

A new analysis of diabetes research across 31 European countries suggests outputs and funding are declining, as the health burden of the condition continues to increase. A boost to the research effort is urgently needed to address the challenge of diabetes in Europe

IS EUROPEAN DIABETES RESEARCH STEPPING UP TO THE CHALLENGE?

According to World Health Organization data, the average percentage of disability-adjusted life years (DALYs; lost years of 'healthy' life) attributable to diabetes increased across Europe from 2.0 per cent to 2.6 per cent between 2002 and 2012. These data, collected for the 31 European countries (EUR31; the European Member States plus Iceland, Norway and Switzerland), reflect the growing health burden of the condition. In 2012, the DALY diabetes level ranged from 1.3 per cent in the UK to 4.9 per cent in Cyprus (Table 1).

Research is needed to address the challenges that the increase in diabetes burden poses to the European nations. A new paper from researchers at King's College London, and colleagues elsewhere, reports on the output and funding for diabetes research in Europe from 2002 to 2013. The study was part of the Mapping Non-Communicable Diseases project, funded by the European Commission under the 7th Framework Programme. It sought to map research activity and identify gaps and overlaps in diabetes research, and point out areas where future strategies should be focused.



European diabetes research outputs

The researchers retrieved 40,547 diabetes papers from the Web of Science. These were categorised by the fractional presence of each of the EUR31 countries among the authors (thus, if there was one French author, one 'point' was counted, if there were two, it was two 'points' and so on). They were also analysed with respect to each country's gross domestic product (GDP). Finally, an analysis of diabetes topic covered in the paper (eg type of diabetes, complications etc) was carried out. Information on funding sources was also collected. Research expenditure was calculated using previous evidence that the average funding involved in a research paper is €260,000.

The above analysis shows that the European presence in diabetes research has gone down from 44 per cent of the world total output in 2002 to 36 per cent in 2013 (and only 33 per cent in 2015). While the proportion of European biomedical research on diabetes rose between 2002 and 2013 from 1.4 per cent to 1.6 per cent, the researchers note that this rise is lower than the rise in the burden imposed by the condition.

An analysis of research output from the EUR31 against GDP shows that, relative to its wealth, Denmark carried out the most diabetes research, followed

Table 1: Sample DALYs from diabetes in Europe (2012)

Country	DALYs (%)
Cyprus	4.9
Portugal	4.3
Spain	3.7
Italy	3.5
Greece	2.2
Iceland	2.0
Finland	1.8
Lithuania	1.8
Romania	1.8
UK	1.3

by Finland and Sweden, then Croatia. France, Norway and Romania did much less research than might have been expected from their GDP. Overall, the UK led the EUR31 countries in diabetes research, publishing 30 per cent more than Germany, which came second.

Diabetes research topics

Almost one third of papers analysed for this study were on Type 2 diabetes, followed by cardiovascular complications (14 per cent) and Type 1 diabetes (14 per cent).

Other topics accounted for less than 10 per cent of output, as follows:

- nephropathy – 7 per cent
- retinopathy – 4 per cent
- liver complications – 3 per cent
- feet, gestational diabetes, psychosocial complications, hypoglycaemia – < 2 per cent
- Maturity Onset Diabetes of the Young (MODY), neonatal diabetes, latent autoimmune diabetes of adults (LADA) – < 1 per cent.

There were some interesting differences in topic choice between countries. Finland is very active in Type 1 diabetes research (although it was also the first country to raise the prospect of Type 2 diabetes being prevented). Type 2 diabetes research is strong in the Netherlands, Greece and Slovenia. In diabetes complications, Poland was focused on nephropathy, Slovenia, Croatia and Norway on retinopathy, and Portugal, Hungary, Slovakia and

the Czech Republic on neuropathy. Italy focuses more on the liver, and Greece, the UK and Germany on diabetic foot.

Research funding

The total estimated funding of diabetes research in Europe amounted to €986 million in 2013. When it came to diabetes topics, research on LADA and MODY attracted most support in terms of number of funders (even though they are relatively small subject areas). In contrast, hardly any funding went to research on the diabetic foot, with fewer than half of papers analysed revealing any funding. Where no research funding organisation was listed, the research was likely supported by the authors' institutions' core or structural funding, or by government via the investigators' contracts.

Overall, governments, including regional ones, provided the most support for diabetes research – at 30 per cent of the total. In France and Spain, government funds over half of research. Regional governmental support is particularly important in Belgium (23 per cent), Spain (19 per cent), Norway (17 per cent), Sweden (15 per cent) and Italy (10 per cent).

Meanwhile, the private non-profit sector made the largest contribution to diabetes research funding in the Nordic countries, including Iceland, and the Netherlands. Industry provides 13 per cent of the European total research funding, with the most support occurring in Denmark (29 per cent), Germany (19 per cent) and the UK (13 per cent). The European Commission provided 2.7 per cent of support in total, but this was far higher in some small countries, including Latvia, Estonia and Slovakia.

The leading private non-profit organisations supporting diabetes research were Diabetes UK (150 papers), the Wellcome Trust (141 papers), the Dutch Diabetes Research Foundation (109 papers) and the British Heart Foundation (106 papers).

Finally, nine companies supported over 50 papers each, with the Danish company Novo Nordisk A/S leading the field by a long way, supporting 431 papers, followed by Sanofi-Pasteur,

Eli-Lilly Co Inc, Novartis s.a, AstraZeneca, Merck and Co Inc, Pfizer Inc, Hoffman La-Roche and Boehringer Ingelheim AG.

Research boost needed

This report shows that the growth of diabetes is being paralleled by a declining research output in Europe, from 44 per cent to 33 per cent of the world's published papers from 2002 to 2015. Thus, although there have been significant advances, more activity and funding in diabetes research are needed to keep pace with the challenge the condition poses in the EUR31 nations. Research outputs are growing at different rates, with those from the countries in Eastern Europe growing more rapidly than those from the countries in Western Europe.

These findings must be taken on board when planning future funding streams and promoting exchange and mobility of researchers between centres. They also have implications for planning pan-European research funding from the European Research Council, Horizon 2020 and the Innovative Medicines Initiative.

It is clear from this new study that competencies and expertise in different diabetes topics vary across countries. Of particular concern are the implications of Brexit, given that the UK is a major player in diabetes research. It is hard to predict how its role in the European landscape will change and how this will impact the field.

The authors recommend that European funders and policymakers should match up the findings on outputs and funding with trends in diabetes burden when they are planning their diabetes research portfolios.

i This is a digested version of Begum M, Lewison G, Sommariva S et al (2017). European diabetes research and its funding, 2002–2013. *Diabetic Medicine* 34; 1354–1360. To download this paper, go to <http://onlinelibrary.wiley.com/doi/10.1111/dme.13411/pdf>

“The implications of Brexit are now of particular concern, given that the UK is a major player in diabetes research in terms of both output and funding”