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Increasing European Support for Neglected Infectious Disease Research

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ABSTRACT

Neglected infectious diseases (NIDs) are a persistent cause of death and disability in low-income countries. Currently available drugs and vaccines are often ineffective, costly or associated with severe side-effects. Although the scale of research on NIDs does not reflect their disease burden, there are encouraging signs that NIDs have begun to attract more political and public attention, which have translated into greater awareness and increased investments in NID research by both public and private donors. Using publicly available data, we analysed funding for NID research in the European Union's (EU's) 7th Framework Programme for Research and Technological Development (FP7), which ran from 2007 to 2013. During FP7, the EU provided €169 million for 65 NID research projects, and thereby placed itself among the top global funders of NID research. Average annual FP7 investment in NID research exceeded €24 million, triple that committed by the EU before the launch of FP7. FP7 NID projects involved research teams from 331 different institutions in 72 countries on six continents, underlining the increasingly global nature of European research activities. NID research has remained a priority in the current EU Framework Programme for research and innovation, Horizon 2020, launched in 2014. This has most notably been reflected in the second programme of the European & Developing Countries Clinical Trials Partnership (EDCTP), which provides unprecedented opportunities to advance the clinical development of new medical interventions against NIDs. Europe is thus better positioned than ever before to play a major role in the global fight against NIDs.

Contents

1. Introduction

Neglected infectious diseases (NIDs) comprise a highly diverse group of communicable illnesses that disproportionately affect poor populations in low- and middle-income countries (LMICs) in tropical and subtropical parts of the world. NIDs affect more than one billion people [1] and are responsible for more than 500,000 deaths every year [2]. While NIDs disproportionately affect the poorest countries in the world, they are not exclusively a problem of developing countries. The recent and devastating outbreak of Ebola in several West African countries demonstrated that NIDs can rapidly develop into a global threat. It also illustrated how social stability, economic growth, regional peace and national security can be threatened by an emerging disease outbreak when no adequate medical interventions are available.

Combating and controlling NIDs is therefore a global challenge, but a number of scientific and commercial obstacles impede the development of new medical products. Of the 850 new therapeutic products registered between 2000 and 2011, only 18 (2%) were indicated for NIDs [3]. As a result, patients with NIDs are often treated with antiquated drugs that are ineffective, toxic or difficult to administer, while for

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some NIDs such as Buruli ulcer no drugs or vaccines of any kind are available.

When world leaders adopted the Millennium Declaration in September 2000 [4], the fight against "HIV/AIDS, malaria and other diseases" was included as the sixth goal. This resulted in significant global support to combat the three major poverty-related diseases (HIV/AIDS, malaria and tuberculosis), whereas other important diseases of poverty were largely overlooked [5]. This situation has improved significantly over recent years, and the international community has become increasingly aware of the importance of confronting NIDs. In their statement of 9 October 2015, the ministers of science from the G7 countries expressed their resolve to support the fight against neglected tropical diseases, in line with the declaration of the G7 leaders at their meeting in Elmau, Germany on 8 June 2015 [6]. Similarly, the heads of state of the BRICS countries (Brazil, Russia, India, China and South Africa) included the fight against neglected tropical diseases in the Ufa declaration in July 2015 [7]. These high-level statements align well with target 3–3 of the Sustainable Development Goals, which promises to end the epidemics of AIDS, tuberculosis, malaria and neglected tropical diseases, and to combat hepatitis, water-borne diseases and other communicable diseases by 2030.

In parallel with this greater political attention, several major donor organisations have increased their funding of NID research. Despite the financial crisis, overall global R&D funding for 13 neglected tropical diseases increased by more than 70% between 2007 and 2011, from US$268 million to US$464 million [8]. This has partly been a consequence of increased donations from private charitable organisations such as the Bill and Melinda Gates Foundation, but LMICs, in particular some emerging economies, have also begun to support NID research on a larger scale. More academic and public research organisations have therefore increased their engagement in NID research, while a number of pharmaceutical companies have created dedicated facilities for the development of new interventions against NIDs.

The largest funder of public research within Europe is the European Union's (EU's) multiannual Framework Programme (FP), which has supported research on NIDs since the 4th Framework Programme (FP4, 1994–98), when International Cooperation (INCO) activities were introduced. INCO was one of the first major research funding schemes to focus specifically on NID research through transnational collaborative research. Between 1997 and 2006, it provided some €70 million support for 55 NID research projects. The projects covered a wide range of research areas, from vector control to vaccine research, as well as development of non-medical innovations such as traps for tsetse flies and solar-powered disinfection of drinking water. The projects included research on individual diseases but also addressed complex diseases such as childhood infections and diarrhoeal diseases, as well as research on health systems and health service issues of disease control.

Building on the activities of the INCO programme, NID research was identified as a specific priority for the 7th EU Framework Programme (FP7; 2007–13) [9]. FP7 had a total indicative budget of more than €50 billion and was composed of four major sub-programmes (in addition to a special sub-programme on nuclear research). The largest sub-programme, Cooperation, represented two-thirds of the overall budget and focused on collaborative research between research teams in different countries. While research teams from most countries in the world could participate and receive funding from the Cooperation sub-programme, individual projects should always include organisations from at least three different EU or FP7-associated countries, thereby giving a bias towards participation and funding of European institutions. The Ideas programme, with the European Research Council (ERC) as its flagship initiative, supported individual research teams around a principal investigator. The People programme, including Marie Curie actions, provided fellowships for researcher mobility and career development. The Capacities programme, the smallest of the four sub-programmes, was predominantly aimed at strengthening research infrastructure.

Using publicly available information, we have analysed FP7 funding for NID research, to determine whether European support in this area has matched the global increase in funding. We also analysed the specific diseases and pathogens targeted in FP7 NID projects and the type of research funded.

2. Methods

We used the European Commission's Community Research and Development Information Service (CORDIS, cordis.europa.eu) to identify NID research projects funded during FP7 (2007–13). Search terms included broad classifications of pathogens (e.g. helminth, kinetoplastid, protozoa, virus, worm) and diseases (e.g. diarrhoea, filariasis, neglected infectious diseases, neglected tropical disease, trypanosomiasis) as well as specific infections (e.g. dengue, elephantiasis, leishmaniasis, rabies, schistosomiasis) and organisms (e.g. bancrofti, buruli, cruzi, leprae, shigella). This resulted in a gross list of 640 projects of potential interest. The abstracts of these projects were then examined to identify projects for which NID research was the core activity, resulting in a shortlist of 65 projects. These projects were subsequently categorised according to the diseases and pathogens they addressed, and according to the type of research funded. A few projects were addressing both NID and other diseases, in which case they were proportioned evenly between NID and other diseases. Financial data and information about participants in the shortlisted projects were obtained from the CORDIS database and cross-checked with downloaded data from the EU Open Data Portal (https://open-data.europa.eu/en/data/dataset/cordisfp7projects). For collaborative projects involving multiple partners, the distribution of project budgets among partners was available in most cases through the Open Data Portal. However, for a few projects (approximately 5%) only the total project budget was available and in these cases we assumed that the total budget was distributed evenly among all project partners.

To compare the funding for NID research from major funding organisations, we used the G-Finder Public Search Tool (https://gfinder.policycures.org/PublicSearchTool/searchDisease). For each funder we extracted the total disbursements in the period from 2007 to 2014 for all of the 35 diseases covered by the G-Finder database and subsequently subtracted disbursements for HIV/AIDS, malaria, tuberculosis and non-allocated research to arrive at an estimated level of funding for NID research.

3. Results

We identified 65 NID research projects that were funded during the seven years of FP7 and received a total financial contribution of almost €169 million (Fig. 1). This corresponds to an average annual commitment of more than €24 million. By comparison, less than €8 million was disbursed on average during the nine years of the INCO programme. EU funding for NID research therefore tripled in the period 2007–13 in comparison to the preceding decade. NID research was funded within each of the four major sub-programmes of FP7, but more than 87% of funding (€147.5 million) was allocated to just 34 projects within the Cooperation programme.

Kinetoplastid diseases (leishmaniasis, trypanosomiasis and Chagas disease) received €67 million, making it the largest disease area in terms of EU funding (Table 1). One of the kinetoplastid diseases, leishmaniasis, received the most funding dedicated to a single disease, €20.5 million. With an EU contribution of €31 million to 10 projects, research on helminth diseases was the second largest funding area; around half of the projects (five projects, €9.3 million) targeted schistosomiasis. Some €30 million was allocated to 17 projects on bacterial diseases, with more than three-quarters of this funding (€22 million) being allocated to research on diarrhoeal diseases. Finally, almost €23 million was allocated to three cross-cutting research projects spanning more than one group of pathogens.