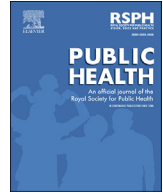




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Letter to the Editor

The SARS-CoV-2 crisis: A crisis of reductionism?



Systems thinking is a kind of epistemological antireductionism, i.e., the realization that to obtain knowledge about entities and phenomena in the world (syndromes, diseases, pandemics, and so on) one cannot seek explanation by referring to more and more specific disciplines but has to transcend disciplinary boundaries. This concept, also known as transdisciplinarity, is especially important when dealing with issues of public health.¹ Transdisciplinary science involves scientists from various disciplines working together in a common understanding of seeing both the forest *and* the trees.

Unfortunately, the management of the coronavirus disease 2019 (COVID-19) crisis in most Western countries has followed a reductionist approach thus far. Examples abound: First, it has not been distinguished if patients positively tested for severe acute respiratory syndrome-corona virus-2 (SARS-CoV-2) died *because of* or *with* the virus. Second, similar to what has happened during the swine flu epidemic, a few virologists were standing in the spotlight of media attention, while a scientific discussion among representatives from various disciplines would have been needed. A transdisciplinary collaboration between virology, pathology, microbiology, and epidemiology would have been needed to inform the public and policy makers. Third, risk communication by the government and media has been inadequate because it solely focused on the number of new cases and deaths without standardizing to the total number of tests performed or population density for international comparisons. Furthermore, the possible inaccuracies of the SARS-CoV-2 tests² have also not been communicated transparently. This could have been the time for teaching some basic statistical knowledge. Fourth, the reduction to the virus as an invisible killer has totally neglected our own immune system, and the chance to inform the public about factors that each individual could control that would strengthen the immune system against respiratory virus infections. These include several micronutrients or secondary plant substances³ and vitamin D.⁴ Fifth, recognition of the interactions between mental health and the endocrine and immune systems ('psycho-neuro-endocrinology') implicates that chronic anxiety is able to disrupt hormone and immune regulation; this could not only negatively impact the acute risk of SARS-CoV-2 infection but also predispose to chronic diseases in the long-term. Insofar, it is highly problematic that the media again conducted a virus-centric 'angst campaign', similar to what they did in past pandemics.⁵

Besides these considerations, we need transdisciplinary science to improve the rapid installment and derestriction of political decrees based on epidemiological data and prognostic models.

Given the drastic impact of public health policies on every affected individual, basing public health decisions on sound evidence rather than blind actionism is of utmost importance to prevent causing more harm than good.⁶ For example, new prognostic models show that incorporation of variation in SARS-CoV-2 susceptibility (e.g. because some individuals' immune system effectively manages the virus) can drastically reduce the required percentage of the population becoming immune to achieve herd immunity.⁷ Thus, the previous models with which the lockdowns were partly justified may have suggested a vastly exaggerated number of immune people needed to achieve herd immunity. Furthermore, transdisciplinary science is needed to assess the overall and specific economic and financial burden of the SARS-CoV-2 crisis, as well as the influence of economic and financial factors on the COVID-19 associated death rates in different countries. This involves, but is not limited to: (i) research on causal mechanisms within the healthcare system and hospital structure impacting on COVID-19 deaths; (ii) research on financial conflicts of interest of scientific advisors, research institutions and politicians and how these influence public health decisions; (iii) financial toxicity resulting from the lock down in many countries and how this impacts long-term anxiety and depression disorders and deaths such as suicides resulting thereof;⁸ (iv) modeling of the complex relationship between pandemics, economics, and financial markets.

In summary, scientists with media presence thinking in reductionist terms, together with the politicians who are advised by them, have followed a virus-centric, reductionist approach thus far, similar to previous pandemics.⁵ This has also ethical consequences as the question emerges whether avoidance of infection at any cost should outweigh other human values such as basic civil rights or social contacts that are essential for children and the elderly. Insofar, the SARS-CoV-2 crisis is a crisis of reductionism. To overcome it and use systems thinking in the future we need more appropriately trained, industry-independent, and financially independent scientists who see both the forest and the trees.

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2 June 2020

Available online 12 June 2020