Review

Public Health Needs the Public Trust: A Pandemic Retrospective

Matthew Halma and Joshua Guetzkow *

Posted Date: 7 February 2023

doi: 10.20944/preprints202302.0111.v1

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Public Health Needs the Public Trust: A Pandemic Retrospective

Matthew T.J. Halma [1,2] and Joshua Guetzkow [3,*]

[1] Vrije Universiteit Amsterdam, 1081 De Boelelaan, 1081 HV, Amsterdam, North Holland, The Netherlands; m.t.j.halma@vu.nl
[2] World Council For Health, 11 Laura Place, BA2 4BL, Bath, United Kingdom
[3] Institute of Criminology, Department of Sociology & Anthropology, The Hebrew University of Jerusalem, Jerusalem, Israel
* Correspondence: joshua.guetzkow@mail.huji.ac.il

Abstract: Public trust in science was tested and relied on during the SARS-CoV-2 pandemic, which has shaped global events since the WHO declaration in March 11, 2020. Public trust has been impacted through the government recommendations and mandates informed by public health guidance, including non-pharmaceutical and pharmaceutical interventions. The free-flow of ideas and information so essential to the functioning of science has faced unprecedented challenge from widespread censorship in both the media and in scientific journals. This has created a poisoned environment for the building of trust between science and society. Scientific norms and accountability must be restored in order to rebuild the vital relationship between scientists and the public they serve.

Keywords: public health; public trust; science communication; pedagogy; citizen science; stakeholders; informed consent; uncertainty communication

1. Introduction: A loss of trust

The response to the emergence of SARS-CoV-2 has had a significant impact on the relationship between the biomedical community and the public. Public perceptions impact the decision to follow health guidance set by governments and scientists [1], and so it is vital to identify the extent and sources of mistrust between the public and the scientific community and public health bodies.

Public trust in science has demonstrably declined since the beginning of the pandemic [2,3]. We review changes in three areas; vaccination, anthropogenic global warming, and regulatory decisions on chemicals. Conspiratorial thinking is negatively correlated with support for childhood vaccination [4].

Unfortunately, significant mistrust has been built, which can be exemplified by decreased desire for childhood vaccination [5], which differs from drops in vaccination due to the inaccessibility resulting from lockdowns. As a consequence of mistrust, vaccination rates have declined, and this effect cannot entirely be attributed to the direct impacts of closures [6]. Initially support for vaccination rose during the pandemic [7].

The pandemic also saw a rise in 'alternative' medicinal modalities [8–15], including Ayurveda [16], herbalism [17–19], supplementation [20]. The increase in CAM can be seen as a tacit desire to find an alternative to 'mainstream' medical practice. One contradicting piece of information found no significant increase in the use of dietary supplements [21].

Increasingly, CAM and conventional medicine are at odds; in one study, 40% of CAM practitioners surveyed in Norway said that they would not refer COVID-19 patients to a physician [22]. Antagonism has grown on both sides; increasingly, government regulations target CAM practitioners. For example, the New Zealand Labour is introducing a 'Therapeutic Products Bill', which enables the government to regulate the sale of commonly used vitamin and mineral supplements, nutraceuticals, and natural medicines [23].

Some therapeutics with strong supporting evidence, such as ivermectin for the prevention and treatment of covid-19, were restricted under legal penalty [24].

 doi:10.20944/preprints202302.0111.v1

Despite the economic pressures of the pandemic on consumers, a Romanian study demonstrated an increased consumption of organic food amongst those with some organic food consumption already, but not a significant adoption of organic food consumption from those indifferent prior to the pandemic [25]. Other studies have seen an increased consumption of organic food [26–29], and entertaining heterodox beliefs on COVID-19 was a significant predictor of support for organic food [30].

Along with distrust of vaccines, distrust of GMOs, among other beliefs contrary to the alleged scientific consensus form a constellation of beliefs [31]. While running against the expressed intentions of science communicators

Vaccine refusal was very common in Africa, with willfully unvaccinated survey participants providing concerns with vaccine safety and side effects and lack of trust for pharmaceutical industries as their major motivating factors [32]. Lack of trust features highly among people's stated reasons for not intending to get vaccinated [33–47]. Furthermore, marginalized groups with significant historical reasons for mistrust of the medical establishment and the government show lower rates of vaccination; including African Americans [48,49] indigenous people [50–54], and Hispanics [6,34,55]. Trust on COVID-19 is highly partisan [56].

It is demonstrated that if people were exposed to non-mainstream sources of information on COVID vaccines, they were less likely to get vaccinated [57]. Media strategies emphasized a single unified and authoritative message [58], and negative [59], fear- and guilt-based messaging [60–63]

2. Reasons for Distrust

2.1. Censorship

In his classic work on the ethos of science, Robert K. Merton outlined four norms essential to the scientific enterprise: universalism, communism, disinterestedness, organized scepticism [64]. At least two of those norms, universalism and organized skepticism, are abrogated in a scientific environment where censorship and suppression of scientific findings and opposing views are rampant.

Censorship was also rife regarding all topics related to SARS-CoV-2 [65]. To take the example of the COVID-19 outbreak, there were several non-mainstream scientists accused of spreading 'misinformation'. While many of their arguments were sound (and predictions came true) and they frequently had a previous career marked by significant achievement, they were still unfairly marginalized, as the attempt by NIH director Francis Collins and NIAID director Anthony Fauci to "Takedown" the Great Barrington Declaration [66], a document co-authored by Dr. Martin Kulldorf, Dr. Sunetra Gupta and Dr. Jay Bhattacharya, all highly credentialed experts in epidemiology [67].

In fact, many people advancing non-mainstream views, especially those challenging the need for, safety and efficacy of products known as COVID-19 vaccines, saw censorship, not only on social media, but by scientific journals themselves. In one such episode, a manuscript for publication in the journal *Current Problems in Cardiology* by Dr. Jessica Rose and Dr. Peter A. McCullough was withdrawn after publication without explanation [68]. Several examples exist of articles retracted for ostensibly political reasons, as opposed to scientific reasons [69,70].

While the extent of censorship escapes much of the lay public, it has been acknowledged by human rights organizations, including Amnesty International [71], as well as scientists and several scientific and medical organizations established around independent science, including the Frontline Covid-19 Critical Care Alliance(FLCCC) and the British Ivermectin Recommendation Development (BIRD), two organizations advocating for the use of Ivermectin in early treatment of COVID-19 patients, which became highly politicized, which served to the detriment of covid-19 treatment [72].

Simply put, there is a large gap between what the science *is* and what it is *presented as*. Responsibility certainly falls on the media, and governments for pursuing a singular, one-size-fits-all strategy of vaccine mandates, lockdowns, and masking for entire populations, with few exceptions. These regulations were advanced often without public consultation and without disclosure of relevant conflicts of interest [73]. Education level in several surveys had little impact on holding non-mainstream beliefs [39], and even a higher level of education was associated with vaccine hesitancy

 doi:10.20944/preprints202302.0111.v1

[74,75], and holders of non-mainstream views use data-centric arguments [76].However, science and scientists are not blameless in their lack of questioning official guidance when it contradicted science. For example, a 2020 review on masking to prevent pandemic influenza found no benefit [77], yet mask mandates were a popular policy in many countries [78]. Few scientists spoke out against policies such as lockdowns, while having dubious benefit for the spread of SARS-CoV-2 [79], had significant detrimental impacts on the economy [80–83], mental health [84], education [85–87] and rates of domestic abuse [88–90].

2.2. Narrowness and inflexibility of public health response

The lived experience of individuals contrasts with what they were told by experts, about the vaccines preventing infection and transmission [91]. In fact, vaccination makes recipients more prone to serial reinfection, as the protection conferred by natural immunity lasts for significantly longer [92]. While symptomatic infection was the original endpoint of the clinical trial used in the Emergency Use Authorization (EUA) of the vaccines [93,94], it was later stated that the vaccines were primarily intended to reduce hospitalization and death [95]. Since young people carry a much lower risk from hospitalization or death due to covid, almost 10 000 times less fatality risk for those under 20 years old compared to those over 90 according to one Ontario study [96], it does not make sense to expose them to the risk of adverse events from these products, according to one analysis [97].

Procrustean policies such as general mandates not taking into account one's individual risk, including factors of age [98], prior infection [99], pre-existing conditions or lack thereof [100,101] lessened trust between the general public and the biomedical community. While booster requirements were enforced in American universities [102], studies emerged that based on conservative estimates of the number needed to vaccinate (NNTV) to prevent a single hospitalization from COVID-19, at least eighteen serious vaccine adverse events would occur [97]. These mandates contradict the approach that other nations, mostly European, have taken in restricting and discontinuing the use of Moderna for younger people [103,104]. Denmark later discontinued vaccinating individuals under 50 years old [105].

2.3. Conflicts of Interest and Regulatory Capture

These issues lay against a backdrop of known criminal malfeasance by the pharmaceutical industry [106,107], including the largest criminal fine in history given to Pfizer [108]. There is definite evidence of prior malfeasance, even at the level of academic research, as financial influences are known to impact research [109,110]. For example, one widely circulated one-paragraph letter in the New England Journal of Medicine in 1980 claimed a very low rate of opioid addiction [111,112] and was used to justify the over prescription of opioid medications, despite the letter providing no evidence.

Conflicts of interest abound in pharmaceutical research [113,114], and pharmaceutical profits not only fund scientific journals [115,116], but also medical schools [117], patient advocacy groups [118,119] and even regulatory bodies (almost half of US FDA's annual budget [120]). Trials are also increasingly funded by the pharmaceutical companies who manufacture the very products under evaluation [121], resulting in significant conflicts of interests, as contract research organizations are prone to corruption [122].

2.4. Bioethical violations

Another driver of people's move towards distrust of science has been the experience of adverse events following administration of products known as COVID-19 vaccines. The adverse event rate is significantly higher than any previously administered vaccine, and is even much higher than the rates of vaccines previously withdrawn due to safety concerns [123]. Dangers being assuaged away by public health agency without sufficient evidentiary basis to rule out these dangers violates the bedrock bioethical principle of informed consent [124]. Considering the harms that have come out as a result of research afterwards, obviously the data at the time of approval was insufficient to show

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safety, meaning that informed consent of *all* recipients of the products known as COVID-19 vaccines did not give *informed* consent. Furthermore, mandates forced many reluctant people to receive vaccination, approximately ¼ of all recipients in France were otherwise unwilling but chose to receive the vaccine due to the mandate, by one estimate [125]. As one principle of informed consent is the lack of external coercion on the subject, vaccine mandates violate the Nuremberg Code, which states [126]:

"1. The voluntary consent of the human subject is absolutely essential.

This means that the person involved should have legal capacity to give consent; should be so situated as to be able to exercise free power of choice, without the intervention of any element of force, fraud, deceit, duress, overreaching, or other ulterior form of constraint or coercion".

Since the 'consent' of a significant portion of the population was only obtained through coercion, imposing a mandate and injecting an individual with a yet-experimental substance constitutes a violation of the Nuremberg Code. Beyond the ethical violation, vaccine mandates were also predicted to damage public trust [125,127] and retrospectively, penalizing non-recipients of the products damages public trust [128–130].

2.5. The price of distrust

The coronavirus pandemic has made more volatile an already strained relationship between scientists and the public. Public trust in large companies as well as other people declined during the pandemic in a US and Netherlands survey [131]. While trust in scientists rose early in the pandemic [132,133], trust is now lower than it was before the pandemic and shows significant political polarization [2,134–136]. Distrust manifested even in cases of games between peers [137].

Factors which influence trust [138–140] include ethnicity [141,142] (particularly for groups like African Americans, with a history of medical experimentation by authorities [143,144]), sex [139], education, income, perceived risk [145] and cognitive disposition [146].

The coronavirus pandemic has made more volatile an already strained relationship between scientists and the public. While trust in scientists rose during the early pandemic, trust is now lower than it was before the pandemic and shows significant political polarization [2]. Incredibly, public distrust was most often blamed on people spreading contrary views, rather than the scientific establishment itself [147]. Increasing numbers of people doubt official government narratives [38], and are unlikely to cooperate with government guidelines, presenting a challenge for public health measures.

Distrust creates an antagonistic relationship between scientists and society, and hampers cooperation. Science also becomes ineffectual in this situation, as attempts to make science-based reforms are met with hostility, and there is less support for public funding of science [148,149]. Distrust sows further distrust, as groups stop listening to each other, and retreat into their respective silos. Put simply, once trust has been broken, it is difficult to get back.

Furthermore, messaging is unable to effectively 'land' for a public audience unless several communicator criteria are met; expertise in the subject matter [150], and trust of the audience towards the communicator [151]. Understanding this necessitates movement away from the 'information-deficit' model of science communication, which is the dominant paradigm in science communication today [152], towards a different approach. The information deficit model is not even an effective strategy, even in cases when one has accurate information [153].

3. Discussion: Pedagogy in the public square

Rebuilding trust necessitates accountability for offenses and lies (both of commission and omission), as well as rectification of wrongs. It means acknowledging the limitations of results, communicating that in most studies, the measured value is a proxy of the actual metric of interest (such as mice antibody levels and no human trials used in the approval of bivalent boosters by the FDA [154]), reporting uncertainties and the possibility that the response may change with new information [155,156]. This also guards against holding onto models too tightly when they need to be updated.

It also means open communication and free speech as fundamental principles. Conflicts of interests must be disclosed and investigated where relevant, and firings, as well as legal and criminal accountability must be enforced when violations are present to maintain scientific and medical integrity.

Also, transparency and openness need to be operative principles of science. Where there is raw data, it should be accessible to an interested researcher (preserving subject confidentiality) [157], and procedures must be clearly posted to enable replicability. The FAIR guidelines (findable, accessible, interoperable and reusable) have been developed for this purpose, and they should guide publishing in the future [158]. Not only is there an added benefit for a field adopting open data policies [159], but there is also greater trust engendered by the openness [160].

We do not know the extent that such an approach would have, and it may not disabuse all members of the public of their distrust, but with the stakes at hand, it deserves our best shot. As humanity, we face multiple converging crises in health, ecology and in the wider social fabric. A continued relationship of antagonism simply will not cut it to face the challenges ahead.

Navigating the future requires an informed public, and as scientists, this is our duty.

Author Contributions: Conceptualization, M.T.J.H.; writing—original draft preparation, M.T.J.H and J.G..; writing—review and editing, M.T.J.H and J.G.; project administration, M.T.J.H. All authors have read and agreed to the published version of the manuscript.

Funding: This research received no external funding.

Acknowledgments: The author would like to thank David Charalambous for discussions related to this manuscript.

Conflicts of Interest: The authors declare that the research was conducted in the absence of any commercial or financial relationships that could be construed as a potential conflict of interest.

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