

# The future of cardiovascular research in Ireland

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## Introduction

The potential benefit of cardiovascular research for the country is very significant, specifically leading to improved health outcomes for people and contributing to the development of the knowledge economy in Ireland. Cardiovascular research may span basic science, translational research, clinical trials, health service research and research on the determinants and promotion of health in the population. To realise its potential, cardiovascular research will require an integrated and multidisciplinary approach. The area is of key strategic importance to Ireland based on the current prevalence of cardiovascular disease and predicted population demographics. While the contributions of many clinicians in Ireland to cardiovascular research down through the years is acknowledged elsewhere in this issue, the current article will focus on the future potential to develop this area.

## Investments in biomedical research

The Irish Government has invested substantial amounts of money in the development of basic biomedical research infrastructure in Ireland in recent years. The capital elements have been largely provided through the Programme of Research in Third Level Institutions (PRTLTI) administered by the Higher Education Authority (HEA). This has resulted in the establishment of major research institutes in all universities including the National Centre for Biomedical Engineering Science in NUI Galway, Conway Institute in UCD, Institute for Molecular Medicine in TCD, Biosciences Institute in UCC and the Institute for Biopharmaceutical Sciences at RCSI. In addition, Science Foundation Ireland was established, resulting in substantial funding for biomedical researchers located in all of the above institutes.

Science Foundation Ireland has a broad range of programmes to fund individual investigators, clusters of researchers and large interdisciplinary programmes called Centres for Science Engineering and Technology (CSETs). CSETs are funded in partnership with industry and, in addition to standard academic metrics, are expected to generate industrial outputs and to

engage in substantive outreach and education activities. This investment has resulted in a scenario that would have been difficult to imagine in Ireland 20 years ago, with state-of-the-art research facilities and well-funded investigators.

## Biomedical research at NUI Galway

I will describe the National Centre for Biomedical Engineering Science (NCBES) as an example of the types of research capabilities that are developing in Ireland at the current time. Biomedical engineering science was chosen by NUI Galway as a priority research area in the late 1990s. The goal of this initiative was to bring together researchers from the Faculties of Medicine and Health Sciences, Science and Engineering to engage in collaborative research. As a large cluster of medical device companies, including Medtronic, Abbott and Boston Scientific are located in Galway, a significant focus of the research is in the cardiovascular arena. It is recognised that the future success of biomedical research in the cardiovascular as well as other areas will depend on substantive interactions between researchers with a broad range of expertise and that many scientific discoveries will occur in areas of overlap between current disciplines.

NCBES received funding under all rounds of PRTLTI, resulting in the construction and equipping of a state-of-the-art research facility, which houses researchers from the three faculties. The programme has a number of research clusters including biomaterials, biomechanics, tissue engineering and regenerative medicine, all of which interact closely and have specific interests in cardiovascular disease. NCBES also includes a GMP grade manufacturing facility for gene vectors and stem cells.

In addition, there are strong links with clinicians in Galway University Hospital, in keeping with the translational goals of the programme. This type of multidisciplinary research will be required to an increasing extent in the future. There has been a large emphasis on collaboration between Irish universities as part of the PRTLTI process and the government is now putting substantial effort into promoting this interaction further with additional funding.

## Health research

Having invested heavily in basic biomedical research, there is now a need for increased investment in health research. This development will add substantially to the return on the investment to date in basic research, as currently there is an obstacle to translating basic findings from the laboratory to the bedside. The health research community in Ireland, including cardiovascular researchers, will have a significant opportunity to contribute to this development.

For the potential of health research to be realised, a number of developments are needed and these are outlined in a recently published document from the Advisory Council on Science, Technology and Innovation (ACSTI). There is a broad recognition that there are multiple benefits of undertaking health research for both patients and society at large. The main areas outlined in the report, which will need to be addressed in the coming years to support health research in the cardiovascular and other areas, are: the need for a National Health Research Policy led by the Department of Health and Children and feeding into the new government structures overseeing the national research agenda, the need for close interaction between universities and hospitals, the need for increased funding of health research based on international peer review of projects, the need for investment in human capital, education and infrastructure, and the development of the health service as a place where innovation can thrive and be captured for the benefit of society.

## Protected time for health research

While a detailed description of all issues is beyond the scope of this article, the interested reader can refer to the ACSTI report. However, a number of points will be addressed here. There is an urgent need for increased numbers of clinicians with protected time for health research. This may be addressed by including designated research sessions in a consultant's contract, but would also be aided by recruiting a cadre of investigators with substantial protected clinical research time. The HEA and Health Services Executive (HSE) have approved eight academic clinician posts this year, with eight academic and three clinical sessions to support the educational mission of the medical schools as recommended in the Fortrell report. An additional 16 posts are planned for next year. A similar initiative is needed in the area of health research.

The Health Research Board (HRB) has introduced the Clinician Investigator Scheme to allow clinicians to spend eight sessions in health research. There are limited funds for this excellent initiative, with just two awards available per year. The awards are only open to clinicians in service and it is crucial that, in the event of success, the HSE will appoint an additional consultant to ensure that service delivery needs are met.

## Clinician involvement and training

In addition to increasing the number of posts with protected time, it will be crucial to keep all clinicians involved in health research if the full potential is to be realised. This should be borne in mind as university restructuring is implemented. Efforts are needed to ensure that clinician involvement in the university is protected and valued. In addition to protected time for clinicians, there is a need for multidisciplinary research similar to the situation alluded to above in the university. All disciplines in the health service should be encouraged to collaborate in research projects. There is an urgent need to develop a cadre of research nurses and the same applies to other allied health professionals.

One challenge to be met is the need for an adequately trained workforce to allow health research to flourish. This should be considered in the context of medical curriculum reform and programmes such as MB/PhDs should be developed. In addition, the postgraduate training bodies should develop training programmes for academic clinicians. There will also be a need for health service researchers and experts in population health. Finally, the research career needs of allied health professionals will need to be addressed.

## A national research infrastructure

Another exciting development in Ireland recently is the construction of clinical research facilities (CRFs). Until recently, RCSI/Beaumont had the only CRF in Ireland. Two other facilities have recently been opened in St Vincent's/UCD and the Mater/UCD. Recently, the Wellcome Trust and HRB have announced funding for a CRF to be built in St James's/TCD. Proposals are currently under consideration to construct facilities in Cork and Galway. All CRFs should collaborate to create a unified clinical research network in Ireland. This initiative should be extended to include the Wellcome-funded CRF recently announced for Belfast.

The cardiovascular research community in Ireland has a major opportunity to develop a national cardiovascular research programme centred in these facilities. Under the guidance of the Dublin Molecular Medicine Centre (DMMC), the Irish Clinical Research Network (ICRIN) has recently been established. ICRIN has recently sought operational funding from the HSE and HRB and has joined the European Clinical Research Network. This is a particularly important initiative, as large amounts of funding have been targeted under the EU seventh framework programme for clinical research. The extension of the DMMC model nationally should now be considered. The population of Ireland, while small, has advantages, and the country should be viewed as a national centre for translational research. This approach makes sense when one considers that the population of the Republic of Ireland is approximately equal to that of the greater Chicago area in the US.

A nationally integrated and adequately resourced clinical research infrastructure will allow many opportunities for cardiovascular research. This clinical research infrastructure should also include health service research and population health capacities. As cardiovascular disease is the most common cause of death in Ireland it is likely to feature prominently in any future national health strategy and a bench to bedside to population approach to research should be encouraged.

## Summary

In summary, there is a need to apply the same model of funding to health research as has been applied to basic biomedical research in recent years. This should be done as part of a national health research strategy that encompasses priority research areas, governs structures between universities and hospitals, and ensures adequate funding, including human capital and infrastructure, and an appropriately skilled workforce.

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