Executive Summary

The effectiveness of public spending on R&D

- Long-term sustained investment is required to result in a greater step change to support the next generation of research leaders and entrepreneurs, and address our greatest medical challenges
- It is important to enable and support multidisciplinary, collaborative and international research to address complex areas like Dementia
- Given the role medical research charities play in translating research into development, they should be considered as equal partners in applications to the Industrial Strategy Challenge Fund
- As public funds are invested in health and medical research to address issues experienced by patients, it is essential that patient and public involvement be encouraged across all research areas to inform public spending on R&D

The rationale needed for deciding on the balance of public R&D funding between:

Pure and applied research

- It is important to ensure an equal balance of pure and applied research to deliver beneficial outcomes for patients, and pure research should not be neglected in light of the recent increased focus on applied research

The two research funding streams of the ‘dual support’ system

- The Charity Research Support Fund urgently needs an uplift in line with inflation in order to ensure medical research in universities has a sustainable future and universities maintain their international reputations for research excellence
- Government should uphold the commitment set out in the Industrial Strategy White Paper to increase support for Quality-Related research through Research England, a critical source of funding that supports the wider university context and community that enables the excellent project research being carried out in the UK

Global challenges and other strategic/national priorities

- It is important that public investment in R&D focuses on societal challenges and areas of unmet need, such as Dementia, since a strategic focus on such challenges increases research capacity and provides critical infrastructure

The effectiveness of and balance between the different available UKRI/Government levers for encouraging innovation

- New levers will need to be implemented to increase medical research charity investment in R&D, which can contribute to the goal of increasing R&D spend by 2.4% of GDP in R&D by 2027, as medical research charities are able to leverage significant funding from the private sector
- Government should extend the principles of its R&D tax credit policies as a tool to drive medical research charity investment
- Changes should be made to the UK pension funds regulations, as these are a source of long-term investment capital which has the potential to renovate the supply of capital to R&D
About Alzheimer’s Research UK

1. Alzheimer’s Research UK is the leading dementia research charity. We have funded over £100 million to date in world-class research at leading universities and research institutions across the UK and have committed to funding a further £250 million by 2025. We are dedicated to finding new ways to diagnose, prevent, treat and understand dementia.

2. Our research strategy is targeted to deliver research that offers the most potential for improving the outcomes of people living with dementia. Increased and sustained investment in research is critical to help deliver the treatments and outcomes that will offer hope to people living with dementia and reduce the massive societal and economic burden.

3. We are currently funding a range of strategic initiatives such as the Dementia Research Institute, a milestone investment in dementia research and a successful example of partnership between government and charity funding to support R&D. We are also accelerating translation of research from the laboratory towards early drug discovery through different initiatives mentioned here.

Q1. The effectiveness of public spending on R&D

4. The private sector is responsible for approximately two-thirds of UK R&D investment, with most of the remaining investment coming from government. Charity and EU funding represent a smaller proportion of the investment portfolio, but play a critical role in supporting R&D. Return on past investments on R&D can be shown both in improved health outcomes for the general population, and in direct financial returns. To date, cancer has shown the largest health gain. UK public and charity research investment in cancer was around £290 million per year between 1976 and 1995, representing 17 per cent of global investment, which generated a net health gain valued at £6.5 billion between 1991 and 2010.

5. While dementia research has seen recent increases in funding and charity-led initiatives are expanding capacity in the UK dementia research landscape, we see clear evidence that long-term sustained investment, as mentioned above in the case of cancer research, is required to result in a greater step change to support the next generation of research leaders and entrepreneurs. Below are recommendations for Government to support future research. These are targeted at dementia as one of our greatest medical challenges but can also be applied to other disease areas.

I. Increase strategic investment in people, projects and infrastructure to grow the research base

The Government challenge on Dementia 2020 provides the necessary strategic focus, resulting in a step change in investment and researcher capacity. Between 2008-9 and 2014-15 both the number of UK dementia publications and the number of UK dementia researchers almost doubled, showing a really positive impact. However, stark differences in investment remain compared to other disease areas. For example, for every £2 million of disease costs there were 10 cancer researchers for every 1 dementia researcher. This gap needs to be addressed given the significant impact dementia has on people and the economy.

II. Enable and support multidisciplinary and collaborative research

Besides affecting a vast number of people, who have different genetic, environmental, and lifestyle characteristics, the diseases that cause dementia display huge clinical, pathological, and biological complexity. To address complex areas like dementia, a collaborative and multidisciplinary approach is necessary, and given the global challenge of dementia international collaborations should also be supported. By having a strategic focus on dementia, between 2008-9 and 2014-15 the number of
Internationally collaborative UK dementia publications increased 10%. Government needs to ensure that the UK continues to participate in EU research programmes, and venture capital schemes, and that following Brexit the UK’s immigration system continues to attract top talent. This will ensure progress in dementia research to date is built on and that the UK can remain a global leader in medical research. Similar strategic approaches could be applied to other disease areas.

**Recognising the role of the charity sector in the UK’s changing research landscape**

6. Medical research charities play a critical role in contributing to life sciences research, as part of the UK’s diverse funding base which includes funding from industry, public sector, charities, philanthropic and venture sources. This funding base has been essential in positioning the UK as a world leader in the life sciences.

7. Charities invest in novel ideas to increase knowledge about diseases, support researchers across their career and de-risk ambitious projects for future investors. Due to the cost of drug development, which charities are unable to cover, we invest in early-stage drug discovery research, and act as honest brokers bringing together funders, university researchers, industry, regulators, patients and care providers in areas of unmet need to catalyse further investment. Charities are therefore uniquely positioned to support collaborative, interdisciplinary and patient-centred research.

8. Alzheimer’s Research UK welcomes the introduction of the Industrial Strategy Challenge Fund (ISCF) and plans for its use to distribute some of the £4.7 billion of new R&D funding that the Government has committed. We acknowledge that this funding is focused on industrial R&D, however, given the role that many medical research charities play in translating research into development and productivity we would welcome recognition for this by being able to be considered as equal partners in such applications.

**Case study: Dementia Discovery Fund**
The Dementia Discovery Fund (DDF) is a great example of a successful collaboration between government, charities and industry to provide essential investment in R&D. The DDF makes early stage venture capital investments to develop novel disease-modifying therapeutics for all forms of dementia. The fund brings together strategic investors (pharmaceutical companies, the UK Department of Health and Social Care and Alzheimer’s Research UK) and is managed by SV Health Investors. Since its launch in October 2015, the DDF has made significant progress building an initial portfolio of 16 investments in drug discovery companies. The fund recently announced the completion of its fundraising, including investment from Bill Gates. The total £250 million raised has far exceeded its initial target of £130 million. Strong leadership from government was instrumental in creating the DDF and a partnership with a medical research charity in the space not only added additional funds, but also helped drive the collaborative nature of the model. We believe that this model could be extended to other disease areas, where there is a need to attract investment to high risk, expensive early drug discovery and development.

**Patient and public involvement in research**

9. Many funders globally have recognised patient and public involvement (PPI) as best practice, being an essential requirement to receive funding. As public funds are invested in health and medical research to address issues experienced by patients, active public involvement in healthcare research should be supported. This should include all aspects of the research process including priority setting, design, conduct and dissemination.
10. Involving the public and patients who have first-hand experience of a certain disease or condition ensures research is relevant, ethical, participant-friendly, and that results are widely disseminated and implemented. It is essential that patient and public involvement (PPI) be encouraged across all research areas, and charities have adopted strategies to ensure research results in outcomes that matter most to people, as shown in the case study below.

**Case study: Alzheimer’s Research UK Lay Review Panel**

The public and patients can play a really important role in helping to support the best clinical dementia research, therefore Alzheimer’s Research UK assembled a Lay Review Panel to review research grant applications. We recruited people with experience of dementia, who input by commenting on whether studies are practical for people with dementia and are addressing issues that are important for people affected and their families. Lay members read a selection of application summaries and complete a short review form with comments, which are included in our funding decision process. They may also be invited to attend our research grant review panel meetings as observers. We believe that by better understanding patient preferences we are able to focus investment in areas of research that are most relevant to the public, and this approach could be adopted to inform public spending on R&D more widely.

**Q2. The rationale needed for deciding on the balance of public R&D funding between:**

**Q2.1. Pure and applied research**

11. As Government invests more in mission-led approaches (such as the ISCF) to increase focus on application of knowledge and commercialisation, it is important to ensure a balance of pure and applied research to deliver beneficial outcomes for patients. The importance of this ‘translational research’ is evident in medical research: novel research ideas and approaches are moved into the clinic, leading to later-stage clinical research, where the benefit for large numbers of people with a disease or condition can eventually be demonstrated in larger trials. However, to benefit patients, pure research should not be neglected in light of the recent increased focus on applied research. Funding is needed both to develop novel research ideas through pure research and to enable these discoveries to move towards the clinic through applied research. Public investment in pure and applied research complement pharmaceutical R&D investment, de-risking projects and stimulating private-industry investment. This approach has been successfully adopted by Alzheimer’s Research UK, where several initiatives have been set up in partnership with Government and the private sector.

**Case study: role of Alzheimer’s Research UK in pure and applied research**

Alzheimer’s Research UK’s research strategy is aimed at supporting an environment with the most potential for patient benefit, which involves an equal balance of pure and applied research. Therefore, we fund pure research through academic grants, and we are also currently funding the Dementia Research Institute which contributes to the base of discovery science. In addition to funding pure research, Alzheimer’s Research UK also funds applied research to accelerate breakthroughs in R&D. The pure research we fund feeds its discoveries into applied research initiatives like our Dementia Discovery Fund, mentioned above. Government investment in such initiatives was critical to catalyse private investment, and our balance of investment in pure and applied research and the collaborative models between academia and industry that we support, ensure that there is a favourable ecosystem for dementia research to progress and for benefits to reach patients as soon as possible.
Q2.2. The two research funding streams of the ‘dual support’ system

12. The UK’s research excellence significantly depends on world-class research environments provided by UK universities. The dual support system for university research supports this environment, as diverse modes of funding allow academics the flexibility to adapt their research, create collaborations, and respond to different challenges and opportunities. This approach, that provides block funding for universities as well as response-mode funding from UKRI, is essential to the UK’s research base and new R&D funding should continue to be allocated accordingly.

**Quality-Related funding**

13. Research funding from UKRI is incredibly valuable, as it rewards the best peer-reviewed competitive bids and delivers discrete outputs and impacts. However, quality-related (QR) funding awarded as block grants to universities is also necessary. These awards support the wider university context and community that enables the excellent project research being carried out. The flexibility of QR funding allows universities to offer academic careers, pursue new ideas, and support early-career researchers. This funding also makes it possible to integrate teaching and research, and gives universities the opportunity to participate in international partnerships or business collaborations.

14. That is why it is critical that government upholds the commitment set out in the Industrial Strategy White Paper to increase support for QR research through Research England. This will enable universities to deliver more with QR, especially since certain new schemes require universities to contribute match-funding.

15. In July 2018, the Wellcome Trust published a report titled ‘Case studies on the impact of mainstream Quality-Related funding and Research Excellence Grants’ which includes case studies that show how QR funding is critical for the UK research funding system. These case studies illustrate how the stability of this source of funding enables institutions to develop and implement long-term research strategies, in contrast to other sources of public funding for research.

**Charity Research Support Fund**

16. QR funding is also essential for the relationship between medical research charities and UK universities. There is a specific charity support element of non-mainstream QR which enables universities to leverage investment from charities, termed the Charity Research Support Fund (CRSF). Since 2010 the CRSF was fixed at £198 million per annum for over 7 years; a real-terms decrease over this period. For 2018/19, there has been a small uplift of 3% which is a welcome first step, but this still falls short on the significant increase in charity investment on research over this period and impact of inflation. By failing to keep pace with this increased charity investment, researchers in universities in receipt of charity-funding are facing significant shortfall and the sustainability of medical research charity funding is being put at risk.

17. In addition, there are significant near-term benefits to investing in medical research, including dementia. Every £1 spent by the Government on R&D increases private sector productivity by 20p every year. In areas like dementia, where private investment has historically lagged due to increased risk and a higher clinical trial failure rate, public investment drives other funders into the field and creates opportunities for economic benefit even before a treatment is found.
Q2.3. Global challenges and other strategic/national priorities

**Strategic investment needed to boost research in areas of unmet need**

18. It is important that public investment in R&D focuses on societal challenges and areas of unmet need. Dementia is one of our greatest medical challenges. The scale and impact of the challenge of dementia makes it important to invest in dementia research and this must continue to be a priority area for R&D in the UK. There are an estimated 850,000 people living with dementia in the UK today, a number forecast to rise rapidly as the population ages. Dementia is now the leading cause of death in the UK. Dementia costs the UK economy over £26 billion a year, a combination of health and care costs and the contribution made by informal carers.

19. Recognising this challenge, in 2015 the UK government published the challenge on dementia 2020, an iteration of the 2012 dementia challenge, outlining the government’s aims to improve dementia care, support and research by 2020. Since 2012, Government investment in dementia has increased from £44m to £83.1m, almost double. By positioning dementia as a priority and focus area for strategic investment, the research capacity has seen a significant increase, and critical infrastructure to address specific challenges. This includes the Dementias Platform UK, a data-sharing public-private partnership funded by the Medical Research Council, as well as the Dementia Research Institute.

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**Case study: Dementia Research Institute**

The UK Dementia Research Institute (DRI) is a milestone investment in dementia research, and a successful example of bringing together government and charity funding to support R&D. As a founding funder, Alzheimer’s Research UK joined forces with the Medical Research Council and Alzheimer’s Society to make a long-term investment in the UK DRI, which plays an essential role in the search for the first life-changing treatments for dementia. The UK DRI is an Institute made up of six centres across the UK, and will be home to over 400 researchers from a range of disciplines. The UK DRI aims to build a solid base of discovery science, feeding its discoveries into existing initiatives like Alzheimer’s Research UK’s Drug Discovery Alliance to accelerate breakthroughs in R&D. This institute will therefore become a critical hub for dementia research, facilitating collaborative and multidisciplinary research, and was only made possible by strategic investment.

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Q3. The effectiveness of and balance between the different available UKRI/Government levers for encouraging innovation

20. In order to meet the goal of increasing R&D spend by 2.4% of GDP in R&D by 2027, it will be essential to recognise the crucial role medical research charities have in the UK’s R&D base. New levers will need to be implemented to increase medical research charity investment in R&D, which can also contribute to this goal as medical research charities are able to leverage significant funding from the private sector. In medical research, the process to move from initial discovery to patient benefit can take around 10 years, and the time needed to make those initial discoveries is impossible to predict. For this reason, encouraging innovation involves long-term investment. Early-stage medical research needs nurturing – it requires patient, long-term capital in order to fulfil its long-term potential. As mentioned above, our Dementia Discovery Fund is a good example of how government seed funding is able to leverage further private investment (please see p.2). However, due to the scale of the challenge of dementia, additional levers are required.
**R&D tax credits**

21. R&D tax credit schemes for businesses have been successful in incentivising investment in R&D. However, these R&D tax credits are designed for businesses that directly employ researchers and not for charities who fund via research institutions. Charities are increasingly working as honest brokers and partnering with industry and other partners to de-risk and stimulate investment in the field of dementia prevention and treatment. Government should extend the principles of its R&D tax credit policies as a tool to drive medical research charity investment. It is important to note that charities will reinvest any funding received back into research.

**Pension regulation changes**

22. The capital available to date has not been sufficiently long-term in scope. The venture capital model, for example, usually raises funds for a five- or seven-year term, which is too short for medical research to convert discoveries into patient benefit. A possible source of long-term investment capital are the UK pension funds, and small changes in investment have the potential to renovate the supply of capital to R&D.

If you have any queries, or would like to discuss any of our responses in more detail, please contact Dr Alison Evans, Head of Policy on 01223 896635 or alison.evans@alzheimersresearchuk.org.

**Declaration of interests**

We do not have any interests to declare.