IMPROVING PUBLIC ACCEPTANCE OF HEALTHCARE

The Haldane Group

Authors: Elena Meganck, Harit Phowatthanasathian, Jessie Ng, Samantha Yates, Shirin Bamezai

Contents

Executive summary

This paper explores the relationship between healthcare systems and the general public. Examining the key drivers of public mistrust of healthcare allows for development of targeted interventions that improve acceptance of healthcare.

Recommendations for improved policies are provided within the context of general science communication, healthcare case studies, and influential parties.

A summary of the recommendations outlined in this report is given below:

Science communication:
- Striving for a better understanding of the reasons underlying science skepticism to inform a novel approach to science communication
- Encourage political engagement to advance scientific applications for the public healthcare landscape
- Building trust in the scientific community by establishing public scientific bodies to explain the origins and meaning of contentious scientific phenomena

Healthcare case studies:
- Account for cultural differences in developing public immunisation education programs
- Deployment of public initiatives to reach minority groups to create a more inclusive healthcare system

Influential parties:
- Implementation of regular physician communication training to develop crucial emphatic communication, allowing for patients to understanding their situation, their options, and bolster the doctor-patient relationship
- Research into the efficacy of outreach programs to determine their impact and make decisions on the value of further investment

Introduction

One of the many lessons learnt from the COVID-19 pandemic is the importance of public acceptance of healthcare. Whilst developing resilient and effective healthcare practices receives significant funding, its impact can only be realised with wide-ranging public cooperativity. Understanding the drivers and challenges of public healthcare acceptance can allow for targeted interventions that enhance the impact of healthcare measures. This report approaches this in 3 domains: understanding how science communication influences public opinion, exploring key case studies that unveil how healthcare can be effectively managed, and investigating how influential parties can be leveraged for improving public opinion on healthcare.

Science communication

Many researchers have called for more scientific and effective public communication due to mass hysteria and distrust of experts, exemplified by the anti-vaccination movement. A field of great relevance called the "science of science communication" has been blooming in recent years, illustrating the growing attention towards this challenge (1). Science communication within a healthcare context can be explored in 5 key focus areas: The information gap between researchers and the public; General social acceptance and trust in science; Political support; and communicating scientific advances.

Case studies

The analysis of specific case studies of healthcare biases offers a comprehensive view of the interweaving drivers of public healthcare acceptance. In this report, issues of discrimination, stigmatisation, limited accessibility, and general mistrust of healthcare are highlighted to facilitate the development of tailored interventions. These case studies highlight areas of current healthcare systems that appear to be driving distrust of the healthcare industry. Examining patterns and themes across such case studies can allow for development of interventions that rebuild such dysfunctional aspects of healthcare systems.

Influential parties

Public mistrust of healthcare is driven through a number of channels - examining these can determine parties that influence public perceptions. Ranging from the individual physician to community hospitals and government organisations, each provides different opportunities for improving the relationship between the public and the healthcare industry. Key opportunities include the introduction of regular training for healthcare workers on how to communicate best with patients. Further, building community-specific programs may provide avenues to breaking down numerous healthcare accessibility barriers. The accumulation of small improvements such as these across interaction points between the public and healthcare providers culminates to improve public healthcare acceptance.

Science communication

Background

The relationship between science communication and public acceptance of healthcare can be explored in several domains. These range from the relay of information directly to the public, to engaging with policy groups to support the dissemination of information. Below, 4 key areas of focus for scientific communication in healthcare are detailed.

1. The Information Gap Between Researchers and the Public

Effective communication is not only about presenting facts, but also about ensuring information is understood. Unlike researchers, who have studied in their fields for decades, most of the public audience are laymen and do not know a lot about the subject. Jeanne Garbarino, the Director of Science Outreach at Rockefeller University, reports that she observes researchers assuming that the audience was interested in their messages (2). She also argues scientific messages were framed in a way that is too technical, which made it even harder for the audience to understand. Besides not understanding the subject, another contributor to the widening communication gap is the fact that most of the audience does not possess a significant understanding of statistics (2). This information gap has to be minimized with effective, evidence-based communication before the public can digest healthcare information from researchers.

2. Social Acceptance and Trust in Science

The anti-vaccination movement gathered enormous support from the public, not due to mass agreement on scientific evidence against vaccines, but rather because they distrust the researchers and the scientific community. It was estimated by the Center for Countering Digital Hate that in the UK alone, there are more than 5.4 million anti-vaxxers agreeing that the experts cannot be trusted (3). Under such circumstances, efforts to communicate healthcare measures and build support in this segment of the population are in vain. Social acceptance and trust are therefore basic requirements for any meaningful and constructive healthcare dialogue.

3. Political Support

Generating political support can aid scientific research in securing funding. Improved understanding of science can allow for appreciation of the value of science in military and civilian applications. Government spending benefits from public approval of funding uses, and this relationship between political bodies and the public can be utilized to foster public trust in the scientific field. This relies on increased political collaboration and public participation – with this participation exposing greater proportions of the population to the potential of scientific discoveries in addressing social challenges.

4. Advancements in Society by Scientific Methods

Technology in the scientific field has seen great improvement. For example, automatic delivery vehicles are now in use due to the invention of automatic sensors and advancements in engineering. Further, many diseases that were once incurable are now treated effectively by antibiotics. For the public to benefit from these advancements, the science behind these inventions should be explained to the public. Increased awareness of the underlying scientific factors contributing to general improvements in living standards should also be pursued.

Interventions

The key drivers and opportunities explored above can be examined for the recommendation of policy focus areas and targeted interventions.

Unremitted and gratuitous rejection of science, in other words, science skepticism, is a major problem that can have severe detrimental effects on individuals and society.
Before further exploration, it is important to point out that science skepticism is not heterogeneous. In a joint study led by the University of Amsterdam, it was found that the "levels of science skepticism are heterogeneous across countries, but predictors of science skepticism are heterogeneous across domains". Taking the example of climate change, skepticism levels are lower in Portugal than in France, but the predicting factors for this skepticism (scientific literacy, political beliefs, spirituality, and religiosity) are largely the same. However, other domains can be associated with other predictors, such as vaccine skepticism being associated with spirituality and scientific literacy, genetic modification skepticism with scientific literacy, and evolution skepticism with religiosity (6).

We observe that science skepticism varies in degree and kind, which is important to consider if our goal is to prevent and reduce science skepticism. In this report, we propose that its presence can be explained by various predicting factors, such as scientific literacy and political, religious and spiritual beliefs. Predicting factors of skepticisms are interlinked in a complex web of interactions, and so the report will inevitably reflect the complexity of their relationships, with significant overlap between topics as a result.

Scientific Literacy and Communication

According to UNESCO, scientific literacy can be defined as "an individual's scientific knowledge and use of that knowledge to identify questions, to acquire new knowledge, to explain scientific phenomena, and to draw evidence-based conclusions about science-related issues, understanding of the characteristic features of science as a form of human knowledge and enquiry, awareness of how science and technology shape our material, intellectual, and cultural environments, and willingness to engage in science-related issues, and with the ideas of science, as a reflective citizen" (9).

In recent years, there have been increased calls for a focus on science literacy, due to the concerning increase in the spread of misinformation and conspiracy theories surrounding established scientific findings, especially those regarding health. The general assumption, still untested, is that greater science literacy could curb the spread of harmful healthcare-related misinformation and enable more responsible and informed decision-making at the individual and collective levels.

Although an understanding of how science is investigated and how conclusions are made based on years of research, not singular papers, is vital to prevent the rejection of science, it is not enough to prevent the spread of misinformation. Notably, a recent study found that scientific literacy was the main driver of science skepticism only in the case of genetic modification, amongst a range of topics (8). This is supported by previous research that suggests an approach focused on knowledge deficits is insufficient to combat science skepticism (3, 4, 5). The nature of digital media environments shapes what information people receive, how they receive it and what conclusions they can draw from it. Since most individuals learn about science and health through mediated sources, it is necessary for science literacy to be expanded to digital media science literacy. Digital media science literacy consists of an understanding of the elements that shape online information and its distribution, namely how singular users and institutions generate content, with certain norms and goals, and how platforms and search engines can shape what type of content is accessible. This type of literacy must encompass three main skill areas: 1) the ability to access science information in online environments; 2) the ability to evaluate a piece of content based on how information travels through media systems; 3) the ability to evaluate pieces of science information in media messages.

As digital platforms increase the spread of misinformation it is important to examine what makes individuals particularly susceptible to this. Research suggests that people are generally capable of "epistemic vigilance", in other words of being on guard of misinformation from outside sources. A review on the effects of a range of misinformation campaigns found that it was not the use of communication that was influential in changing people's opinions and understanding of a specific topic, rather it was whether the piece of misinformation fit within the individual's preexisting belief. In these cases, people's vigilance fell, and they were more willing to take in information at face value. Therefore, the issue is not necessarily that people are widely easy to influence or lack understanding of the basics of science, it is that they are selectively influenced based on their pre-held beliefs, biases, and cognitive shortcuts. Thus, individuals may also require cognitive science literacy, that is an understanding of their biases as they evaluate pieces of science information. There have been extensive studies on cognitive literacy, also known as metacognition, that define this type of literacy as the awareness of one's own processes for interpreting information and how such processes shape the conclusions they come to. The theory is that if individuals are aware of these processes, they will be empowered to regulate them. High cognitive literacy has been shown to improve learning and problem-solving in both adults and children, as well as being a skill that can be developed in adulthood. It is a skill that facilitates information

searching and critical thinking/reading. Cognitive science literacy can counteract the tendency to accept misinformation that fits narratives we already believe in.

A lack of science literacy and skills is not the only culprit for the 'rejection' of science and healthcare. There is a gap between how science is communicated by scientists and officials, and how most people interpret messages. The 2017 NAS report on 'Communicating Science Effectively: A Research Agenda' highlights the "deficit model" of science communication, which assumes that a lack of scientific knowledge is the main cause for a failure to accept and act on science communication. As noted by the authors, this model is wrong - research shows that people may understand what scientists communicate but may "not agree with or act consistently with that science". As discussed above, information is acquired and filtered through people's identities and their pre-existing beliefs and values, which influences its interpretation. It is thus necessary for science communication to utilise language that does not allow for conflicting interpretations (such as the meaning of theory in a scientific context versus in everyday use) and is contextualised to the community being addressed.

Political, religious, and spiritual beliefs

Amid the array of pre-existing beliefs, biases and cognitive shortcuts, spiritual, religious, and political beliefs can be argued to be amongst the strongest influences on science skepticism.

Throughout the report, the term 'religiosity' will be defined as 'religious feeling or belief' and 'spirituality' as 'the quality of being concerned with the human spirit or soul as opposed to material or physical things'. The relationship between science and religion observes large crossovers in the study of the natural world, theology, history, philosophy. Historically, religion has at times fostered scientific development - and at other times, some religious activity may have opposed or hampered it. Today, although perhaps not as strongly as in previous historical periods, religious orthodoxy contributes significantly to low faith in science and is especially associated with evolution skepticism across the world. However, the results of Rutjens et al's study demonstrate that across both Western, Educated, Industrialized, Rich, and Democratic (WEIRD) and non-WEIRD countries, vaccine skepticism was associated with spirituality, rather than religiosity (6).

The influence of political beliefs on science skepticism operates on governmental, judicial and individual levels. To limit excessive state power, authority on healthcare practice is commonly divided into both the government and an independent judiciary. However, political parties may seek to further individual political agendas and re-structure healthcare in a manner that is not evidence-based. This is problematic for two reasons.

Firstly, a political agenda informs policymaking, and in turn influences public opinion. Notably, recent populist politics have roused skepticism within the public community by portraying academics as an elite detached from the general American population. Populist leaders have in effect leveraged instinctive tribalism to breed distrust of scientific expertise, providing a potent breeding ground for malicious actors to disseminate doubt about what is true and what

is not. This dialogue often overpowers that of any scientist or healthcare expert, partly due to the failure of scientists to connect with their audience.

Secondly, modern techniques in the Sciences offer tremendous benefit to the promotion of human health, solving challenges faced by a global population – including diseases previously thought to be incurable, such as cancer and Parkinson's. However, such advances often require significant political backing – and the absence of an evidence-based political system that supports healthcare can acts as a blockage to future progress.

Unchecked political power may also evolve into the lack of an independent judiciary. Misuse of an independent judiciary to unfairly abet sectoral privileges of judicial authorities or allow unchallenged interpretations of the law is deterred by the Rule of Law. A lack of an independent judiciary threatens fundamental rights and may cause public rejection of science and healthcare. A key example topic of concern in healthcare policy are the security standards, or lack thereof, for genomic data in electronic health records.

It is of interest to expand upon this example: whole-genome sequences should be strongly protected. It offers the promise of specific genetic patterns that can be used to predict a patient's response to specific treatments, reduce health and safety risks, and avoid the costs of ineffective treatments. However, new privacy challenges involving pharmacogenomics have evolved. Most notably, data privacy is not a defined concept – not only does the perception of data privacy differ interpersonally, but it also morphs over time. A judiciary should be conscious of this and adapt laws accordingly to ensure this scientific challenge is communicated appropriately to the public, such that the public perceives these technological advances in a balanced manner.

Corruption in the healthcare sector is also an important factor leading to the rejection of science and healthcare and should be kept in check by an independent judiciary. This issue already incurs significant costs every year, and the pandemic threatened to exacerbate the problem as the government hastened supplies and resources to those in need, circumventing procedures to prevent inefficient use of resources and fraud. Scarcity creates opportunities for profiteering, bribery, and fraudulent schemes involving the sale of malfunctioning or counterfeit goods, such as imaging technology or test kits. Protective mechanisms such as audit agencies are obstructed by the pandemic in their ability to review the use of public health resources. If protective mechanisms are not able to keep corruption in the healthcare sector in check, public perception of science and healthcare becomes tainted by a view of abuse, coercion, and injustice.

Strongly tied to political beliefs is an individual's socioeconomic background – an important factor to consider when tackling science skepticism. A person's socioeconomic background appears to influence their perception of science and healthcare. Surveys have shown that a lower socioeconomic background is associated with decreased trust in science and healthcare. This is in part due to the diverging access to means of social justice. Financial slumps, such as those resulting from the COVID-19 pandemic, initiate chasms in access to

justice, particularly for poorer and marginalised communities, many of whom may lack a legal identity, housing, or formal employment - and therefore may not be able to access emergency assistance. Meanwhile, chronically under-resourced justice institutions, many of them operating at reduced capacity due to the pandemic, risk falling even further behind. The combined lack of support from the justice system and the scientific community disconnects and marginalises many communities - which can lead to negative sentiments towards a scientific worldview.

Elucidating Cultural Contributors to Science Skepticism to Inform Future Communication Efforts

Recent research has suggested that a strategy aiming to combat science skepticism focused on increasing scientific literacy may be more relevant and effective in certain countries than in others. Any strategy which aims to combat science skepticism should be supported by a thorough understanding of the public it aims to inform, and the causes of science skepticism in this group, whether on a national, regional, community, or individual scale. In particular, there is a need to recognise the importance of spiritual beliefs as an indicator of general faith in science, and a strategy aimed at better understanding the relationship between them is likely to steer the combat in the right direction.

One possible explanation that can be offered for the robustness of spirituality as a predictor for science skepticism is the underlying intuitive nature of spiritual knowledge and its incompatibility with scientific knowledge and the scientific way of thinking. Whereas spirituality aims to drive actions by personal instinct and feelings, science aims to do so by empirical and objective observations. It is possible to argue that it is then necessary to tackle a possibly much vaster problem facing science skepticism: a "post-truth" society in which truth and perceptions of reality are thought to be based on feelings rather than fact.

To tackle such a vast problem, a strategy cultivating habits of mind to counter existing incorrect and dangerous practices, whereby individuals are able to distinguish information that is trustworthy from information that is not, should be prioritised. This should not be achieved by forcing facts onto people; this deficit model, as previously seen, is counter-productive to nurturing critical, active, and analytical minds, and further deepens resentment of expertise. Rather, this should be achieved through an education system encouraging balanced skepticism, open-mindedness, appropriate evaluation of probabilities, as well as fostering disposition to sensible and civil debate. In the face of scrupulous leaders and misinformation, it is vital to foster these minds from an early age, in part through our education systems.

In addition to altering our education system, tackling the issue of a socially compartmentalised society that insists expertise is distrustful and the truth is relative requires tailoring of its delivery of scientific information to its target audience. Individuals are more receptive to information they can relate to, and by leveraging the cultural values, priorities, and concerns each individual or group identifies with, scientists and science communicators

may be able to surmount any mental barriers obstructing the consideration of uncomfortable truths.

Building Trust in the Scientific Community

While long-term policies, focused on education, can mitigate the issue of science literacy for future generations, strategies aimed at tackling science skepticism today must focus on building trust in the scientific community. In an essay by Harvard history-of-science professor Steven Sharpin, the crucial difference between knowing science and believing people who know science is outlined. He argues that understanding the nature of phenomena such as climate change is less about knowing the scientific facts and methods, but more about knowing where "science lives" (9). As misinformation booms, governments and institutions are limited in their capacity to suppress its sources, and effort must rather be placed in fostering confidence in the scientific community such that the general public knows where science 'lives', or 'who knows and who doesn't'. Building trust in the scientific community across different demographics is key to increasing understanding and acceptance of science and science policy.

To this aim, endeavors should be made in establishing a fully independent public-facing body of scientists, with expertise in communicating with the public rather than inner scientific circles. In a 2021 study, Cvitanvic et al. identified 14 strategies to build trust at the interface of science policy, including ensuring process transparency, impartiality through demonstrable independence, and awareness of local sensitivities. The crucial element here is to ground and contextualise the information when communicating with the public (10). Transparency is not limited to opening the door to the inner workings of how science policy is developed through the disclosure of methods and findings. There is a need to contextualise the information to enable understanding of how and why interventions are being recommended. The goal should be to build an understanding of the scientific method as it relates to developments in our understanding of different phenomena, as this leads to changes in policy.

An effective vehicle for science communication, under a broader aim of building trust, may be a grassroots approach. Having experts based in a local community, who understand common biases, misconceptions, and sensitives, and are available to address concerns, answer questions, and have 1-1 conversations can be an extremely effective tool in the adoption of science policy within a community.

Case studies

Discrimination, stigmatisation, and mistrust are highly complex and interconnected biases that occur within most aspects of societal interactions. More specifically, they are also prevalent in the relationship between the public and healthcare industry. These biases are dependent on factors such as culture, religion, and historical events, to name a few. Case studies can help offer a more complete view of the interplay between different characteristics of a population and its influence on trust towards the healthcare sector. Compared to the in-depth analysis of one societal contributor to healthcare mistrust, this approach allows for the development of specific interventions to mend the relationship between the public and the healthcare industry.

Case Study 1: Transphobia in sexual health services

Transgender people – those whose gender identity differs from the sex the person had or was defined as having at birth – are more likely to face discrimination and stigma in the UK. A 2018 report by Stonewall found that 41% of trans people in the UK experienced a hate crime or incident because of their gender identity in the last 12 months (11). Discrimination and stigma unfortunately are also found in healthcare environments, particularly within sexual health services.

The People Living With [human immunodeficiency virus] HIV Stigma Survey UK 2017 found that compared to cisgender participants, transgender participants were likely to avoid care provided by the National Health Service (NHS). It was generally reported that transgender participants are being treated differently by sexual health service staff and refused or delayed treatment in the past 12 months (12).

Transgender participants also reported:
- Hearing negative comments regarding patients with HIV from healthcare workers
- Non-consensual disclosure of HIV status by healthcare workers with other healthcare workers or members of the public

Case Study 2: Age discrimination in mental health services

A report published in 2018 by the Royal College of Psychiatrists showed that doctors within the UK's mental health services are less likely to correctly diagnose and treat older patients compared to younger patients (13). A 2009 study by Linden and Kurtz (14) concluded that doctors seeing a 39-year-old vs. an 81-year-old, both with depression, are more likely to diagnose the older patient with dementia or a physical illness, indicating how ageism may underlie mental health diagnoses. Treatment for mental health illnesses also differed between the younger and older patients in this study; supportive counseling was seen as more appropriate for elderly patients, whereas referrals to specialists and different types of therapies were recommended in the case of the younger patients. With a steadily ageing population, the increasing demand for mental health services for older people is an increasingly prevalent issue and ensuring that older patients get timely diagnoses and the most appropriate treatments, like their younger counterparts, will also become increasingly important.

Case Study 3: Sexual health services

Between 2019 and 2020, the number of sexual health screens (testing for gonorrhea, chlamydia, syphilis, and HIV) decreased by 25% in England - this was accompanied by a 32% decrease in new sexually transmitted infection (STI) diagnoses in England (15). The 2020 statistics also showed that STIs disproportionately affect the following groups:

- Heterosexual young adults aged between 15 and 24 years old are more likely to be diagnosed with STIs compared with their counterparts aged 25 to 64 years old
- Bacterial STIs are more prevalent in men who have sex with men (MSM)
- People of Black ethnicity are disproportionately affected by STIs

Given the groups highlighted by the statistics, sexual health services and education can be tailored to the at-risk groups. In 2019, the UK government revealed the newly updated guidelines for Relationships and Sex Education (RSE), the first update in 20 years (16) which implies many students have been taught in an outdated manner. The RSE curriculum needs to be updated regularly, ideally annually, and integrate societal aspects to focus the message to at-risk groups identified by collected data.

Alongside this, sexual health clinics are far removed from secondary schools and 16-18 education in the UK. The C-Card is an example of a service currently available to secondary school pupils in which pupils can register for a card that will provide them with access to free condoms. 24% of all C-Card distribution outlets in England were in youth organisations and education settings (17), with the leading venue type being pharmacies (30%). However, young people who require condoms are less likely to go to pharmacies as they may not be accessible without parental help and may seem scary or embarrassing, meaning youth organisations and education settings are the most accessible place for young people to acquire condoms. The registration process for a C-Card may also hinder some young people from accessing condoms and the physical C-Card given to young people may also be discouraging as it risks being found by a parent. The C-Card system in theory is a good idea, but its application requires some improvements to reduce the STI statistics in 15- to 24-year-olds.

Case Study 4: Vaccine Hesitancy in the UK

The concept of vaccine hesitancy has had a revival due to the COVID-19 pandemic in the form of increased engagement and awareness of its impact on public health. A broad-spectrum systematic review has uncovered that vaccine acceptance rates across many countries fall between 28%-78%, with the acceptance for the SARS-CoV-2 vaccine averaging at approximately 57% (18). Within the United Kingdom demographic, after adjustment for other predictors, affiliation with certain ethnic groups proved to be a strong predictor for vaccine hesitancy (19). This correlation has been noted before, but the overwhelming risk of the pandemic has demanded further investigation into the cultural reasons behind the hesitancy and mistrust of the healthcare industry's agenda (19).

Further diving into vaccine hesitancy amongst the United Kingdom demographic, one of the largest cohort nationwide cohort studies by Woolf et al. expressed three qualitative themes behind hesitancy: trust, health information and messaging, and perceived risk (19). These themes are also explored in other studies, such as those by Alhomoud et al., which additionally propose religious factors and language barriers as contributors to the mistrust of vaccines (20). Similar reviews, focusing on the United Kingdom, collected information and

trends of vaccine hesitancy through face-to-face interviews, surveys, hospital records, and community meetings (21). A major, often cited, limitation of these cohort studies and reviews is that they attribute the vaccine hesitancy problem to a cultural origin, but the diverse complexities of minority cultures make it extremely hard to conduct further research (21).

On the other hand, review studies of other western countries might give insight into methods of tackling the public mistrust of the healthcare industry and vaccine hesitancy. A recent longitudinal study of the United States by Fridman et al. examined the demographic breakdown of vaccine hesitancy in the context of COVID-19, compared with historical vaccine hesitancy data (22). Fridman et al.'s study shares commonalities with the United Kingdom targeted studies, mentioning predictors including perceived risk and communication, in minority groups (12). However, the research team additionally notes the large influence of political factors, including political affiliation, method of communication of political parties of interest, and a political group's healthcare agenda (22). In line with other cohort studies of American demographics, it has been theorized that legacy media outlets with strong political affiliations are responsible for the polarization of threat perception of COVID-19 (23). For the United States specifically, studies have suggested that scrutinizing the extent of political exposure on certain demographics would be an area of interest in efforts to reduce vaccine hesitancy rates (23).

Interventions

Accounting for Cultural Differences in Immunisation Education Programs:

Examining case studies where public acceptance of the healthcare industry is hindered allows researchers to develop interventions for tackling healthcare mistrust and non-compliance. The COVID-19 pandemic has set a new precedent for how vaccination efforts and protocols should be carried out internationally, not only for existing diseases, but also for future outbreaks. Taking note of the NHS's vaccination efforts, a major part of its success is attributed to their immunisation education programs. NHS publishing of the benefits of vaccinations, personal protection methods, and social distancing measures has contributed to increased compliance with healthcare guidelines. NHS online resources regarding the covid vaccination are among some of the most comprehensive in the world, accounting for individuals of differing medical predispositions, ages, cultural backgrounds, and lifestyles (17). The main NHS COVID-19 webpage presents a summary of key pandemic statistics and information, expressed in 18 different languages from ethnic groups in the UK (17). This is the most culturally extensive education program of any immunisation effort that the NHS offers.

A viable intervention to foster increased public trust of the healthcare system in the UK involves provision of educational material in a culturally broader manner to include the majority of ethnic groups in different UK communities. This inclusion would extend further than the covid-19 immunisation program and to other vaccination programs like for measles, mumps, rubella, the flu, hepatitis B, and other common diseases (18). An expansion in the current immunisation program to allow for an increasingly diverse group of people to be educated on the benefits would in the longer term develop a closer connection between ethnically diverse UK communities. The intervention of adapting education programs to becoming culturally broader could be applied to other programs of focus the NHS provides, including cancer awareness, mental health, and motherhood care (18,19).

All in all, providing an education program inclusive of the major cultures present in UK communities would provide the foundation for closer communication and connection with the public. The covid-19 vaccination effort has set a precedent for what a culturally expanded education program should be. Replicating this level of inclusivity to other vaccination programs and potentially other branches of community-specific schemes would support an increase in public acceptance of the healthcare system.

Influential parties

Background

Having explored case studies of public mistrust towards the healthcare industry, and the influence of media on public opinion, it follows to question how the relationship between the public and healthcare may be improved. The vision for a supportive and transparent relationship can only be achieved by a combined effort; from individual patients to researchers, the community hospital, and the government. Examining the current rapport that healthcare has at each level gives insight into where improvements and interventions can be effective.

The patient-doctor relationship is arguably the most vital in dictating the public's opinion about healthcare. Trust has been a major factor that determines the effectiveness of one's care. As such, most hospitals have policies and regulations in place to act as a foundation for building a trustworthy rapport with their patients. Fundamental policies specifically targeting data protection and thus promoting trust include the Health Insurance Portability and Accountability Act (HIPAA) of the United States and the General Data Protection Regulation (GDPR) of the United Kingdom (24). The common core of these two patient-protection laws is protecting patient medical information, both physical and digital versions, with the GDPR extending to the protection of information regarding insurance and payments (25). In addition to facilitating regulation (e.g., how long digital information is stored, a patient's right to access their information, and consent notices), this framework is crucial to the patient-doctor relationship. Research has suggested that there are a number of effective options for physicians to tackle patient anxiety and build healthcare trust. A 2017 study by Dang et al. pointed out five improvements: providing reassurance to patients, encouraging patients to ask questions, presenting patient lab results with an explanation of their implications, avoiding judgmental language and behavior, and asking patients what their preferences are in healthcare delivery (26). Similar studies have explored these methods in a range of countries and healthcare settings, determining these strategies as effective in boosting patient-doctor relationships (27). From such studies, a common conclusion is that hospitals should provide training for all healthcare workers that deals with language, empathy, and developing supportive communication (26).

However, studies also note that it is not just the training of medical professionals that is important, but for a long-term solution that incorporates the training of new doctors every year, the system and curriculum to teach these communication skills needs to be fine-tuned and adjusted (26). Not only should physician-patient communication be taught at the university or formal education stage, but periodically throughout a physician's career to follow evolving patient demographics and trends (26). A cross-sectional study by Świątoniowska-Lonc et al. established the positive correlation between satisfaction of physician-patient communication and adherence with treatments (28). This upholds the argument that physician communication training to create a supportive environment should be a more common regular occurrence, in the hope of building a solid foundation from which to improve public acceptance of the healthcare industry.

Zooming out to the actions that a hospital can take to improve public acceptance of healthcare, there is a large overlap between doctor-patient relationships and the local community view of healthcare. First and foremost, hospitals must have a clear, transparent

set of rules and regulations for all healthcare staff. Once established and communicated to healthcare workers, hospitals can begin to look to cultivate a safe and supportive environment. One of two avenues to create a trusting relationship with the public deals with behavior of frontline workers and the physician-patient communication previously explored. The other approach is the development of programs specifically designed for the surrounding community. Great examples include the outreach programs set up by the National Health Service (NHS) (29). The NHS has stated that in addition to patient care, they actively look for ways to partner up with the community to elevate the hospital experience. Planting the seeds for future success is exactly the step that all hospitals should be actively engaging in to repair public mistrust.

From a logical stance, it seems consequential that by actively engaging and focusing on community-specific problems, a hospital would be able to both improve its relationships with the public and elevate their level of care. Unfortunately, only a handful of studies have looked at the success rates of outreach programs, fundraisers, and community-specific schemes, with most of them returning inconclusive results or requiring future research. Studies looking at Critical Care Outreach Services (CCOS) and similar medical support teams have found a lack of evidence of its effectiveness in reaching their goals (30). CCOS and programs alike were developed after evidence surfaced regarding the suboptimal care of acutely ill or deteriorating patients, with aims to reduce critical care admissions, educate staff on the identification of deteriorating patients, and improve patient discharge rates (30). Even with a clear aim to improve a community-specific problem, exploratory literature has found little evidence of its efficacy, which brings into question the value they bring to the community (30). There is a need for more research into the objective benefits that these outreach and community-based programs deliver to conclude whether the outcome justifies the effort and costs (30). It is critical that hospitals do not blindly support schemes based on a fallacious cause and effect logic, but rather support those that objectively improve the community or revise those measures that are ineffective. Once there is an improvement in community outreach programs, the relationship between hospitals, healthcare delivery and the public can continue to be improved upon.

Looking at the responsibilities a government can take to support the relationship between the public and the healthcare industry, evidence-based policymaking serves as a great example. Since the 1990s, there has been an increase in the term and implementation of evidence-based policymaking (31). Evidence-based policies are policies informed by a set of methods of a rational, rigorous, and systematic approach (32). In line with technological and scientific advancements, this approach was preferred over the subjective opinions and biases of policymakers. By applying this method to drafting policies there needs to be an additional step - which is the education of the public on the systematic approaches from which policies were derived (33). Efforts to clearly convey the methodology of health-related policies significantly improves the transparency and general understanding of the healthcare industry to the general public.

Partially due to the SARS-CoV-2 pandemic and rapid release of policies, there is a dire need for clarity in the research and logic used to produce new rules and regulations. In the United Kingdom, there has been an increase in attempts to inform the public on policy via weekly hearings, online information, or broadcast expert opinions. For protection against future health crises, further research is required to quantify whether the method in which the government is communicating to the public is truly effective. With more transparent policies, the public will have a heightened acceptance of the healthcare industry, benefiting all.

Analysis of public discourse regarding the SARS-CoV-2 pandemic has identified, categorised, and ranked thematic clusters of conversations on social media (34). Unsurprisingly, a popular topic of discussion related to the implementation of policies and restrictions, and the scientific evidence supporting them (34). The next most prevalent topic was discussion on "social measures", and the reaction of the public to new restrictions (35). Within the category of "social measures" there were clear groups of positive and negative reactions. By mapping out the emotional intensity of different social media posts, Li et al.'s research team were able to estimate the social standing of the government and healthcare industry from the public's perspective (34). Utilizing this analysis, governments can improve their policy or adapt their approach to compromise with the public on certain policies. Every country has dramatically different dynamics between the public and healthcare, therefore specific research into regional opinions on certain policies are required. Li et al.'s research, among other studies, highlights the lack of research into the efficacy of discourse between the government and its citizens when it comes to evidence-based policymaking. To gain the public's acceptance of the healthcare industry, at a government level, there needs to be more analysis on whether the government's communication strategies are efficacious.

Interventions

Implementation of periodic physician communication training

To bring about an increase in public acceptance towards the healthcare industry, the physician-patient relationship should be improved. Communication training as used in this context refers to the development of effective communication by the medical professional, not only in the accuracy of the content, but in the manner in which it is conveyed. This will allow for a patient to feel confident and informed about their situation – and more likely to accept healthcare interventions.

Upon closer inspection of medical curriculums within the United Kingdom, there is an ambiguity in the way communication training is worded. There is no clear guideline or definition for how physicians can effectively communicate to patients (35). Assessment of a medical student's communication skill is largely dependent on a teaching staff's subjective definition of clear communication. This method of verifying a student's ability to interact with patients is not entirely invalid, because doctor-patient interactions should be judged by an experienced professional rather than exclusively by rigid criteria. Nevertheless, medical course syllabuses largely incorporate communication or interpersonal skills as an aspect of a larger piece of work, but never the main topic of focus (35). Therefore, medical students only focus on the vaguely defined communication skills as a secondary rather than a primary priority throughout their education.

Additionally, as physicians there is little to no emphasis on the importance of empathic patient communication because the assumption is made that all doctors would possess such skills, despite this not being a focus of their training. Courses and seminars are offered by organisations in the hopes of building better communicators - however many of these are hidden behind a paywall (36). Physicians interested in improving their communication might have the opportunity to do so with a small sponsorship by their associated hospital for the course, but the majority receive no financial support for this (36). This is a large barrier to the development of physician communication within the NHS and may be a key driver of public distrust of the healthcare industry.

A targeted intervention to aid in the building of public trust of the healthcare industry is to implement free communication courses for physicians. This could be provided in a mandatory or voluntary manner depending on a specific hospital or organization's valuation of empathic patient communication. Investing into additional doctor training will require financial resources, time, and professional expertise – but from a holistic and research-backed perspective, it is worth the investment (26,27). The short-term benefits are the direct improvement of physician skills, and the long-term benefit is a gradual increase in public trust of the healthcare industry.

Research into the efficacy of outreach programs
From a top-down perspective, interventions targeting the way in which the healthcare industry and community hospitals reach out to specific communities are vital. There are a wide variety of community-specific programs led by local hospitals that target the needs of the community. Research into the efficacy of these community-specific schemes have found little evidence of its impact, therefore more research is required to confirm whether these outreach programs are worth the investment or not. If found to be of limited benefit, the government and hospitals need to elucidate for what reason this may be the case.

As noted in the investigation of the effectiveness of the Critical Care Outreach Service (CCOS) by Hyde-Wyatt et al., three noteworthy discussion points were introduced: the lack of evidence of the outreach program's impact on community health, the need for further research with more samples, and the potential need for increased investments into the service (30). Hyde-Wyatt et al. highly advocates further research with larger sample sizes after which he implies two routes of action in response to the research's findings (30). In the event that further research is congruent with his team's preliminary results (in that outreach programs still do not provide significant benefit), his team believes a prompt restructuring of the program and temporary diversion of resources elsewhere is appropriate (30). However, if research supports a potential benefit from these programs, it would be assumed that initial insignificance in the CCOS's impact could be attributed to a lack of funding or resources. The path of action in this scenario would be to consequently devise a plan of introducing more funding and personnel to these community-specific schemes.

In addition to a call for more research, other investigations have mentioned a need to expand the breadth of investigation. This includes examining the impact of community servicing programs from the smallest level of doctor-patient interactions to the larger impact on community health over time. Longitudinal, comprehensive research requires a large investment of resources, however many research teams believe it to be a necessary step towards improving the health of the community - and consequently improving the rapport of the healthcare industry with the public (30).

Bibliography

1. Schäfer M. The Science of Science Communication: Why it matters [Internet]. Hindawi. 2020 [cited 2021 Nov 6]. Available from: https://www.hindawi.com/post/science-science-communication-why-it-matters/
2. Kappel K, Holmen SJ. Why Science Communication, and Does It Work? A Taxonomy of Science Communication Aims and a Survey of the Empirical Evidence. Frontiers in Communication. 2019 Oct 25;4.
3. Revealed: Anti-vaxxers' plans to undermine trust in Covid-19 vaccine [Internet]. ITV News. 2020. Available from: https://www.itv.com/news/2020-12-22/revealed-more-than-5-million-anti-vax-followers-in-uk-as-leaders-spread-distrust-about-covid-vaccine
4. Rutjens BT, van der Lee R. Spiritual skepticism? Heterogeneous science skepticism in the Netherlands. Public Understanding of Science. 2020 Apr 1;29(3):335-352. https://doi.org/10.1177/0963662520908534
5. Scientific Literacy. *UNESCO International Bureau of Education*. Webpage. Available from: http://www.ibe.unesco.org/en/glossary-curriculum-terminology/s/scientific-literacy [Accessed 10th November 2021]
6. McPhetres, J., & Zuckerman, M. Religiosity predicts negative attitudes towards science and lower levels of science literacy. *PloS one.* 2018; 13(11), e0207125. https://doi.org/10.1371/journal.pone.0207125
7. R Rutjens, B. T., Sutton, R. M., & van der Lee, R. Not All Skepticism Is Equal: Exploring the Ideological Antecedents of Science Acceptance and Rejection. *Personality & social psychology bulletin.* 2018; 44(3), 384-405. https://doi.org/10.1177/0146167217741314
8. de Jong, S., Ketting, E., & van Drooge, L. Highly esteemed science: An analysis of attitudes towards and perceived attributes of science in letters to the editor in two Dutch newspapers. *Public understanding of science (Bristol, England).* 2020; 29(1), 37-52. https://doi.org/10.1177/0963662519878988
9. Shapin, S., 2019. Is there a crisis of truth. Los Angeles Review of Books. December, 2, p.2019.
10. Cvitanovic, C., Shellock, R.J., Mackay, M., van Putten, E.I., Karcher, D.B., Dickey-Collas, M. and Ballesteros, M., 2021. Strategies for building and managing 'trust' to enable knowledge exchange at the interface of environmental science and policy. Environmental Science & Policy, 123, pp.179-189.
11. Stonewall. 2018. *LGBT in Britain – Trans Report (2018)*. [Online] Available from: https://www.stonewall.org.uk/lgbt-britain-trans-report [Accessed 1st November 2021].
12. Hibbert M, Wolton A, Crenna-Jennings W, Benton L, Kirwan P, Lut I, Okala S, Ross M, Furegato M, Nambiar K, Douglas N, Roche J, Jeffries J, Reeves I, Nelson M, Weerawardhana C, Jamal Z, Hudson A, Delpech V. Experiences of stigma and discrimination in social and healthcare settings among trans people living with HIV in the UK. *AIDS Care.* 2018;30(7):836-843. Available from: https://doi.org/10.1080/09540121.2018.1436687
13. Royal College of Psychiatrists. Suffering in silence: age inequality in older people's mental health care. 2018. Available from: https://www.rcpsych.ac.uk/docs/default-source/improving-care/better-mh-policy/college-reports/college-report-cr221.pdf?sfvrsn=bef8f65d_2
14. Linden M, Kurtz G. A Randomised Controlled Experimental Study on the Influence of Patient Age on Medical Decisions in Respect to the Diagnosis and Treatment of

Depression in the Elderly. *Current Gerontology and Geriatrics Research.* 2009. Available from: https://dx.doi.org/10.1155%2F2009%2F475958

15. Public Health England. 2021. *Sexually transmitted infections (STIs): annual data tables.* [Online] Available from: https://www.gov.uk/government/statistics/sexually-transmitted-infections-stis-annual-data-tables [Accessed 1st December 2021]

16. Department for Education. 2021. *Relationships and sex education (RSE) and health education.* [Online] Available from: https://www.gov.uk/government/publications/relationships-education-relationships-and-sex-education-rse-and-health-education [Accessed 1st December 2021]

17. Public Health England. 2017. *Condom distribution schemes in England.* [Online] Available from: https://www.gov.uk/government/publications/condom-distribution-schemes-in-england [Accessed 1st December 2021]

18. Sallam M. COVID-19 Vaccine Hesitancy Worldwide: A Concise Systematic Review of Vaccine Acceptance Rates. Vaccines [Internet]. 2021 [cited 6 November 2021];9(2):160. Available from: https://www.mdpi.com/2076-393X/9/2/160

19. Woolf K, McManus I, Martin C. Ethnic differences in SARS-CoV-2 vaccine hesitancy in United Kingdom healthcare workers: Results from the UK-REACH prospective nationwide cohort study. The Lancet Regional Health - Europe [Internet]. 2021 [cited 6 November 2021];9:100180. Available from: https://www.thelancet.com/journals/lanepe/article/PIIS2666-7762(21)00157-5/fulltext

20. Alhomoud F, Dhillon S, Aslanpour Z. Medicine use and medicine-related problems experienced by ethnic minority patients in the United Kingdom: a review. International Journal of Pharmacy Practice [Internet]. 2012 [cited 6 November 2021];21(5):277-287. Available from: https://pubmed.ncbi.nlm.nih.gov/23418849/

21. Robertson E, Reeve K, Niedzwiedz C. Predictors of COVID-19 vaccine hesitancy in the UK household longitudinal study. Brain, Behavior, and Immunity [Internet]. 2021 [cited 6 November 2021];94:41-50. Available from: https://www.sciencedirect.com/science/article/pii/S0889159121001100

22. Fridman A, Gershon R, Gneezy A. COVID-19 and vaccine hesitancy: A longitudinal study. PLOS ONE [Internet]. 2021 [cited 6 November 2021];16(4):e0250123. Available from: https://journals.plos.org/plosone/article?id=10.1371/journal.pone.0250123

23. Sharfstein J, Callaghan T, Carpiano R. Uncoupling vaccination from politics: a call to action. The Lancet [Internet]. 2021 [cited 6 November 2021];398(10307):1211-1212. Available from: https://www.thelancet.com/journals/lancet/article/PIIS0140-6736(21)02099-7/fulltext

24. Nass S, Levit L, Gostin L. The Value and Importance of Health Information Privacy [Internet]. Ncbi.nlm.nih.gov. 2021 [cited 27 October 2021]. Available from: https://www.ncbi.nlm.nih.gov/books/NBK9579/

25. The HIPAA Privacy Rule [Internet]. HHS.gov. 2021 [cited 2 November 2021]. Available from: https://www.hhs.gov/hipaa/for-professionals/privacy/index.html

26. Dang B, Westbrook R, Njue S. Building trust and rapport early in the new doctor-patient relationship: a longitudinal qualitative study. BMC Medical Education [Internet]. 2017 [cited 6 November 2021];17(1). Available from: https://bmcmededuc.biomedcentral.com/articles/10.1186/s12909-017-0868-5

27. Haskard Zolnierek K, DiMatteo M. Physician Communication and Patient Adherence to Treatment. Medical Care [Internet]. 2009 [cited 6 November 2021];47(8):826-834. Available from: https://pubmed.ncbi.nlm.nih.gov/19584762/

28. Świątoniowska-Lonc N, Polański J, Tański W, Jankowska-Polańska B. Impact of satisfaction with physician-patient communication on self-care and adherence in patients with hypertension: cross-sectional study. BMC Health Services Research [Internet]. 2020 [cited 6 November 2021];20(1). Available from: https://bmchealthservres.biomedcentral.com/articles/10.1186/s12913-020-05912-0

29. NHS England » Partnerships and relationships [Internet]. England.nhs.uk. 2021 [cited 6 November 2021]. Available from: https://www.england.nhs.uk/ourwork/part-rel/

30. NHS England » Voluntary, Community and Social Enterprise (VCSE) Health and Wellbeing Alliance [Internet]. England.nhs.uk. 2021 [cited 6 November 2021]. Available from: https://www.england.nhs.uk/hwalliance/

31. Ham C, Hunter D, Robinson R. Evidence based policymaking. BMJ [Internet]. 1995 [cited 6 November 2021];310(6972):71-72. Available from: https://pubmed.ncbi.nlm.nih.gov/7833721/

32. Sutcliffe S, Court J. Evidence-Based Policymaking: What is it? How does it work? What relevance for developing countries? [Internet]. Cdn.odi.org. 2021 [cited 6 November 2021]. Available from: https://cdn.odi.org/media/documents/3683.pdf

33. Cairney P. The UK Government's COVID-19 Policy: What Does "Guided by the Science" Mean in Practice?. Frontiers in Political Science [Internet]. 2021 [cited 6 November 2021];3. Available from: https://www.frontiersin.org/articles/10.3389/fpos.2021.624068/full

34. Li L, Aldosery A, Vitiugin F. The Response of Governments and Public Health Agencies to COVID-19 Pandemics on Social Media: A Multi-Country Analysis of Twitter Discourse [Internet]. Frontiers. 2021 [cited 6 November 2021]. Available from: https://www.frontiersin.org/articles/10.3389/fpubh.2021.716333/full

35. Internal Medicine [Internet]. Joint Royal Colleges of Physicians Training Board. 2021 [cited 4 December 2021]. Available from: https://www.jrcptb.org.uk/internal-medicine

36. Medical Communication Skills Courses | Oxford Medical [Internet]. Oxford Medical Training. 2021 [cited 4 December 2021]. Available from: https://www.medicalinterviewsuk.co.uk/course-category/communication-skills/