I. Introduction: CFI's Mission and How It Relates to Health Misinformation

The Center for Inquiry[1] (CFI) is an educational and advocacy organization that promotes reason and scientific integrity in public affairs. CFI includes under its banner the Committee for Skeptical Inquiry (CSI), which was founded in 1976 by luminaries from the scientific and skeptical communities, including Carl Sagan, James Randi, and Isaac Asimov, under the name Committee for Scientific Investigation of Claims of the Paranormal (CSICOP).[2] CSI's mission statement is as follows:

> The mission of the Committee for Skeptical Inquiry is to promote scientific inquiry, critical investigation, and the use of reason in examining controversial and extraordinary claims. To carry out these objectives the Committee:
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> 1. Maintains a network of people interested in critically examining paranormal, fringe science, and other claims and in contributing to consumer education
> 2. Prepares bibliographies of published materials that carefully examine such claims
> 3. Encourages research by objective and impartial inquiry in areas where it is needed
> 4. Convenes conferences and meetings
> 5. Publishes articles that examine claims of the paranormal
> 6. Does not reject claims on *a priori* grounds, antecedent to inquiry, but examines them objectively and carefully.[3]

For over forty-five years, CFI has challenged the impact of pseudoscience throughout society. CSI's magazine, *Skeptical Inquirer*, is published bimonthly both in print and online. It hosts articles and original research into all levels of pseudoscience. This research encompasses everything from investigating cryptozoology and claimed hauntings to debunking those who claim to use psychic powers to contact the dead (and who often charge grieving family members large sums). It also includes debunking the proponents of flat earth theories, water dowsing, and fortune telling.[4] Central to this research has always been challenging junk science, such as climate change denial and the promotion of what is often referred to as alternative medicine.[5]

In fact, these treatments, including such concepts as homeopathy, acupuncture, reiki, naturopathy, and chiropractic medicine, are not alternatives to medicine at all. They are quackery and snake oil. A true alternative to medicine would provide a cure in a different way. These modalities provide no benefit to consumers that is not explained by the placebo effect. Those who peddle such fake medicines are harming consumers on multiple levels, and CFI has recently established its Office of Consumer Protection from Pseudoscience to assist

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[1] https://centerforinquiry.org
[2] https://skepticalinquirer.org/about
[3] *Id.*
[4] https://skepticalinquirer.org/volume/no-2-vol-46
[5] https://skepticalinquirer.org/archive

those harmed by such misinformation.[6] CFI also offers the public its regularly updated website Quackwatch,[7] which warns of the widespread nature of pseudoscience in medicine.

CFI challenges medical misinformation and the promotion of pseudoscience in multiple ways. CFI has been vocal in the campaigns in favor of vaccination, supporting the worldwide availability of vaccines, challenging misinformation on vaccinations—such as the specious link between childhood vaccines and autism, as pedaled by those such as Andrew Wakefield[8]—opposing exemptions to vaccine mandates for nonmedical reasons, and promoting the rights of mature children to protect themselves and their friends through vaccination even in face of parental opposition.

CFI has also forcefully addressed the harms caused by reliance on homeopathy, both through legal challenges and through petitioning and submitting comments to the Federal Trade Commission[9] and the Food and Drug Administration,[10] the relevant governing regulatory bodies. CFI challenges attempts by states to blur the boundaries between science-based medicine and misinformation-based pseudoscience, such as by challenging state legislation seeking to grant naturopaths the same standing as medical doctors.

Overall, CFI believes that public policy must be guided by science, not superstition. Misinformation is a threat to this goal. Absent accurate information, those in government, public health officials, medical professionals, and consumers are unable to make science-based decisions. At perhaps no time in recent memory has misinformation regarding healthcare been so prevalent in the United States as during the COVID-19 pandemic. This spread of misinformation, and the reliance upon pseudoscience that it has encouraged, is a direct challenge to the mission of CFI and its members.

For that reason, we are submitting this comment, which we submit not only on behalf of CFI and its affiliate division CSI but also on behalf of its program, the Richard Dawkins Foundation for Reason and Science,[11] and all the medical professionals, scientists, and researchers associated with it.[12]

II. The Scope of the Problem

A. The Impacts of Misinformation

From CFI's perspective, the scope of the problem of health misinformation in the United States is massive.

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[6] https://centerforinquiry.org/advocacy/office-of-consumer-protection-from-pseudoscience
[7] https://quackwatch.org
[8] https://www.chop.edu/centers-programs/vaccine-education-center/vaccines-and-other-conditions/vaccines-autism
[9] https://centerforinquiry.org/press_releases/cfi_dawkins_ftc
[10] https://centerforinquiry.org/news/center_for_inquiry_to_fda_label_homeopathic_drugs_as_untested_and_unproven
[11] https://richarddawkins.net
[12] https://skepticalinquirer.org/fellows-and-staff

A 2021 study in *Scientific Reports* found that having less accurate knowledge about COVID-19 was associated with greater likelihood of contracting the virus. The study, "Contracting COVID-19: A Longitudinal Investigation of the Impact of Beliefs and Knowledge," tested U.S. residents with a series of thirteen true or false statements, such as "Some individuals who have COVID-19/the coronavirus do not show any symptoms" (an example of a true statement) and "Spraying chlorine on my body will protect me even if COVID-19/the coronavirus has already entered my system" (an example of a false statement).[13]

A total of 2,120 participants were then contacted four months later to see whether they had tested positive for COVID-19, and 348 of the participants answered in the affirmative. The study's authors found that the less knowledgeable participants were about COVID-19, the more likely they were to have gotten sick. The authors expounded on these results as follows:

> All our variables addressing perceptions of the pandemic proved to be strong predictors of testing positively for COVID-19. […] These were COVID-19 knowledge, believing the threat of COVID-19 to (not) be exaggerated, the degree to which one is worried about personally contracting the virus, and the perceived likelihood of contracting the virus. […]
>
> Specifically, we hypothesize that our individual difference measures are indirectly predicting illness by leading people to (a) develop less accurate (or more inaccurate) knowledge about COVID-19, (b) minimize the overall threat of the pandemic, and/or (c) accurately perceive that they have a greater risk of contracting the virus.[14]

The authors ultimately concluded: "This research demonstrates the importance of an individual's beliefs and personal characteristics for predicting a critically important health outcome—whether said individual is likely to contract COVID-19."[15]

These results are consistent with another longitudinal study conducted in The Netherlands, which found that people who believed in conspiracy theories about COVID-19 were more likely to contract the virus.[16]

Another troubling indicator is the fact that the pandemic has brought mainstream parenting groups online, on platforms such as Facebook, closer to conspiracy theory groups. This can be seen in an Institute of Electrical and Electronics Engineers (IEEE) published study, "How Social Media Machinery Pulled Mainstream Parenting Communities Closer to Extremes and Their Misinformation During Covid-19."[17]

As an initial matter, this research indicates that over the course of the COVID-19 pandemic, many anti-vaccine groups online expanded their advocacy into general misinformation about

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[13] https://www.nature.com/articles/s41598-021-99981-8
[14] *Id.*
[15] *Id.*
[16] https://www.psypost.org/2021/10/belief-in-covid-19-conspiracy-theories-linked-to-a-greater-likelihood-of-contracting-the-virus-study-finds-61998
[17] https://ieeexplore.ieee.org/document/9663381

the pandemic. Even more concerning, during the pandemic Facebook parenting groups not only became closer to groups devoted to alternative medicine, homeopathy, and spiritual healing, they connected to groups propagating a wider range of misinformation and conspiracy theories. These latter groups spread misinformation and conspiracy theories on issues ranging from climate change to water safety to 5G cellular service. Thus, their impact on parenting communities (and their families) cannot easily be overstated.

Unfortunately, the resulting impacts have gone well beyond COVID-19. A very recent report from the Centers for Disease Control and Prevention (CDC) demonstrates that a lower percentage of children in the United States received routine vaccinations for kindergarten during the pandemic. Vaccination rates for measles, whooping cough, and chicken pox were at approximately 94 percent for the 2020–2021 school year, down 1 percent from the previous year.[18] This means that roughly 35,000 children entered kindergarten lacking vaccination for extremely contagious diseases. Furthermore, the CDC's April 2022 report found that nearly 400,000 fewer children than expected entered kindergarten (a drop of 10 percent) and that their vaccination status is uncertain.[19]

A spokesperson for the American Academy of Pediatrics (AAP) stated: "There's a greater proportion of parents who are now questioning routine vaccines."[20] This speaks loudly to the impact that health misinformation has had on American family life and the well-being of children.

B. Efforts to Address Misinformation

Fortunately, there is hope in the form of fact-checking. A 2022 study in *Public Opinion Quarterly* demonstrates that journalistic fact checks do more to combat the spread of COVID-19 misinformation than false tags used by social media companies. The study, "The COVID-19 Infodemic and the Efficacy of Interventions Intended to Reduce Misinformation," found that a journalistic fact check made people much less likely to believe a false claim—as opposed to a false tag, which had no effect on participants' perception of a statement's accuracy and actually increased the likelihood that they would share it on social media.[21]

This is due to the fact that journalistic fact checks not only flag a post as false but also provide further statements refuting the false claim with accurate information. On the other hand, tags on social media typically partially obscure a post but do not allow users to easily access the details of that fact check.

Similarly, it has been shown that "fact checks can successfully reduce misperceptions about COVID-19 immediately after people read them," although this requires "repeatedly debunking false claims about the coronavirus," otherwise people "tend to revert back to the level of belief that they had before."[22] These were the conclusions drawn by researchers at the

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[18] https://apnews.com/article/covid-science-health-centers-for-disease-control-and-prevention-whooping-cough-17eb8db7ac468a03ab1dd7bfb0e2ab94

[19] https://publications.aap.org/aapnews/news/20161/CDC-Kindergarten-vaccination-rates-dip-pandemic-to

[20] https://www.nytimes.com/2022/04/21/health/pandemic-childhood-vaccines.html

[21] https://academic.oup.com/poq/article-abstract/86/1/162/6528973?

[22] https://munkschool.utoronto.ca/fact-checks-work-best-on-loop

University of Toronto, Dartmouth College, the University of Exeter, and the University of Kent in a February 2022 study published in *Nature Human Behaviour*.[23]

Lastly, it is worth noting the efforts of many graduate students in media, communications, and related fields across the country, who are "serving as monitors of misinformation, watching livestreams and combing through countless online posts."[24] As profiled in April 2022 in a CNet article, their research for the Center for an Informed Public has been cited by policymakers, regulators, tech industry professionals, and other universities and organizations.[25] These efforts will be instrumental in comprehensively addressing the challenges presented by health misinformation going forward.

III. The Legal Perspective

Misinformation comes from many sources. When it comes from trusted sources, it is perhaps most dangerous. Online conspiracy theory promoters such as Alex Jones's *InfoWars*[26] and *Natural News*,[27] which is described on Wikipedia as "a far-right, anti-vaccination conspiracy theory and fake news promoting website known for promoting alternative medicine, pseudoscience, disinformation, and far-right extremism,"[28] are shocking in the breadth of their reach. However, pseudoscientific health misinformation also reaches the general public through sources that are significantly more predisposed to be considered trustworthy.

This includes media personalities, sometimes even those with medical qualifications, such as Dr. Mehmet Oz.[29] But consumers are also presented with misinformation at a basic retail level. There are pharmacies that sell pseudoscientific products, such as homeopathy, alongside real, science-based medicines without distinguishing between them. And of course there are also the manufacturers of such "alternative medical" products.

Many Americans' first point of contact in medical situations is the local retail pharmacy. There are myriad reasons this might be the case: they might be uninsured or their insurance includes a high deductible or copay, or the wait time for them to get an appointment to see a primary care physician is too long, or they do not wish to take time off to see a physician, or their condition is relatively minor. For whatever reason, sick people or the parents of sick children will often visit a retail pharmacy for purposes far broader than simply filling prescriptions. Pharmacists provide quick, easily accessible, cost-free medical advice, and pharmacies contain a vast array of over-the-counter remedies that can be purchased without need for a physician's prescription.

CFI has launched legal challenges against both CVS, the nation's largest pharmacy chain, and Walmart, the world's largest retailer, in the District of Columbia, challenging their retailing of

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[23] https://www.nature.com/articles/s41562-021-01278-3
[24] https://www.cnet.com/news/misinformation/features/the-unsung-force-digging-through-misinformation
[25] *Id.*
[26] https://www.infowars.com
[27] https://naturalnews.com
[28] https://en.wikipedia.org/wiki/Natural_News
[29] https://doctoroz.com

homeopathy in a fashion based on misinformation.[30] Under the D.C. Consumer Protection statute, consumers have an enforceable right to accurate information about products they are sold. CVS and Walmart (and many other retail pharmacies) sell FDA-approved and tested over-the-counter medicines such as Tylenol, Advil, Nyquil, and Prilosec, but they also sell non-FDA-tested or approved products based on homeopathy or other forms of pseudoscience alongside them.

When a customer enters a CVS or Walmart pharmacy section, the products are displayed on shelves organized by the conditions they claim to treat. Under a sign reading "Pain Relief," Advil, a product containing ibuprofen, will sit alongside Boiron's Arnicare, a homeopathic dilution of the plant Arnica Montana. Throughout the store, whether it is in the section labeled "Asthma Relief" or "Cold and Flu" or "Sleep Aids," pseudoscientific homeopathy sits alongside science-based, tested, and approved remedies that actually work.

By placing a product under those signs, the retailer, here Walmart and CVS, is informing consumers that this is what the product does. It is not unreasonable for a consumer to believe that a product included in a section labeled "Pain Relief" will relieve pain. However, to make that claim about homeopathic products is simply false. All credible evidence shows they provide no relief over that of a placebo. Moreover, by placing these products alongside science-based remedies that do in fact work, the retailers are misleading consumers into believing that there is no difference between the science-based remedies and the "alternative" medical products. This is, once again, misinformation, because the retailers are well aware that, for example, Advil relieves pain while Arnicare does not.

CFI's legal challenges to the policies of these retailers are currently being litigated. It is also important to note that the retailers seek to present themselves as advocates for the remedy-seeking consumers, who are trusting the retailers to steer them in the right direction. For example, the first message a customer sees on CVS's website is: "Let's make healthier happen together."[31] Retail pharmacies across the United States have invested heavily in creating a public image as a necessary part of the health care process for their customers, which only magnifies the harm that they are capable of inflicting through providing misinformation.

This retail misinformation was apparent from the onset of the COVID-19 pandemic. Consumers were, of course, extremely concerned about the pandemic. While there were no easy answers coming from medical professionals and the health care system as a whole, pharmacy shelves remained packed with pseudoscientific products promising to boost a patient's immunity or to treat the symptoms of COVID-19.

By placing these products front and center, retailers sought to take advantage of the understandable fears of consumers. For example, it was common to see at the onset of the pandemic retail pharmacy sections running special offers on products such as Boiron's Oscillococcinum,[32] which claims to relieve the symptoms of flu. In fact, Oscillococcinum

[30] https://centerforinquiry.org/cases/center-for-inquiry-v-cvs/; https://centerforinquiry.org/cases/center-for-inquiry-v-walmart
[31] https://www.cvs.com
[32] https://www.oscillo.com

claims to contain a 200C dilution of *Anas Barbariae*, or heart and liver of the Muscovy duck, diluted to a level of 10^{-400}, rendering it an impossibility that a single molecule of duck offal remains in the final product; there is no medically credible evidence to show it has a beneficial effect. CFI wrote to request that retailers cease such activities, but for many of them the pandemic was an opportunity to peddle worthless pseudoscientific snake oil to desperate customers.[33]

Across the internet, the pandemic provided an opportunity for hucksters and charlatans of all types to make profits hawking fake remedies and preventives. As of April 19, 2020, at the very beginning of the pandemic, the US Public Interest Research Group (US PIRG) was reporting that the FDA had already issued thirty-four warning letters on COVID-related products, including six to hawkers of colloidal silver products.[34] One organization that the FDA demanded stop selling such products was Alex Jones's InfoWars.[35] Also among famous individuals warned for the sale of unapproved COVID-19 products was televangelist Jim Bakker.[36]

Misinformation was also prevalent once vaccines designed to prevent the spread of COVID-19 became available. False claims regarding the contents of these vaccines were common. They sought to tie the COVID-19 vaccines to earlier (also false) claims regarding childhood vaccines causing autism or the presence of tissue from aborted fetuses in the vaccines. The latter was meant to stimulate pro-life opposition to the vaccines. These claims were rapidly debunked but continued to circulate.[37]

Anti-vaccination groups also promoted the notion of detoxification after receiving vaccines. This pseudoscientific concept centered on purging one's body of supposed poisons received during vaccination. As with all pseudoscientific misinformation regarding COVID-19, there was no medical evidence of efficacy here.[38] Vaccine detoxification ranged from the homegrown solution of a bath of Epson Salts, baking soda, and Borax as proposed on social media by Georgia osteopath Carrie Madej,[39] to the retailing of homeopathic detoxification formulas by large corporations, such as Liddell Laboratories' Vac Vaccine Detox product.[40] What these products had it common was their nonsensical pseudoscientific basis and their attempt to utilize misinformation.

CFI's program Quackwatch has, throughout the pandemic, followed and documented scams, schemes, and misinformation related to COVID-19.[41] The scope of misinformation here is

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[33] https://centerforinquiry.org/press_releases/wegmans-hawking-fake-medicine-during-pandemic-cfi-calls-out-retailer-for-crassly-irresponsible-profiteering

[34]https://uspirgedfund.org/resources/usf/false-coronavirus-cures; an example of such a warning notice can be seen at http://www.ftc.gov/system/files/warning-letters/covid-19-letter-dap_noble_elements.pdf

[35] https://www.forbes.com/sites/leahrosenbaum/2020/04/09/infowars-founder-alex-jones-must-stop-selling-fake-coronavirus-silver-cures-fda-says/

[36] https://www.cnbc.com/2020/03/09/fda-and-ftc-warn-televangelist-jim-bakker-and-six-others-to-stop-selling-fraudulent-coronavirus-products.html

[37] https://www.reuters.com/article/uk-factcheck-covid-vaccine-ingredients-idUSKBN2AQ2SW

[38] https://www.theguardian.com/us-news/2021/nov/14/covid-vaccine-mandate-detox-borax-bath

[39] *Id.*

[40] https://www.liddell.net/product/vaccines-detox

[41] https://quackwatch.org/consumer-protection/covid-19-consumer-protection

nothing short of staggering. Scams are at every level, from prevention to research to testing to contact tracing to treatment to vaccination to mask exemptions. Wherever an opportunity to make money popped up, misinformation was spread.

Classic scams were repurposed in the pandemic, such as fraudsters calling vulnerable old people claiming to be their grandchildren hospitalized for COVID-19 and desperate for money.[42] Social media became the home for myriad false information about topics such as masking and social distancing. While social media channels sought to act, by the time one video with masking misinformation was removed by YouTube, it had already received over 700,000 views.[43]

Quackwatch lists large numbers of civil and criminal proceedings undertaken by the federal government, including the misbranding of drugs by a former naturopath,[44] the sale of industrial bleach as a COVID-19 treatment,[45] and the provision of fake tests by a Holistic Healing Center.[46] A Florida chiropractic clinic was reportedly handing out pre-signed medical exemption forms to any parent who wished their child to be exempt from school mask mandates.[47]

Most recently, CFI's Legal Department has filed a lawsuit, again in the District of Columbia, challenging the practices of Boiron, the world's largest manufacturer of homeopathic products. In its suit, CFI alleges that misinformation permeates Boiron's practices. When tested, Boiron products were shown to be materially identical, yet they are sold in different packaging for different conditions. Moreover, the contents claimed on the packaging did not match the contents discovered by testing.[48]

IV. CFI's Office of Public Policy Regularly Battles Legislation Based on Misinformation

In addition to the legal issues discussed above, CFI regularly faces legislation based on health misinformation. The Office of Public Policy—which is CFI's government affairs arm at both state and federal levels—has encountered several such bills during the pandemic, including very recently.

Just this year, CFI opposed a state bill in Arizona, S.B. 1016, that would require pharmacists to fill prescription orders for off-label use of medication, including the use of ivermectin and hydroxychloroquine to treat COVID-19. The bill provided, in relevant part: "During a

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[42] https://consumer.ftc.gov/consumer-alerts/2020/04/grandparent-scams-age-coronavirus
[43] https://quackwatch.org/11ind/a-skeptical-look-at-kelly-victory-m-d
[44] https://www.justice.gov/usao-wdwa/pr/former-naturopath-convicted-trafficking-misbranded-drugs-he-claimed-could-treat-and
[45] https://www.fda.gov/news-events/press-announcements/coronavirus-covid-19-update-federal-judge-enters-temporary-injunction-against-genesis-ii-church
[46] https://www.justice.gov/usao-wdtx/pr/federal-judge-grants-temporary-restraining-order-against-new-braunfels-business
[47] https://centerforinquiry.org/news/florida-officials-must-stop-chiropractors-giving-bogus-medical-exemptions-to-school-mask-mandates
[48] https://centerforinquiry.org/press_releases/homeopathy-manufacturer-boiron-sued-for-deceiving-consumers-with-junk-meds

proclaimed public health state of emergency, a pharmacist shall dispense all prescription orders written by a medical practitioner for the off-label use of a prescription drug."[49]

CFI's written testimony argued that this misguided measure was not only at odds with public health needs, but it ignored the fact that the Food and Drug Administration had not approved the use of ivermectin to treat COVID-19 and had warned that "[t]aking large doses of ivermectin is dangerous."[50] As CFI's testimony pointed out, the FDA had concluded that it can be "highly dangerous" to use a medicine for the prevention or treatment of COVID-19 that has not been approved by or received emergency use authorization from the FDA.[51]

Fortunately, CFI's testimony had its desired impact; the Arizona Senate voted against S.B. 1016 by a 15–14 margin in March. CFI is, of course, heartened by this victory. However, the narrow margin for this vote underscores the extent to which Arizona legislators subscribed to rampant misinformation about COVID-19—even in the face of science-based medicine and clear federal agency guidance.

A similar instance arose in Kansas earlier this year, when the Kansas Legislature considered H.B. 2280. CFI's opposition to this bill was based on its provision of a religious exemption from vaccination requirements for children attending schools or childcare facilities. However, the bill also stipulated that "a prescriber may prescribe a prescription drug approved by the United States food and drug administration, including, but not limited to, hydroxychloroquine sulfate and ivermectin, for an off-label use to prevent or treat COVID-19 infection in a patient."[52]

While CFI is generally supportive of the rights of medical prescribers, it is very telling that the aforementioned section of H.B. 2280 specifically names hydroxychloroquine and ivermectin as medications that, in the sponsors' eyes, prescribers should be allowed to prescribe for off-label use. CFI submitted written testimony against H.B. 2280 in February 2022, and the bill remains in Senate deliberation. However those debates turn out, it is unmistakable that a driving force behind the bill is misinformation about the benefits of hydroxychloroquine and ivermectin for treating COVID-19.

In addition to the examples from Arizona and Kansas, CFI has fought back against countless state bills that oppose COVID-19 vaccination requirements or attempt to provide workarounds to those who object to vaccination mandates. Each of these bills is deeply grounded in misinformation about COVID-19 vaccines and draws at least some of its support from legislators and constituents who subscribe to such misinformation.

For instance, in March 2022, the Indiana State Legislature passed H.B. 1001, legislation that bans employer vaccine mandates.[53] This measure was promptly signed by state governor Eric Holcomb. The Ohio Legislature has contemplated its own anti-vaccine legislation, H.B. 218,

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[49] https://www.azleg.gov/legtext/55leg/2R/adopted/S.1016HHS.DOCX.htm
[50] https://cdn.centerforinquiry.org/wp-content/uploads/2022/03/30110855/CFI-Written-Testimony-on-AZ-S.B.-1016.pdf
[51] *Id.*
[52] http://kslegislature.org/li/b2021_22/measures/documents/hb2280_04_0000.pdf
[53] http://iga.in.gov/legislative/2022/bills/house/1001

which would ban public and private entities—including schools, businesses, and universities—from requiring vaccinations and would also provide numerous vaccine exceptions, including a religious exemption.[54] Fortunately, following receipt of CFI's written testimony against the bill, the Ohio Legislature has thus far not advanced this legislation.

Another current anti-vaccine bill in Arizona, H.B. 2043, would even make employers that deny employees a religious exemption from vaccination requirements liable to pay significant amounts of money to any employee who is harmed by the vaccine.[55] This stipulation, of course, relies on widespread misinformation about the supposed harmful effects of COVID-19 vaccines, despite the lack of science-based and medical evidence pointing to such harms.

These and many other state bills unfortunately demonstrate the impact that health misinformation has had, and continues to have, on our nation's policymaking.

V. Conclusion

The COVID-19 pandemic has created conditions for misinformation regarding pseudoscientific products to spread and take hold. However, such misinformation is not a new phenomenon. CFI's work against misinformation spans decades. What has been demonstrated recently is the force of such misinformation. Indeed, structural advantages exist that add to the appeal of misinformation, in particular in such times of crisis, and governmental and private organizations must increase their efforts to challenge it and promote policy based on reason and science.

This tactical advantage misinformation possesses comes from three sources. First, the methods of science and reason, which require that proper, rigorous studies have their results carefully interpreted and their conclusions repeatable, allow pseudoscientific misinformation to get to the marketplace of ideas before properly vetted scientific ones. Being right requires time and effort. Being wrong is quick and easy (and all too often profitable).

Secondly, we live in the social media era. As the general public is seeking answers to a frightening pandemic with a rapidly mounting death toll, it is all too easy for the purveyors of misinformation to fill the gap left in the face of the long lead time required for scientific information. When combined with a deep mistrust for science and medicine in many communities, misinformation can take root on social media before accurate information has even had a chance to emerge.

Finally, the pandemic has provided a rapidly changing situation as the virus itself has evolved and more information has become apparent. The advantage inherent in misinformation here is that it has no requirement to be correct. It can appear consistent, because it does not seek to adjust to new information. As the situation has developed, so has the information provided to the public, including recommendations regarding masking, social distancing, and the survival times of the virus on various surfaces. This represented the best scientific information

[54] https://www.legislature.ohio.gov/legislation/legislation-summary?id=GA134-HB-218
[55] https://apps.azleg.gov/BillStatus/BillOverview/76383

available at the time, but it was all too easily portrayed as, at best, uncertainty or, at worst, politically motivated misinformation unto itself.

While the issues of misinformation are exacerbated by the pandemic conditions, it is necessary to address them throughout public life. Only a population that is educated in reason and science, and that comes to expect those values to be represented well in public policy, will be able to withstand the inevitable onslaught of misinformation.