Correspondence

COVID-19 vaccines: call for global push to maintain efficacy

We write as former leaders of the World Health Organization's precursor to the Global Influenza Surveillance and Response System (GISRS) and of the US Centers for Disease Control and Prevention Collaborating Center for Influenza Surveillance and Research. We now call for a globally coordinated system to urgently advise national authorities and vaccine companies on changes necessary to vaccines as a result of new SARS-CoV-2 virus variants (*Nature* **589**, 177–178; 2021).

For vaccine efficacy to keep pace with the variants, COVID-19 surveillance must be linked to genetic and antigenic surveillance of SARS-CoV-2 (see *Nature* **589**, 337–338; 2021). Virus sequencing is important, but it is not enough to inform up-to-date recommendations on the composition of vaccines.

We learnt this 70 years ago for influenza vaccines, which were soon rendered ineffective as the virus rapidly mutated. The GISRS now issues biannual recommendations on the composition of vaccines and the reagents necessary for their assessment and release.

A comparable, globally recognized institution is needed to swiftly analyse changes in SARS-CoV-2 together with data on epidemiology, immunology and the field effectiveness of vaccines. It would build on existing GISRS mechanisms and resources, and use data collected worldwide by a network of national and regional laboratories and regulatory agencies.

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COVID-19 vaccines: sprint predicted a decade ago

New technologies and scientific knowledge have drastically compressed the timelines of vaccine discovery. It was apparent by 2011 that high-throughput methods and parallel testing of multiple approaches would hasten the identification of candidate vaccines and formulations as well as their development (R. Rappuoli and A. Aderem *Nature* **473**, 463–469; 2011).

In the 1980s, only killed, live-attenuated, toxoid or polysaccharide vaccines were available. A decade later, recombinant DNA technologies, conjugation and reverse vaccinology boosted research into new vaccines. At a meeting in Rockville, Maryland, in 2019, vaccine experts from academia, regulatory agencies and industry agreed that new technologies to shorten the long and expensive timelines of vaccine development were ready to be implemented (see S. Black *et al. Semin. Immunol.* **50**, 101413; 2020).

Indeed, vaccines against SARS-CoV-2 were developed at an unprecedented speed. The key factor was the parallel execution of the preclinical, toxicology and phase I, II and III trials needed to bring a candidate to licensure and still ensure safety and efficacy.

Open questions remain on why we needed a pandemic to implement something that was already scientifically mature and whether we can maintain this high speed in future (see *Nature* **589**, 16–18; 2021).

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TL;DR: how well do machines summarize our work?

The SciTLDR software tool (scitldr.apps.allenai.org) uses machine learning to summarize scientific texts (see *Nature* https://doi.org/ghmnjj; 2020). Although it is impressive how far natural language processing has come, there is a risk it could distort scientific discourse by stripping away important context and over-amplifying results.

SciTLDR tends to extract one or two key statements from the original text and edits them into a cohesive sentence, sometimes removing parenthetical phrases and using synonyms for common words or phrases. Such changes are mostly innocuous, but they could omit qualifiers that the authors deem relevant. When the software replaces "we investigated" with "we identified", for instance, it changes the meaning by seeming to present results rather than simply setting a research context.

And what happens when these tools are applied to, for example, anti-vaccination research or papers denying climate change? When I submitted abstracts from retracted works to the SciTLDR online demo, the summary statements of the results were often stronger than those in the original paper because they lacked context. They failed to acknowledge that the paper had been retracted, as a human writer would. Given the long-running threats posed by anti-science movements, caution is needed when developing and deploying tools such as SciTLDR.

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Open access: pay-for-review option — ethical questions

Although I welcome the 'guided open access' option being adopted by the Nature family of journals (see *Nature* **588**, 19–20; 2020), I have serious ethical concerns about it in the short and medium term.

These go beyond the commonly voiced financial and organizational problems, such as how to get funders on board or how reviews can be transferred to other publishers. For example, given that most manuscripts are rejected without review, wealthy authors or disciplines might use the guided option to buy their way into the process. In a world where slots in highly influential journals are limited, positive reviews of manuscripts that might otherwise be rejected could disadvantage those unable to afford the guided option, and make selection of non-guided manuscripts harder.

Moreover, what would happen if the success of guided open access were to cause a sudden flood of reviewing requests from Nature journals? Potential reviewers might not react well to participating for free, knowing that authors are paying for the chance to have their manuscript reviewed. Incentives for reviewers beyond serving the scientific community might be necessary. Such incentives, together with the opportunity to review high-flying manuscripts, could affect the dynamics of the finite pool of reviewers by diverting reviewers from other journals. The net result could be control of the peer-review process by a few important publishers.

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