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How to be a good science communicator

During the COVID-19 pandemic, the public have turned to scientists and doctors for vital information. But science communication is a skill in itself, so we asked the experts to share their tips.

Meenakshi J.

Science communication is more of an art than a science, one that compels physicians, scientists and science communicators to innovate new ways to reach the public. A good science communicator connects the public with the world around them.

“Science communication should be a means of connecting with [the] public, and not just as a side profession. All physicians should be able to do this,” says Muge Cevik, a clinician–scientist and lecturer in infectious diseases and medical virology at the University of St Andrews, Scotland. “But effective science communication needs good training.”

Know your audience

A 2014 report from the UK showed that the public overwhelmingly thinks that science is important and takes an interest in it. But science communicators need to identify their target audience — which could be other scientists, other physicians, or the general public — for the specific activity, says Cevik. “Decide whether you are going to inform or educate or run-through.” A science communicator has to tweak information according to the situation and the communication platform used.

“Academic talk is different from a policy debate, which is different from a public health message,” adds Faheem Younus, chief

of infectious diseases at the University of Maryland.

Once the target audience has been identified, let the communication be measured and simplified according to the audience, suggests Sanjeev Bagai, senior consultant pediatrician and chairman of Nephron Clinic, Delhi, India. A good science communicator should be data-driven, accurate and have the courage to accept when they are wrong. “[Good science communication] can only be achieved by staying abreast with the latest research world-wide on a daily basis,” says Bagai. “Read all publications, make notes...and critically

review the methodology and results of studies.”

Explain and inspire

Karishma S. Kaushik hosted her first webinar, COVID-19 for Kids, on 31 March 2020, just a week after India went into a stringent country-wide lockdown. Kaushik, an assistant professor at Savitribai Phule Pune University, interacted with 75 young minds in this session through her ‘Talk to a Scientist’ (TTAS) platform.

“Like other children across the country, my 9-year-old son had a lot of questions related to school closures and homeschooling. We started having discussions on viruses, pandemics, quarantine and vaccines,” she says. After seeing a surge in webinars and online engagement, Kaushik decided to leverage this growing interest and created TTAS to communicate science to young minds from the safety of her home.

At the time of writing, TTAS had been successfully running webinars for 70 weeks on a wide range of science topics, roping in scientists to facilitate discussions and communicate science to children. Children want to know why events and phenomena occur, and [explanation-seeking curiosity](#) is an important driver of children’s learning.

During the COVID-19 pandemic, there has been a general thirst for scientific explanations. As new variants emerge, lockdowns are implemented and vaccines are developed, effective science communication is essential but challenging.

Be yourself

With misinformation widespread during the COVID-19 pandemic, science communicators are spending a great deal of time debunking myths and combating misinformation with facts. “I strive to communicate evidence-based facts in an accurate but accessible manner,” says Akiko Iwasaki, professor of immunobiology at Yale University.

For the facts to be understood and accepted, a science communicator has to gain the trust of the public, says Younus. “The public is listening. So be aware,” says Cevik. “Set goals and objectives. Establish trust. And, foremost, respect other academicians and scientists.”

Younus also considers credibility, ease, relevance and timeliness as key ingredients for good science communication. Science communicators should not worry about giving a positive or a negative message; they should just tell the truth. Sometimes the truth is “we don’t know,” he says.

“These days, the most frequent question I get from the developing world is whether

people can take the Pfizer or Moderna vaccine on top of the Chinese vaccines that they took months ago,” says Younus. But, since there is not enough research on the subject, he simply tells them the truth — that he doesn’t know. “I believe that builds trust.”

Science communicators have to be honest and be themselves to gain trust. Have evidence ready when confronting uncertainty and biases, says Cevik. Explain pros and cons. For example, Cevik started a Twitter thread on ivermectin usage with all of the available data to show that it is not an effective COVID-19 treatment. “Instead of cherry-picking evidence, show all evidence to the public,” she says.

Build expertise

Science communication involves either sharing information along with the uncertainty that surrounds it or providing enough detail and supporting it with sufficient data. While the former is harder as the credibility of a science communicator may be questioned, the latter requires a science communicator to understand the ‘why’ and not just the ‘what’, says Salim S. Abdool Karim, an HIV researcher at the University of KwaZulu-Natal in South Africa. “This is where confidence and subject matter expertise comes into play during public outreach,” he says.

In this era of COVID-19, science communicators need to read widely, says Bagai, including on virology, microbiology, immunology, biochemistry, vaccinations, public health and mental health issues. “Often, many science communicators tend to overlook the basic functions of a cell,” he says. “Remember that genomics, biochemistry, enzymatic changes, metabolic pathways and dysfunctions form the core of science. So have a thorough understanding of a cell and its functions.”

As a science communicator, leave jargon out, says Younus. Science communication should sound different than grand rounds, where methods and conclusions are debated. It is important to stay relevant to the general public’s concerns. “Why talk about mask mandates when everyone’s worried about vaccine safety?” he says.

Amplify others

Tara Smith, an epidemiologist at the Kent State University College of Public Health, says that as a white woman, some communities may relate to her either more or less than others. Smith tries to use her platform to amplify posts and thoughts from other researchers, especially those from underrepresented groups. “Lift up other scholars and communicators instead of always needing to be in the limelight,” she adds.

“Similarly, many people in my rural area might be more likely to listen to me than someone they see as a big-city big shot,” Smith says. “I think we need to listen and hear what is working and what is not and play a bit of tag team to bring others into the conversation when their voices need to be heard.”

Choose social

Social media has changed the way we all communicate, while making science communication less formal and more accessible. “Social media’s become part of a science communicator’s toolkit. Learning to leverage [social media] is both important and necessary,” says Kaushik. She suggests that science communicators embrace social media but choose the right platform. “Know your audience’s age group, and then aim to use the right platform for that age group,” adds Cevik.

Instagram is great for visuals, says Kaushik, while bite-size messages are ideal for Twitter, and families and communities are best reached on Facebook. Bagai recommends both Twitter and LinkedIn for ongoing discussions with the public.

Cevik had a few thousand followers on Twitter before the COVID-19 pandemic. But as she started sharing up-to-date COVID-19 research, her tweets went viral and her follower count escalated. Now, she has nearly 136,000 followers. “I like Twitter. It is easy to get opinions from different people with different values,” Cevik says. “We can instantaneously reach so many people around the globe through Twitter,” adds Iwasaki.

Younus agrees. “Last year I received a message from India. This man lived in a village and was the only one with online access. By following simple, affordable advice from my tweets, he said, he kept the whole village safe and informed,” he says.

Do not feed the trolls

However, social media has its own downside and comes with a price; it is a double-edged sword. Science communicators have the potential to reach a large, wide audience, but have little in the way of protection if they get attacked, says Smith.

“Among the people who read and react to my tweets are trolls and people with fundamental bias against women, people of color, etc. I had to grow a thicker skin to even be out there on Twitter,” says Iwasaki.

A number of scientists have left social media because of the threats they have received, sometimes through coordinated attacks, says Smith. “I love being able to interact directly with people who have valid questions, and I’ve met many friends and

collaborators via social media, but there is a big downside when suddenly your field has become politicized and controversial,” says Smith.

“I try to remain calm and stay on message no matter how hard or political the discussion gets,” says Iwasaki.

“The informality [of social media] means people will also troll you and even threaten you. Learn to deal with the noise, and don’t lose your focus,” says Younus. “Keep your outreach or communication profile professional, solely focusing on the theme of outreach or communication,” adds Kaushik.

Use old media

Abdool Karim is a veteran of science communication and sees the benefits of traditional media, such as television. “I communicate to a much wider audience through television and other forms of media,” he says. Abdool Karim was asked by the South African government to explain the COVID-19 pandemic outbreak through a television broadcast and received overwhelmingly positive feedback. “Use any medium for science communication, but respect your audience,” he says.

No single platform can cater to everyone across not only the digital divide, but also sociocultural, economic, geographic and demographic divides, says Kaushik. For science communication in India, she recommends including multilingual communication and print as well as online versions.

Iwasaki warns that Twitter can become an echo chamber quickly. “You are only speaking to the converted,” she says. “I try to do radio interviews and podcast shows that target a different geographic and political audience. I want my message to reach people who might not be familiar with immunology or virology. That is where the real value is,” she adds.

Learn to listen

Regardless of the channel used to communicate, a science communicator must also be a good debater with a tolerance of contrary views and should have the self-belief to change their mind, says Bagai.

“Create a two-way dialogue. Listen to followers and understand their concerns,” says Cevik.

Science communication is as much about the audience as it is about the communicator and communication, says Kaushik. “I try to stay focused on the message and provide accurate information in an accessible manner. I use analogies where helpful,” says Iwasaki. An uninterested, bored and overwhelmed audience is unlikely to be receptive to new ideas, much less to engage. “Keep the engagement interactive, two-way, paced well, and, most importantly, keep hearing your audience,” says Kaushik. “Avoid monologues.”

Languages can be a barrier. “The virus exploits our linguistic and cultural barriers,” says Younus. “I have tweeted in Urdu, Spanish and Indonesian, which effectively allowed me to reach another one billion people globally who may not be fluent in English.”

Listening is an important part of science communication, especially when it comes to issues such as vaccine hesitancy and climate change. The key is being open to questions, says Kaushik. “Communicator, hear your audience! What are their concerns and views? What do they think of the situation? What makes them feel this way? Building trust can start with initiating discussions on familiar aspects, preferably audience-driven questions, and then taking the discussion to more fact-based arguments,” she says.

Do not take sides

In these increasingly polarized times, some science communicators choose to avoid politics. Abdool Karim does not take political sides as a science communicator. “I am on the side of knowledge,” he says. Younus agrees: “My strategy is to attack the virus more and attack political positions less; not because I don’t have opinions, but because I am not an expert on public policy and I also don’t have all the economic and social data points to understand why certain policies are put in place”.

Both Abdool Karim and Younus feel that once scientists start taking political sides, they compromise their position.

Stick to what you know

Finally, a science communicator should not stray from their own expertise. The privilege of engagement comes with responsibility, cautions Cevik.

“One person generally can’t do it all,” says Smith, “so stick to what you know and use original research as much as possible.”

Iwasaki tries to avoid speaking on issues outside her expertise, which can sometimes be a challenge. When her lab demonstrated that low humidity impairs viral clearance from the respiratory tract, she received questions from the public and the media about which humidifiers they should purchase for their home or office.

“I am not a humidification, ventilation or building expert. Fortunately, there are many who are.”

In such situations, Iwasaki makes sure to acknowledge her own limitations and to defer to other experts on topics outside her area of research.

Scientists veering out of their areas of expertise has frustrated Younus. “You have experts in one area who are suddenly scholars in infectious disease, and the public doesn’t know the difference between an MD or PhD who has years of background and training in the relevant areas and one who doesn’t.” This has led to mistrust when experts disagree, and the media tends to amplify those who are most controversial instead of those who are most often correct, says Younus.

Stay on topic

To avoid veering off topic, Abdool Karim quickly gets to the point when communicating science and does not meander. Kaushik suggests that “one session should cover just one major concept” as a rule of thumb. “Too many concepts, a mix up of ideas and thoughts, will likely be overwhelming to the audience and could even lead to misconceptions,” she says.

“This is particularly vital for science communicators when engaging with children, with whom building the thread of the discussion is important.” In the end, Kaushik says, a successful science communicator is one who simplifies science so that a child can understand it and be inspired. □

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