

## Science communication in (a time of) crisis

By Federica Bressan

### Introduction

In normal times, science communication activities are generally associated with leisure and entertainment. We watch a documentary out of interest or curiosity, not for an immediate practical return. We visit a museum or a science fair for the same reason: we find pleasure in learning something new while having a good time. We don't do it out of fear or anxiety. There is nothing instrumental in a visit to the planetarium: we just enjoy doing it.

In a time of crisis, it is a different story. We do not want to be entertained. We do not watch a documentary because we enjoy it, we watch it because something is threatening our safety and we want to know more, so that we can plan for action. It is very instrumental. And we can experience fear and anxiety.

In a time of crisis, most people who do not work in science are not interested in the structure of a virus for the sake of being educated: they want to know, 'will it affect me?' They don't want to know how long the virus can survive on a given surface because it's an interesting fact, they want to know, 'if I touch the shopping cart, can I catch it?'

In a time of crisis, we only value the information that will help us plan for action. It is not the case that the global population has suddenly developed a keen interest in virology and epidemiology. People *need* this knowledge to know what to do in order to feel safe.

And this is a problem, because science does not tell us what to do [1]. Science informs our decisions, but it doesn't take them for us. In a time of crisis, we should look at politicians and policy makers, because they have the responsibility to devise our plan for action. Unfortunately, this pandemic has exposed some confusion about the attribution of roles and responsibilities.

Science is often expected to be a source of definitive truths, from which should derive a

necessary code of conduct.

Much 'bad communication' is to be laid at the feet of this misconception about science. The problem is not 'how do we communicate better?', but what we communicate, to whom, and why. In a time of crisis, good science communication matters; but the best science in the world cannot make up for a lack of political leadership.

### Science or communication

Since the beginning of the pandemic, mainstream media have been filled with technical language that people absorbed and brought to their everyday life. The use of some terms is not always accurate, and the expression 'herd immunity' deserves the grand prize.

The British Prime Minister Boris Johnson's first response to the epidemic, back in March of this year, was to allow "a significant part of the population to get coronavirus to build immunity against it in the long-run" [2]. This was called 'herd immunity strategy' and cost Johnson severe backlash. There was never much ambiguity on the meaning of the expression: the same source explains that it "refers to the state in which the majority of the population [...] has contracted and survived a disease, and is therefore immune to contracting and spreading it a second time." Herd immunity became synonym of 'no action to contain the virus' and 'let nature do its course'.

First of all, herd immunity is not a strategy: it is a desirable condition to achieve. There are two important things to say about herd immunity: (1) when herd immunity is achieved, it means that a sufficient percentage of the population is immune to the disease, and this minimises the risk that the rest of the population gets infected; (2) there are two ways to achieve this: by allowing the population to develop immunity by contracting the disease, or via vaccine. This is what the 'general public' should know about herd immunity. The details of how

the percentage is calculated etc. are for technicians.

Yet, the internet is covered with headlines that reinforce the understanding of herd immunity as ‘let everybody get sick.’ Some examples: – CNN Health: *A herd immunity strategy to fight the pandemic can be ‘dangerous,’ experts say. Here’s why* [3]

– Fox News: *Dr. Atlas blasts reports he backed ‘herd immunity’: ‘I’ve never said that to the president’* [4]. In the text: “One of Donald Trump’s top new medical advisers is urging the White House to embrace a “herd immunity” strategy to combat the coronavirus pandemic. Herd-immunity strategies entail allowing disease to spread through much of the population, thereby building natural immunity to the deadly, highly contagious virus” [4]

– The Washington Post: “One of President Trump’s top medical advisers is urging the White House to embrace a controversial “herd immunity” strategy to combat the pandemic, which would entail allowing the coronavirus to spread through most of the population to quickly build resistance to the virus” [5]

Truth be told, the word ‘herd’ does not help. It does not suggest the idea that only a *percentage* of the population needs to be immune. And referred to human beings, it is a pejorative, thus misleading many into thinking that herd immunity is a bad thing (just like ‘herd mentality’ has a negative connotation).

Still, I cannot comprehend why this expression is so widely misused by the majority of the media, regardless of the political orientation. The misconception about herd immunity is well rooted. And what about the appointed medical advisor to the President of the United States that publicly defends himself from the ‘accusation’ of backing herd immunity? Even if we conceded that ‘herd immunity’ were short for ‘herd immunity achieved by means of natural infection’, which Dr. Atlas may well oppose, his response should not have been to distance himself from herd immunity altogether, but to emphasise that of course he wishes herd immunity be achieved, only via vaccine. It is really difficult to understand how these misun-

derstandings persist around public figures surrounded by assistants, consultants, teams of experts, without someone walking up to them and say sir, actually. . .

What is the role of scientists in this scenario? What accountability should they have when technical language is (mis)used by lay people, including news anchors? Does it mean that they miscommunicated in the first place, are they the source of the misunderstanding? Or it is outside their hands, and all they could do is jump in and rectify the information every time, probably coming across like pedantic school teachers? Whether this is bad science communication, misinformation, or an innocent misunderstanding, I am not sure.

### Learning through communication

I was one of the people who believed that herd immunity was a bad thing. I didn’t *‘know for sure, but’* in doubt I would have probably abstained. In this sense, I am an excellent representative of the average member of the ‘general public’ (a rather unspecific definition). The media reinforced my belief, of course. One day I decided to reach out to Maíra Aguiar, biomathematician I connected with through the Marie Curie network. I wanted to pose her some questions, hoping she could clear my doubts.

In the light of the first part of this article, I think it is worth noting that I was not seeking answers instrumentally, in order to know *what to do*. Even if we are in the middle of a pandemic, I reached out to Maíra moved by curiosity. I was not afraid or anxious. I wasn’t understanding the news, I could not form my own opinion, and it bothered me because I am a curious person and I want to understand. I was hoping that maybe I would understand alone over time, but the news were very repetitive, not really adding useful information.

I spoke with Maíra on the phone, and very early in the conversation I decided I wanted to do a public interview with her. I was receiving clear, convincing, exhaustive answers from her. I had the feeling that I was advancing my understanding, no longer lost in a fog of doubts–

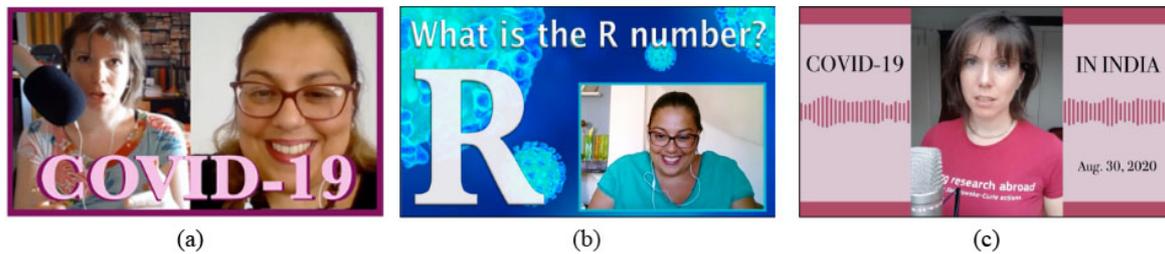


Figure 1. Videos on COVID-19 I have produced since June 2020. Accessible on YouTube.

at last! I felt compelled to share this knowledge: if even CNN can accidentally misrepresent herd immunity, it is everybody's responsibility to speak up when they have good information. So, I decided to be that voice. Maíra brought her expertise, and I brought the questions and my platform. And this is how our first COVID-19 video came about (Fig. 1-a) [6].

Is our video science communication? Does it qualify as such? Like other trending expressions, 'science communication' is a blanket term. So, the answer is yes and no. But I like narrow definitions, so I would say no. This video marked the beginning of a beautiful friendship, and an ongoing conversation on how to spread good information about COVID-19, within the limits of the tools we have. Maíra has been very patient with me, answering all of my questions. But some questions raised more questions. Especially about the basic reproduction number, the implications of which I found somewhat difficult to follow. And this is how our second video came about: What is R (Fig. 1-b).

### Conclusions

People need to be informed, and they have a right to accurate and complete information. But beyond the science and the knowledge that comes from it, the pandemic has a very concrete impact on people's lives, an impact that is very personal and very real. It touches us, it has changed the way we live.

People in different situations, and around the world, experience the pandemic in very different ways. The science is the same, but our experiences are not. That is why my third video on COVID-19 is not about plasma therapy or self-

spreading vaccines, but about people. I was interested in exploring this virus through human eyes, and not only the eyes of science.

Living through this pandemic remains first and foremost a human experience, no matter how advanced our science can get.

So, I asked an Indian friend, and former public health official, to send me a voice message with an overview of the situation in her home country. Her response was heartfelt but sober, informed and accessible. I didn't know much about the social repercussions of the pandemic in India. I was caught off guard. Her message shook me. Again, I decided to use my platform to channel that story. I asked my friend if I could share her message, and this is how my third video on COVID came to be (Fig. 1-c). Is it science communication? No. But I am convinced that it serves a purpose. It helps us paint a more meaningful picture of the current situation, it increases our awareness of the pandemic as a social crisis, and altogether it better equips us to face the challenge.

Ultimately, people want to stay safe and meet on the other side of this as soon as possible. And probably forget about R numbers, or at least learn about them out of curiosity, and not because they feel that their lives depend on it. The science is necessary to get us there faster and better, but the social aspect of the pandemic is still the most important one. And everybody must do their part, as citizens, scientists, business owners, lay people, old and young, or we do not have the right to point our finger at science communication and say it is broken. Communication is a two way street.

## References

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## Minutes of the ESMTB board meetings

Palermo, October 25, 2019

Present: the complete board (Maíra Aguiar (MA), Ellen Baake (EB; minutes), Luděk Berec (LB), Silvia Cuadrado (SC), Andrea De Gaetano (AdG; chair), Toby Lundh (TL), Bob Planqué (BP), via skype: Anna Marciniak-Czochra (AMC), Susanne Ditlevsen (SD)

Time: 9:30–12:20, 13:30–17:30

- The informal decisions taken via email ballot since the Heidelberg meeting were unanimously approved. The list of informal decisions is attached to the minutes.
- News from JOMB: Helen Byrne has stepped back as editor of the Perspectives Section, Susanne Ditlevsen has been appointed as her successor by the Managing Editors. The role of the Perspectives editor is analogous to that of an associate editor or guest editor. The Perspectives are reviewed and remain under the scientific responsibility of the Managing Editor(s). A self-archived version may appear on the ESMTB website and in the Communications (analogous to a preprint on arXiv).
- The Board discusses in detail the new draft of the Publishing Agreement with Springer and agrees on a number of changes to be made.
- ECMTB 2020:
  - ECMTB 2020 is an ESMTB endeavour financially, but SMB is an equal partner in all scientific issues. SMB may also give out its own prizes, or support plenary speakers. AdG and AMC will draft and circulate a MOU with the University of Heidelberg.
  - We plan for 9 plenary speakers, 1 free afternoon, no special homage. The General Assembly of ESMTB will take place on Thursday afternoon, separate from SMB. We may think of an additional joint meeting with SMB about more scientific issues. In one lunch break, we will provide the opportunity for a meeting with the editors of BMB; and similarly with those of JOMB (provided the Managing Editor(s) support the idea).
  - The previous agreement about the scientific board (1st tier) is in place. AdG will clarify with SMB the structure of scientific committee.