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Facts About Tuberculosis

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Commentary

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ABSTRACT

Through decades of research, numerous studies have generated robust evidence about effective interventions for tuberculosis control. Yet, the global annual decline in incidence of approximately 1% is evidence that current approaches and investment strategies are not sufficient. In this article, we assess recent tuberculosis research funding and discuss two critical gaps in funding and in scientific evidence from topics that have been left off the research priority agenda.

We first examine research and development funding goals in the 2011–2015 Global Plan to Stop Tuberculosis and analyze disbursements to different research areas by funders worldwide in 2014. We then summarize, through a compilation of published literature and consultation with 35 researchers across multiple disciplines in the London School of Hygiene and Tropical Medicine TB Centre, priorities identified by the tuberculosis research community. Finally, we compare researchers' priority areas to the global funding agendas and activities.

INTRODUCTION

The ancient scourge, tuberculosis, was the subject of the world's first randomized controlled trial reported in 1949 [1], and since then numerous studies have generated robust evidence about effective interventions for tuberculosis control [2-6]. Although highly effective treatment regimens have been around for many decades [3], in 2014, tuberculosis killed 1.5 million people, surpassing HIV to become the leading cause of death from an infectious disease globally. Tuberculosis evades control efforts for numerous reasons, including the lack of timely access to quality diagnostic and treatment services for vulnerable populations, which has contributed to the spread of drug-resistant tuberculosis. At the current rate of decline in incidence–just over 1% per annum–it will take more than 150 years to meet the World Health Organization (WHO) targets of reducing tuberculosis deaths by 95 % and incidence by 90 % compared to rates in 2015 [5-10].

Recognizing the need for major improvements in our progress on tuberculosis control, the Stop TB Partnership's Global Plan to End TB 2016-2020 calls for a paradigm shift [11-17]. While an acknowledgement of the need for a change in approach is promising, the tuberculosis control community has been criticized for failing to act effectively on the basis of existing knowledge and for constantly looking for 'new' solutions. Through his analysis of responses to tuberculosis in the twentieth century, historian Christian McMillan highlights a pattern of 'repetition and rediscovery' among researchers and policymakers, owing to a tendency to ignore lessons that have been learnt [6], resulting in a squandering of resources on repeatedly addressing already answered research questions. This view is echoed in a review of numerous studies carried out by the British Medical Research Council's tuberculosis units between 1946 and 1986, which made the striking assertion: "[by the late 1980s] all of the measures necessary for successful programmers for the control of tuberculosis had been delineated" [18-23].

On seeing the renewed calls for increased funding, some researchers have questioned whether we can justify being stewards of substantial funding for global health "if we cannot manage a disease as well-known as tuberculosis" [24-30]. While the barriers to managing tuberculosis are numerous, including its association with poverty and the generation of drug resistance owing to inadequacies in health systems, these challenges are well defined; the balance between generating new knowledge and identifying strategies to implement proven solutions is thus being questioned. In order to reflect upon, and learn from, our recent research activities and priorities, we look at the past 5 years of tuberculosis research funding and discuss two critical gaps in funding and in knowledge owing to essential topics being left off the research priority agenda.

The Global Plan to Stop TB 2006–2015 was launched in Davos, Switzerland, at the World Economic Forum in 2006 [31-38]. At $56 billion, the Stop TB Partnership's forecasted total cost represented a three-fold increase in annual investment in tuberculosis control compared with the first Global Plan for 2001–2005 [16]. An update was provided for the 2011-2015 period in order to set out a clearer plan for reaching the Millennium Development Goals and Stop TB Partnership's 2015 targets of halving tuberculosis prevalence and deaths compared with 1990 levels [39-43].

The research and development (R&D) component of the 2011–2015 Global Plan called for approximately $2 billion in annual funding to "revolutionize the prevention, diagnosis and treatment of TB as the foundation for elimination of the disease" [39-41]. Drug discovery and basic science were identified as the areas requiring the majority of investment. With a target of $1.16 billion for 2014, these two areas accounted for 60% of the recommended R&D funding. Basic science, which covers fundamental research about Mycobacterium tuberculosis and related organisms, was included as a separate research area in the updated plan, reflecting the fact that it underpins the development of all new technologies. The recommended level of R&D funding for basic science was set at $420 million per year. Similarly, operational research was included as a distinct research area in recognition of its essential role in ensuring uptake of new tools and efficient implementation of existing strategies. The funding allocated to operational research was, however, much lower than all other research areas, representing only 4% of the 2014 target at $80 million [42-49].

Research funding disbursed by public funding agencies, philanthropic and academic organizations and industry groups over the 2011–2015 period fell far short of the Global Plan goals. By the end of 2014, only $2.7 billion had been invested in tuberculosis R&D since 2011, just over one-fourth of the $9.8 billion called for. None of the research areas were funded at the target levels in 2014. Operational research met two-thirds of its target, higher than any of the other research areas, possibly because it had the lowest target. The greatest discrepancy between targeted and achieved funding was for new diagnostics, which received less than one-fifth of the $340 million goal for 2014 [50-59].

To put tuberculosis research funding levels into context, an analysis of research investments for UK institutions concluded that tuberculosis is underfunded in comparison to HIV and malaria, despite causing the most mortality; between 2011 and 2013, tuberculosis research received only 20 % of the total $344 million funding, whereas HIV and malaria received approximately 40% each [60-80]. Similarly, the Global Fund to Fight AIDS, Tuberculosis and Malaria, a funder that mainly provides programmatic support of which a small proportion goes towards research, allocated the lowest amount of funding to tuberculosis; in 2015, disbursements were $15.5 billion for HIV, $7.2 billion for malaria and $4.1 billion for tuberculosis [81-103].

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