Global health science leverages established collaboration network to fight COVID-19

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Abstract

How has the science system reacted to the early stages of the COVID-19 pandemic? Here we compare the (growing) international network for coronavirus research with the broader international health science network. Our findings show that, before the outbreak, coronavirus research realized a relatively small and rather peculiar niche within the global health sciences. As a response to the pandemic, the international network for coronavirus research expanded rapidly along the hierarchical structure laid out by the global health science network. Thus, in face of the crisis, the global health science system proved to be structurally stable yet versatile in research. The observed versatility supports optimistic views on the role of science in meeting future challenges. However, the stability of the global core-periphery structure may be worrying, because it reduces learning opportunities and social capital of scientifically peripheral countries — not only during this pandemic but also in its "normal" mode of operation.

Keywords COVID-19 | Scientific Networks | International Collaboration | Health Sciences

Introduction

International scientific collaboration is on the rise since the early 1980s [1]. The phenomenon is one aspect of globalization in science. International collaboration is observed in particular among productive researchers from top-tier universities located in advanced national scientific systems [2, 3]. The gain is (more) excellent research [1, 3]. The tendency of 'excellence-attracting-excellence', however, entails the risk of increasing stratification not only within but also between national science systems [2, 4]. In order to catch-up scientifically, or at least not to fall behind, being well connected to the global knowledge flows has become a science policy imperative in most countries.

The paper at hand treats the outbreak of the novel coronavirus Sars-CoV-2 in January 2020 as an exogenous shock to the international health science system. Our main interest is in the structural effects of the shock on the international health science network. Recent empirical studies have shown that the scientific contribution to coronavirus related research from individual countries has been very uneven; often framing it as a scientific race [5, 6]. [7] investigate the international coronavirus collaboration network, and find that it has become more 'elitist' with the pandemic.

Our empirical analysis adds the insight that the contribution of countries to coronavirus research is closely related to their contribution in the broader domain of health sciences, and that the structure of the international coronavirus research network rapidly converged to the structure of the global, international health science network. Before we discuss the implications of this finding, let us first turn to the empirical analysis.

Data

We proxy scientific activity in the health sciences through peer-reviewed articles in journals indexed by MEDLINE. The restriction to MEDLINE indexed journals ensures that papers in the sample fall into our scope of biomedical research and are of (minimum) scientific quality. Coronavirus related papers are identified through a text search query suggested by PubMed Central Europe on the papers' title, abstract, and MESH terms.

The analysis is based on the papers' submission dates to stay close to the actual research activity. Our working sample includes papers submitted in the pre-COVID-19 period (Jan.–Dec.2019), as well as in the early phase of COVID-19 (Jan.–Apr.2020). In detail, we downloaded all papers appearing in MEDLINE journals from the PubMed database as of December 2020. Due to the time lag from submission to acceptance, the number of paper submissions in our sample starts to drop in May; a data artifact that may bias statistics. Therefore, we end the analysis period in April 2020.