 2023</p>

Theme	Subtheme	Quote
		<p data-bbox="724 359 1154 390">“The spirit of science is still there”</p> <p data-bbox="724 411 1008 443">Interview Participant</p> <p data-bbox="724 449 886 516">UK Based August 2023</p> <p data-bbox="724 575 1430 785">“Accelerating progress on cancer outcomes together is the epitome of a “win-win” for the new UK-EU relationship. If the political will is there, we can close the gap between the love and care and dedication being shown by the scientists who collaborate across borders, and the barriers they now have to work around.”</p> <p data-bbox="724 806 1008 837">Interview Participant</p> <p data-bbox="724 844 886 911">UK Based August 2023</p> <p data-bbox="724 970 1422 1037">“I think what we’ve shown is that if we can work together that there is a way forward.”</p> <p data-bbox="724 1058 1008 1089">Interview Participant</p> <p data-bbox="724 1096 902 1163">UK Based October 2023</p> <p data-bbox="724 1222 1422 1289">“Fostering collaborations in the Americas and in Asia (is) also critically important.”</p> <p data-bbox="724 1310 1008 1341">Interview Participant</p> <p data-bbox="724 1348 886 1415">UK Based August 2023</p>

Theme	Subtheme	Quote
		<p>“these Horizon collaborative grants which, you know, these big networks and those, I mean, I believe you can have, it was always possible you could have people from ‘third countries’ or whatever they called third party countries on those, but I think there was always the perception that it wasn’t a good thing in terms of getting the funding to have to have too many of those or possibly any of them. And so I think that there’s been a perception that actually it was so risky thing to put UK scientists onto those collaborative network grants. But I believe when I sort of looked into that in detail that actually that probably there wasn’t anything official about that, but it was widely held belief. So I think that reflects the fact that sometimes the reality and the perceptions are different.”</p> <p>Workshop Participant UK Based October 2023</p> <p>“I was at the this conference in Brussels and there was a lot of really positive stuff going on in the EU and it would be nice to have a seat at that table.”</p> <p>Interview Participant UK Based October 2023</p> <p>“Collaboration with European researchers, but also other international researchers have been absolutely key.”</p> <p>“The collaboration is absolutely essential because when you want to do clinical trials that have a global impact that are relevant everywhere around the world and also be quickly, then you need collaboration. So, and it’s for most of the studies I’ve conducted over the years, the collaboration with Europe has been absolutely key because patients have been recruited both from the UK and the rest of Europe. And you know, some of the studies we could not have conducted only in the UK and certainly not in a timely manner. It’s also absolutely crucial to work with researchers from different environments.”</p> <p>Interview Participant UK Based August 2023</p>

Theme	Subtheme	Quote
		<p data-bbox="724 359 1430 457">“Those personal relationships between UK and EU-based researchers (is as) strong as ever... The mutual respect.”</p> <p data-bbox="724 485 1008 583">Interview Participant UK Based August 2023</p> <p data-bbox="724 646 1430 888">“The attitude of our European colleagues and friends has not changed .. (W)e’re not excluded when they’re thinking about trials. It’s just sometimes the UK is disadvantaged because there was always a national setup... it’s just added an extra some extra layers, but it isn’t making people not look to the UK as far as in the area I work in.”</p> <p data-bbox="724 915 1008 1014">Interview Participant UK Based August 2023</p> <p data-bbox="724 1077 1430 1140">“I think they still welcome people from the UK and to take on the roles, you know, leadership roles.”</p> <p data-bbox="724 1167 1008 1266">Interview Participant UK Based August 2023</p> <p data-bbox="724 1329 1430 1465">“We don’t feel that we’re considered differently and there’s some kind of segregation between UK researchers and non-UK researchers. I think we’re still very much valued as part of the research community.”</p> <p data-bbox="724 1493 1008 1591">Interview Participant UK Based August 2023</p>

Theme	Subtheme	Quote
		<p data-bbox="721 359 1430 709">"It would be more expensive [to open sites in the EU now]. To be honest, you'd have to really, really evaluate whether it's worth it for the recruitment... So although the collaboration has been amazing and it's been fantastic working with the people... to cost in a legal Rep or a CTIS application or anything like that, or getting QP or drugs it would need to be anticipated from at least from a time perspective ... and then when you add the cost... and then doing a cost per participant... It's so awful to say... But is it worth it?"</p> <p data-bbox="721 737 1008 835">Interview Participant UK Based August 2023</p> <p data-bbox="721 898 1430 1213">"[collaborating with the Republic of] Ireland [often seems like] a good idea. Obviously on the continent you had the challenge of a of a different first language for most of the potential participants and a slightly different framework sometimes about healthcare and various things. [The Republic of] Ireland to some extent is aligned with the UK and therefore it was potential collaborator [but we're now] reticent to do that because it's just going to be more complicated."</p> <p data-bbox="721 1241 1008 1339">Interview Participant UK Based August 2023</p>
	1.3 Missed and lost opportunities	<p data-bbox="721 1367 1430 1465">"I've spent a lot of time and energy trying to sort of say just how damaging that non-association with Horizon has been for us as at all sorts of levels."</p> <p data-bbox="721 1493 1024 1591">Workshop Participant UK Based October 2023</p> <p data-bbox="721 1654 1430 1822">"There's all these other opportunities for collaboration for these large multi institutional awards and I think we lose a lot if we're not part of that..(T)he mechanisms that encourage it are often within these kind of pan European programs."</p> <p data-bbox="721 1850 1008 1948">Interview Participant UK Based August 2023</p>

Theme	Subtheme	Quote
		<p data-bbox="724 359 1432 533">“Even if you try to solve the problem right now, whatever has been done before, unfortunately, I don’t think that you have any mechanism to fix, you know, the participation in these ongoing projects that were launched at the time that British investigators couldn’t participate.”</p> <p data-bbox="724 558 1008 657">Interview Participant EU Based September 2023</p> <p data-bbox="724 720 1432 1247">“By not being in the EU anymore, a lot of the researchers and I think in particular we’re thinking about the paediatric space, there’s a lot of initiatives that are going on where they’re getting funding from the European Commission to do these massive projects and where we’re constantly seeing that the UK is of course not part of that anymore, so that money’s gonna if we want to do something in partnership, we will have to kind of find that money from an alternative route and also it just means we’re sort of duplicating a lot of the work whereby instead we could have been working in partnership, but it makes things a little bit more complex and a little bit more clunky now that we can’t be totally a part of that and have the support that would have been available otherwise.”</p> <p data-bbox="724 1272 1024 1371">Workshop Participant UK Based September 2023</p> <p data-bbox="724 1434 1432 1677">“UK has missed and continues to miss major opportunities to collaborate on cancer at a political as well as a scientific level. One is the Understanding Cancer.eu, UNCAN.eu. And unfortunately, we lack British experts, and this is important because it’s one of the key projects not only to make the priorities in where we should invest in better understanding cancer”</p> <p data-bbox="724 1703 1008 1801">Interview Participant EU Based September 2023</p>

Theme	Subtheme	Quote
		<p>“So we miss out on an opportunity to recruit patients to studies because of the slowness of the regulatory agencies and we see that time and time again in academic studies and particularly in industry studies as well where there’s limited numbers of slots around the globe. And if we’re slow, we lose out on it, happens time and time again and when you think about it, the resource and effort that goes into the work to get these studies off the ground and through these regulatory processes, ultimately to be hit by lack of slots and not being able to get patients in and therefore, it’s somewhat disappointing. But MHRA know this and they’re trying to get it better and they’re slowly getting better.”</p> <p>Interview Participant UK Based October 2023</p>
	1.4 Continued concerns and uncertainties	<p>“I do have concerns that it could be used as a political football on either side again in the future, which would introduce more uncertainty. And the uncertainty is a real killer. That’s the thing. You just don’t know what’s gonna happen next, and that’s, you know, it’s all very well for politicians to sort of start showing how tough they are by doing this sort of thing. But you know, for us who actually have to try and run long term research programmes, if you suddenly like, don’t know whether this funding is gonna be there or not, it’s really destabilizing. So you know, so we hope that will be maintained. I mean, there are some bits of funding that have not”</p> <p>Workshop Participant UK Based October 2023</p> <p>“To date we see partners very willing to engage with CRUK as a not-for-profit organisation because our scale compared to most other non-profits in in Europe is much larger. But as we start to see some of these European Partnerships playing out kind of pan Europe, I guess there’s a concern about a budget some of these organisations will have to play with in terms of other partnerships out of the EU ...but to date we’ve certainly seen a continued willingness to engage with CRUK across Europe.”</p>

Theme	Subtheme	Quote
		<p>Workshop Participant UK Based September 2023</p>
	<p>1.5 Implications for people affected by cancer and the public from loss of collaboration</p>	<p>“I think the movement of patients, which is something that EMA or the Europeans have brought in is that their patients are moving from country to country for trials and we can’t access that. And not just trials, but also best patient care... because we’re not part of Europe, we’re not part of their initiative, which is best cancer care for everyone. So I think we’re not part of all the new initiatives of cancer care throughout Europe and I think that’s really being problematic.”</p> <p>Workshop Participant UK Based October 2023</p> <p>“Quite a lot of the companies you know, they’ve already budgeted, they’ve already selected their sites and then there’s this huge additional cost. Just to allow a couple of patients in Northern Ireland to come on board. So unfortunately, some sponsors, particularly academic sponsors, just said, look, we’re really sorry [...] so that’s been particularly frustrating.”</p> <p>Interview Participant UK Based October 2023</p>
	<p>1.6 Suggested ways forward</p>	<p>No further quotes selected</p>
<p>2. Effects on UK and EU workforce</p>	<p>2.1 Mobility of the workforce</p>	<p>“Science is global, people relocate, particularly to start their research group. And we want to be attracting those people and not being able to do that and seeming to be a less attractive place to come and start your independent lab is an issue.”</p> <p>Workshop Participant UK Based September 2023</p> <p>“I worry about the immigration situation, the whole thing with the complexity of the visas and work permits and the cost of them.”</p> <p>Workshop Participant UK Based October 2023</p>

Theme	Subtheme	Quote
		<p data-bbox="724 359 1430 709">“If [a colleague who was part of the focus group] had followed the same career path five years ago, it would have been completely frictionless. [...] But now the administrative aspects are huge and the costs are huge and they think the, you know, the work permit costs are high, they’re very high in the UK relative to other places and they seem to be going up the whole time. [...] That’s, you know, ultimately money that comes from CRUK and comes from the individuals could donating to CRUK. So they’re basically paying for all this.”</p> <p data-bbox="724 737 1024 835">Workshop Participant UK Based October 2023</p> <p data-bbox="724 898 1430 1035">“It does get the feeling that everything has been done to sort of try and extract as much money out of the whole system as possible. So out of the individuals as possible. So the net effect is that it just puts people off.”</p> <p data-bbox="724 1062 1024 1161">Workshop Participant UK Based October 2023</p> <p data-bbox="724 1224 1430 1423">“We’ve cut ourselves off from a huge pool of talent like that, which is, and that’s probably the single biggest issue... we’re left with carrying the can with this stuff and you know, basically just makes us much less competitive as a place for really good scientists globally to come and work.”</p> <p data-bbox="724 1451 1024 1549">Workshop Participant UK Based October 2023</p> <p data-bbox="724 1612 1430 1791">“The sort of mobility of individual workers, that’s really been severely damaged. And you know, and I think there’s quite... its undoubtable that this will impact on the scientific quality in the UK in the long run, but it takes a long time for these things to feed through.”</p> <p data-bbox="724 1818 1024 1917">Workshop Participant UK Based October 2023</p>

Theme	Subtheme	Quote
		<p data-bbox="724 359 1432 604">“If we lose a lot of scientific talent that would have come to the UK from the EU but hasn’t, then, you know, you’ll start to see that impacting on the quality of UK science in the next 10 years or so. And that’s gonna be very hard to really quantify. But you know, eventually you’ll see it as just a sort of a slow drift of the UK down, the sort of the league table of scientific impact globally.”</p> <p data-bbox="724 625 1024 730">Workshop Participant UK Based October 2023</p> <p data-bbox="724 789 1432 856">“We’re struggling to recruit people or retain people from Europe”</p> <p data-bbox="724 877 1008 982">Interview Participant UK Based August 2023</p> <p data-bbox="724 1041 1432 1213">“the worry is some of the earlier career stages, where people would flock here because the scientific environment was amazing. It probably is harder from the immigration perspective, but from the finance perspective at the PhD level, it’s a lot harder.”</p> <p data-bbox="724 1234 1432 1518">“this idea that we’re going to restrict the number of foreign students that come in, the idea that we’re gonna restrict their ability to bring families, the idea that we’re gonna restrict their ability to remain in the UK for some period afterwards. I mean basically this is like putting up giant billboards and say, don’t come. And I think we won’t see the impact of that necessarily immediately, but I think we will see the impact of that over time.”</p> <p data-bbox="724 1539 1008 1644">Interview Participant UK Based August 2023</p> <p data-bbox="724 1703 1432 1875">”So we are saying no to masters students that come from the European Union [...] imagine that’s the PhD student from a collaboration in Germany that wants to come here for a few months to learn a technique or something.”</p>

Theme	Subtheme	Quote
		<p>Workshop Participant UK Based October 2023</p> <p>“European people, such as myself, have left the UK, or the difficulties that we have in recruiting people from Europe. So in the past, when we used to advertise for research fellows, for example, of various research positions, we used to have a lot of people applying from Europe. Nowadays, very few to be fair and that’s a real issue.”</p> <p>Interview Participant UK Based August 2023</p> <p>“I think the challenge and the difficulty has been in recruitment... and that goes at every level...for me and the in the lab, it has been recruiting PHD’s and post-docs. It has been an absolute nightmare... [O]ur recruitment numbers are way down...”</p> <p>Interview Participant UK Based August 2023</p> <p>“where we really struggle is just hiring research nurses.”</p> <p>Interview Participant UK Based October 2023</p> <p>“I’m currently out for advert for a senior clinical academic, we would have previously you know comfortably expected to see applicants from Europe. It’s now a huge commitment for them because of the residency challenges, the expense of the visa, if people are, you know, at the level we’re recruiting, they’re into their early to mid-30s. They often have dependents they might want to bring. And then the other challenge is the loss of the collaborative agreement for healthcare in that people, if you work for the NHS, it doesn’t apply. But if you have an honorary NHS contract or work for a university, you have to pay a huge upfront payment for access to healthcare. And I, you know, I think that is absolutely crippled, that movement of people and recruitment.”</p>

Theme	Subtheme	Quote
		<p>Interview Participant UK Based August 2023</p>
	<p>2.2 Changing roles and working conditions</p>	<p>“I didn’t think it would have impacted me as much as it has.”</p> <p>“It’s added to my day job significantly.”</p> <p>Interview Participant UK Based October 2023</p> <p>“It’s those more operational things or those things that suddenly come into a legal space and that then, you know, suddenly it’s not on you... and someone will just say in a meeting we’ve got to think about this differently because of Brexit.”</p> <p>Interview Participant UK Based August 2023</p>
	<p>2.3 Implications for people affected by cancer and the public</p>	<p>No further quotes selected</p>
	<p>2.4 Suggested ways forward</p>	<p>“We definitely appreciate [UK association to Horizon Europe] finally being worked out, but I think it is just gonna be a question of trying to sort of chip away at the all the sort of the negatives, just trying to improve on them a bit. But my next priority would definitely be trying to improve things with the recruitment.”</p> <p>Workshop Participant UK Based October 2023</p> <p>“Improving on the whole process of bringing in research talent from the European Union would be would be the key and actually, you know, something relatively radical but, you know, not that radical a move would be something like setting up a reciprocal agreement for actual free movement of researchers between the UK and the EU in both directions”</p>

Theme	Subtheme	Quote
		<p>Workshop Participant UK Based October 2023</p> <p>“We usually expect nurses to have had a year’s sort of rotational training before they come into research because it’s a bit unusual and but now in fact I just short-listed for nursing of an entry level nursing job yesterday and I would have said 90% of them were international, which is great but not actually able to work as a registered nurse in the UK yet because they’re coming from places like, you know, West Africa or South Asia where you have to come and work for a year and do XY and Z qualifications whereas from the EU you used to be able to just... come over.”</p> <p>Interview Participant UK Based October 2023</p>
<p>3. Regulatory effects on research and the health and care system</p>	<p>3.1 Data sharing, and sample and product transfers</p>	<p>“As a day-to-day thing, one of the worst things is sharing samples. It’s just getting a nightmare. Everything we send to the European Union gets stuck in customs. [...] and that that makes all collaborations very complicated because you know, if you send something that you only have 1 sample of, then you just run into the risk of losing it if it’s a frozen sample. So you think it twice before collaborating with people if there are shipping of samples involved. The other solution is just pay for more expensive companies. That they are more reliable, but that triplicates the cost of the shipping of the samples. So we just talking from like something that a normal box would be like £200 - £300 to more than £1000 since Brexit. Definitely.. So now it’s like every time we just have to send something, it just a nightmare... If you send the same box to the US, usually we don’t have problems.”</p> <p>Workshop Participant UK Based October 2023</p> <p>“There is a sense that the UK are more difficult to work with than other countries, particularly in relation to data sharing”</p>

Theme	Subtheme	Quote
		<p>Interview Participant UK Based October 2023</p> <p>“I can’t believe it has become more difficult to get something to France than to the US. I just cannot see that there’s a reason why it should be harder to get something into the country that’s, you know, 30 miles away then, then a country that’s 3000 miles away. Just makes no sense on any level.”</p> <p>Workshop Participant UK Based October 2023</p> <p>“So if it’s a cell line, as it was this time [“one package in Germany that just got stuck for more than a week”], that we have a lot of vials of the same thing, you lose the money of sending the package and you send the package again. But, you can be sending samples that you only have those samples. So you can lose months or years of work or like even clinical samples that are like very important. So... You always run the risk when you send a package. But, I’ve never - I mean we send a lot of packages during this 15 years I’ve been in the lab - I’ve never encountered so many issues.”</p> <p>Workshop Participant UK Based October 2023</p> <p>“In terms of the terms of getting materials, equipment expertise into the UK that is vastly more complicated than it was. And sometimes it’s just hasn’t happened.”</p> <p>Workshop Participant UK Based September 2023</p>

Theme	Subtheme	Quote
		<p>“Shipping organizations are part of the problem as well... because we always had packages stuck in customs before, but usually you could just kind of give them a call and they will tell you this is what we need. So you just kind of give them the paperwork and then that’s fine. I mean, we all used FedEx and they are completely unreliable these last years. I think probably because it’s also backlog of customs. Before there was like only that box that had mouse cells that was giving problems. So they used to give you a direct call. You could get the package, you know, you send them directly to paper, that’s what you need, and then the package goes through customs. Now, I think the package is there, they don’t tell you what you need. So you call them and there’s no one that knows what’s going on. So that’s why you end up going to these more expensive companies. That they make sure that you have all the papers you need and you make sure that they will add the dry ice, that’s what you need, for sure that the box is gonna be frozen. Whereas FedEx even if you pay extra to tell them at dry ice, they just never do that. So, well, they do that sometimes.”</p> <p>Workshop Participant UK Based October 2023</p> <p>“Sometimes you buy something that is like less than £100 and you have to pay £50 of shipping and customs costs... it has increased the cost of the things that we order from outside I would like from the European Union”</p> <p>Workshop Participant UK Based October 2023</p> <p>“[Regarding the EU Clinical Trials Information System] it would be great to be part of that. We were at a conference in Brussels a few weeks ago and there’s all of these things, the [EU’s] Beating Cancer Plan and all these things they’re doing in in the EU that we just had to sit sort of sheepishly by and listen. I think will be detrimental to not be part of the EU’s data information stuff [the European Health Data Space] because, you know, the bigger the pool, the better the data, right?”</p>

Theme	Subtheme	Quote
		<p data-bbox="724 321 1430 638">“So we generally send ambient samples which are a bit more robust, but if we’re sending refrigerated samples and they get stuck, what they’ve, they’ve got a really tight shelf life. So there, there, there is a risk there that either samples will be destroyed, destroyed or, you know, ruined. And and we’ll have to bring the patient back in ... Or it might be that then it’s too late and we can’t do it and the patients won’t get on to the trial, which they could have otherwise.”</p> <p data-bbox="724 661 1430 764">“...sometimes [samples and materials] can just get held up in customs. I don’t know the cause. It never used to happen and now it happens.”</p> <p data-bbox="724 787 1008 890">Interview Participant UK Based October 2023</p> <p data-bbox="724 951 1430 1121">“[W]e’ve been waiting for a particular chemical for about 3 months and you know part of it is import paperwork and that science is stopped for three months, which is not an excellent use of either CRUK or other UK funding.”</p> <p data-bbox="724 1144 1008 1247">Interview Participant UK Based August 2023</p> <p data-bbox="724 1308 1430 1591">“In between the countries, I say there’s definitely a sense of UK being a slight outlier, more than a slight outlier, a definite outlier in terms of being difficult with things like data sharing or, or even if we’re not actually transferring materials. But certainly you know, material transfer agreements, again, just get lost in a whole load of regulatory and legal things that make it very difficult for us to work together.”</p> <p data-bbox="724 1614 1430 1822">“it is just around data sharing that and I don’t have sufficient knowledge around all the legal and regulatory aspects around it or all I know is my own sense of challenges is that data sharing is difficult and if we are gonna collaborate with the European colleagues, we have to be as flexible and collaborative as they are.”</p>

Theme	Subtheme	Quote
		<p data-bbox="724 321 1432 499">“our default position [in the UK] is to be high risk. (W)hether there’s something we can learn from our European colleagues around data sharing, particular genomics data sharing, I’m sure there is cause they you know it’s done [in the EU] fairly routinely”</p> <p data-bbox="724 520 1008 621">Interview Participant UK Based October 2023</p> <p data-bbox="724 680 1432 858">“[we collect the raw data from pseudo anonymity. It’s raw data set from cancer registries individual record that are essential for this type of research. Because] is no way to do appropriate estimation of survival probabilities without having individual records.”</p> <p data-bbox="724 879 1008 980">Interview Participant UK Based September 2023</p> <p data-bbox="724 1039 1432 1140">“there were lots of changes, but the UK government weren’t really good in providing the guidance on how to implement these changes”</p> <p data-bbox="724 1161 1008 1262">Interview Participant UK Based August 2023</p>
	3.2 Regulatory changes affecting multi-national clinical trials	<p data-bbox="724 1291 1432 1751">“For trials that were already open (open pan-European) that became a major issue and I have other CRUK sponsored studies such as the paediatric e-smart study where we have trial arms that are open in France, in the Netherlands, in Italy. They are arms that have been written and devised out of our institutions by UK investigators and we cannot give those drugs to our patients because of the QP release arrangements with pharma partners, not being willing to release documents to allow the MHRA QP release rules. We’ve had to go to additional processes to now find another UK based CRO that will carry out the QP. That’s gonna involve extra funding that is not covered by the trial sponsor”</p> <p data-bbox="724 1772 1024 1873">Workshop Participant UK Based October 2023</p>

Theme	Subtheme	Quote
		<p data-bbox="724 359 1432 890">“Because we sponsor trials in Europe and the university has had to put in an arrangement so that we’ve got what’s called a legal representative within an EU Member State. Now, we’ve done that. We’ve set it up with the company in Ireland, which adds phenomenal cost. You know, the university is underwriting that, we can’t apply for grant funding for it. It’s just an additional cost at universities have to absorb in order to allow us to continue to lead clinical trials. It’s all very well participating in European collaborations, but UK’s proud of his leadership in clinical research and that’s why we wanted to be involved in it. So, we’ve done that and we’ve managed to transition all our trials to continue to sponsor them in the EU because there’s legal representatives that adds a bit of complexity to what we do.”</p> <p data-bbox="724 915 1008 1016">Interview Participant UK Based August 2023</p> <p data-bbox="724 1077 1432 1283">“There are opportunities by not in not being in Europe [the EU]. Um, you know, in terms of potentially more permissive regulation when it comes to things like stem cells or kind of trials, but then does that impact on our ability to share data and samples, etcetera? [...] I think that is a big unknown.”</p> <p data-bbox="724 1308 1024 1409">Workshop Participant UK Based September 2023</p> <p data-bbox="724 1470 1432 1675">“We are seeing a direct impact of pharma company saying actually we are not going to open those arms in the UK because we can recruit in the other European countries. So why should we bother? And that’s really, really difficult. And it just we are slowly managing to address it, but we’re on the back foot all the time.”</p> <p data-bbox="724 1701 1024 1801">Workshop Participant UK Based October 2023</p>

Theme	Subtheme	Quote
		<p data-bbox="722 359 1432 638">“The EMA is still getting up and running to where it was when it left London and the MHRA has had a complete kind of, you know, has been decimated, really. And they just never... the factoring in of what was going on in Canary Wharf, you know, with everybody walking around and the interactions between the MHRA and the EMA and the pharma companies and the regulatory groups cannot be under estimated the value of that”</p> <p data-bbox="722 663 1024 764">Workshop Participant UK Based October 2023</p> <p data-bbox="722 827 1432 1535">“Our big issues, I think with the MHRA in particular at the moment and we’re waiting to see if they’re gonna resolve these issues this year and into next is because the EMA moved to Amsterdam, the MHRA’s influence on the EMA’s obviously reduced or gone almost entirely. They lost a lot of staff as well through that process, and more recently they’ve undergone heavy restructuring and that’s resulted in a lot of experienced staff leaving their MHRA to the point where we’ve had amendments, even though legally they’re required to turn them around within 35 days, they’ve been taking six or seven months and that’s a major impact on how efficiently we can operate our clinical trials. And if that is not resolved soon it’s gonna really impact sort of clinical research within the UK from an academic as well as a commercial perspective. It matters [for] our ability to compete on the world stage. There’s a lot of noises there trying to use the opportunity of not being part of the EMA to do things differently, but at the moment they can’t even do the basic things it seems.”</p> <p data-bbox="722 1560 1024 1661">Workshop Participant UK Based September 2023</p>

Theme	Subtheme	Quote
		<p data-bbox="722 359 1432 709">Trials that were already open have been more affected than new trials. “Your trials [that have] been going for such a long time [I] suppose you’ve had to react to these changes, whereas if it was a new trial, you would be able to plan some of these things in a bit more.” – understanding that as the environment evolves, UKGov and EU need to appreciate the impact on ongoing research projects and provide specialist guidance to protect patients on existing trials; it’s not just a question of doing something different next time”</p> <p data-bbox="722 737 1010 764">Interview Participant</p> <p data-bbox="722 772 889 835">UK Based August 2023</p> <p data-bbox="722 898 1432 1283">“If countries are under different [regulatory] umbrellas, sometimes it’s more difficult, obviously, to get agreements to have access to experimental drugs that are being supplied from pharma companies, if you will, to two different environments. But it’s not only UK, so these are the same difficulties that we have, for example, in launching these kind of clinical trials in collaboration with clinicians based in the US. It’s not something specific to UK rather than other countries when you are not in the same umbrella for the organization of the pharma companies.”</p> <p data-bbox="722 1310 1010 1337">Interview Participant</p> <p data-bbox="722 1346 938 1409">EU Based September 2023</p> <p data-bbox="722 1472 1432 1856">“The fact that we’re bound by the European regulations [...]. [...] it’s education of sponsors as part of their site selection to actually understand what it is at a site level the impact has been of the addition of these regulations because I do feel I’m an educator more these days about it [...] I know that the education around it is probably key and it’s communication and publicizing it.” “[...] it would be good to educate people...and then hopefully we’ll reap the benefits [...]. [...] you’re trusting your judgment of the complex regulations and interpretations of them. But that’s challenging to start with.”</p> <p data-bbox="722 1883 1010 1911">Interview Participant</p> <p data-bbox="722 1919 901 1982">UK Based October 2023</p>

Theme	Subtheme	Quote
		<p data-bbox="722 359 1432 961">“[...]the advantage of clinical trial information system is it will be a single approval of the protocol in all participating Member States. Obviously we’re not in that system. We’ll have to get the trials approved by the MHRA and my worry, and the MHRA said they won’t do this, but experience tells me that’s not what happens, is that we’ll get trials approved in Europe. We’ll put it through the MHRA. The MHRA will come up with lots of UK things that they want because they always do. And we won’t be able to get that amended by something that’s already been approved by half dozen Member States. And so we’ll be on the outside and if we keep coming back to the our European sponsors going, oh, we can only participate in UK if you completely amend this approved protocol. They’re going to say we can’t work with you. And I’m predicting that. It hasn’t happened yet, but it’s obvious that’s the direction we’re going to go in.”</p> <p data-bbox="722 989 1432 1052">“a mutual recognition of QP release would reduce costs and make life a lot easier.”</p> <p data-bbox="722 1079 1432 1247">“[...] for the MHRA to demonstrate when it happens that they are willing to accept the decision making of EU competent authorities on clinical trials so that when we are asked to participate, we don’t run the risk of quite frankly, nit-picky changes to the Protocol.”</p> <p data-bbox="722 1274 1432 1843">“[...]we’re completely signed up to the principles of GDPR, which is good because that means that we are a trusted country and we can share data with Europe. But we all know that you know that there are huge problems which GDPR particularly in the in the realms of research. And so again, there’s an opportunity for the UK to look at that legislation and see if we can interpret it in it a way that helps research, but we can’t go too far away from it because we stopped being trusted country for Europe. So we do, we do run a bit of a tightrope there, but I think there is an opportunity for some things because the problem with GDPR is it’s interpreted differently in every country. And I think as long as you stay within the framework, I think the UK interpretation could potentially be more beneficial to research. I think there’s opportunity.”</p> <p data-bbox="722 1871 1011 1969">Interview Participant UK Based August 2023</p>

Theme	Subtheme	Quote
		<p data-bbox="721 352 1432 604">“I think just being clear on the guidelines, we didn’t understand what they wanted from a legal Rep and you know, finding it out was just such hard work. You know, it really, really was where it should be so clear exactly what they wanted for the legal Rep, the MHRA, or any drug import stuff should be so easy... Clearer guidelines, much simpler guidelines would really, really help”</p> <p data-bbox="721 625 1432 730">“The regulatory the rollout of CTIS is a big worry for me at the moment. The pharmacovigilance as well. The safety reporting that also needs to be streamlined”</p> <p data-bbox="721 751 1010 856">Interview Participant UK Based August 2023</p> <p data-bbox="721 909 1432 1161">“You know, if we could have some exemption, if you ask me for a wish list, some kind of exemption that just said, we can just transfer the drug back to the UK as if we weren’t outside Europe now that would be very helpful, because we’re not making money. (W)e’re just trying to do the research in in the most efficient way, ...budget is our bottom line.”</p> <p data-bbox="721 1182 1010 1287">Interview Participant UK Based August 2023</p> <p data-bbox="721 1339 1432 1770">“[MHRA] has now moved to the Netherlands and I understand that as a result of that, the[y] lost a lot of staff that used to be based in London. [...] we’ve had some major delays in getting studies either approved or amendments going through and we have been told that is because of staffing issues. [...] drug companies want research to be done fast and at the moment all these delays are causing a lot of issues with [pharmaceutical company] and I think that the UK in general, not just for this study, but in general is perceived to be not the most favourable environment to conduct these drug studies because it’s taking so long.</p>

Theme	Subtheme	Quote
		<p>“drug companies are not perceiving the UK as being an optimal environment to the clinical trials anymore and that is a real problem. You know, and that will impact CRUK because it’s not unusual to have clinical trials that are co-funded by CRUK and drug Companies, as a partnership.”</p> <p>Interview Participant UK Based August 2023</p>
	3.3 Opportunities for regulatory innovation to improve access	No further quotes selected
	3.4 Implications for people affected by cancer	<p>“Largely we were sort of left in this situation where we had clinical trials open in Belfast, but it wasn’t really clear as to what the arrangements were in terms of drug supply out there or whether there was a possibility we had to ship drugs into Europe and then from Europe to Ireland. Fortunately, I think the Windsor agreement has resolved all those issues now, but it’s I think it’s still a theoretical barrier if you see what I mean, I think we’re still a little bit reluctant to see how things are gonna work in Belfast and although there have been a good recruiting centre in the past, it is still acting as a bit of a I think a barrier to bring them on. Um just the challenges in terms of getting drugs across there, especially as we’ve got sort of clinical trials now that use kind of bespoke Investigation of the medicinal products as well as marketed medicinal products being used in a sort of non-approved indication. So that’s yeah, it’s just creates issues that we didn’t sort of obviously experience before the end of 2020.”</p> <p>Workshop Participant UK Based September 2023</p>

Theme	Subtheme	Quote
		<p data-bbox="722 352 1432 783">“Drug supply and how this kind of affects some of our clinical trials. And so for example, if they’re opening a new arm. And again, linked up to the regulatory elements as well, this causes massive delays. It can also impact their funding potentially. When it comes to, you know, progress reports about funding, they’ve got for a particular arm, if they can’t actually deliver on it because they don’t have the the drugs supplied to even open up the clinical trial. And a lot of the time if, if that means that the that we’re not gonna continue to fund them, that means that patients aren’t gonna have access to these trials anymore in the UK”</p> <p data-bbox="722 804 1026 909">Workshop Participant UK Based September 2023</p> <p data-bbox="722 968 1432 1287">“Northern Ireland one potential advantage in future that isn’t being realised yet: “where we might have advantages for trials sponsored in Europe, it should be fairly straightforward in regards to drug importation and set up, and management of trials going forward and that might attract more trials coming in that route rather than the traditional pathway. I can’t say that I’ve seen that that works better at this point. I’m thinking that financially it could.”</p> <p data-bbox="722 1308 1092 1413">Interview Participant UK Based (Northern Ireland) October 2023</p> <p data-bbox="722 1472 1432 1717">“the drug going from the EU to the UK and UK to EU created a lot of unnecessary delays and a lot of unnecessary regulatory requirements that cause a lot of issues within the trials... So you can’t recruit anyone... And if you’ve got people on [a] trial... there’s a risk that you can’t provide them with the medication, which is [a] disaster, absolute disaster.”</p> <p data-bbox="722 1738 1432 1948">“Two participants had to be withdrawn from the study because we couldn’t guarantee what drug they got, which is also a disaster. And we just really worried about, you know, not being able to access (a) drug when we needed it” – because they couldn’t find out quickly if they could use cisplatin from the EU”</p>

Theme	Subtheme	Quote
		<p data-bbox="721 321 1430 674">“[...]we didn’t understand what they wanted from a legal Rep and you know, finding it out was just so such hard work. You know, it really, really was where it should. Just it should be so clear exactly what they wanted for the legal Rep, the MHRA, or any drug import stuff should be so easy. It should be, you know. You hope that people aren’t making a drug that’s really bad. And you know when it once it comes out of the facility, you, you hope and pray that it’s it’s safe. So don’t make it even more complicated to access the drug”</p> <p data-bbox="721 699 1008 800">Interview Participant UK Based August 2023</p> <p data-bbox="721 863 1430 1066">“Europe is reviewing the pharmaceutical legislation and I think that potentially could be very good for children’s cancer and for rare diseases. But again, because UK’s on the outside of it, I’m not quite sure when it comes out of the European washing machine where UK is going to sit with this at the moment.”</p> <p data-bbox="721 1094 1430 1266">”We’re almost holding our breath as to how this is going to impact on more, more new drug trials and we’re hearing and it is anecdotal that the drug companies are saying, well, we’ll collaborate with you, but not if you open it in the UK because that’s just too difficult.”</p> <p data-bbox="721 1293 1430 1392">“[...]I do think there are opportunities for the UK here to try and do something that’s even more innovative for rare diseases and children’s cancers.”</p> <p data-bbox="721 1419 1008 1518">Interview Participant UK Based August 2023</p>
	3.5 Public health and cancer prevention	No further quotes selected
	3.6 Suggested ways forward	<p data-bbox="721 1669 1430 1808">“The drug, the QP, the quality assurances for the drugs and the CTIS and the legal Rep [now] need to be costed in”. Also potentially shipping samples. “and it would need to be anticipated from a time perspective [too]”.</p> <p data-bbox="721 1835 1008 1934">Interview Participant UK Based August 2023</p>

Theme	Subtheme	Quote
<p>4. UK environment for research, innovation and health and care</p>	<p>4.1 UK position and reputation as a science leader and global collaborator</p>	<p>“We’ve got some real beacons of excellence in terms of our some of our more centralized and bigger research institutes.” Workshop Participant UK Based October 2023</p> <p>“I can see what I can define an implosion if you like, of what I thought it was you know the best place to work in terms of epidemiology. You know “the country of epidemiology” and now you see that it seems to be restricted to the UK rather than opening to the world in general.” “the UK is closing a bit to the world right now” Interview Participant UK Based September 2023</p> <p>“Our European academic partners... have remained engaged with us in our consortia. They see their real importance of UK involvement, both in study design and experience, but also in the patients that we can contribute...But we are starting to see in the grant calls, you know sometimes UK is excluded or you can be included in the ground call, but the money will not go to the UK sites because of the extra costs and logistics involved.” Workshop Participant UK Based October 2023</p> <p>“You know, we’ve got some fabulous sort of Paediatrics CTUs in the UK that, you know lead the way and again that sort of experience gained over many, many years is not to be vouchsafe.” Workshop Participant UK Based October 2023</p>

Theme	Subtheme	Quote
		<p data-bbox="724 359 1432 747">“We’ve gotta do some serious leg work. And again, it’s about people coming from abroad to take these positions. You know, we’re not doing enough for home-grown training of clinical academics and clinician scientists, and where there is, they’re often quite regionally restricted in terms of that. So again, I think that again is something that we’ve gotta really, really watch over the next 10 years. Is it a massive shortfall of people to actually, particularly at an academic level, again translationally, but also writing in the studies, we’ve got a really, really watch that space”</p> <p data-bbox="724 768 1024 873">Workshop Participant UK Based October 2023</p> <p data-bbox="724 936 1432 1209">“I think in terms of attracting third party clients to come and work with us and we have all this expertise within our department and with all the clinicians we work with. But if we can’t actually get into a clinical trial or make the changes we need to during the course of that trial, people are gonna stop wanting to work with us as well. So the whole competitiveness, the space becomes very a great concern”</p> <p data-bbox="724 1230 1024 1335">Workshop Participant UK Based September 2023</p> <p data-bbox="724 1398 1432 1566">“I think there’s simply a bit of a psychological barrier as well. I think a lot of people, just perhaps, who felt that in the past UK would welcome people from all kinds of countries and backgrounds, perhaps feel that now the country is a bit more closed, I think.”</p> <p data-bbox="724 1587 1008 1692">Interview Participant UK Based August 2023</p>

Theme	Subtheme	Quote
		<p>“reputation is a big deal. It’s a competitive market [...] and if we are, if we’re if we’re getting these these problems, it’s gonna have reputational damage, not just for us but sort of UK wide because this is additional burden on just sending something simple that used to be sending samples that where they’re just gonna they’re just gonna lose interest.”</p> <p>Interview Participant UK Based October 2023</p>
	4.2 Changing research landscape	<p>“I do wonder if there’s a little bit of a shift to looking more globally than specifically regionally. And I think CRUK is very well positioned to you know, be a leader from an international research perspective.”</p> <p>Workshop Participant UK Based September 2023</p> <p>“Not only is it the quality and it’s the numbers and the speed and it’s slick, and it’s also scientifically rich, and Europe is still important, but you know, increasingly you can see certainly with certain disease, lung being a good example of this, that the centre of gravity has swung right away from you know, US and Europe, and right towards Southeast Asia.”</p> <p>Workshop Participant UK Based October 2023</p> <p>“I think you’ve got to look at the European UK nexus in a wider global context because increasingly I think that’s going to become quite a dominant theme in drug development.”</p> <p>Workshop Participant UK Based October 2023</p> <p>“Research costs and whether that’s gonna be the new normal that we can fund less because everything’s more expensive.”</p>

Theme	Subtheme	Quote
		<p>Workshop Participant UK Based September 2023</p> <p>“When we collaborate with the US, it’s a lot more compromise and because of the way the clinical trial regulations are implemented in the US compared to UK and Europe, we do have quite substantial barriers that we’re trying to find ways - I’m running a workshop to try and find ways of closing the difference. You know, we genuinely are separated by common language. You know, we talk differently about clinical trials and whilst on both sides of the Atlantic, we’re trying to find a way to work together, it’s proving quite challenging.”</p> <p>Interview Participant UK Based August 2023</p> <p>“Fortunately the collaborations through CRUK have been kept and even improved. So that’s, you know, something remarkable from the side of CRUK. It could have been the opposite, right? That once you have the Brexit, they would have focused more on funding only projects with British investigators and not other countries and actually has been normally opposite, right. So I think that this has been really very good.”</p> <p>“I think, that in the last years we have witness(ed) an increased, you know, dialogue in among those associations. Also those foundations especially learning from CRUK’s experience because you have a lot of experience previous experience in UK that we didn’t have right.”</p> <p>Interview Participant EU Based September 2023</p>
	4.3 Industry investment in the UK	<p>“I think we still get the same level of interest from uh, non-European entities. So from the US, we are still, you know, a small geographic area with great infrastructure for research and a diverse pool of patients. So they I I don’t think that’s changed their view on us particularly, which is very helpful. We’ve got lots of US sponsors, lots of commercial trials that I run from US pharmaceutical firms, which hasn’t dried up, which is nice.”</p>

Theme	Subtheme	Quote
		<p>Interview Participant UK Based October 2023</p> <p>“I mean nearly all of our projects are partnered with, Um, a commercial entity of some kind. Whether a small biotech or big Pharma, and it has been very, very embarrassing sitting on calls this year where we said, well, yeah, we submitted the amendment. We can’t do anything about it. It’s like months and months down the line and you just don’t have any answers that you can give to these companies.”</p> <p>Workshop Participant UK Based September 2023</p> <p>“Certainly in terms of commercial studies, it’s very obvious that we’re a pretty long way down the pecking order at the moment and you know we are now definitely second/third wave. “And so whereas Switzerland and Belgium and will be first wave, we’re not. And again that extra level of bureaucracy within the UK that’s been brought in as a result of this means that, you know, we tend to be quite late to opening because we just don’t get offered it particularly early. And then the numbers are very restricted by pharma who just say, well, you can have four patients and that would be a lot for the UK compared with the 44 in France for example.”</p> <p>Workshop Participant UK Based October 2023</p> <p>“BioNTech is a German company and you know, to see them get stuck in the way they are in the UK is really quite gratifying. So I think that side of it’s good.”</p> <p>Workshop Participant UK Based October 2023</p>

Theme	Subtheme	Quote
		<p>“We are still attracting companies to work with us and we’ve had a couple of [major European] cancer charities looking at bringing money in and helping facilitate some of our projects and maybe take some of them into Europe. So I think we’re still seen as somewhere attractive to do clinical research and bring something to the table and make it happen.”</p> <p>Workshop Participant UK Based September 2023</p> <p>“We still get the same level of interest from non-European entities. So from the US, we are still... a small geographic area with great infrastructure for research and a diverse pool of patients. ...We’ve got lots of US sponsors, lots of commercial trials that I run from US pharmaceutical firms.”</p> <p>Interview Participant UK Based October 2023</p>
	4.4 Concerns about the impact on UK higher education institutions	No further quotes selected
	4.5 UK competitiveness within the global market	No further quotes selected
	4.6 Implications for UK health and care system	No further quotes selected
	4.7 Suggested ways forward	<p>“I think what we’ve shown is that if we can work together that that there is a way forward”</p> <p>Interview Participant UK Based October 2023</p>
General quotes		<p>“There’s just been so much uncertainty and you know what we’ve ended up with is, at best is that’s sort of replicated what we had before, and at worst is a lot, a lot less good than what we had before.”</p>

Theme	Subtheme	Quote
		<p>Workshop Participant UK Based October 2023</p> <p>“I would go on record as agreeing entirely that there’s nothing, nothing has worked better.”</p> <p>Workshop Participant UK Based October 2023</p> <p>“I’m afraid to say I’ve absolutely nothing positive to say that has improved because of it.”</p> <p>Workshop Participant UK Based October 2023</p> <p>“Our funding partners are still keen to collaborate, researchers still seem to collaborate, science is inherently collaborative and an international outlook. So I don’t think people’s principles and outlook and ethos has been affected”</p> <p>Workshop Participant UK Based September 2023</p> <p>“costs have to have to come out of somewhere and the costs are passed on to us and then we would have to pass them on to the grant funders”</p> <p>Interview Participant UK Based August 2023</p>

I. Tables of references and corresponding themes

The scoping review includes the records cataloged in Table 4. Table 3 provides an inventory of sub-themes, each with its own distinct key. In Table 4, every reference is allocated a key that aligns with the sub-theme to which it pertains. Note that the citation numbers refer to the reference list in this document, not to those in the report.

Table 3: List of references used in the evidence review and their corresponding sub-themes

Key	Sub-themes
	Access to EU research funding and collaboration
1.1	Access to Horizon Europe funding
1.2	Access and commitment towards EU-UK collaboration and beyond
1.3	Missed and lost opportunities
1.4	Continued concerns and uncertainties
1.5	Implications for people affected by cancer and the public
1.6	Suggested ways forward
	Effects on UK and EU workforce
2.1	Mobility of the workforce
2.2	Changing roles and working conditions
2.3	Implications for people affected by cancer and the public
2.4	Suggested ways forward
	Regulatory effects on research and the healthcare environment
3.1	Sharing data, samples and product
3.2	Regulatory changes affecting multi-national clinical trials
3.3	Implications for people affected by cancer and the public
3.4	Opportunities for regulatory innovation to improve access
3.5	Public health and cancer prevention
3.6	Suggested ways forward
	UK environment for research and innovation
4.1	UK position and reputation as a science leader and global collaborator
4.2	Changing research landscape
4.3	Industry investment in the UK
4.4	Concerns about the impact on UK higher education institutions
4.5	UK competitiveness within the global market
4.6	Implications for the UK health and care system
4.7	Suggested ways forward

Table 4: Characteristics on included documents from the scoping review

Author	Year	Document type	Source	Perspective	Themes
Amsen [2]	2022	Journal - Viewpoint	D	Scientific Research	1.1; 1.2; 1.3; 2.1; 2.2; 3.1; 3.2; 3.6; 4.1; 4.3
Anderson [3]	2022	Report	D	Cancer Care Delivery	2.1; 2.3; 2.4; 3.2; 4.6
Ankit [4]	2021	Journal - Research	D	Cancer Care Delivery	3.1; 3.2; 3.3; 3.4; 4.3; 4.6
Anonymous (13) [5]	2022	Journal - Viewpoint	D	Scientific Research	1.1; 1.2; 1.3; 2.1; 4.1; 4.2; 4.3
Anonymous (25) [6]	2022	Journal - Viewpoint	D	Scientific Research	2.1
Anonymous(30) [7]	2022	Journal - Viewpoint	D	Scientific Research	1.1; 1.2; 1.3; 1.4; 2.2; 4.1
Anonymous (45) [8]	2022	Journal - Viewpoint	D	Scientific Research	1.1; 1.2; 1.3; 2.2; 4.1; 4.2; 4.7
Anonymous (1) [9]	2023	Journal - Viewpoint	D	Scientific Research	1.1; 4.2; 4.4
Bampton [10]	2021	Electronic article	G	Prevention	2.2; 3.5
Banks [11]	2022	Journal - Research	D	Scientific Research	3.1
Barry-Hundeyin [12]	2022	Journal - Viewpoint	G	Cancer Research	2.1; 2.2
Baumbach [13]	2021	Journal - Research	D	Scientific Research	1.1; 1.2; 1.3; 1.4; 1.6; 2.1; 2.2; 3.1; 4.1; 4.4
Bentzen [14]	2022	Journal - Research	D	Scientific Research	3.1
Brainard [15]	2023	Journal - News	D	Scientific Research	1.1
Branston [16]	2021	Journal - Viewpoint	D	Prevention	3.5; 4.6
Breen [17]	2022	Electronic article	G	Cancer Care Delivery	3.4; 4.3
Brennan [18]	2023	Journal - Research	D	Cancer Care Delivery	2.1
Brighton [19]	2023	Electronic article	G	Scientific Research	1.1; 1.2; 1.3; 1.6; 4.2
Buckton [20]	2021	Report	G	Prevention	3.5; 4.6
Carvalho [21]	2021	Journal - Viewpoint	D	Cancer Care Delivery	2.1; 2.3; 2.4

Author	Year	Document type	Source	Perspective	Themes
Cavallaro [22]	2021	Blog	G	Scientific Research	1.1; 1.3; 1.4; 2.1; 2.2; 4.3; 4.4; 4.7
Cavallaro [23]	2020	Journal - Research	D	Scientific Research	1.1; 1.2; 1.3; 2.1
Ciupijus [24]	2022	Journal - Research	D	Cancer Care Delivery	2.1; 2.4
Corbett [25]	2021	Blog	G	Scientific Research	1.1; 1.2; 1.3; 2.1; 2.4; 4.1; 4.2; 4.3; 4.4
Coulter [26]	2021	Journal - Research	D	Scientific Research	3.1
Courtois [27]	2022	Journal - Research	D	Scientific Research	2.1; 2.2; 2.4; 4.4
Cruz Rivera [28]	2021	Journal - Research	D	Scientific Research	3.3; 4.1; 4.7
Dayan [29]	2021	Journal - Viewpoint	D	Cancer Care Delivery	1.1; 1.2; 3.2; 3.4; 4.3; 4.6
Dayan [30]	2023	Journal - Research	G	Cancer Care Delivery	1.1; 1.2; 2.1; 3.1; 3.2; 3.3; 3.4; 3.6; 4.1; 4.2; 4.3; 4.5; 4.6; 4.7
Do Mar Machado [31]	2022	Journal - Research	D	Scientific Research	2.1; 2.3
Eardley [32]	2022	Journal - News	D	Cancer Research	1.1; 1.3; 3.1
Else [33]	2022	Journal - News	D	Scientific Research	1.1; 1.3; 2.1; 2.2; 3.1; 4.1
Else [34]	2022	Journal - News	D	Scientific Research	1.1; 1.2; 2.1; 4.1
Fahy [35]	2021	Journal - Research	D	Cancer Care Delivery	1.1; 1.5; 2.1; 2.2; 2.3; 2.4; 3.1; 3.2; 3.3; 3.4; 3.5; 4.1; 4.5; 4.6
Fahy [36]	2022	Journal - Research	D	Cancer Care Delivery	1.2; 1.3; 1.5; 2.1; 2.2; 2.3; 2.4; 3.1; 3.2; 3.3; 3.4; 3.5; 4.2; 4.3; 4.6; 4.7
Forster [37]	2023	Electronic article	G	Cancer Research	1.1; 1.2; 2.1; 4.1; 4.2; 4.5
Foster [38]	2021	Journal - Research	D	Scientific Research	1.1; 1.2; 1.4; 1.5; 1.6; 2.1; 2.4; 3.1; 3.4; 3.6; 4.1; 4.4; 4.7

Author	Year	Document type	Source	Perspective	Themes
Freund [39]	2021	Journal - Research	D	Prevention	3.5; 4.6
Gibney [40]	2021	Journal - News	D	Scientific Research	1.1; 2.1; 3.1; 3.2; 4.4
Gilbert [41]	2023	Journal - Viewpoint	D	Cancer Care Delivery	3.2; 3.3; 3.6
Gray [42]	2022	Journal - News	D	Scientific Research	1.1; 2.1; 4.1; 4.5
Guglielmi [43]	2022	Journal - News	D	Scientific Research	1.1; 1.2; 1.3; 2.1; 2.2; 4.2
Han [44]	2022	Journal - Research	D	Cancer Care Delivery	3.2; 3.3; 3.4; 3.6; 4.1; 4.3; 4.5; 4.6; 4.7
Hennessy [45]	2023	Journal - Research	D	Cancer Care Delivery	3.2; 4.3
Highman [46]	2023	Journal - Research	D	Scientific Research	1.1; 1.2; 1.3; 2.1; 4.1; 4.4
Hofer [47]	2022	Journal - Research	D	Cancer Care Delivery	3.2; 3.3; 4.3
Husain [48]	2021	Journal - Viewpoint	D	Scientific Research	2.1; 2.3; 2.4
IQVIA [49]	2021	Electronic article	G	Scientific Research	1.1; 1.2; 2.1; 4.1; 4.3; 4.6
Kasli [50]	2022	Journal - Research	D	Cancer Care Delivery	3.3
Lythgoe [51]	2023	Journal - Research	D	Cancer Research; Cancer Care Delivery	2.3; 3.2; 3.3; 3.4; 4.1; 4.2; 4.3; 4.5
Lythgoe [52]	2022	Journal article	G	Cancer Research; Cancer Care Delivery	1.4; 3.2; 3.3; 3.4; 3.6; 4.1; 4.2; 4.3; 4.5
Macaulay [53]	2022	Journal - Research	D	Cancer Care Delivery	3.4
Mason [54]	2023	Electronic article	G	Cancer Care Delivery	3.2; 3.4
Mathieson [55]	2022	Journal - Viewpoint	D	Scientific Research	1.1; 1.2; 1.6; 2.1; 4.1
Mayhew [56]	2022	Journal - Research	D	Scientific Research	1.1; 1.2; 1.3; 1.4; 2.1; 2.4; 4.1; 4.2; 4.4; 4.7

Author	Year	Document type	Source	Perspective	Themes
Mayor [57]	2021	Journal - News	D	Cancer Care Delivery	1.1; 1.5; 2.1; 3.1; 3.2; 3.4
McCarey [58]	2022	Report	G	Cancer Care Delivery	2.1; 2.3; 2.4; 3.1; 3.4; 4.6
McKee [59]	2021	Journal - Viewpoint	D	Cancer Care Delivery	1.1; 1.5; 2.1; 2.3; 3.1; 3.4; 3.5; 4.1; 4.4
McKee [60]	2023	Journal - Viewpoint	D	Cancer Care Delivery	1.1; 3.5
Mehta [61]	2022	Electronic article	G	Scientific Research	1.1; 1.3; 1.4; 3.4; 4.1; 4.3
Meyers [62]	2022	Report	G	Scientific Research	1.1; 1.2; 1.3; 1.4; 1.6; 2.1; 2.2; 2.4; 3.1; 4.1; 4.2; 4.3; 4.4; 4.5; 4.7
Milmo [63]	2021	Journal - Viewpoint	D	Cancer Care Delivery	3.1; 3.3; 3.4; 4.3; 4.6; 4.7
Milner [64]	2021	Journal - Research	D	Cancer Care Delivery	1.3; 2.1; 2.2; 2.3; 2.4; 3.4; 3.5; 4.6
Moore-Hepburn [65]	2022	Journal - Research	D	Cancer Research	1.5
Murphy [66]	2023	Journal - Viewpoint	D	Cancer Research	3.3; 3.6
Nicholls [67]	2021	Electronic article	G	Cancer Research	1.1; 1.2; 1.4; 1.5; 2.1; 2.4; 3.1; 3.2; 3.4; 3.6; 4.1; 4.2; 4.3; 4.4; 4.5; 4.7
O'Carroll [68]	2022	Journal - Viewpoint	D	Scientific Research	1.1; 1.3
O'Grady [69]	2022	Journal - Viewpoint	D	Scientific Research	1.1; 1.2; 1.3; 1.4; 2.1; 2.2; 4.1
O'Shaughnessy [70]	2023	Report	G	Scientific Research	2.1; 2.4; 3.2; 3.6; 4.1; 4.2; 4.3; 4.5
Owens [71]	2023	Journal - News	D	Scientific Research	1.1; 1.2; 1.4
Pye [72]	2021	Electronic article	G	Cancer Care Delivery	1.2; 1.4; 4.2; 4.7
Sánchez Cañizares [73]	2022	Journal - Viewpoint	D	Scientific Research	1.1; 1.3; 1.6; 2.2; 4.4

Author	Year	Document type	Source	Perspective	Themes
Shaw [74]	2022	Journal - Research	D	Cancer Care Delivery	3.4; 4.6
Smith [75]	2022	Journal - Viewpoint	D	Scientific Research	1.1; 4.2
Spisak [76]	2023	Electronic article	G	Scientific Research	2.1; 2.4; 3.1; 3.4; 3.5; 3.6; 4.6; 4.7
Springford [77]	2023	Electronic article	G	Scientific Research	1.1; 1.2; 1.3; 1.4; 1.6; 2.1; 4.1; 4.3; 4.4; 4.7
Springmann [78]	2021	Electronic article	G	Prevention	3.5; 3.6
Stimson [79]	2021	Journal - Viewpoint	D	Prevention	3.5
Thistlethwaite [80]	2022	Electronic article	G	Cancer Research	4.3; 4.7
Thorp [81]	2023	Journal - Viewpoint	D	Scientific Research	1.1; 1.2
Tumiene [82]	2021	Journal - Research	D	Cancer Research	1.5; 2.2; 4.1
Wallace [83]	2021	Journal - News	D	Scientific Research	1.1; 1.2; 1.3; 4.1; 4.5
Wellcome [84]	2021	Electronic article	G	Scientific Research	1.1; 1.2; 1.3; 1.4; 2.1; 3.2; 4.4
Williams [85]	2021	Electronic article	G	Cancer Care Delivery	3.1; 3.4; 3.6
Woolston [86]	2022	Journal - Viewpoint	D	Scientific Research	1.1; 1.3; 1.4; 2.1; 2.2; 4.1; 4.2
Yusufi [87]	2022	Journal - Research	D	Cancer Care Delivery	3.2; 3.3; 3.4; 4.3; 4.6
Zimmer [88]	2021	Journal - Viewpoint	G	Scientific Research	1.1; 1.2; 1.3; 1.4; 2.1; 2.2; 2.4; 3.1; 4.1; 4.2

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