

Obedience to Authority in the COVID-19 Pandemic: Milgram's Lessons on Ivermectin Suppression

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Abstract: The COVID-19 pandemic presented unprecedented challenges to public health policy, clinical decision-making, and scientific discourse. One of the most polarizing issues was the suppression of repurposed drugs, particularly ivermectin, despite early observational signals and biological plausibility. This commentary applies the psychological framework of Stanley Milgram's obedience experiments to explain how deference to authority, diffusion of responsibility, and peer conformity may have contributed to the widespread dismissal and active suppression of alternative COVID-19 treatments. Drawing on historical and institutional analysis, we argue that the medical and scientific community's obedience to regulatory and professional authorities, while understandable under crisis conditions, often stifles legitimate inquiry and ethical responsiveness. Language and framing, particularly the use of terms like "misinformation", "anti-science", and "unproven cure" and the misuse of evidence-based medicine principles to suppress evidence, further reinforced compliance and marginalized dissent. We emphasize that while institutional guidance is vital during emergencies, it should not negate clinicians' and researchers' moral agency. The piece concludes with an ethical call to re-examine accountability in scientific decision-making and to foster professional environments that support critical engagement rather than rote adherence to top-down directives. By revisiting Milgram's insights, we highlight the enduring importance of vigilance against the psychological and systemic forces that can lead well-meaning professionals to suppress innovation and ethical action in times of crisis.

Keywords: COVID-19; ivermectin; SARS-CoV-2; Milgram experiment; obedience

1 Introduction

The COVID-19 pandemic will be remembered not only for its viral devastation and scientific breakthroughs but also for the suppression of dissent within the medical and scientific communities. Among the most polarizing controversies was the categorical rejection of repurposed drugs, particularly ivermectin, a long-standing antiparasitic agent with a well-established safety profile and theoretical antiviral mechanisms of action, including inhibition of importin α/β -mediated nuclear transport, which is exploited by some RNA viruses for replication (Babalola and Ajayi, 2023; Caly, Druce, Catton, Jans, and Wagstaff, 2020; Zaidi and Dehghani-Mobaraki, 2022). Despite early observational signals and preliminary clinical studies suggesting potential benefit (Kory et al., 2021), particularly at a time when therapeutic options were limited, ivermectin was rapidly dismissed by major regulatory authorities such as the US Food and Drug Administration (FDA), the World Health Organization (WHO), the National Institute of Health (NIH), the European Medicines Agency (EMA), and the South African Health Products Regulatory Authority (SAHPRA) (European Medicines Agency, 2021; Medical Letter, Inc, 2022; South African Health Products Regulatory Authority, 2022; US Food and Drug Administration, 2024; World Health Organization, 2023). Institutional guidance quickly hardened into orthodoxy. Clinicians and researchers who questioned this consensus or considered off-label prescribing in good faith were disparaged, censured, or even professionally sanctioned (Kory and McCarthy, 2023; Leake and McCullough, 2022; Shir-Raz, Elisha, Martin, Ronel, and Guetzkow, 2023; Stone and Aldous, 2024).

This pattern raises a critical question: why did so many in the medical and scientific professions so readily comply with institutional directives that ran counter to the clinical imperative to do what is best for the patient, especially in the face of therapeutic uncertainty? The psychological framework provided by Stanley Milgram's obedience experiments offers a compelling explanation. Milgram demonstrated that ordinary individuals, when placed under pressure from authority figures, often relinquish moral responsibility and comply with directives, sometimes even when these conflict with their personal ethical standards (Milgram, 1963, 1965, 1974). In the context of the pandemic, centralized decision-making structures and the portrayal of institutional authority as infallible created conditions where independent thought and clinical judgment were effectively subordinated. Even conscientious professionals hesitated to question prevailing dogma, fearing reputational damage or regulatory consequences. The resulting erosion of public trust, chilling of scientific inquiry, and displacement of moral agency, should prompt reflection across all levels of health care and research governance.

This paper applies Milgram's insight to the ivermectin controversy, to highlight the epistemic and ethical risks of uncritical deference to authority, and it is organized as follows. Section 2 provides a brief overview of the Milgram experiments, his insights about the agentic state, and the influence of peer behavior and dissenting authority figures on obedience. Section 3 reviews the predominantly hostile response of authoritative institutions against the use of repurposed drugs like ivermectin in COVID-19 treatment. Section 4 explains how language and framing was used to reinforce obedience by denying the existence of positive evidence, delegitimizing ivermectin, dissident physicians and scientists, and by reframing independent thought itself as "misinformation". Section 5 provides a very brief review of the positive evidence in favor of ivermectin-based combination therapies. Section 6 reviews how a hardline reinterpretation of evidence-based medicine was used to suppress this evidence, functioning as a highest authority commanding the obedience of the authorities themselves across the world. These components of the overall argument are synthesized in Section 7 which connects them with the psychological mechanisms of obedience that were identified by Milgram. Section 8 discusses the ethical implications of our argument and conclusions are summarized in Section 9.

2 Milgram's experiments: Why people obey authority

In the early 1960s, Stanley Milgram conducted a series of social psychology experiments to test the willingness of individuals to obey authoritative commands even when those commands conflict with personal conscience (Milgram, 1974). Participants in Milgram's studies were told they were part of a learning experiment. Assigned the role of a "teacher," each participant had to administer electric shocks to a "learner" (an actor employed to respond to the "shocks") whenever the learner answered questions incorrectly. With each wrong answer, the shock level increased by 15 volts, up to a maximum of 450 volts, labelled with ominous designations like *"Danger: Severe Shock"*. In reality, no shocks were delivered; the learner's cries of pain were pre-recorded, but the teacher believed them to be real. As the learner's feigned suffering intensified, many teachers wanted to stop. Yet an authority figure in a lab coat, the experimenter, firmly instructed them to continue with prompts such as *"Please go on"* and *"The experiment requires that you continue."*

Milgram's experiments, inspired in part by a desire to understand the Holocaust and how Nazi officials defended their atrocities as "just following orders," revealed a sobering truth about human psychology. Even when actions conflict with fundamental standards of morality, many people will comply with authoritative commands, especially if someone in charge assures them that responsibility is not theirs to bear. In the first run of the experiment at Yale University, every participant continued administering shocks up to at least 300 volts, and 65% of participants went all the way to the maximum 450 volts despite the learner's screams and pleas (Milgram, 1974, Table 2, Experiment 1). Many subjects exhibited extreme stress - sweating, trembling, even crying - but still obeyed the scientist's orders to inflict pain. Across all 18 variations of the experiment, a median 40% (IQR: 15% – 65%) of participants obeyed authority to the maximum potentially lethal endpoint. Milgram concluded that ordinary people can commit harmful acts when instructed to do so by an authority figure, even if it violates their moral code.

A critical observation was that participants often entered an "agentic state," seeing themselves not as autonomous actors but as instruments carrying out the authority's wishes (Milgram, 1974, Chapter 11). In

this state, personal responsibility is shifted onto the authority: participants felt that the authority will be solely responsible for what happens. This diffusion of responsibility enabled them to obey orders that caused apparent harm. As Milgram later wrote, *“The essence of obedience consists in the fact that a person comes to view himself as the instrument for carrying out another person’s wishes, and he therefore no longer regards himself as responsible for his actions”* (Milgram, 1974, Preface). In a subsequent study, Russell and Gregory (2011) argued that Milgram’s concept of an “agentic state” is not, in and of itself, the direct mechanism causing obedience, arguing that obedience to authority involves a more complex dynamic that includes a pattern of gradual escalation, capitulation to social pressure and intimidation, and even an initial preference to surrender to the authority figure’s commands. Even so, the “agentic state”, as a phenomenological description of the state of mind associated with obedience to authority, was not challenged by this criticism.

Interestingly, Milgram found that peer behavior strongly influences obedience. In variations where additional “teachers” (actually confederates) were present, if those peers refused to continue, the real participants’ obedience rates plummeted - in one version, only 4 of 40 subjects (10%) continued to the end when two peers rebelled (Milgram, 1974, Table 5, Experiment 17). Conversely, if peers complied fully, the participant’s obedience jumped dramatically (in one variant, 37 of 40 subjects continued when paired with a fully compliant peer) (Milgram, 1974, Table 5, Experiment 18). In short, authority pressure combined with group conformity can greatly amplify obedient behavior. A more dramatic effect in suppressing obedience rates was observed in a variation of the experiment where two authority figures gave contradictory commands, as soon as the subject first expressed reluctance to continue the experiment, with none of the subjects continuing the experiment to the end, let alone continuing above the 180 volts setting (Milgram, 1974, Experiment 15). This highlights the importance of suppressing heterodox authority figures, as a necessary condition for enforcing obedience.

A partial replication of Milgram’s experiment, 45 years later, confirmed that the observed obedience rates were not an artifact of the generational characteristics of the American population of the 1960s and that they were not influenced by the subject’s gender (Burger, 2009). In addition, this replication study showed that although personality characteristics influenced an initial reluctance to continue the experiment, they had no effect on whether the subjects ultimately refused to continue (Burger, 2009).

During the COVID-19 pandemic, Milgram’s insights into obedience, responsibility, and conformity take on new relevance. The patterns Milgram observed, specifically deference to authority, surrender of personal judgment, and powerful social influence, were on display as medical professionals and scientists responded to official positions on treatments like ivermectin.

3 Institutional responses to repurposed drugs in COVID-19

From early 2020 onward, as the coronavirus swept the globe, clinicians and researchers searched for existing repurposed drugs that might help treat COVID-19. Medications such as hydroxychloroquine, ivermectin, budesonide, and others were proposed based on preliminary studies and theoretical mechanisms (McCullough et al., 2020). Ivermectin, in particular, generated intense interest by mid-2020 after lab experiments suggested antiviral effects (Caly et al., 2020) and some small trials and case series reported positive outcomes (Kory et al., 2021; Procter et al., 2021a, 2021b; Santin, Scheim, McCullough, Yagisawa, and Borody, 2021; Stone et al., 2022). But the institutional and regulatory response to these off-label therapies was largely cautionary and restrictive, especially in Western countries.

In March 2021, the WHO issued a firm recommendation that ivermectin should only be used within clinical study settings: *“We recommend not to use ivermectin in patients with COVID-19 except in the context of a clinical trial”* the WHO stated, and *“until more data is available, WHO recommends that the drug only be used within clinical trials”* (World Health Organization, 2023, version 4). This guidance, applying to COVID-19 of any severity, was incorporated into WHO’s living guidelines for pandemic therapeutics (World Health Organization, 2023, versions 4 to 14), and it was based solely on the availability of large randomized controlled trial (RCT) data and a complete dismissal of the totality of evidence.

National regulators also actively discouraged the use of ivermectin in treating COVID-19. Most notable was the response of SAHPRA in South Africa who stated, in December 2020, that *“Ivermectin is not indicated*

not approved by SAHPRA for use in humans” and “any attempt to import this drug will be dealt with by SAHPRA’s Regulatory Compliance unit in conjunction with law enforcement agencies”, effectively banning the use of ivermectin (South African Health Products Regulatory Authority, 2020). SAHPRA also stated that the “use of such a drug could potentially lead to harmful effects or even death” (South African Health Products Regulatory Authority, 2020), without mentioning ivermectin’s outstanding safety profile (Aldous, Gkioulekas, and Oldfield, 2024, Section 3). Because COVID-19 patients in South Africa sought out black market and veterinary ivermectin products, SAHPRA subsequently initiated a controlled compassionate use program in January 2021 but terminated it in May 2022 (South African Health Products Regulatory Authority, 2022), citing the WHO advisory recommendation, the FDA, and two RCTs (Lim et al., 2022; Reis et al., 2022), even though the WHO excluded both of these trials from their own meta-analysis (World Health Organization, 2023, version 14).

The FDA did indeed issue a consumer advisory stating that *“the FDA has not authorized or approved ivermectin for use in preventing or treating COVID-19 in humans”,* claimed that clinical trial data so far do not show that it is effective against COVID-19, and highlighted similar safety concerns (US Food and Drug Administration, 2024). However, the FDA also acknowledged that *“healthcare professionals may choose to prescribe or use an approved human drug for an unapproved use when they judge that the unapproved use is medically appropriate for an individual patient”* (US Food and Drug Administration, 2024). Similarly, the EMA, in 2021 advised against ivermectin’s use for COVID-19 outside clinical trials (European Medicines Agency, 2021). Interestingly, the EMA claimed to consider a wider range of evidence, including laboratory studies and observational studies, however the EMA also stated that *“most studies the EMA reviewed were small and had additional limitations, including different dosing regimens and use of concomitant medications”* (European Medicines Agency, 2021). Thus, it appears that the EMA disregarded all positive studies of successful ivermectin-based multidrug treatments, by reinterpreting the use of multiple drugs in combination as a study limitation.

Perhaps the most striking institutional response came from professional medical organizations in the United States. In September 2021, the American Medical Association (AMA) joined with the American Pharmacists Association (APhA) and American Society of Health-System Pharmacists (ASHP) to demand an immediate end to any prescribing of ivermectin for COVID-19 outside of clinical trials (American Medical Association, 2021). In a strongly worded statement, these organizations *“strongly oppose the ordering, prescribing, or dispensing of ivermectin to prevent or treat COVID-19 outside of a clinical trial”,* calling on all physicians and pharmacists to halt its use. They urged clinicians to warn patients against ivermectin, emphasizing that it was not FDA-approved for COVID and that veterinary forms of the drug are dangerous for human use. The AMA cited alignment among the CDC, FDA, NIH, and even ivermectin’s manufacturer (Merck), all of whom stated there was insufficient evidence or no approval for using the drug in COVID-19. Essentially, the top medical authorities closed ranks in advising that ivermectin not be used in routine practice for COVID.

Beyond official guidelines, there were instances of active suppression of ivermectin’s use. Hospitals set policies forbidding their staff from administering ivermectin to COVID-19 patients; in the United States there were several instances where the next of kin had to secure court orders to compel hospitals to allow the administration of ivermectin for severely ill patients that wanted to try it as a last resort (Bain, 2024). Several countries, including but not limited to Canada (Hibberd, 2024), Japan (Nagao, 2024), Philippines (Landrito, 2024), and Australia (Fidge, 2024) explicitly banned the use of ivermectin for treating COVID-19. Other countries, such as South Africa and St Lucia banned the importation of ivermectin altogether (Rose, 2024; South African Health Products Regulatory Authority, 2022), whereas Netherlands resorted to the use of exorbitant fines against doctors prescribing ivermectin to COVID-19 patients (Elens, 2024). Suppression of ivermectin was particularly repressive in Canada, where many doctors had their offices invaded by investigators, and faced disciplinary hearings and/or had their licenses suspended (Hibberd, 2024). In Zimbabwe, the Ministry of Health explicitly supported the importation of ivermectin for COVID-19 treatment, and yet even there, hospitals refused to use ivermectin for treating COVID-19 inpatients and the medical council took disciplinary action against physicians using ivermectin in an outpatient setting (Stone and Aldous, 2024). This was a consistent pattern throughout many other nations around the world.

In some countries, the tone differed: parts of Latin America, Asia, and Africa did deploy ivermectin on a wide

scale (often with government endorsement), believing it safe and possibly beneficial (McCullough et al., 2020, Table 1). Even in the United States, the Attorney General of the State of Nebraska issued a statement, in response to a request from the Nebraska Department of Health and Human Services, supporting the off-label prescription of both hydroxychloroquine and ivermectin for the treatment of COVID-19 patients, which included both the corresponding legal analysis and an extensive scientific review of the research literature (Office of the Attorney General, State of Nebraska, 2021), thus dissenting from the predominant position of other government authorities and professional associations in the United States. However, in much of the West, the official consensus was unwavering: repurposed drugs like ivermectin and hydroxychloroquine were deemed failures and even risks to public health. This consensus was enforced not just through guidelines, but through a powerful social and professional narrative, a narrative that can be analyzed with the help of Milgram's psychology.

4 Language and framing: Enforcing compliance through words

If authority and peer pressure provided the structure for obedience, the language and framing used to communicate information to professionals and to the public, throughout the pandemic, played a crucial role in sustaining compliance with the recommended line on COVID-19 treatments. The framing relied on the use of certain terms and narratives, much like a form of linguistic social control, to stigmatize dissent and solidify group consensus, by denying the existence of scientific evidence favorable to the use of ivermectin-based combination therapies and delegitimizing ivermectin itself with the pervasive use of the words “anti-science”, “dangerous”, “unproven cure”, “snake oil”. However, the framing also targeted the dissenting doctors and scientists as villains, and the term “misinformation” was insidiously defined and injected into the public discourse to disparage contrarian views and to suppress the ability to make inferences by critical consideration of the entire range of all available evidence.

4.1 Delegitimizing the scientific evidence

Authorities dismissed the emerging evidence for ivermectin, and cited the absence of positive findings from large high-quality RCTs as grounds for inaction. For example, SAHPRA's statement from December 2020 claimed that *“there is no evidence to support the use of ivermectin and we do not have any clinical trial evidence to justify its use”* and *“SAHPRA is firm on the stance that this medicine is unproven in the management of COVID-19 infections”* (South African Health Products Regulatory Authority, 2020). Likewise, the EMA March 2021 statement claimed that *“the currently available evidence is not sufficient to support the use of ivermectin and COVID-19 outside clinical trials”* and *“further well-designed randomized studies are needed”* (European Medicines Agency, 2021). The joint AMA, APhA, ASHP statement also stated that *“there is insufficient evidence to support the use of ivermectin to treat COVID-19”* (American Medical Association, 2021).

However, these authorities ignored the broader totality of evidence that supported a potential therapeutic role for ivermectin, further reviewed in Section 5. Using language to accept only large RCTs and disregarding the converging lines of supportive evidence almost with contempt, decision-makers adopted an epistemologically rigid stance that undermined both the precautionary principle and the ethical obligation to act in the face of credible benefit signals during a global health emergency (McCullough and Oskoui, 2020). Some social scientists even coined the term *“pharmaceutical messianism”* to disparage the physicians and research scientists who were in favor of decisively leveraging the totality of the available positive evidence in pursuit of combination therapies based on repurposed drugs (Lasco, Yu, and Bharti, 2024).

4.2 Delegitimizing the drug itself

From the highest levels of government and public health, leaders framed ivermectin and similar repurposed treatments as products of misinformation, not legitimate scientific debate. For instance, a group of U.S. Senators wrote to social media platform Reddit in late 2021 expressing grave concern about *“the rapid spread of misinformation on Reddit specific to the unproven and dangerous use of ivermectin to treat COVID-19”* (Senator

Ben Ray Lujan, 2021). They urged the platform to “*act swiftly to curb the spread of dangerous medical misinformation*” about the drug. In that letter, the Senators explicitly tied ivermectin promotion to “*anti-science and anti-vaccination groups*” pushing an “*unauthorized and dangerous COVID-19 treatment*”. This kind of language, linking ivermectin advocacy to being “*anti-science*”, sent a powerful message: If you support this drug, you are aligning with ignorance and fringe elements. The letter also emphasized instances of people ingesting livestock ivermectin, to reinforce the idea that the use of this drug for COVID-19 was inherently irrational and laughable.

Similar framing of ivermectin, as an “*unproven cure*”, can also be found in the published peer-reviewed literature. One example, is a commentary paper from Belgium (Taccone, Hites, and Dauby, 2022), which objected to the decisive repurposing of therapeutic agents for treating COVID-19 patients “*before adequate clinical studies were performed*”, meaning high-quality RCTs. The authors cited several RCTs that were invoked by the WHO to justify their negative recommendation against the use of ivermectin for treating COVID-19, all of which were later critiqued in terms of external validity (Gkioulekas, McCullough, and Aldous, 2025b, section 4.3). The authors then lament that “*adherence to these recommendations has again been hindered by social media’s spread of incorrect information*” and reference several organizations as sources of “*misinformation*” on social media, without mentioning that these were associations of medical professionals with direct clinical experience in successfully treating COVID-19 patients. This omission reframed a scientific debate, requiring further discussion and the scientific analysis of the abundance of observational clinical data accumulated by the dissenting medical professionals, into a problem of rogue groups using social media to spread “*misinformation*” that should be condemned by the scientific community, which was, in part, the purpose of the commentary paper. Specifically, the authors concluded that “*firm condemnation by the scientific community is not sufficient*” and suggested that “*scientists should attempt to vulgarize medical information in newspapers and social media*”.

In addition, statements from government and public health authorities cited safety concerns from overdosing. Indeed, the CDC in August 2021 issued an advisory about a sharp increase in poison control calls due to ivermectin misuse, highlighting side effects like seizures, and death, in overdose (Centers for Disease Control and Prevention, 2021). This advisory was cited by the joint AMA, APhA, ASHP statement (American Medical Association, 2021), and similar safety warnings were highlighted in the statements by the FDA (US Food and Drug Administration, 2024) and SAHPRA (South African Health Products Regulatory Authority, 2020). While these warnings addressed a real concern, as some individuals did take inappropriate animal doses, in the absence of timely access to the human form of the medication and even access to medical supervision, the net effect was to make the word “ivermectin” sound decisively perilous to a lay person or to an uninformed clinician.

Perhaps the most famous piece of framing came from the FDA’s official Twitter account in August 2021. The FDA tweeted out: “*You are not a horse. You are not a cow. Seriously, y’all. Stop it.*” (Chaufan, 2024). Though somewhat jocular in tone, this message carried serious weight. It was a deliberately patronizing admonishment, implying that anyone taking ivermectin for COVID was as misguided as a farm animal. The tweet linked to an FDA page explaining why ivermectin (especially veterinary versions) is dangerous and unapproved for COVID. This moment went viral and firmly planted in the public consciousness the notion that ivermectin is horse medicine, not for humans. For healthcare professionals, seeing their top regulator take this stance reinforced that promoting ivermectin would invite ridicule. The frame was set: ivermectin use is a foolish, primitive behavior fueled by internet lies. Subsequently, when a legal case, spearheaded by a group of medical doctors, forced the FDA to retract this tweet, the media discourse reporting on the court case used terms like “*snake oil*”, the “*zombiest of zombie drugs*” to describe the repurposed treatment, referred to its proponents as “*anti-vaccination activists and conspiracy-mongers*”, and disparaged the Surgeon General of the State of Florida, also a proponent of using ivermectin in COVID-19 treatment, as a “*quack*” (Hiltzik, 2023).

4.3 Delegitimizing the dissenting doctors and scientists

Framing dissenting doctors as villains also served to enforce compliance. Physicians who spoke out in favor of ivermectin were described in media reports as “*fringe doctors*” who promoted misinformation about treatments with “*questionable and unclear*” scientific evidence for the purpose of profiteering from the COVID-19 pandemic,

also framing them as outliers who put lives at risk by “*undermining vaccination efforts*” (Szalinski, 2021). An ABC News report from March 4, 2022 explicitly framed ivermectin advocacy as “*dangerous misinformation*” about “*unproven treatments*”, similarly to the commentary by Taccone et al. (2022), and promoted favorably a group of doctor activists that filed complaints to medical boards against the medical license or board certification of colleagues that advocated in favor of using repurposed medicines, including but not limited to ivermectin, to treat COVID-19 (Kim, Romero, Abdelmalek, and Osunsami, 2022).

This rogue activism was precipitated by an advisory report from the US Surgeon General, during the Biden administration, who proclaimed that “*health misinformation is a serious threat to public health*” and advocated for actions to counter it (Office of the Surgeon General, 2021b). The Federation of State Medical Boards (FSMB) responded to this call to action with their own report advocating in favor of delicensing medical professionals for spreading “misinformation” (Federation of State Medical Boards, 2022). Likewise the President of the American Board of Internal Medicine (ABIM) called for revoking the board certifications of medical doctors that the ABIM deems responsible for spreading “misinformation” (Baron and Ejnes, 2022), and such actions were indeed taken by the ABIM against some of the leading research medical scientists who published papers in peer-reviewed research journals in favor of ivermectin-based multidrug treatment protocols (Gkioulekas, Rendell, Risch, and Stricker, 2022), in addition to a wide range of professional reprisals (Kory and McCarthy, 2023; Leake and McCullough, 2022; Shir-Raz et al., 2023).

These actions signaled to the broader medical community that advocating for these treatments could equate to being labeled a “dangerous misinformation spreader”. No doctor wants to be publicly shamed, have their medical license in jeopardy, or lose their academic appointment or employment. Thus, the language of “misinformation” created a chilling effect. The combined narrative promoted by public health authorities, some scientific journals, and news media solidified the cognitive shortcuts: “ivermectin equals misinformation” and “ivermectin equals anti-vaccine”. Once these associations were in place, any new data or advocacy for the drug could be casually dismissed as more noise from the “misinformation/anti-vaccine camp”. By labelling the proponents of ivermectin-based multidrug treatment protocols as credulous or manipulative, the authorities and media insulated the dominant policy from challenge. It is not unlike how, in other contexts, dissenters might be labeled heretics or traitors to delegitimize their arguments.

4.4 *Delegitimizing independent thought*

Ultimately, the most destructive linguistic reframing for enforcing compliance was the explicit use of the ill-defined concept of “misinformation” itself and its successful injection and acceptance in the public consciousness, as a self-evident legitimate abstraction. The report by the US Surgeon General defined misinformation as “*information that is false, inaccurate, or misleading according to the best available evidence at the time*” (Office of the Surgeon General, 2021b). Likewise, the FSMB report gave the same definition, slightly rephrased (Federation of State Medical Boards, 2022). The sleight-of-hand is leaving the concept of “*best available evidence*” undefined. Most health-related treatment protocols are supported by *inductive inference* or by *inference to the best explanation* (IBE) reasoning (Ward, 2009). This is unlike Mathematics, which is based on *deductive inference*, resulting in unambiguous clarity about whether specific statements are true or false. In medical sciences we have scientific data and inferential reasoning that attempts to provide interpretations of this data. Medical professionals, who may agree about the facts concerning the available data, may disagree, in good faith, about the interpretation of the data, necessitating vigorous scientific debate and careful consideration of multiple points of view.

The underlying philosophical conundrum concerns the distinction between *inductive inferences*, which require a controlled clinical trial (ideally, a large RCT or a meta-analysis of RCTs), and IBE which involves a wider range of semi-quantitative or qualitative evidence, encompassing mechanistic evidence and/or several of the other aspects of a causal association by Bradford Hill (Hill, 1965; Howick, Glasziou, and Aronson, 2009; Ward, 2009). As reviewed by Ward (2009), there is wide agreement that inductive reasoning can provide sufficient support for “establishing” the truth of a hypothesis and that IBE is hypothesis-generating. The point of contention is whether IBE reasoning can also “establish” the truth of a hypothesis. Sidestepping the matter of precisely defining the word “establish” in this context, EBM hardliners implicitly accept as unquestioned axioms that (1)

IBE reasoning is *only* hypothesis generating; (2) only inductive inferences constitute the “best available evidence” for “establishing” causality and treatment efficacy. On the other hand, the causal efficacy of cardiac defibrillators and the Heimlich maneuver was never tested in a controlled study (Howick et al., 2009, Introduction) and is supported solely by observational studies and IBE reasoning, but not by inductive inference. Indeed, many widely accepted scientific theories, such as the existence of subatomic particles, the Big Bang theory, and even the theory of biological evolution are solely supported by IBE reasoning rather than by inductive inference.

A toolkit, made available by the US Surgeon General’s office, put forth a more pedestrian approach to this matter of “best evidence”, indicating that the ultimate adjudicator of best evidence is the CDC, i.e. the government itself (Office of the Surgeon General, 2021a). A recent scoping review investigated how misinformation was defined *de facto*, in the context of statements concerning the COVID-19 pandemic, and found that the “misinformation” designation was adjudicated by epistemic authorities, selectively chosen by the establishment, many of whom were not necessarily subject-matter experts but “experts” in “misinformation” itself (Chaufan, Hemsing, Heredia, and McDonald, 2024).

One serious harm of the “misinformation” concept is that its definition automatically excluded from the notion of “best evidence” the direct clinical observations of the physicians who successfully treated COVID-19 patients with a wide variety of innovative treatment protocols based on repurposed medications. More broadly, the most insidious aspect of this definition is the implicit distinction between considering the “best available evidence” as opposed to considering “*all* available evidence”. As was noted by Risch (2023), causality inference arguments based on the Bradford Hill framework utilize *all* available evidence to determine whether a causality hypothesis is supported by the available evidence. Requiring that consideration be limited only to “best evidence” invites subjective cherry-picking and bias.

As evidenced by the targeting of the board certifications of published medical research scientists, under the pretext of “misinformation” allegations (Gkioulekas, Rendell, et al., 2022), an additional clear harm is active interference with the academic freedom to publish and present new scientific evidence. Gkioulekas, Rendell, et al. (2022) argued that it was a fallacy of circular reasoning when authorities accused medical research scientists of “misinformation” for presenting new scientific evidence that conflicted with the authorities’ previous understanding of “best evidence”, given that it is the research scientists that produce the knowledge that authorities presumably rely on to adjudicate on what is or is not “misinformation”. As a result, researchers who might have been interested in rigorously investigating repurposed drugs, could fear that even studying ivermectin would tarnish their reputation and destroy their credentials, given the toxic branding of “misinformation” by government and public health authorities.

The pandemic was not just a medical battle but a rhetorical battle. By framing these issues as black and white, the gray zone of uncertainty and inquiry was squeezed out. This enforced compliance, but at the potential cost of missed opportunities to save the lives of COVID-19 patients and delayed objective assessments of these treatments. This use of language to police thought and action is a reminder that how we talk about science and medicine can enforce conformity just as much as formal rules do. It is easier to obey authority when every cultural signal tells you that the authority is right, and those who disagree are disparaged outcasts.

5 Evidence for ivermectin-based treatment of COVID-19

An extensive review of the safety profile, mechanisms of action, and available clinical evidence supporting the use of ivermectin in COVID-19 treatment was given by Santin et al. (2021), Babalola and Ajayi (2023), Aldous, Gkioulekas, and Oldfield (2024), Yagisawa, Foster, Hanaki, and Omura (2021, 2024), and Yagisawa, Foster, Matsui, Hanaki, and Omura (2026). Here we shall present some of the highlights. Initial interest in ivermectin was spearheaded by an *in vitro* experiment demonstrating that ivermectin inhibited viral replication of the SARS-CoV-2 virus in cell cultures (Caly et al., 2020). Skeptics argued that the experiment required very high ivermectin dosages, far outside the known safety range, to achieve sufficiently high concentrations in the blood plasma (Pena-Silva et al., 2021). However, a modeling study suggested that ivermectin achieves a much higher concentration in the lungs that is 10-fold higher than what is sufficient for antiviral activity (Arshad et al.,

2020). Furthermore the *in vitro* study does not account for the synergistic interaction of ivermectin with an active human immune system and, thus, lower dosages can suffice *in vivo*.

Several studies have confirmed ivermectin's antiviral mechanisms *in vivo*. For example, a prospective RCT, conducted in Egypt between June 1, 2020 and July 28, 2020, testing the prophylactic effect of ivermectin (two weight-adjusted doses on day 1 and day 3) on household close contacts of COVID-19 patients for a period of 2 weeks, showed 91.3% risk reduction of symptomatic cases and 92.9% risk reduction of severe cases (Shoumann et al., 2021). A cohort study, conducted in India between September 2020 and November 2020, tested the prophylactic effect of administering ivermectin (2 doses at 0.3 mg/kg on day 1 and day 3) over a period of one month, showing 83% risk reduction of symptomatic cases in healthcare workers who were regularly exposed to COVID-19 patients (Behera et al., 2021). The prophylactic dosage was very conservative in both studies. Although ivermectin has a wide range of helpful mechanisms of action (Zaidi and Dehgani-Mobaraki, 2022), the risk reduction in symptomatic infection can only be plausibly attributed to the combined antiviral mechanisms.

The most interesting *in vivo* confirmation of ivermectin's antiviral activity is from the prospective observational prophylaxis study from Itajai, Brazil, showing statistically significant reduction in likelihood of symptomatic infection from 6.6% to 3.7% when comparing ivermectin users against non-users (Kerr, Cadegiani, et al., 2022). This was achieved with a very modest dosage of 0.2 mg/kg every 15 days. Because the study involved 71% of the city's population, the potential risk for selection bias is very low. In addition, with this modest dosage, an overall 68% reduction in mortality and 56% reduction in hospitalizations was observed, although both reductions cannot be exclusively attributed to the antiviral mechanisms alone. A follow-up study distinguished ivermectin users into a group of regular users and a group of irregular users, with the former having taken a total of at least 180 mg of ivermectin over 150 days (Kerr, Baldi, et al., 2022). Comparison of the regular ivermectin users against ivermectin non-users showed 92% mortality reduction and 100% reduction in hospitalizations, both statistically significant. Thus, this dose-response effect provides compelling evidence for a causal association.

The findings of the Itajai study were corroborated by an ecological study of the state-level use of ivermectin in Peru (Chamie, Hibberd, and Scheim, 2023). This study showed a 14-fold reduction in excess deaths at the national level for the age ≥ 60 years population in the time period between May 2020 and November 2020, during which ivermectin was approved for the treatment of COVID-19 patients, both before and after hospitalization. On November 2020, the Peruvian government restricted the use of ivermectin for COVID-19 treatment, and the observed excess deaths resumed at the previous levels with 13-fold increase. The study carefully controlled for several potential confounders and had a negligible risk of selection bias, as it was based on population-level data. The consistency in magnitude between the 14-fold decrease followed by a 13-fold increase in excess deaths, temporally associated with the introduction and subsequent removal of ivermectin from COVID-19 treatment, provided further evidence of a causal association and replicated the mortality reduction finding of the Itajai study.

In the COVID-19 pandemic context, where physicians were confronted with high fatality rates among their patients, the efficacy of ivermectin-based combination therapies was sufficiently self-evident to treating physicians on the grounds of their individual clinical expertise, accumulated from their direct observations of patient response to treatment (Landrito, 2024; Procter et al., 2021a, 2021b; Rapiti, 2024). The most successful ivermectin-based combination therapies were attempted by Stone et al. (2022) and Hazan et al. (2026) on high-risk hypoxic patients with baseline oxygen saturations below 93% and 90% correspondingly, using a baseline 10-day combination therapy of ivermectin, doxycycline, and zinc, with supplemental use of vitamin C and D3, without the use of oxygen concentrators, because of extenuating circumstances. The efficacy of the treatment was self-evident to the treating physicians because it resulted in immediate stabilization of oxygen saturations within 24 hours.

Specifically, Stone et al. (2022) reported that most of the rapid recovery of oxygen saturation levels occurred within 12 hours. Hazan et al. (2026) further reported that the initial response of oxygen situation levels after the medication administration occurred within 3 to 6 hours for most patients, a timescale that is consistent with the observed bioavailability time-scale for peak concentration of ivermectin in the plasma (Edwards, Dingsdale, Helsby, Orme, and Breckenridge, 1988, Table 1) when administered orally in capsule, tablet, or liquid form. In addition, the rate of improvement was responsive to increase of ivermectin dosage, which was empirically adjusted for each patient based on their response to treatment (Hazan et al., 2026, Figure 1). These empirical

adjustments were crucial for the success of treatment. Hazan monitored her patients via telemedicine and increased ivermectin dosage above her baseline protocol in 12 mg increments to maintain a consistently upward trend of oxygen saturation levels. Further increase was implemented during the first 24 hours of treatment aiming to achieve at least 90% oxygen saturation by the end of the first day of treatment. Stone used a more sophisticated approach to implement ivermectin dosage adjustments, because patients were treated in person in her clinic or via traveling nurses, incorporated nebulized nanosilver for all patients, and used additional steroid and anti-coagulant medications depending on patient biomarkers (Gkioulekas, McCullough, and Aldous, 2025a, Table 1).

An exhaustive review of this combination therapy has shown that the Bradford Hill criteria for temporality, strength of association, biological gradient, biological plausibility, coherence, consistency, and analogy are satisfied (Gkioulekas et al., 2025a, 2025b). It was argued that the key reasons for these successful outcomes were the 10-day duration of treatment, adjusting the ivermectin dose empirically for each patient to effect a rapid response of oxygen saturation recovery, and likely synergistic interactions between ivermectin, doxycycline, and zinc (Gkioulekas et al., 2025b). The specific mechanism driving the rapid recovery of oxygen saturation levels in response to treatment was explained as follows: (1) viral spike protein binding to red blood cells causes the formation of microscopic blood clots in the lungs which interfere with oxygen absorption leading to decrease in oxygen saturation levels; (2) ivermectin unhooks the bindings between the viral spike protein and red blood cells rapidly resolving the microclots and restoring oxygen saturation levels (Schein, Vottero, Santin, and Hirsh, 2023). This mechanism was isolated and confirmed experimentally via an *in vitro* experiment, which demonstrated that viral spike protein from the Wuhan, Alpha, Delta, and Omicron B.1.1.529 variants causes red blood cells to aggregate into rouleaux-like clumps, which have also been observed in blood samples from COVID-19 patients (Boschi et al., 2022). The experiment demonstrated that ivermectin can reverse this aggregation, when added to the blood sample after clumping has occurred, and prevent it, when added beforehand (Boschi et al., 2022). On the other hand, it should be stressed that, any resulting mortality reduction benefit should be attributed to the entire combination therapy used and the convergence of multiple mechanisms of action, rather than any one particular medication alone.

This emerging data and the clinical experience of pioneering physicians should have been acted on with professional curiosity. Instead, the positive evidence, favoring ivermectin-based protocols, was sidelined by the authorities via the coercive mechanisms summarized in Section 3 and Section 4. Milgram's experiments have shown that systems encouraging obedience can suppress ethical behavior. Unfortunately, this finding has been vindicated, not only by the extent to which the authorities were able to discourage clinicians from critically engaging with emerging data, but also by successfully triggering some physicians to file medical board complaints against outspoken colleagues resisting the authority directives, as noted in Section 4.

6 Enforcing compliance through EBM and the suppression of evidence

National regulators, professional medical organizations, and other institutional authorities invoked EBM to justify the imposition of a top-down authoritarian control of COVID-19 treatment protocols onto practicing doctors and to malign any doctors deviating from government guidelines. In effect, EBM functioned as a higher authority that commanded the blind obedience of the majority of authority institutions and academic scientists, who surrendered their responsibility to constructively explore the COVID-19 treatments that were proposed by the minority of dissenting doctors. Specifically, a wide range of empirical evidence was ignored because authorities relied only on RCTs or meta-analysis of RCTs to decide for or against the use of any one particular medication.

For example, the WHO recommendation against the use of ivermectin for treating COVID-19 was based solely on a meta-analysis of 5 RCTs, which did establish statistically significant mortality rate reduction associated with the use of ivermectin, but which they overturned by removing the two studies with the most positive outcomes (World Health Organization, 2023, version 14, page 146). A recent review identified 27 additional ivermectin meta-analyses, of which 15 suggested that ivermectin was effective and 12 failed to establish efficacy, with the number of underlying studies included in these meta-analyses ranging from 3 to 52 (Yagisawa et al., 2024). Consequently, it is *prima facie* unclear which of these meta-analyses can be trusted and whether the WHO meta-analysis itself is reliable. The empirical finding of such a wide variability and inconsistency across several

ivermectin meta-analyses, demonstrates that the assessment of which evidence agrees with the definition of “best evidence” involves unavoidable subjectivity and bias.

Although several ivermectin RCTs claimed negative findings, a recent critical appraisal (Gkioulekas et al., 2025b, section 4.3) provided with very detailed explanations about why their external validity does not extend to the 10-day Hazan/Stone ivermectin-based multidrug protocol. Most of these RCTs were irrelevant for at least one of the following reasons: (1) several RCTs considered ivermectin treatment for 2 or 3 consecutive days which is too short to generalize to a 10-day treatment protocol; (2) other RCTs used low-risk cohorts with no deaths or almost no deaths observed on either treatment or control group, thus, their findings do not generalize to the treatment of high-risk patients. Other RCTs that did investigate high-risk cohorts with treatment over at least 5 consecutive days (Beltran-Gonzalez et al., 2022; Lim et al., 2022) can be repurposed to identify insufficient dosage regimens that should have been used only as a baseline for the adaptive dosage approach that was used by Stone et al. (2022) and Hazan et al. (2026). In summary, although several of these RCT studies are of some academic interest, in terms of highlighting specific implementations of ivermectin-based therapies that do not work, they were not properly designed to test the actual combination therapies that were used by the practicing doctors in the field.

Nevertheless, the underlying premise of considering only RCT evidence is not aligned with Sackett’s founding principles of EBM (Sackett, Rosenberg, Gray, Haynes, and Richardson, 1996). Although Sackett et al. (1996) stated that RCTs have “*become the gold standard for judging whether a treatment does more good than harm*”, they also highlighted that “*some questions about therapy do not require randomized trials (successful interventions for otherwise fatal conditions) or cannot wait for the trials to be conducted*”. Thus, the proffered justification for using RCTs was to make the fine distinction between whether a newly invented treatment or medication is more beneficial than harmful (or vice versa) by enabling the calculation of an unbiased effect size. For new treatments, based on new medications with unknown safety record or based on repurposed medications with some real or potential safety concerns (e.g. remdesivir), an unbiased effect size is indeed required to decisively rule out the possibility of an overall harmful effect. However, for new treatments against a potentially fatal disease, based on repurposed medications with known acceptable safety, prior knowledge allows us to rule out the likelihood of harm, or to at least assert that any theoretical risk of harm is negligible relative to the standing risk associated with the illness itself by several orders of magnitude. Then, the sole remaining question is to assess the likelihood that these treatments may have a beneficial effect, which could be easily done via statistical comparisons against historical controls (Gkioulekas, McCullough, and Zelenko, 2022), broader causality arguments based on the Bradford Hill criteria (Hill, 1965; Howick et al., 2009) or the EBM+ framework (Williamson, 2019), and a careful consideration of the totality of all available evidence (Aldous, Dancis, Dancis, and Oldfield, 2024).

For treatments based on repurposed medications with known acceptable safety, the case series threshold analysis technique (Gkioulekas, McCullough, and Zelenko, 2022) allows for two potential outcomes when a treated patient case series is compared against available population-level historical controls: (1) a *preponderance of the evidence* finding implies that there is sufficient contrast to infer that it is more likely than not that the entire efficacy signal cannot be explained solely as a consequence of random selection bias; (2) a *clear and convincing* finding implies that we can have at least 95% confidence that some of the observed efficacy signal is a true signal and cannot be accounted for by random selection bias. In the first case, there is sufficient justification to further explore the potential treatment on an emergency basis, however equipoise may remain that could permit the ethical approval of an RCT. In the second case, the contrast between the case series and historical controls is sufficiently large that one should not retain equipoise about treatment efficacy.

Notably, Ellis, Mulligan, Rowe, and Sackett (1995) explicitly acknowledged that treatments supported with “*convincing non-experimental evidence*” for which their “*face validity is so great that randomized trials were unanimously judged by the team to be both unnecessary and, if placebo would have been involved, unethical*” may be deemed evidence-based without explicit support from an RCT. Thus, it was acknowledged that RCT evidence are not a necessary condition for supporting the use of some treatments, when there is overwhelmingly convincing non-experimental evidence of efficacy, although the assessment of that was not objectively defined. The case series threshold analysis technique can characterize this category of evidence more objectively by requiring:

(1) a clear and convincing finding for strength of association; (2) a decisive Bradford Hill causality argument that brings in additional direct, mechanistic, and parallel evidence based on the refined guidelines proposed by Howick et al. (2009). As a result, there is now a more objective statistical approach for dealing with the case series data that was accumulated by dissident physicians that used ivermectin-based combination therapies during the pandemic period. However, the prevalent hardline RCT-only interpretation of EBM automatically suppresses and dismisses any consideration of this evidence by default.

Finally, Sackett et al. (1996) emphasized that EBM is not a top-down enforced cookbook and “*it requires a bottom-up approach that integrates the best external evidence with individual clinical expertise and patient’s choice*”. Although this statement is not aligned with the Bradford Hill framework of considering *all* external evidence, which also factored into the problematic definition of the term “misinformation”, Sackett and colleagues did emphasize with this statement that individual clinical expertise and patient choice take precedence over the consideration of external evidence. In addition, Sackett et al. (1996) had clarified that the primary purpose of integrating external evidence into the treatment of patients was that “*without current best evidence, practice risks becoming rapidly out of date, to the detriment of patients*”. It follows that using claims about the supposed lack of “sufficient evidence” (i.e. RCTs specifically) as the pretext for persecuting dissident practicing doctors, whose innovative COVID-19 treatment protocols were pioneering and ahead of the curve, was in direct conflict with the stated purpose of integrating external evidence into medical practice.

Despite these carefully qualified definitions of EBM (Ellis et al., 1995; Sackett et al., 1996), Worrall (2007) observed that the founders of EBM, from the beginning, had sent mixed messages about the supremacy of RCT evidence in other publications. As evidenced by the WHO document (World Health Organization, 2023, version 14, page 146), it was this most hardline interpretation of EBM that was applied by government and medical authorities when they recommended against the use of ivermectin for COVID-19 treatment. Although the carefully qualified definitions of EBM had already accounted for most of the situations where RCT evidence is not needed, EBM itself functioned as an absolute authority that persuaded authorities that the “evidence is insufficient” and that the proposed treatments are not “evidence-based”. Being trained to blindly obey the diktats of EBM methodology, authorities not only did not question the appropriateness of an RCT-only strategy for the specific problem at hand, but they completely ignored and dismissed all non-RCT evidence, with some going as far as to support and facilitate the persecution of their more independent-minded physician colleagues that had successfully treated COVID-19 patients (Hibberd, 2024; Rose, 2024; Stone and Aldous, 2024).

7 Obedience, conformity, and diffusion of responsibility in the pandemic response

The compliance of clinicians and scientists with the “ivermectin is off-limits” directive can be striking when viewed in light of Milgram’s findings on obedience. In Milgram’s lab, ordinary people administered shocks because an authority figure insisted; in the pandemic, medical professionals largely “administered” (or withheld) treatments according to what authorities decreed, even when some had personal inclinations to try alternatives. Several psychological mechanisms identified by Milgram appear to have been at play:

7.1 Obedience to authority

Doctors, pharmacists, and health officials are trained to respect guidelines and hierarchies of expertise. As documented in Section 3, during COVID-19, authorities like the WHO, FDA, CDC, NIH, SAHPRA, EMA and professional societies such as the AMA, APA, ASHSP, and many other top authorities in various countries took on the role of Milgram’s experimenter - issuing instructions on what treatments were acceptable. The message from these authorities was clear: Do not use ivermectin (or hydroxychloroquine, etc.) outside clinical trials; it is not approved and could be harmful. Many healthcare providers obeyed this guidance with little overt resistance, being strongly dissuaded by the knowledge that the higher authorities in medicine have deemed the drug unsanctioned. Milgram’s subjects obeyed the scientist in the lab coat; analogously, clinicians deferred to the “white coats” at the top of our health institutions.

Likewise, as explained in Section 6, these “higher authorities” dictating treatment protocols and policies to the frontline physicians, in turn, were obedient to a highest absolute authority: the diktats of the EBM pyramid of the hierarchy of evidence, which compelled them to be dismissive of all non-RCT evidence supporting the use of ivermectin-based combination therapies and other similar innovative treatments. These EBM diktats have been so deeply ingrained in the academic environment, and even in academic publishing and academic journal guidelines, that they commanded blind obedience from a broad sector of academia. The unique characteristics of ivermectin-based combination therapies, namely excellent known safety profile of ivermectin and the unusually wide flexibility for ivermectin dosage adjustments (Guzzo et al., 2002), combined with the urgency of the pandemic, created a unique scientific problem that was fundamentally different from the intended purpose of EBM. However, the dynamic of obedience did not allow most academic scientists to interrogate EBM and take personal responsibility for independently evaluating the pandemic situation and all available evidence, briefly reviewed in Section 5, from a fresh and creative point of view.

7.2 Diffusion of responsibility

A hallmark of Milgram’s obedient subjects was a diminished sense of personal responsibility for their actions, while participating in the experiment, because they were just following the instructions of the experimenter (Milgram, 1974, Chapter 10). In the pandemic context, this translated to a kind of bureaucratic diffusion of responsibility. Clinicians could reassure themselves that in denying a patient ivermectin they were following official protocol, they had no say in the matter, and, therefore, they could consider themselves absolved from having to take personal responsibility for making an ethical decision. If this decision was wrong, or the patient worsened, they would reason that the fault lay with the authorities who set the guidelines and not with them personally. Researchers, too, may have felt this. A scientist considering studying or speaking positively about ivermectin might be dissuaded from doing so if she instead defers to the authority of NIH and WHO experts and/or the authority of the randomized controlled trials published in the journals with the highest impact factors, without critically interrogating them with respect to methodology (Risch, 2023) and external validity (Gkioulekas et al., 2025b).

In effect, both clinicians and researchers ceded their agency to institutional authority, diluting personal accountability. This agentic shift, seeing themselves as agents executing the directives of higher authorities, relieved their perceived moral burden of possibly withholding a life-saving treatment. In practice, many medical professionals likely experienced an internal conflict: their ethical inclination is to try everything to save a life, yet the authoritative guidelines told them not to use certain drugs. The psychological relief from abandoning all responsibility to a higher authority enabled morally uneasy actions or inactions. This is reminiscent of Milgram’s teachers continuing the shocks, after the experimenter said that he will be responsible for any harm (Milgram, 1974, Chapter 7).

Such diffusion of responsibility may be reinforced and validated when patients are experienced primarily as cases, subjects, or objects of policy rather than as unique individual persons (Haque and Waytz, 2012). Psychological and organizational distancing can reduce the emotional salience of decisions and weaken personal moral restraint (Bandura, 1999; Bandura, Underwood, and Fromson, 1975). Compliance with impersonal protocols may consequently become easier, even where those decisions have serious consequences for an identifiable patient – a process related to the authorization, routinization and dehumanization described by Kelman and Hamilton (1989). In this regard, the ethics of following an order depend not only on who issues the instruction, but also on how the patient affected by it is perceived by the clinician (Haque and Waytz, 2012; Pellegrino and Thomasma, 1988).

7.3 Conformity and peer pressure

Milgram showed that if peers rebel, individuals find courage to rebel, but if peers comply, individuals are more likely to go along (Milgram, 1974, Table 5, Experiments 17, 18). During the pandemic, the social environment within medicine and science strongly favored conformity with the prevailing view on treatments. Those who

diverged and championed off label combination therapies, including ivermectin-based multidrug treatment protocols, were quickly painted as outliers. Many physicians surely took note of what happened to outspoken ivermectin proponents: some were ridiculed in the press, investigated by medical boards for “misinformation,” or even lost positions (Shir-Raz et al., 2023). Furthermore, the targeting of leading medical research scientists by stripping of most trappings of their authority status (Gkioulekas, Rendell, et al., 2022; Kory and McCarthy, 2023; Leake and McCullough, 2022) served to eliminate dissention amongst authority figures, which Milgram found to be an even more powerful factor for countering the dynamic of obedience than peer rebellion alone (Milgram, 1974, Experiment 15).

Conformity is indeed a powerful motivator; humans desire the approval of their peers and fear ostracism. The pandemic created, in effect, an enforced consensus on therapeutics, where deviating from the official line was met with censure from both peers and institutional authorities, leaving scant room for individual deviation, much as Milgram’s subjects found it hard to disobey when no one else in the room was doing so (Milgram, 1974, Experiment 18).

7.4 Hierarchical organizational culture

Modern medicine is often practiced in hierarchical teams (attending physician, residents, nurses, etc.) and governed by protocols. In a crisis like COVID-19, many clinicians defaulted to a command-and-control structure for decision-making, deferring upward (Gordon, 2020; Schandl, Kiss, Lengyel, Kis, and Winkler, 2024). If a hospital’s COVID treatment committee (often following public health guidance) decided ivermectin is not in the protocol, then lower-level providers complied as a matter of procedure. This is analogous to a military context: orders flow downward and are followed to maintain order. In this emergency context, questioning command decisions would be discouraged, as the whole point of transitioning to a command-and-control structure is to move away from a consensus-driven decision structure. Thus, a fertile ground for near-automatic obedience was created, in which the internal moral hesitations of individuals were overridden by the perceived necessity to follow the chain of command.

7.5 Gradual escalation and seduction into obedience

The suppression of early outpatient treatments, including ivermectin-based combination therapies, was deployed in an incremental fashion that catalyzed the dynamic of obedience, as per the analysis by Russell and Gregory (2011). As reviewed in Section 3, the initial response by government and professional authorities against the proposed ivermectin-based combination therapies was to argue that there is insufficient evidence and to recommend against them on that basis. Patients were advised by their primary care physicians, who were following government guidelines (National Center for Immunization and Respiratory Diseases (U.S.). Division of Viral Diseases, 2020), to stay home and seek hospital treatment only when they had trouble breathing or other similarly severe symptoms. It is reasonable to surmise that many outpatient physicians were initially seduced into obedience because of their fear of coming into contact with COVID-19 patients and becoming infected themselves. Surrendering responsibility to the government and public health authorities for their choice to refuse to treat their patients catalyzed their descent into Milgram’s agentic state, initiating the dynamic of obedience. Conversely, dissident physicians, who were confident that the proposed outpatient treatments would protect themselves as much as their patients, would be expected to be less inclined to succumb into a pattern of obedience to authority. Subsequently, ivermectin did become the subject of extensive research and, as noted in Section 6, selective cherry-picking of the evidence was used by the authorities to gradually escalate the suppression of ivermectin, while maintaining continuing obedience from the majority of physicians. These escalations included interference with patient access to the medication (Chan, 2021; Fink, 2023), attacks on the medical licenses of treating physicians (Dyer, 2023; Hibberd, 2024; Stone and Aldous, 2024), and delegitimizing the leading medical research scientists who dissented (Gkioulekas, Rendell, et al., 2022).

8 Discussion

The story of ivermectin's suppression, viewed through Milgram's lens, raises ethical questions for medicine and science. In crises, is it enough to simply follow orders and consensus, or do professionals have a moral responsibility to exercise independent judgment? Milgram's experiments demonstrated how normal people can commit harmful acts when absolved of responsibility by authority, a cautionary tale that obedience is not always a virtue. In the context of public health, the stakes are different but still significant: lives may be lost either by action or inaction. Thus, ethical reflection is needed on how to balance authority and individual moral agency in science-driven policy.

Firstly, the duty of care in medicine suggests that clinicians must put patient welfare above all else. According to the American College of Physicians' Ethics Manual, "*The physician's primary commitment must always be to the patient's welfare and best interests, whether in preventing or treating illness or helping patients to cope with illness, disability, and death*" (Sulmasy, Bledsoe, and ACP Ethics, Professionalism, and Human Rights Committee, 2019). This principle implies that if a physician genuinely believes a treatment might save their patient, they have an ethical imperative to consider it, even if it is not officially endorsed, particularly in situations where no proven effective therapies exist. During the early pandemic, when treatments were scant, some clinicians argued it was unethical not to attempt potentially life-saving therapies (with patient informed consent) just because they were unproven (McCullough et al., 2020; McCullough and Oskoui, 2020). This perspective views compassionate use and clinical judgment as part of moral agency. On the other hand, mainstream ethics would caution that offering unproven remedies can also harm patients or give false hope, violating the principle of non-maleficence (Eijkholt, 2020). Where to draw the line between these two perspectives is the main challenge. Nevertheless, it is clear that an over-reliance on authority or protocol can lead to a moral oversimplification - an attitude of strictly following guidelines without grappling with these ethical nuances.

This raises the ethical question of how professional judgment should operate, in the context of a doctor-patient relationship, when established protocols are uncertain or potentially inadequate. Fletcher's situational ethics is one possible approach that places the circumstances of the specific patient at the center of moral deliberation and decision making, as opposed to treating established rules as unwaveringly determinative (Fletcher, 1966). In an unprecedented pandemic where evidence was emerging daily and rapidly, the situational ethics focus on the potential consequences or outcomes of action vs inaction and the focus on personalism (i.e. focusing on pursuing the benefit of the individual patient being treated, as opposed to following rules and guidelines, presumably optimized for population-level benefit) are both particularly pertinent. To be clear, the flexibility of situational ethics presents some serious difficulties, such as allowing subjective rationalization, inconsistent decisions, and moral relativism (Ramsey, 1967). Nonetheless, its value lies not in replacing evidence, professional standards, or ethical requirements, but in reminding clinicians that rules and guidelines require contextual interpretation coupled with compassionate attention to individual patients, and that this cannot simply be excluded from moral deliberation. Context-sensitive principlism and casuistry are more conservative approaches, in which general ethical principles remain relevant but must be specified, balanced, and interpreted in light of the circumstances of the particular patient (Beauchamp and Childress, 2019; Jonsen and Toulmin, 1988).

The pandemic tested the ethics of all treating physicians: some practitioners deferred completely to public health authorities, while others took initiative (for example, ordering off label drugs or publicly questioning policies). Although evidence of efficacy can be investigated retrospectively after data has been accumulated, the challenge is that, in the moment, certainty about efficacy can be more elusive. To resolve this challenge, dissident physicians, knowingly or unwittingly, followed an insight, originally tracing back to Bradford Hill (Hill, 1965), that to make decisions about whether to act or not, "*we ought to pay attention to the absolute costs and benefits of potential actions*" (Phillips and Goodman, 2004). As was noted by Gkioulekas et al. (2025b), given ivermectin's excellent safety record, the expected absolute cost of using it to treat COVID-19 was "*overtreated parasite-free patients*"; however, the absolute potential benefit was lifesaving. Gkioulekas et al. (2025b) also argued that the clinically observed rapid recovery of oxygen saturation levels, in response to ivermectin-based treatment, alleviated patient suffering, which alone is the minimum absolute benefit that is sufficient for the ethical justification of taking action, consistently with both Fletcher's situational ethics and with article 37 of

the 2013 Helsinki declaration (World Medical Association, 2013) (the latter was unfortunately weakened in the subsequent 2024 revision (World Medical Association, 2025)).

Another ethical dimension is how language and power were used, as discussed in Section 4. The labelling of alternative viewpoints as “misinformation” could be rationalized by a perceived need to protect the public from false cures, but it can also be hijacked to suppress treatment options when the adjudicators of the notion of “best evidence” blindly surrender their critical discernment to following unquestioned rules and process. More insidiously, institutional authorities carefully qualified their definition of the concept of “misinformation” to suppress all favorable scientific evidence outside of the RCT-only paradigm and to sideline the clinical observations of dissident medical doctors that successfully treated COVID-19 patients. That raises an ethical issue of respect and openness in scientific discourse. Branding fellow scientists or physicians as heretical for interpreting data differently is a slippery slope that can undermine the process of scientific discovery, especially when it is urgently needed, as it was in the midst of the COVID-19 pandemic. The COVID crisis saw a bit of an ethical lapse in this regard: ad hominem attacks and sweeping dismissals took the place of nuanced engagement. Ethically, scientists should argue on evidence, not authority alone. In an ideal world, even during a crisis, we should foster an environment where questioning and exploring are allowed, because that’s how we avoid collective blind spots.

Finally, consider the long-term implications. If we normalize a culture in medicine where obeying authority is the overwhelming norm, we risk losing the checks and balances that independent thinking provides. Milgram’s work was a warning: it is easy for humans to slide into an agentic mode and surrender moral choice. To guard against that, professions like medicine have codes of ethics and emphasize principles like beneficence, autonomy, and justice (National Commission for the Protection of Human Subjects of Biomedical and Behavioral Research, 1979). These principles sometimes require speaking up or deviating when something seems wrong. An ethical post-mortem of the pandemic should ask: *Did we strike the right balance between authoritative guidance and clinician autonomy? Did we allow science to self-correct through open inquiry, or did we enforce a premature consensus?* Moving forward, we must ensure that “following orders” in medicine never becomes an excuse to abandon critical thinking or compassion.

Stanley Milgram’s obedience experiments remind us how trust in authority, desire to conform, and handoff of responsibility, can lead to outcomes that, in hindsight, merit critical scrutiny. The suppression of ivermectin and other repurposed drugs during COVID-19 can indeed be understood through Milgram’s framework: good people, in a hierarchical system, adhered to authority and prevailing norms, potentially at the expense of innovative or empathetic solutions. This is not to claim that all authority guidance was necessarily wrong, but rather to caution that the process by which dissent was silenced and obedience enforced should be examined so that in future crises we maintain both scientific rigor and open-minded compassion.

This matter extends beyond active compliance. Martin Niemöller’s postwar reflections on silence and complicity provide a related warning: moral responsibility may also be surrendered through inaction (Hockenos, 2018). In a scientific or clinical culture in which dissent is progressively marginalized, silence may contribute to maintaining an erroneous or harmful consensus. Hudnut (1971) expressed the underlying principle succinctly: *“Not to speak is to speak. Not to act is to act.”*

As we reflect on the pandemic, we should celebrate the successes of science (like the rapid deployment of the novel monoclonal antibodies) but also candidly critique where groupthink and over-obedience may have hindered us. The moral of the story is that we are all susceptible to the same psychology that Milgram documented. Awareness of that fact is the first step toward ensuring that “following orders” never again overrides our fundamental responsibilities to seek truth, to care for patients, and to uphold our moral agency even under pressure.

9 Conclusions

While Milgram’s experiments powerfully illustrate the psychological ease with which people can abdicate moral responsibility under authoritative pressure, the presence of such mechanisms does not absolve individuals from accountability. In medical ethics, professional accountability requires being answerable not only to

institutional protocols but to the patient's welfare, the public interest, and the broader scientific community. When professionals act purely out of obedience, without critical engagement or moral reflection, they surrender their agency and, with it, their ethical responsibility. Accountability in such cases should be proportionate and restorative rather than punitive, focusing on professional self-regulation, ethics education, and structural reforms that encourage responsible dissent and safeguard scientific integrity. For example, guideline developers and regulatory authorities should be expected to critically appraise *all* available evidence and justify the inclusion or exclusion of evidence transparently, while individual clinicians and researchers must be expected to raise concerns, ask questions, and contribute to evidence synthesis, even in the face of dominant narratives. In extreme cases, such as when harm is done by failing to consider viable treatments out of blind obedience, there must be mechanisms for inquiry, redress, and, where appropriate, institutional or personal accountability. The goal is not to punish people for obeying under duress, but to create cultures in science and medicine that empower conscientious decision-making, reward integrity, and make it harder to hide behind the shield of "just following orders".

Abbreviations

ABIM, American Board of Internal Medicine; AMA, American Medical Association; APhA, American Pharmacists Association; ASHP, American Society of Health-System Pharmacists; CDC, Centers for Disease Control and Prevention; COVID-19, Coronavirus Disease 2019; EBM, Evidence-Based Medicine; EMA, European Medicines Agency; FDA, US Food and Drug Administration; FSMB, Federation of State Medical Boards NIH, National Institute of Health; RCT, Randomized Controlled Trial; SAHPRA, South African Health Products Regulatory Authority; WHO, World Health Organization.

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Conflicts of Interest

The authors declare no conflicts of interest.

Authorship Contributions

Colleen Aldous: Conceptualization, Supervision, Investigation, Writing – original draft, writing – review and editing. **Ingbert Misselhorn:** Writing – review and editing. **Eleftherios Gkioulekas:** Project Administration, Investigation, Writing – original draft, writing – review and editing.

Dedication

We dedicate this paper to the memory of Dr. Jacqueline Stone, who pioneered the use of a 10-day COVID-19 treatment protocol based on ivermectin, nebulized nanosilver, doxycycline, and zinc in Zimbabwe (Stone et al., 2022) and trained her colleagues in the use of this protocol. Medical authorities responded with a failed attempt to imprison her and unrelenting persecution in the ensuing years. Dr. Stone took her life on October 3, 2024. The circumstances of ivermectin-based treatments in Zimbabwe were described in a posthumous publication by Stone and Aldous (2024).

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