British Heart Foundation Scotland

Solving the puzzle:

Ensuring the long term stability of Scotland's medical research environment

Introduction:
Piecing together the puzzle

Scotland has a strong history in medical research and has been responsible for major breakthroughs such as the discovery of penicillin and the first use of an MRI machine as a diagnostic test.

These breakthroughs are a result of the reputation and strength of Scotland's universities and its single, unified health service, the NHS.

This strength is due to the historic levels of research funding awarded, and attracted to, research centres in Scotland. For example, Scotland was awarded the highest level of Horizon 2020 funding of any UK nation on a per capita basis (€55 compared to the UK average of €40).[1]

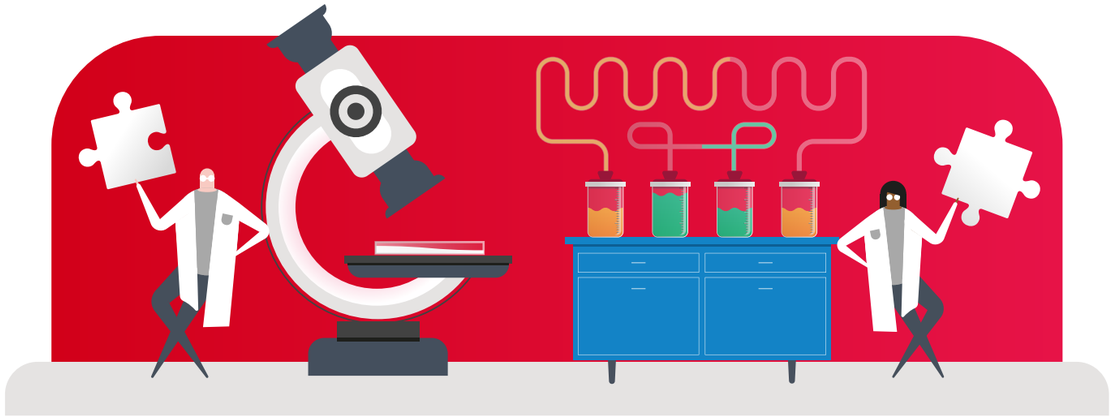
Not only this, research in the UK has also benefitted from strong public commitment to supporting the development of medical research through their support of medical research charities. Medical research charities are a major funder of research in the UK, funding over £14.5 billion worth of research in the last 10 years alone.[2]

However, the Covid-19 pandemic has had a significant impact on research across Scotland, not only through forcing clinical and laboratory research to pause, but also on the stability of funding available. From impacts on university income to significant falls in the income of the charities who fund medical research, there is a pressing need for action to support the long term health of medical research in Scotland.

This paper looks at the picture for research funding in Scotland, both in its universities and the NHS. It also highlights the unique and crucial role that the funding of medical research charities plays in Scotland's medical research landscape, exemplifying this role by showing the research projects and infrastructure funded by the British Heart Foundation in Scotland.

At a time where Scotland's medical research environment is in need of support to ensure its resilience, of particular concern is the relative low level of funding that is provided for clinical research by the Scottish Government. This funding gap is creating issues in clinical research particularly in the establishment of clinical research infrastructure and the funds that are available to support research careers. Issues that are being exacerbated by restrictions on funds from other sources.

Action is needed urgently to make sure that opportunities are available for people to take part in research. Not only for the benefit of people affected by heart and circulatory disease and other conditions, but also for the many talented researchers may leave this career path due to a lack of opportunity, creating a lost generation of researchers.



A crucial piece: The role of medical research charities in Scotland's research environment

Charities are a major source of funding for medical research in Scotland. In 2018, the UKCRC estimated that charities funded 46% of all publicly funded medical research in Scotland – investing £122 million.[3]

Without charities funding medical research and development in Scotland, the government and other public bodies would therefore need to increase direct funding by 73% to make up for the shortfall.[4]

Charity funding also plays a unique role amongst the range of sources that fund research in the UK, but it is a source that has been impacted significantly by the Covid-19 pandemic. This section highlights both the unique role funding from medical research charities plays in both Scotland's research environment and economy, as well as the impact that Covid-19 has had on this support.

Research funded by charities is amongst the strongest investments in gaining economic value

The Fraser of Allander Institute recently published a report[5] modelling the economic contribution of research funding by members of the Association of Medical Research Charities (AMRC) in Scotland. They estimated that, in 2019, medical research funding by charities supported:

- **7,475 jobs.**
- **£470 million output.**
- **£320 million GVA.***

Their analysis compared funding by medical research charities across a number of sectors of the economy for every £1 million spent. They found medical research funding by charities to be one of the most effective sectors in Scotland in driving economic growth and supporting jobs. Every £1 million spent on medical research funding in Scotland by charities supports:

- **£1.33 million of GVA**
  – 4th highest multiplier out of 97 sectors.
- **31 jobs**
  – 6th highest multiplier out of 97 sectors.

Charity funding plays a unique role in the research funding environment

Funding from medical research charities plays a unique and fundamental role in the research environment in Scotland. A paper by IPPR[6] identified a number of features of medical charity funding that makes it unique in the UK's research environment:

They invest in the UK's skills pipeline

- **Charity-funded research boosts national infrastructure and develops the skills of the research workforce.**

They are inherently patient-centric

- **Medical research charities, many of whom are both patient organisations and research funders, are inherently patient-centric and ultimately driven by patient benefit. This brings unique contributions as a result of charities' insights into their priorities.**

They fund high-risk, high-reward research

- **A critical route by which charity-funded research drives economic impact is by de-risking research for industry – i.e. funding in areas where industry is not incentivised to.**

*GVA: A measure of contribution to an economy equal to output less intermediate consumption (i.e. purchases of goods and services as inputs)

Charity research has been shown to create significant impact

The AMRC recently published their Making a difference: Impact report 2021.[7] Their report analysed the impact of a subset of over 10,000 grants awarded by medical research charities across the UK and found that:

- **42%**
  of all grants generated further funding from other sources.
- **81**
  spin out companies were created following research supported by grants from AMRC charities.
- **922**
  unique medical products and interventions were generated.
- **528**
  unique software and technical products were developed.
- **39%**
  of grants supported researchers to move into a new position.
- **1,720**
  grants had an influence on policy.

The impact of Covid-19 on charity medical research funding

The Covid-19 pandemic had a huge impact on the income of charities due to the closure of charity shops and the impact of restrictions on fundraising events. Whilst income is recovering, it is important that the research environment is supported to maintain its stability in a period of reduced funding availability.

A report launched by the AMRC in April 2021 demonstrated the impact of the Covid-19 pandemic on the research budgets of medical research charities.[8] Their findings from a survey of their member charities shows the potential medium and long-term impacts of this funding drop on charities.

- **1 in 2**
  AMRC charities planned to cut their research spend for 2021/22, amounting to over £148 million.
- **3 or more years**
  is the estimated amount of time it will take before charity research spend returns to pre-pandemic levels.

Research by the Fraser of Allander Institute[9] also highlighted the wider economic impacts from the fall in charity research funding caused by the Covid-19 pandemic. They found that the fall in medical research funding in 2020 put 575 jobs, £36 million output and £25 million GVA at risk in Scotland.

The impact of this drop in funding is also being seen through a loss in stability within research careers. A survey conducted by the AMRC in October 2020 showed the potential impact on the careers of talented researchers, particularly those early in their career.[10] They found that:

- **56%**
  of AMRC charities will have to cancel or delay funding for early career researchers and skilled research roles.
- **40%**
  of charity-funded early career researchers were considering leaving medical research.
- **82%**
  of charity-funded early career researchers felt less secure in their research career than before the pandemic.

The findings of these projects highlight the potential impact of the pandemic on the long-term stability of the medical research environment in Scotland. It was not only charities that were impacted financially by the pandemic. But the impact on charities, and the loss of funding that has been shown to be highly effective in generating jobs and value to the economy, has the potential to both delay Scotland's economic recovery and impact the careers of highly talented people.

British Heart Foundation research funding in Scotland

The British Heart Foundation is the largest public funder of cardiovascular research in Scotland. Across the UK, the UK Clinical Research Collaboration found that the British Heart Foundation funded 55% of all publicly funded cardiovascular research,[11] more than all Government research funders combined.

The BHF currently funds £60.6 million in ongoing funding in Scotland, 13.7% of its current UK research portfolio.[12] This includes funding across 10 universities in Aberdeen, Dundee, Edinburgh, Glasgow, St Andrews and Stirling. (See figures 1 and 2 for more details of our funding across Scotland).

The British Heart Foundation's research portfolio in Scotland includes grants worth £16 million in funding for clinical trials in Aberdeen, Dundee, Edinburgh and Glasgow. This research is giving people in Scotland access to new and kinder treatments for conditions including heart failure, stroke and cardiac arrest.

Case Study: Glasgow PhD extension – Simon Fisher

The Covid-19 pandemic had a significant impact on the ability of researchers to undertake research by restricting access to laboratories. For those undertaking a PhD this meant difficulties in completing their research within their original funding timeframe. To support future research leaders at this challenging time, the BHF offered PhD students an extension to their funding to give these students more time to gather data required to complete their study. Simon Fisher was a BHF-funded 4-Year PhD student in Glasgow who received an extension.

Simon Fisher's research, undertaken in his British Heart Foundation PhD, aimed to use precision medicine to improve the treatment outcomes for the management of high blood pressure. This research has the potential to improve treatments by reducing side effects and increasing efficacy.

The pandemic was highly disruptive to his laboratory-based work. His research involved developing a special type of cell under strict conditions, a process that usually takes 4 months. But in early March 2020, as he was coming very close to completing this, the pandemic forced Simon to put this on hold.

Simon was able to use the time during the early pandemic to perform a series of digital experiments. However, his primary goals in the laboratory using these special cells could not be realised. With the re-emergence of laboratory based work in July 2022, he effectively found himself 6 months behind schedule.

However, Simon was able to continue working on his project due to a 6-month extension granted by the British Heart Foundation past his original September 2021 deadline. This extension was crucial to Simon and his lab to allow him to complete his research into improving treatments for high blood pressure. Simon is now working in the private medical research sector in Scotland, where he continues to use the valuable skillsets developed during his PhD.

Figure 1: BHF research funding across Scotland

Stirling:
£290k grant funding,
1 BHF Fellow,
1 other research staff.

Glasgow:
- **University of Glasgow:**
  £15.7m grant funding,
  £3m research excellence award,
  20 PhD studentships,
  1 BHF Professor,
  77 other research staff.
- **Strathclyde:**
  £2.6m grant funding,
  1 PhD studentship,
  7 other research staff.
- **Glasgow Caledonian:**
  £384k grant funding,
  1 BHF Fellow.

Aberdeen:
£3m grant funding,
2 PhD studentships,
10 other research staff.

Dundee:
£1.85m grant funding,
7 research staff.

St Andrews:
£469k grant funding,
2 PhD studentships.

Edinburgh:
- **University of Edinburgh:**
  £27.4m grant funding,
  £3m Research excellence award and **£2.5m** centre of regenerative medicine award,
  22 PhD studentships,
  6 BHF Fellows,
  2 BHF Professors,
  79 other research staff.
- **Edinburgh Napier:**
  £193k grant funding,
  4 research staff.
- **Heriot-Watt:**
  £102k grant funding.

Other workforce include research support staff and scientists at various stages of their career supported on BHF awards.

Figure 2: BHF clinical research funding in Scotland

Aberdeen:
- £597k invested in two treatment trials into COPD and "broken heart syndrome".

Dundee:
- £1.06m invested into 1 treatment trial into high blood pressure.

Edinburgh:
- £4.7m invested into 6 treatment trials into heart attack, stroke, heart valve disease, diabetes and heart failure.
- £2.6m invested into 4 prevention trials into heart protection in breast cancer treatment, predicting heart attacks, troponin test and communicating cardiovascular risk.
- £1.3m invested into 1 diagnostic trial on heart monitoring.

Glasgow:
- £5.3m invested into 7 treatment trials into Heart failure, stroke and high blood pressure.
- £362k invested into 2 diagnostic trials into angina scans and less invasive monitoring after heart attack.

Figures accurate as of 31 March 2021 and excludes supplements made to existing grants

A fundamental piece: University funding in Scotland

Funding for university research in Scotland is provided by the Scottish Government through the Scottish Funding Council's Research Excellence Grant (REG). The Research Excellence Grant awarded universities more than £240 million in 2020–21[13] and this fund compares favourably with similar funds in the rest of the UK when compared per capita.[14]

However, this investment in the REG has stagnated in recent years, with no increase between 2014/15 and 2021/22.[15] Accounting for inflation, this represents a real terms decrease of almost £60 million in this time.

To continue Scotland's reputation for research, the Scottish Government and Scottish Funding Council should seek to continue their commitment to continually increase support for research. This is crucial to ensuring that researchers in Scotland have the funds necessary to develop the infrastructure and talent required to remain competitive and attract further funding from public, charity and industry sources.

A key part of the REG for medical research in particular is the REGc pot, which supports researchers and universities to undertake charity funded projects by supporting the full economic cost of this research. The role of this fund has become even more critical following the Covid-19 pandemic. As previously discussed, charity income has been severely impacted by the necessary restrictions to control the pandemic. Because of this, the REGc pot is even more crucial in supporting medical research in Scotland as charity income recovers.

The Scottish Funding Council recently consulted on the current structure of the REG.[16] Within this consultation, the SFC proposed the proportion of the REG pot committed to REGc be increased from 11% to 15%. This increase would be an important step to support medical research across Scotland, providing an extra £10 million to universities to support researchers who secure funding from charities.

The role of REGc in supporting charity funded research

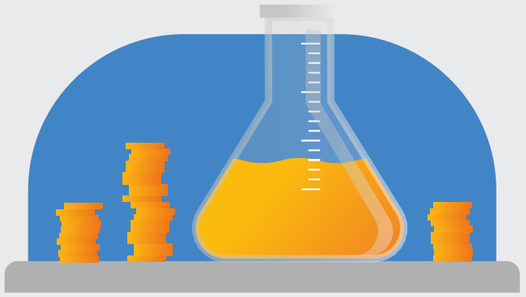
The REGc pot allows universities to effectively leverage research funding from charities by enabling the recovery of some of the indirect costs of research that charities do not pay. These costs include estates, shared IT and administration overheads.

Research in Scottish universities is funded from a variety of sources, with different levels of resource, priorities, objectives and histories.

Charities differ from other funders in the way they fund research. They are independent from government and their purpose is to channel generous donations from the public and others to support research for public benefit that will improve health and wellbeing.

Charities exist because of donations from the public and philanthropists; in 2018 medical research was the UK's second most popular cause. The views and wishes of people who donate, particularly at a time of increased scrutiny on charities, are of paramount importance.

When people donate, they intend their money to be spent on research to ultimately benefit patients. This means that charities pay the direct costs of research and the REGc provides a crucial uplift to enable universities to pay the indirect costs required for charity funded research to occur.



Case Study: Dr Jennifer Lees – NES/CSO Clinical Lecturer in Renal Medicine

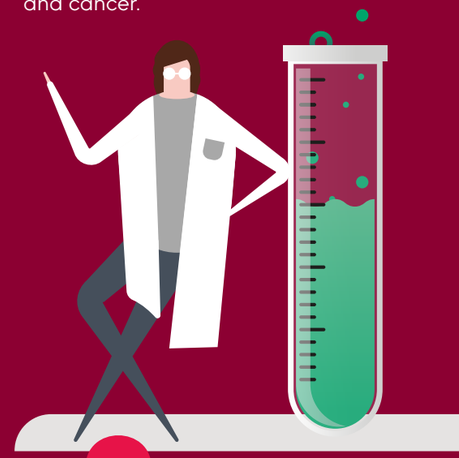
Working throughout her medical training towards a long-term goal to become a clinical academic, Dr Lees undertook a variety of research projects in her spare time to gain experience through the awarding of small research grants.

Dr Lees was then awarded funding from the Glasgow BHF Centre of Excellence (CoRE) award to undertake a PhD in 2016. The BHF Centre of Excellence Award allowed Dr Lees to begin formal research training in a range of areas to gain expertise in research from basic science to coding.

From this training Dr Lees decided to pursue a career in clinical research and epidemiology. Following the BHF CoRE award, she obtained a PhD training fellowship from Kidney Research UK. Following this PhD, Jennifer gained a place on the Scottish Clinical Research Excellence Development Scheme as a clinical lecturer in renal medicine at the University of Glasgow.

The funding from two medical charity sources allowed Dr Lees to establish herself in the clinical research field and she was subsequently awarded a clinical lectureship by the Chief Scientist Office. Dr Lees now works to describe and mitigate the long-term risks associated with kidney disease, including cardiovascular disease and cancer.

Her work has won national prizes, has been published in high-impact journals and led to international collaborations. Most importantly, the training opportunities provided by these funding schemes have allowed Dr Lees to develop the skills and attributes necessary for research independence and to begin developing her own research network. Dr Lees is currently planning her next steps: an ambitious, long-term programme of research, designed to improve outcomes in people with kidney disease, cardiovascular disease, and cancer.



How BHF funding supports research excellence

The high-quality research and researchers funded by charities like the BHF subsequently draws in more Quality-related (QR) funding for universities by contributing to these three elements:

- **High quality outputs: Cardiovascular publications from BHF funded researchers have a higher citation impact than those from the whole of the UK, the rest of Europe, USA and the rest of the world.**
- **Impact beyond academia: The BHF encourages researchers to engage with the public, to communicate and promote BHF-funded research through institutional open days, talks at schools, participation in fundraising events, science festivals and contact with the media.**
- **Supporting the research environment: In recognition of the part that funders play in nurturing a positive research culture, the BHF has engaged with initiatives to promote a fair and open research ecosystem.**

Call

In December 2021, the Scottish Funding Council launched a consultation on the future structure of the Research Excellence Grant. Amongst the proposals of the consultation was a proposal to increase the proportion of the pot given to REGc and supporting charity funded research from 11% of the total to 15%.

To continue to support research excellence and competitiveness across Scotland's universities, the Scottish Funding Council should implement the proposed increase of REGc from 11% to 15% of the overall REG fund. However, this should be complemented by an overall increase to the total amount of funding available through REG.

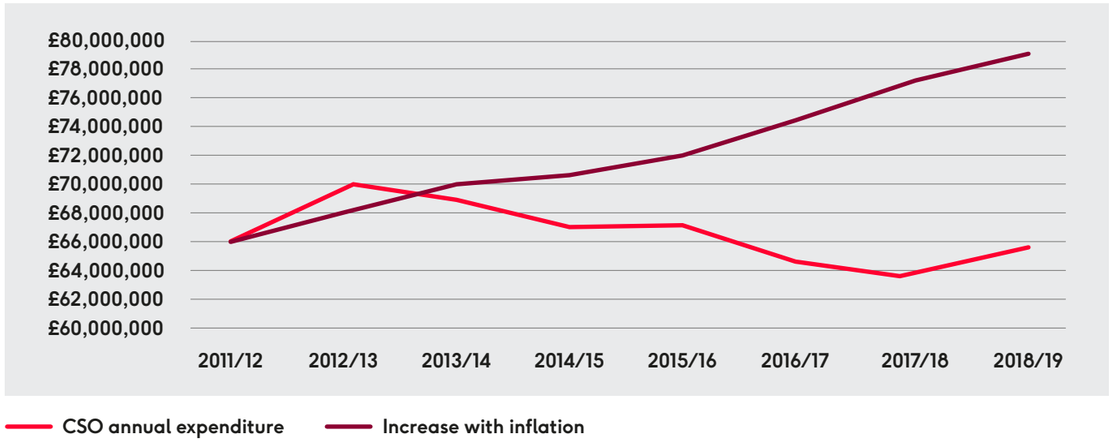
The missing piece: Clinical research funding

How clinical research is supported by the Scottish Government

Funding for clinical research in Scotland is managed through the Chief Scientist Office (CSO). The CSO provides funding for research through a range of programmes including:

- **Direct grant funding and funding to NHS R&D teams.**
- **Contributions to National Institute for Health Research (NIHR) programme grants to allow research in Scotland access to these competitive programmes.**
- **Funding for clinical research through NHS Research Scotland.**

For this, the CSO has a budget of around £65.5 million in 2018/19.[17] This budget has not been increased in a number of years and fell between 2011/12 and 2018/19 from £66.3 million to £65.5 million.[18] Accounting for inflation, this represents an effective decrease of more than £13 million (see graph below).



How Scotland's clinical research funding compares across the UK

The level of funding for clinical research through the CSO is relatively small compared to other UK nations. In 2018/19, the Chief Scientist Office provided £65.6 million of funding across its portfolio. When compared per capita to the NIHR's £1.06 billion budget in the same year, the CSO's funding is just 63.9% of NIHR's per capita.[19, 20]

This creates a range of issues for clinical researchers in Scotland. Firstly, this severely restricts the funds available to build infrastructure for clinical research. For example, funding for NIHR in England provides funding to support research through NIHR Biomedical Research Centres and NIHR Clinical Research Facilities.[21]

Similar facilities are not available for researchers across Scotland at the same scale and this creates significant restrictions on the access of patient to clinical research.

Secondly, it also restricts the funding opportunities available for health professionals to develop as clinical academics and researchers. In 2018/19, the CSO spent £1.8 million on fellowships compared to over £100 million invested by NIHR in 2019/20.[22, 23] Without sufficient funding available for health professionals to build research careers, there is a risk that talent is lost from the research environment, slowing the development of better, kinder treatments for disease.

Case Study: Professor David Newby

In 1995, David was awarded with a 2 year British Heart Foundation Junior Research Fellowship. This allowed David to study a PhD looking at ways to test blood vessels.

Following this PhD, David was able to gain a project grant from the BHF to test the techniques he developed during his study.

The work undertaken with this project grant allowed David to develop and gain a lectureship post with the University of Edinburgh. This post in turn allowed Prof Newby to gain further funding from the BHF and eventually become the British Heart Foundation John Wheatley Chair of Cardiology at the University of Edinburgh.

This career, supported by funding from the BHF allowed David to gain funding from the Chief Scientist Office to run the SCOT-HEART clinical trial. The trial looked at the use of CT coronary angiography for patients with suspected coronary heart disease and lead to changes in clinical guidelines on how heart disease is diagnosed.

This trial is also now being followed up with the SCOT-HEART 2 trial that has been funded by the BHF, looking at the use of CT coronary angiography to analyse the risk of and prevent myocardial infarction.

Past direct funding for his research, charity funding now plays a key role in the development of his team. Over his career Prof Newby estimates that around 90% of his PhD students and junior fellows have been funded in some form by the BHF.

Call

Clinical research is crucial to developing better, kinder treatments for heart and circulatory disease. To ensure that people affected by heart and circulatory disease in Scotland have the best possible standard of care, the Scottish Government must invest further in clinical research infrastructure and careers.

To ensure this crucial area of research is supported, the Scottish Government should increase funding to the Chief Scientist Office in line with the per capita funding of the NIHR by the UK Government.

This would mean increasing the budget of the CSO from it's current £65.5 million to £103 million with the aim of establishing and supporting research infrastructure and career development in Scotland.

This increase should utilise any Barnett consequentials generated from the UK Government's planned uplift to funding for NIHR to £2 billion by 2024–25.

The missing piece: The clinical research funding gap in Scotland

Funding for clinical research in Scotland is managed through the Chief Scientist Office (CSO) which provides funding for research through direct grants, contributions to NIHR programme grant and funding for research in the NHS via NHS Research Scotland.

For this, the Scottish Government allocated the CSO a budget of £65.5 million in 2018/19.[24] This figure has not been increased in a number of years and has fallen between 2011/12 and 2018/19 from £66.3 million to £65.5 million,[25] a fall of more than £13 million accounting for inflation.

This level of funding awarded from the Scottish Government is relatively small compared to other UK nations. Compared per capita to the budget of its English equivalent, the National Institute for Health Research (NIHR), the CSO budget is just 63.9% of that of the NIHR (£12.03 per capita in Scotland v £18.94 in England). This funding discrepancy has had a significant impact on certain elements on clinical research funding in Scotland. Through CSO funding, researchers are able to access direct funding for grants, but the lower level of funding means that gaps exist in the support of infrastructure and research careers. For example, the level of funding available to support clinical research careers in Scotland from the CSO is just 1.69% of that provided by the NIHR for England.

Additionally, the gap in funding for infrastructure has also created issues in the level of infrastructure available for clinical research in Scotland. Namely, researchers in England have access to a network of 20 NIHR Biomedical Research Centres and 26 NIHR supported Clinical Trial Units. However, a centrally funded network is not available in Scotland at the same scale. Whilst facilities do exist, many are reliant on funding from medical research charities and other sources.

To tackle this gap in funding and ensure that people affected by heart and circulatory disease in Scotland have the best possible standard of care, the Scottish Government must invest further in clinical research infrastructure and careers.

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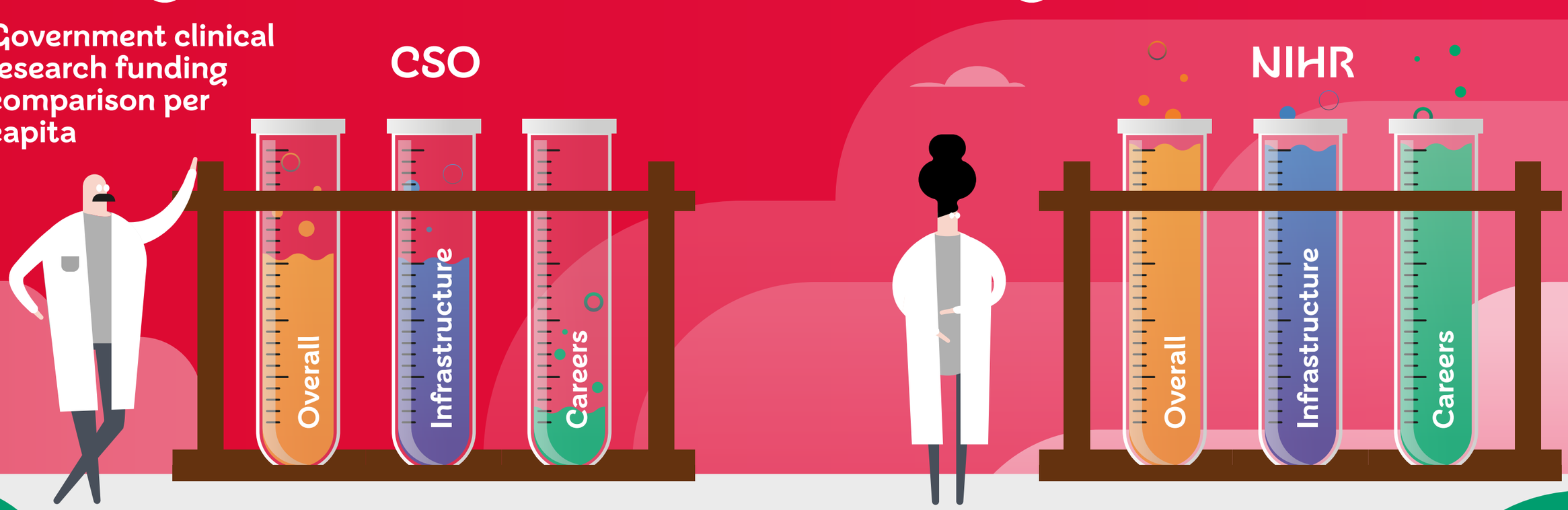

References

1. https://royalsociety.org/~/media/policy/Publications/2017/2017-05-technopolis-role-of-EU-funding-report.PDF
2. https://www.amrc.org.uk/our-sectors-footprint-in-2020
3. https://hrcsonline.net/wp-content/uploads/2020/01/UK-Health-Research-Analysis-2018-for-web-v1-28Jan2020.pdf
4. https://fraserofallander.org/research/the-economic-contribution-of-medical-funding-by-charities/
5. https://fraserofallander.org/research/the-economic-contribution-of-medical-funding-by-charities/
6. https://www.ippr.org/research/publications/research-at-risk
7. https://www.amrc.org.uk/Pages/Site/making-a-difference-impact-report-2021
8. https://www.amrc.org.uk/Handlers/Download.ashx?IDMF=739b1165-973c-4424-be5f-a86413ef92c3
9. https://fraserofallander.org/research/the-economic-contribution-of-medical-funding-by-charities/
10. https://www.amrc.org.uk/Handlers/Download.ashx?IDMF=739b1165-973c-4424-be5f-a86413ef92c3
11. https://hrcsonline.net/reports/analysis-reports/uk-health-research-analysis-2018/#dashboard
12. https://www.bhf.org.uk/what-we-do/our-research/funding-across-the-uk-visual/funding-across-the-uk
13. https://www.sfc.ac.uk/funding/funding-announcements/funding-announcements.aspx?#2021-22
14. https://www.ukri.org/our-work/what-we-have-funded/research-england/re-funding-allocations-from-2021-to-2022/
15. https://webarchive.nrscotland.gov.uk/20171104030043/http://www.sfc.ac.uk/funding/outcome-agreements/outcome-agreements-2014-15.aspx
16. https://www.sfc.ac.uk/publications-statistics/consultations/2021/SFCCN012021.aspx
17. https://www.cso.scot.nhs.uk/wp-content/uploads/CSO1819OTsummary.pdf
18. https://www.cso.scot.nhs.uk/wp-content/uploads/CSO_2011_2012_Summary.pdf
19. https://www.cso.scot.nhs.uk/wp-content/uploads/CSO1819OTsummary.pdf
20. https://www.nihr.ac.uk/documents/annual-report-20182019/24559
21. https://www.nihr.ac.uk/explore-nihr/support/cardiovascular-partnership.htm
22. https://www.cso.scot.nhs.uk/wp-content/uploads/CSO1819OTsummary.pdf
23. https://www.nihr.ac.uk/documents/annual-report-20182019/24559
24. https://www.cso.scot.nhs.uk/wp-content/uploads/CSO1819OTsummary.pdf
25. https://www.cso.scot.nhs.uk/wp-content/uploads/CSO_2011_2012_Summary.pdf

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Heart and circulatory diseases kill 1 in 4 people in the UK. They cause heartbreak on every street. But if research can invent machines to restart hearts, fix arteries in newborn babies, build tiny devices to correct heartbeats, and give someone a heart they weren't born with – imagine what's next.

We fund research into all heart and circulatory diseases and their risk factors. From heart attack and stroke, to vascular dementia and heart failure, we won't stop funding research until we can cure and treat every single one.

We must keep up the pace of progress to protect the people we love. Our children. Our parents. Our brothers. Our sisters. Our grandparents. Our closest friends.

You and the British Heart Foundation.
Together, we will beat heartbreak forever.