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## Science and truth during the covid-19 pandemic

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During the covid-19 pandemic, I became one of those talking heads on the TV and radio in Canada hoping to reassure communities and recommend a way forward. While doing so, I found myself in parallel discussions about two issues: what truth is and is not and what science is and is not. I may not have always succeeded in resolving these debates, but among many covid lessons, I came to appreciate how science, truth, and the scientific method are often under attack. More specifically, I came to realise that, in any debate, “truth” can be the first victim and science can be readily weaponised.

The problem is that untruths—and bad science—can become accepted merely by being repeated. This is especially concerning when the internet spreads nonsense faster than hard won truths.<sup>1</sup> As healthcare professionals, we might assume that our singular core mission is to seek out new knowledge. Covid taught me, however, that it takes considerable effort just to hold our ground.

Clinicians and scientists need to engage in public debate because “the truth” is no longer owned by experts and reputable peer reviewed sources. The internet has democratised information, but also democratised misinformation and disinformation. Personalised search algorithms mean that with a few clicks different people end up not only on different web pages, but in totally different realities. Without action, we risk the emergence of multiple parallel truths on parallel tracks. This matters because medicine is among the most searched and debated topics online, generating an estimated 500 million tweets and 3.5 billion Google searches every day worldwide.<sup>1</sup>

The Oxford online dictionary defines science as “an intellectual and practical activity that deliberately studies the world, primarily through observation and experimentation.” Carl Sagan, one of the 20th century’s leading science communicators, added that science is not “static knowledge,” but rather “a way of thinking” and an “ongoing commitment.” It is a philosophical pursuit by which we inch towards an ever more confident truth. Science is as much about how you think as what you believe.

Importantly, scientific “truth” can be reached only through long term commitment to the highest level of evidence, not by cherry picking favoured observations. Science is a discipline—it takes hard work and self-control. Its beating heart is the scientific method, which involves making observations, forming hypotheses, fashioning predictions, conducting experiments to test those hypotheses and predictions, and objectively analysing results. It must be iterative and plausible, and if the best evidence does not support a particular hypothesis, then it must be rejected. People might prefer politicians’ exaggerated certainties, but

humanity is better off inching slowly towards a more robust scientific truth.

Although scientists must remain open to plausible (that is, testable and rejectable) ideas, this does not mean that nothing is truly known or that everything is equally likely. The scientific method dispassionately advocates for the truth, and therefore must reject failed, or highly unlikely, ideas. It means trying to disprove what we might want to be true. This is why the truth can change over time, even if that idea seems counterintuitive.

Scientific findings need to be accurate not expedient. Absolute answers are rare, and findings usually beget further questions, so when scientists reply “Well, it depends” or “Further study is required,” they are being diligent not difficult. Some people might feel let down by what they assume is confusion rather than just complexity. Science is hard work, truth is nuanced, and almost all humans (including clinicians and academics) prefer life to be easy and certain. Because science should not care whether we like its answers, it can seem elitist and exclusionary. Instead, science should be a defence against propaganda and a way to protect vulnerable and disadvantaged people and communities. We need the scientific method because we can all be unwittingly biased,<sup>2</sup> especially when non-scientific answers can be comforting or self-serving.

Importantly, science is always worth the time, funds, and effort required. Scientific discoveries have saved billions of lives. But in celebrating science we must also acknowledge its shortcomings and potential for harm. Science is only as noble or as fragile as the people who practise and use it. Einstein was right to offer an eternal caution: “People say intellect makes a great scientist. They are wrong: it is character.”

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1 Brindley PG, Byker L, Carley S, Thoma B. *Assessing on-line medical education resources: a primer for acute care medical professionals and others*. JICS, 2021, doi: 10.1177/1751143721999949.

2 Heffernan M. *Willful Blindness*. Walker and Company, 2012.