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Walking the Tightrope: Reevaluating science communication in the era of COVID-19 vaccines

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Abstract

Scientists are trained to be skeptical and not overstate the existing evidence. This cautiousness is a valuable asset when working in scientific research, where the goal is the pursuit of knowledge and truth. It becomes a handicap when scientists are asked to communicate to the public about pressing topics such as COVID-19 vaccines. Often in such contexts, immediate recommendations are sought, and decisions must be made even when complete evidence is lacking.

For scientists to be effective public communicators, they must adjust their mindset and embrace brevity, clarity, and other principles of effective communication. Focusing messages on what is known fosters public confidence in taking needed actions, whereas focusing on what is still unknown fosters inaction and seeds doubt. The implementation of principles of effective communication does not inherently conflict with maintaining scientific accuracy and acknowledging uncertainty, but it does require additional care, effort, and training.

Scientific messaging around Coronavirus Disease 2019 (COVID-19) vaccines has often dwelled on remaining uncertainty (e.g., the limitations of data showing prevention of asymptomatic infection and transmission), rather than the strong likelihood of these vaccines’ massive and critical impact on defeating the pandemic. Messages meant to indicate that the evidence is incomplete come across as indicating the evidence is nonexistent, eliciting reactions like “If I still have to wear a mask and socially distance to prevent transmission, what’s the point of the vaccine?”. Some have blamed this overemphasis on uncertainty for increasing public hesitancy to receive these vaccines [1,2].

Vaccine hesitancy is complex, and cannot be solved exclusively through improved communication [3]. For some, vaccine hesitancy primarily stems from deeply rooted lack of trust in healthcare, research, government, and/or pharmaceutical corporations. [4] often molded by lived experiences with health disparities, access issues, and/or structural racism [5]. Many of the early missteps related to COVID-19 vaccine communication in the United States (US) arose from repeated dismissal of science and general disarray among national leadership [6]. Initial uncertainty about new diseases and vaccines should be expected as new information is obtained and processed. Minor flaws in messaging are often exacerbated by media sensationalism. However, critiquing overcautious science communication is fair, and by no means unique to COVID-19 vaccines. So why do scientists communicate differently than other professions, and what can be done about it, both regarding COVID-19 vaccines and in general?

1. The language of science

Scientists are trained to be skeptical – to assume uncertainty until strong evidence persuades them otherwise. This skepticism is the basis of the scientific method, and is a valuable asset when working in scientific research, where the goal is the pursuit of knowledge and truth. A similar approach drives many other fields as well, including our judicial system – scientific hypotheses are presumed false until evidence supports them to be true beyond a threshold of scientific rigor, just as defendants are presumed innocent until judged guilty beyond a reasonable doubt. Among epidemiologists, this uncertainty pervades how even the strongest conclusions are described, as the language of statistics is probabilistic – one of likelihood, risk, and associations. Even if the remaining doubt is beyond reasonable, conclusions are accurately qualified as less than 100% certain. This leads to a divide in how scientists communicate versus how many others do.
Even if some people do not interpret uncertain language to mean scientists are unsure of themselves, or of the data they are presenting, they may find the qualifying language scientists use to be challenging, as it complicates their decision making, seeds unnecessary doubt, and may lead to “analysis paralysis”. Some interpret uncertain language as never fully committing to a stance – giving yourself an out in case you are wrong. Conversely, to those well-versed in science, absolute statements of certainty are often interpreted with suspicion – a red flag that someone is overselling at best and bluffing at worst.

2. Trust and tension

Trust takes much longer to build than to break. The reputations of science and public health are far more important than for any particular product, even COVID-19 vaccines in the midst of a pandemic. The greatest strength of science lies in its rigorous methods built to minimize bias and facilitate reproducibility, which allows consistent questioning of the status quo and evolution of scientific consensus as new evidence becomes available. Public health practice includes advocacy for evidence-based health interventions such as persuasion to accept routine vaccines. Overstating the current science or allowing politics to impact public health practice risks losing trust in science and public health even beyond this pandemic [7].

No one is right all the time; but to maintain trust, there is a big difference between occasionally being wrong and knowingly deceiving. Scientists use uncertain language because this most accurately reflects the truth; rarely is the scientific evidence so complete that it affirms or refutes beyond any shred of doubt. This leads to a catch-22: either scientists use uncertain language and lose public confidence, or overstate the evidence and lose public trust when unforeseen issues inevitably arise.

Another central tenet of science that affects public trust is willingness to reassess as new information comes to light. Scientists are rightly encouraged to be responsive to new evidence. But politicians are characterized as “flip-flopers” if they change stances. Thus, public perception of new scientific information may suffer when coming from politicians; non-government spokespeople should be considered for such updates.

Scientists who work in public health (e.g., epidemiologists, public health officials) find themselves in an additional balancing act. Above all, science prioritizes seeking and disseminating truth, while public health prioritizes protecting and improving population health. The latter relies on the former, and the former often aims to advance the latter. However, the overlap is not perfect; for example, messages that sacrifice detail for brevity and clarity often make greater positive impacts on public health, but oversimplifying at the expense of important caveats leaves many scientists uneasy.

3. Walking the tightrope

There is no silver bullet to fix science communication, but there are several ways it could be improved.

Scientists – at least those who are spokespersons for providing science-based public health messages to the media and public – must become more comfortable walking the tightrope at the intersection of scientific accuracy and effective communication. Our 2018 book, The Clinician’s Vaccine Safety Resource Guide, [8] outlines several evidence-based principles of effective vaccine communication, including: empathy, brevity, clarity, not lingering on correcting myths, and contextualizing vaccine risks with disease risks. Such principles are meant to increase comprehension and reduce counterarguing. These principles do not inherently conflict with maintaining scientific accuracy nor acknowledging uncertainty (both of which are still critical); however, creating messages that are both accurate and effective requires additional effort and training.

Misinterpretation of scientific messaging around COVID-19 vaccines could be further mitigated by reframing messages in the context of what we know rather than only what we do not. Focusing messages on what is known fosters public confidence in taking needed actions (even while acknowledging remaining uncertainty), whereas focusing on what is still unknown fosters inaction and seeds doubt. For example, in February 2021 a Florida newspaper quoted a prominent doctor stating: “We do not yet know whether the vaccines will prevent you from spreading the virus to other people, even if you don’t get sick yourself.” [9] This unintentionally frames the vaccines’ prevention of asymptomatic infection and transmission as having only two equally likely possibilities (complete prevention or no prevention). Instead, this could be reframed as: “We expect the vaccines will greatly decrease the spread of the virus, but are still collecting data to figure out how much”. This better reflects the early evidence: although not explicitly tested in clinical trials, initial post-authorization studies found a prompt and substantial reduction in infection and transmission among vaccinated populations, [10] and most vaccines greatly reduce infection and transmission of their target disease. Both messages acknowledge the fluid nature of scientific consensus and justify continued precautions while further evidence is collected, but the latter is more nuanced, accurate, and encouraging.

4. Lessons for the Future and the Present

Scientists should be further trained in effective communication (to better frame their messages for the public without sacrificing accuracy or ignoring uncertainty), and media members should be further trained in science (to better translate the science to the public while maintaining accuracy and acknowledging uncertainty). Updated training curricula should be designed by experts in science communication, a discipline which should be fostered through increased collaboration between communication science and other scientific fields.

Long term investments must also be made in improving public understanding of and appreciation for science, both through a reinvigorated focus on science in public education, and through increased public outreach from scientific institutions via social and traditional media. We should strive to eventually reach a middle ground between the traditional languages of scientists and the public, with a scientific community better versed in communication science and a public better versed in science itself.

But we cannot wait for this utopia to confront our current reality: protecting the public from COVID-19 and returning to normal life depend on quickly reaching herd immunity. When discussing COVID-19 vaccines with the media and public, scientists should strive to unite evidence-based content with evidence-based communication strategies. Until communication training is more widespread, those who are most comfortable walking this tightrope must assume greater responsibility for such communication. Our victory against the pandemic may hang in the balance.

Declaration of Competing Interest

The authors declare that they have no known competing financial interests or personal relationships that could have appeared to influence the work reported in this paper.

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