Trust in the CDC:

Framing Theory, Message Mutation, and the COVID-19 Vaccine

By

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LIST OF ABBREVIATIONS

CDC   U.S. Centers for Disease Control and Prevention

CERC   CDC Crisis and Emergency Risk Communication Framework

COVID-19   Coronavirus Disease 2019

EUA   Emergency Use Authorization

FDA   U.S. Federal Drug Administration

NIH   U.S. National Institutes of Health

WHO   World Health Organization

INTRODUCTION

Public health communicators measure the effectiveness of institutional messaging based on their ability to affect behavioral change of target publics (World Health Organization, 2017). One of the most common tools or channels for public relations officials, public information officers and health experts to communicate these messages to the lay public is the news media, but the process of communicating to the news media is becoming a fast-changing variable for communicators (Centers for Disease Control and Prevention, 2014).

In the digital era, the American press (and news media cycle, broadly) is becoming less influential, increasingly fragmented, and socially mediated, losing reporting power and the agenda-setting ability critical for elevating matters of national attention. This combination of an emphasis on social media and an engagement driven journalism model has driven polarization to its recent levels (Gandour, 2016). And while the science is out on how this ever-increasing reflection of bias may directly influence individual behaviors and actions, a more immediate concern may be the ability of polarization over time to erode overall trust in the news itself (Guess et. al, 2021; Robert Wood Johnson Foundation and Harvard T.H. Chan School of Public Health, 2021).

This increasingly divisive media landscape poses a growing threat for effective communication of salient public health guidance and recommendations, especially in light of recent health crises which have affected the global population. Indeed, the case of COVID-19 presents some of the strongest evidence in recent history of this barrier to effective communication, seen directly in the conspiratorial discourse around the disease, as well as the slow response and lagging uptake in response to the development and approval of mRNA vaccines.

One tool which could help researchers develop knowledge about this seemingly intractable communication problem is the concept of framing—a multi-faceted theory used in interdisciplinary research to describe the shaping of ideas both held and communicated—and, more specifically, how these frames "mutate" into news coverage. To date, there is little research on how framing exists in health communication between authorities or government bodies and the news media. Thus, this thesis seeks to synthesize a varied body of literature related to framing's relationship to broader communication theory, including but not limited to fields of health and risk communication, and seeks to lay the groundwork for understanding both how government public health organizations use frames as well as how those frames mutate in the evolution to coverage within a polarized media landscape. A closer understanding of these variables could guide new approaches by government bodies, public health agencies and public relations officials as they seek to maintain a level of trust with the American public and factor the myriad ways in which downstream "message mutation" by the news media might drive effects on audience behavior.

LITERATURE REVIEW

Trust and the COVID-19 Vaccine

On December 2, 2020, regulators in the United Kingdom issued the world's first Emergency Use Authorization (EUA) for a vaccine to help combat coronavirus disease 2019, known as COVID-19. Just nine days later, the United States Federal Drug Administration (FDA) issued its own EUA for the vaccine (Ball, 2020). The authorizations for the vaccine, developed in just ten months by Pfizer and German biotech firm BioNTech, marked two milestone achievements in vaccine development: The fastest vaccine from development to approval in the West, and the first licensed vaccine using mRNA technology (Georgiou, 2020).

It took nine months for the FDA to issue official approval for the Pfizer-BioNTech COVID-19 vaccine. From December 2020 through August 2021, enthusiasm for this technological innovation in research and development waned (Kates, Levitt and Michaud, 2021), displaced by news and rumors regarding the potential risks associated with the vaccine (Kirzinger, Sparks and Brodie, 2021). The swift dismissal of the more remarkable aspects of the vaccine's development became a harbinger for the public discourse around vaccination in the emergency use period, lingering into the days and weeks following eventual FDA approval (Hamel et. al, 2021).

As the pandemic continued taking the lives of people around the globe, and polarization, politics and bias affected how Americans trusted and transmitted this information to their own networks, health authorities including the U.S. Centers for Disease Control and Prevention (CDC) worked to stress the public health imperative of the newly available vaccines through the dissemination of public-facing guidance, recommendations and news related to efficacy of the

novel vaccine as well as potential benefits for the vaccinated. This communication strategy by the CDC, influencing factors notwithstanding, was likely tailored for the news media – as part of its Crisis and Emergency Risk Communication (CERC) framework for epidemics, which we'll discuss later in this review. But even amid the public relations push of the CDC and other health agencies aimed at reaching as many Americans as possible in order to maximize vaccine uptake, polarization affected the transmission of this information (Lopez, 2021). In fact, by May 2021, surveys showed that only half of Americans placed trust in the CDC—an overall decrease from roughly 90 percent of Americans in March 2020—with consumers of left-leaning media reporting dramatically elevated levels of trust when compared to consumers of right-leaning media (Alberti, Talev, and Bettelheim, 2022; Robert Wood Johnson Foundation and Harvard T.H. Chan School of Public Health, 2021).

Thus, there is a need to figure out a path forward in how, amid a highly polarized climate, public health agencies might shape their messages to engender public trust and therefore, theoretically, improve downstream reception to communication of public health imperatives, such as messages encouraging vaccination. One area of opportunity for research is to gain a closer understanding of how these communications develop in the hands of the public health experts, such as those at the CDC, and how they evolve to the fractured news media – seen by scholars as one of the most persuasive public-facing sources of health information (Gunther, 1998; Viswanath & Emmons, 2006; Lee & Basnyat 2013). A refreshed framework for how health institutions discuss the process of evaluating and disseminating information, in an effort to build public trust, would likely enable preventive and strategic measures that aid in the effective transmission and penetration of time-sensitive public health messages in a crowded and polarized news media landscape.

Framing Theory

Fred Cook, director of the USC Center for Public Relations at the USC Annenberg School for Communication and Journalism and chairman emeritus of public relations firm Golin, calls the modern surge in polarization a "communications problem" ("Why Is America so Divided?" 2021). In recent years, researchers from a variety of fields and disciplines, especially those in mass media, have shown increased interest in addressing these communications problems through research and applications centered on the tactical application of framing theory, which investigates how message construction influences cognitions, attitudes and behaviors (Borah, 2011; O'Keefe & Jensen, 2009; Shah et. Al, 2004; D'Angelo, 2002).

History of framing development

It is well established in research that framing shapes how audiences process information, beginning with Tversky and Kahneman's work on prospect theory in the early 1980s, which proved that changes in framing can alter decision making (as cited by Shah et. al, 2004). Since that time, general consensus among scholars reveals that the concept of framing, as applied in news media, is "often constructed in ways that privilege certain orienting and organizing schemes over others, subtly altering the activation of thoughts about a topic among members of the audience" (Pan & Kosicki, 1993; Price & Tewksbury, 1997, as cited by Shah et. al, 2004).

Though its earlier development as a concept can be tracked back decades before, framing was reinvigorated as theory in the 1990s by communication theory scholar Robert M. Entman, who called for a streamlining and holistic reinvention of the "fractured" paradigm of framing and emphasized its potential interdisciplinary use as a more focused way of describing the power of communication (1993). Around the turn of the twenty-first century, framing theory, powered by Entman's work, became a popular theoretical concept with two central foundational tracks in

sociology and psychology (Borah, 2011; Guenther et. al, 2021). While either responding to or continuing Entman's original proposition for a single paradigm – a way to describe how people present ideas to audiences – framing in these two tracks largely shifted away from the call for a single definition, instead growing to embody often (for researchers, frustratingly so) disparate conceptualizations and applications, in a wide range of fields such as political psychology, behavioral economics, mass media and communication, and foreign policy (Cacciatore, Scheufele, Iyengar, 2016; Druckman, 2001; Hameleers & Boukes, 2021).

For the sake of this synthesis as a foundation for understanding how framing as an often confusing and always multifaceted concept might help illuminate the problem of media polarization and map the flow of health communication, we can look at how Entman and Erving Goffman, as seminal scholars of framing, developed and described frames as the tactical components of the broader theory.

From theory to tactics

Goffman was the first to develop the concept of frames or framing devices in 1974, deeming them ''schemata of interpretation," or a sense-making tool for understanding an "otherwise meaningless succession of events" (Borah, 2011). Decades later, political scientist James Druckman (highlighting the interdisciplinary application of framing) helped to help clarify the "framing effect" by distinguishing frames in two different modes: frames in communication (the process of relaying information), and frames in thought (the perception of a situation) (Cappella and Jamieson, 1997; Gitlin, 1980; Iyengar, 1991; as cited by Druckman, 2001). This separation aligns with the two foundational tracks for framing in sociology and psychology – the former speaking to more communications-oriented applications of framing, such as message framing, with the latter describing how framing mechanisms illuminate structural perception of

existing ideas (Druckman, 2001). In examining the communication of public health messages, the subject of this review, we tie more closely to the sociological track of framing and the use of frames.

Entman describes frames as having four broad purposes: "*defining problems*, *diagnosing causes*, *making moral judgments*, or *suggesting remedies*" (1993). He goes on to explain the main action of frames: Highlighting certain information within a larger item or story which thereby makes that information "more noticeable, meaningful or memorable to audiences" (Ibid). Relevant for this analysis, Entman presents what is now recognized as one of the seminal examples of framing – from Kahnman and Tversky, born out of their developed prospect theory:

> *Imagine that the U.S. is preparing for the outbreak of an unusual Asian disease, which is expected to kill 600 people. Two alternative programs to combat the disease have been proposed. Assume that the exact scientific estimates of the consequences of the programs are as follows: If Program A is adopted, 200 people will be saved. If Program B is adopted, there is a one-third probability that 600 people will be saved and a two-thirds probability that no people will be saved. Which of the two programs would you favor? (Kahnman and Tversky, 1984)*

This is gain-loss framing, one of the most heavily studied message framing devices (Bosone & Martinez, 2017). The information in the two options is identical, but with one variation in frame application, presentation of the preventive measures for the hypothetical Asian disease are radically altered – theoretically with an impact on downstream behavior or, perhaps,

an influence on the degree of trust placed by the public in the group communicating the message.

There are numerous different framing devices applied in research as well as a myriad collection of names for each of those individual devices. Thus, it's not beneficial to try and collect them all in one portion of this review. Important for the synthesis is understanding how framing devices are considered and used specific to health-oriented messaging, and how certain frames reappear in relevant studies.

Framing in Health Communication

According to a recent literature review of framing and health communication, the number of peer-reviewed studies examining framing in health communication has increased significantly since 2007, though largely remains a relatively niche area of focus – limited to a dozen or so researchers often studying specific health topics, such as nutrition or vaccination (Guenther, Gaertner & Zeitz, 2021). Their review notes a heavy psychological lens on framing for these studies, rather than a focus on the construction of communication or messages, and contradicts a cited study in this review by Borah et. al from 2011, which found that health communication and framing studies relied more heavily on the sociological track of framing theory (Ibid). This presents an opportunity for future research.

In terms of common devices used in studying the framing of health messages (a critical piece of understanding the larger communication pipeline) the available scholarship is—again—not clear. To illustrate, a 2018 review of framing devices by communication scholars, published in *Health, Risk & Society*, found that health communication scholars in particular don't commonly agree on one single set of frame-names to describe the framing devices included in their respective studies (Dan & Raupp, 2018). This contributes to a certain level of difficulty in

tracking device use over time. However, while the names may not synchronize between studies, the researchers explain and synthesize from the disparate terms broad categorizations which are common in health communication studies. These include: Consequence, Health severity, Human interest, Economic consequences, Attribution of responsibility, Action, Thematic, Episodic, Medical, Uncertainty, Alarmist, Reassurance, Gain, Loss and Conflict (Ibid).

These devices compose the tactical structure of broader framing theory, and the devices—and their relationship to health communication—which are important for understanding how two groups of focus, health authorities and the news media, are involved in their application, and thus might be responsible for potential effects on audience downstream message reception, perception and resulting behavior.

Authoritative Health and Risk Communication

Framing, as a specific messaging concept within the sociological track, can be properly situated within the field of communication studies (Ardèvol-Abreu, 2015). In order to understand how health authorities are responsible for building, framing and disseminating messages in the first place, the field of communication studies helps narrow a review to a specific area of academic concentration with a relevant lens for analyzing the process of time-sensitive health communication: crisis or emergency risk communication.

The World Health Organization, one of the largest public health authorities, defines risk communication as "the range of communication capacities required through the preparedness, response and recovery phases of a serious public health event to encourage informed decision making, positive behaviour change and the maintenance of trust" (n.d.) Health and risk communication are intimately linked, given the ability for many groups to participate in the conveying of risk. In order to understand how authorities might frame messaging of a public

health crisis, such as COVID-19, risk communication theory becomes a valuable lens from which to view the tactical construction of those messages. One of the best examples of this, especially in light of this review's reference case concerning COVID-19, is the published organizational process for crisis and emergency risk communication by the nation's top public health institution, the CDC, referred to as the Crisis and Emergency Risk Communication framework (CERC), which also outlines recommended strategies for communicating with news media.

CDC and the CERC Framework

Scholars in risk communication often cite the same key categories of problems which can be used to "group" the potential barriers for effectively encouraging informed decision making: These reflect the (1) message itself, as well as three broad and possibly rudimentary groups involved in the process of information sharing: (2) source, (3) channel and (4) receiver (Covello et. Al, 1986).

The CDC's CERC manual is an evolving framework for anticipating these barriers. Built on psychology and communication studies, the manual—available online to the public—outlines the various best practices for proactive and reactive messaging (Centers for Disease Control and Prevention, 2020). According to a review of the CERC manual, the CDC evaluates the effectiveness of its risk communication largely on reception and public uptake on its message – informed by anticipation of the public "psychology of a crisis" and building topline rules which emphasize simplicity, credibility, consistency and accuracy (Centers for Disease Control and Prevention, 2019)

The resource, last updated in 2014, emphasizes the media's role as an "important emergency information system during a crisis," and points to specific attributes of news media

which make it an effective transmitter of information – namely, the immediate and continuous nature of information dissemination to the public. However, the CDC also issues a warning to its communicators that the media will not "support official goals," out of a responsibility to "report information they believe is honest and objective" (Centers for Disease Control, 2014).

In terms of framing, the CDC does not mention specific devices in its communication strategy. However, CERC documents do illustrate how framing might influence the strategy for constructing effective messages about crises, notably in the provided directive to "frame the message in a positive way" (Centers for Disease Control and Prevention, 2019).

It stands to reason that the CDC, as with other public health agencies and scientific communicators, aren't guided or informed by the same metrics of success as journalism operations, which are increasingly incentivized based on readership and engagement – often at the expense of public trust (Fink, 2019). Even as political parties in power may shape or influence authoritative strategy, speed or rate of communication (seen in the Trump administration's silencing and undermining of the CDC amid COVID-19) (Desikan, MacKinney and Goldman, 2020; Weiland, 2020), health authorities—as opposed to the news media—are best served by prioritizing strong relationships and regaining trust among both the public and news media through a focus on transparent, science-driven messaging (Pollard & Davis, 2021).

News Media and Message Mutation

Sociologists and communication studies scholars largely agree that the news media are well-established and persuasive sources of health information for the public (Gunther, 1998; Andsager & Powers, 1999; Viswanath & Emmons, 2006; as cited by Lee & Basnyat 2013). In fact, there is an large body of research looking at exactly how the news media communicates

health messages to the public (Granner, Sharpe, Burroughs, Fields, & Hallenbeck, 2009; Habel, Liddon, & Stryker, 2009; Vargas & Pyssler, 1999; as cited by Lee & Basnyat 2013). However, there is less research available on how exactly the news media processes or translates crafted messages from health authorities.

Through disciplinary perspectives in health and risk communication, we have a foundational understanding of how health authorities such as the CDC construct time-sensitive health messages for public-facing communication. But critical for understanding how these messages "mutate" in the communication process between authorities and the news media is, finally, a review examining how messages carry over into news coverage.

News Construction and Framing

The news media are no strangers to the use of frames (Pew Research Center, 2009; Dan & Raupp, 2018; Shih, Schmierbach & Zubric, 2004) as "organizing schemes" (Shah et. al, 2004). This theme of framing through "organization" comes up in related pieces of literature, specifically in the pointed criticism that individual reporters often organize news coverage, "thematically, stylistically, and factually… in order to present a distinct storyline" (Entman, 1993; Gamson & Modigliani, 1987; Gitlin, 1980; Scheufele, 1999; as cited by Lee & Basnyat, 2013).

It's not exactly surprising, especially in today's politically charged and polarized climate, that news media organizations might modify news coverage to fit a desired storyline or narrative. But this process of subtle or not-so-subtle framing carries additional weight when it comes to matters of health – especially issues which are time-sensitive or address a large risk population, such as those affected by pandemics.

For example, a 2004 study published in *Mass Communication & Society* looked at the relationship between framing and three epidemics—avian flu, mad cow disease and West Nile virus—and the corresponding news coverage for each. The researchers found that news coverage was largely driven by perceived "newsworthy" developments related to the issue as well as whether or not geographic concerns related to the publication's readership (Shih, Schmierbach & Zubric, 2004). Additionally, frames used by journalists in the news coverage varied based on the specific epidemic, and largely focused on conflict (in the case of mad cow disease, due to the geopolitics of impacted countries negotiating economic bans) or reassurance (also in the case of mad cow, likely a result of proximity of the potential health effects for beef consumers in the United States, as well as political attention from the beef industry) (Ibid).

These political relations, in conversation with the subtext for this review around political leaning of media publications and polarization's impact on news coverage, comprise a major influencing factor in news media framing of epidemics – specifically those with worldwide health impacts. For instance, one study published in the *Asian Journal of Communication* compared BBC and CNN news coverage framing of the SARS crisis in 2003 and suggested, despite some similarities in how authorities and the media framed SARS (using information from the WHO, focusing on public health, etc.), geopolitics specific to each country played a significant role in the framing choices – perhaps illustrating how macropolitics trickle down to impact news coverage at the individual story level (Tian & Stewart, 2005).

On COVID-19 specifically, there have been numerous early studies on the various ways in which frames are used in news media coverage, particularly in relation to vaccine hesitancy and especially at early stages of the pandemic (Palm, Bolsen and Kingsland, 2021; Huang & Liu, 2021; Sudharsanan et. al, 2021). These studies all contribute findings emphasizing the need for

improved vaccine messaging in order to promote and maximize vaccine uptake. The questions, then, are: What research exists on the breakdown between science-driven health recommendations and guidance, and politicized news reports? How might this information help researchers and health communicators in the future?

Frame Flow and Message Mutation

The available research on frame changes between authorities or government bodies and the news media is limited. One of the earliest examples, a 2009 study in the *International Journal of Public Opinion Research,* analyzed "frame flow" between the U.S. government and news media specific to framing of North Korea. The researchers explain a contrast in framing application between government policy and media coverage as a result of "competition" between each group's prioritization of frames – in this case, Military threat, Human rights, and Dialogue partner (Lim & Seo, 2009). This illustrates again how politics influence an active selection of frames in order to shape narrative and influence public opinion. Moreover, the researchers conclude with evidence of a "two-way frame flow" between government and the news media – a reciprocal relationship which impacts how each group applies framing in messaging (Ibid).

A more influential study for this review came in 2013, when researchers at the National University of Singapore published a study "mapping" this process of frame flow between a public health authority and the news media. In their study, the researchers analyzed press releases by the Singapore Ministry of Health (MOH) around the H1N1 outbreak, and—similar to the aforementioned study—provided evidence contrasting previous work which found a "symbiotic" and relatively unmediated relationship between government institutions and the news media by revealing significant changes in media frames (Bennett, 1990; Curtin, 1999; Gandy, 1982; Nisbet & Lewenstein, 2002; as cited by Lee & Basnyat, 2013). This study, while

specific to the sociopolitical circumstances in the authoritarian capitalist regime in Singapore, is among the first to analyze how health messages, specifically those amid pandemics, "mutate" alongside the disease itself in the translation between authorities and the news media.

Notably, the researchers found that journalists actively built frames that were non-existent in the Singapore MOH press releases – again suggesting active selection of frames – in this case, specific to Reproach, Emotion, Positive tone, and Gain (Ibid). In addition to the shift between the presented information by the Singapore Ministry of Health and the corresponding media reports, the researchers also found selective use of press communications based on the novel or newness of the included information, resulting in rejection of nearly two-thirds of issued press releases (Ibid).

To reiterate: While studies like that of Lee & Basnyat illustrate a growing interest in health communication framing (not surprising considering the effects of COVID-19), this concept of research into frame flow or—as we term it here—"message mutation," distinct from analyses only looking at framing by one group in the health or emergency risk communication process, is understudied. More research is needed to properly understand patterns in journalistic frame construction, as well as the seemingly intractable barriers and limitations frames pose to effective health communication.

Conclusion

In closing, as this review shows, framing as a theoretical concept has a storied history of application in a broad range of academic disciplines, yet is relatively understudied in relation to health and emergency risk communication – especially when applied to the communication of imperatives, such as preventive guidance and recommendations, amid epidemics. This presents an opportunity for future research to gain a more holistic understanding of not only the

communication pipeline or "frame flow" between health authorities and the news media, but also in the specific effects of polarization on both health messages in the news media, as well as the perception of public health authorities and expert guidance. As a result, future communicators, government agencies and health authorities might anticipate downstream message mutations at the news media level in advance of future public health crises on the scale of COVID-19.

METHODS

Aims and Objectives

Given the public need for a reliable and trustworthy health authority amid a health crisis, this study concerns a contextual analysis of the delivery of health information to the press – specifically through a content analysis of how common themes used by the CDC to describe its efforts to manage and encourage the COVID-19 vaccine, during the time frame in which vaccines were under Emergency Use Authorization status, evolved or "mutated" between:

A) Public relations-guided communications drafted and disseminated to news media by the CDC

B) Subsequent and corresponding news coverage of and around those CDC messages, published by American news media

The project uses framing theory as a key conceptual framework – a relatively novel approach given a lack of existing research using framing theory in health communications studies, specifically. For this study, I used a comparative content analysis approach examining

the framing applications by the CDC to better understand outcomes related to the following research questions:

- RQ1: How did the CDC use framing devices in press communications about the COVID-19 vaccine, during the EUA phase?

- RQ2: To what extent, and how, did those framing devices used by the CDC mutate into corresponding news coverage about the COVID-19 vaccine?

- RQ3: How did political bias of each online news publication (Fox News and CNN) affect any message mutation in the application of CDC frames?

Study Design

Publication and Timeline Criteria

This study assessed online stories/articles, only—rather than print media or broadcast recordings—related to the COVID-19 vaccine issued or published by three groups: 1) the CDC, and two politically distinct American news publications: 2) Fox News and 3) CNN. Aside from the CDC (as the originator and disseminator of the health communications this study evaluates), these media outlets were chosen for their representative positions as two of the highest ranked online news sites in terms of overall unique monthly visitors (audience reach) according to SimilarWeb, a large web analytics provider, as well as their representative status of either side of the political ideology spectrum, according to AllSides, an independent assessor of political bias in prominent media outlets.

The time frame for this content analysis of media issued by these three groups was December 2020 through August 2021, dubbed here as the "emergency use authorization (EUA) phase." Limiting the timeframe for this project in this way allowed a focus on content centered

between a start date marked by the Federal Drug Administration (FDA) issuing the Emergency

Use Authorization for the Pfizer-BioNTech vaccine on December 11, 2020, and an end date

marked by the official approval of the Pfizer vaccine on August 23, 2021.

Article Criteria: CDC

Given this project's focus on frame mutation between health authority and news media, I

began the data collection process by building the first of two datasets: All CDC communications

mentioning the COVID-19 vaccine which were issued during the EUA phase. A manual review

was conducted of the official communications stored for reference online via the CDC

Newsroom (https://www.cdc.gov/media), accounting for both press releases and media

statements, due to their general availability and hosted record on the site. All articles mentioning

the vaccine (using key terms "vaccine," "vaccinations" or "vax") were included to capture even

passing references to vaccines, to ensure an accurate and representative collection of data for

analysis.

Notably, while this study aimed to be as comprehensive as possible with the outgoing

communications from the CDC, only press releases and media statements were included. Two

other available press material formats stored on the CDC Newsroom, media advisories and

transcripts, were not included due to inconsistent availability on the Newsroom or a lack of

substantive information. Media advisories, in the CDC's usage, specifically, are given to media

as an advance notice of upcoming dissemination of information via live telebriefing. Thus, these

are exclusively brief notices to the journalist community about future information-sharing

sessions rather than a source of information themselves, and thus are not relevant for a content

analysis. CDC telebriefings, while more substantive information formats, were not consistently documented on the CDC Newsroom site and likewise were not included.

The finalized dataset of CDC communications included 38 press releases and media statements during the EUA phase.

Article Criteria: News Media

To refine a dataset into one representative of only relevant news coverage corresponding to my CDC dataset, I performed a collection of news monitoring data in two phases:

The first phase consisted of a Boolean search of all available news coverage using Cision, a public relations and media monitoring software which tracks and collects more than 7 million pieces of online news coverage. I performed this search on January 11th, 2021 using a selection of broad keywords to capture all relevant online news articles published by Fox News or CNN during the EUA phase.

TABLE 1. Boolean Parameters For Initial Content Data Collection

Search Terms	("Coronavirus" OR "Covid-19" OR "Covid") AND ("Vaccine" OR "Vaccination") AND site_urls_ll:("www.cnn.com" OR "www.foxnews.com") AND mediatype:"News" AND (frequent_terms:("CDC" OR "Centers for Disease Control and Prevention") OR title:("CDC" OR "Centers for Disease Control and Prevention"))
Search Operator Definitions	site_urls_ll: Content from specific publication sites mediatype: Selection from "news," "broadcast" or "blogs" frequent_terms: Mentioned three or more times in article title: Mentioned in headline of article

Of note, the "frequent terms" operator is a feature by Cision capturing articles in which selected keywords (in this case, "CDC" OR "Centers for Disease Control and Prevention") are

mentioned more than three times in an article. The "title" operator applied in this case captured

articles in which those same keywords, alternatively, appear in the headline of an article. I used

these two functions to limit the total amount of scraped news articles to only relevant content for

this analysis on news coverage prominently covering CDC press communications alongside

news related to the COVID-19 vaccine.

The resulting initial dataset was 949 pieces of online news coverage published by either Fox

News or CNN during the time frame. Further clarification of the dataset through manual

combing of the data was necessary to represent full-length, original and representative news

content that matched the key terms and allowed for a focused-yet-representative content analysis.

Along these lines, I made the following manual eliminations in reviewing the data:

- Duplicates of articles published to multiple associated domains (i.e. CNN, which would
  often publish the same story, in the same or similar format, in multiple locations:
  cnn.com, us.cnn.com and edition.cnn.com).

- Links to transcripts and/or video clips of broadcast news segments, as well as links to
  RSS feeds of already represented articles

- Erroneously captured publications, i.e. AM radio affiliates for Fox News

This manual combing process resulted in a news media dataset capturing 439 pieces of online

news coverage across both publications, which mentioned the initial key terms.

Matching Data

To ensure a comprehensive dataset, I performed an additional, manual search on both

foxnews.com and CNN.com to match any relevant news coverage published within 5 days of

each CDC communication, resulting in the manual addition of 31 news stories relevant for this

analysis which were missed by the Cision platform. This manual process was performed through

an application of key terms pulled from the headline of each individual CDC press release and the body copy of each CDC media statement.

The final step was a cross-reference of both datasets to establish which pieces of news coverage (specific to the COVID-19 vaccine) could be directly correlated with a CDC media statement or CDC press release included in the first dataset. This final step was necessary for a feasible content analysis cross-referencing pieces of communication. From the refined dataset of 470 news articles, 93 stories were determined to be unique pieces of online news coverage with direct links to a corresponding CDC press release or media statement. Of those 93 stories, 54 were published by CNN and 39 were published by Fox News.

Coding Theory and Framework

To accomplish the research goals of this thesis, I decided upon a comparative, qualitative content analysis using an inductive coding method, which would allow for a comprehensive, in-depth analysis (rather than a broader accounting of trends in the data or a focus on statistics on devices and themes through a quantitative analysis) calling on both key theoretical applications of framing as well as the flexible creation of framing devices specific to the development and dissemination of messages by the CDC.

While broad framing categories were established in early rounds of the comparative analysis process, the following final frames listed which synthesize the common threads between communications were developed and refined through the end of the project. There were no set number of categories, allowing the expansion and contraction of coding categories into comprehensive yet succinct applied frames.

RESULTS

Number of Frames

This study analyzed 131 unique pieces of content ("articles"). From these 131 articles issued by the CDC, CNN and Fox News, I identified a total of 10 inductive frames categorizing major themes in CDC messaging about the COVID-19 vaccine. While the content analysis began as a broad process open to researcher interpretation, repetitive coding rounds to merged and narrowed the project down into salient frames – "key messages" by the CDC, which were positive and self-reflexive in regard to the organization's abilities, responsibilities or successes in managing the COVID-19 vaccine rollout. While all articles contained at least one frame, some articles contained multiple – and often multiple, repeated uses of the same frame.

Additionally, this study identified 5 inductive key message frames in the news media which negatively reflected the position of, and communication from, the CDC on the COVID-19 vaccine. These frames were notable for their direct opposition to the dominant key message frames developed by the CDC.

Frame Descriptions

Tables 2 and 3 present the full list of frames, categorized as "positive" and "negative," respectively. These two terms were chosen for their description of the sentiment or tone of the portrayal of the CDC's messaging, specifically. In each table, the frames are accompanied by the key message used for content analysis as well as examples (not exhaustive) of phrases and terminology identified to code each frame. These are essential for illustrating the inductive reasoning applied in content analysis.

Note: Each of these 10 dominant frames were coded once per appearance in a sentence. Thus, "frames" can also be measured on frequency by their respective number of sentences (rather than words, paragraphs or articles).

TABLE 2. List of Positive Key Message Frames in EUA Phase

Frame Title	Core Key Message	Sample Phrases/Terms
Addressing Health Inequities	CDC addresses and solves health inequities in America	"Equity"; "Equitable access"; "Solving inequities"; Aiding "disproportionately affected"
Boosting Vaccine Access and Uptake	CDC actively works to increase access and public acceptance to the COVID-19 vaccine	"Ensure reach"; "Increase uptake"; "Ensuring access"; "Make sure we're reaching those.."; "Raise awareness"
Communicating Timely, Reliable Information	CDC communicates time-sensitive, critical and reliable information	Recommendations/ guidance at "critical time"; Communication "whenever needed"; "Complements" or "updates" existing guidance
Leveraging Investments and Partnerships	CDC contributes significant funds and investments into target partnerships	"Timely investment"; "Critical support" through funding; "New investments strengthening…"; "Largest investment to date"; "Offer grants"; Details on partnerships
Practicing Safety and Caution	CDC prioritizes thorough safety and caution measures in its decision-making	"Taking safety seriously"; "Prioritizing safety"; "Exercising caution"; "Safety is top priority"; "Extensive safety protocols"
Prioritizing Safe School Reopening	CDC emphasizes the need for safe school reopening amid COVID-19	Schools should "open and remain open"; Benefits of "in-person instruction"; "Help schools open safely"
Protecting Public Health	CDC considers the protection of public health in its mission and activities	"Protecting Americans"; "Protect America"; "Prioritize populations"; "Protect public health and safety"; "Protect people"
Recognizing Role and Responsibility	CDC recognizes its leading role and critical responsibilities in public health	"Remains committed" to mission; "CDC is at the forefront"; "unprecedented CDC response"; "honor its pledge"; "24/7 mission"; America "counting on CDC's leadership"
Relying on Science and Data	CDC relies on scientific evidence and data in	"Evidence-based guidance"; "Best available evidence"; "As science evolves"; "Leading with science"

	decision making and communication	
Using Phased Approaches	CDC uses iterative, phased approach in its decision-making and communication	"Next step"; "Current phase"; "Interim guidance"; "One step closer"; "First of many"; "Phased approach"

TABLE 3. List of Negative Key Message Frames in EUA Phase

Frame Title	Core Key Message	Sample Phrases/Terms
Creating Vaccine Barriers	CDC actively contributes to vaccine hesitancy or other barrier to vaccination	Advice "a disaster"; "Going to get people killed"; will "create more vaccine hesitancy"; "fuel anti-vaxxers"; "Further hesitancy"
Disregarding Study Limitations	CDC disregards limitations of study in communication to American public	"Crude correlation"; "No adjustment" to data
Misinterpreting or Misrepresenting Science	CDC misrepresents or misinterprets its own scientific data or evidence	"Misinterpreted data"; Concern over "hard science"; Disagreements on data; Skepticism on CDC science
Not Addressing Equity	CDC does not effectively address health equity in actions	"Despite strong message on equitable vaccination efforts…"
Not Communicating Effectively	CDC ineffectively communicates reliable information to American public	"Vague" communication; "Looking to do it soon"; "No timeline"; Slow communication; No indication on timing

Positive Key Message Frames

Rather than use a deductive process to "search" content for dominant frames used in prior literature, this study relied on the inductive coding method to understand which key messages were both relatively unique in comparison with one another and most common within this study. The three most dominant positive frames originating from the CDC, based on frequency and application across our communicating groups amid the EUA phase, were:

1. **Relying on Science and Data (149 total uses)**: The CDC relies on scientific evidence and data in its decision making about the COVID-19 vaccine.

2. **Communicating Timely, Reliable Information (84 total uses)**: The CDC communicates time-sensitive, critical and reliable information to the American public about the COVID-19 vaccine.

3. **Using Phased Approaches (53 uses)**: The CDC uses an iterative, phased approach in its guidance, recommendations and orders/policies related to the pandemic and COVID-19 vaccination rollout.

Negative Key Message Frames

The CDC did not issue contradictory frames in its own press communication; Thus, contradictory frames were found only in articles published by CNN or Fox News. While the articles produced a total of 5 frames, the three dominant frames directly rebutting key messaging from the CDC were:

1. **Not Communicating Effectively (18 total uses):** The CDC at some point bungled or continued to bungle communication to the American public about the COVID-19 vaccine.

2. **Misinterpreting or Misrepresenting Science (10 total uses):** The CDC at some point misinterpreted or misrepresented scientific evidence or data in messaging to the American public about the COVID-19 vaccine.

3. **Creating Vaccine Barriers (8 total uses):** The CDC at some point actively contributed to vaccine hesitancy, anti-vaccination sentiment, or other barriers to vaccination.

To gain an understanding of how these key messages mutated between CDC press communications and news media coverage, Tables 4 and 5 present a frequency analysis of positive and negative key message frames, organized by communicating group. The first set of numbers reflect the average application or use of a frame per article, which by dividing the total frame applications (the second set of numbers included in parentheses) by the total number of analyzed cases (N = article included for analysis) by each communicating group. Total frame use per article reflects the total frame applications divided by the total number of analyzed cases across all groups. In Table 5, CDC articles are not included – as no CDC content included negative messages about the CDC.

TABLE 4. Frequency of Positive Key Message Frames by Communicating Group

Frame Title	CDC (n=38)	CNN (n=54)	Fox News (n=39)	All (n=131)
	Avg frame use per article (n)	Avg frame use per article (n)	Avg frame use per article (n)	Avg frame use per article (n)
Relying on Science and Data	1.29 (49)	1.35 (73)	.69 (27)	1.14 (149)
Communicating Timely, Reliable Information	.71 (27)	.74 (40)	.44 (17)	.64 (84)
Using Phased Approaches	.63 (24)	.39 (21)	.21 (8)	.40 (53)
Addressing Health Inequities	.63 (24)	.37 (20)	.15 (6)	.38 (50)
Practicing Safety and Caution	.50 (19)	.37 (20)	.23 (9)	.37 (48)

Boosting Vaccine Access and Uptake	.68 (26)	.15 (8)	.18 (7)	.31 (41)
Leveraging Investments and Partnerships	.74 (28)	.11 (6)	.08 (3)	.28 (37)
Protecting Public Health	.50 (19)	.15 (8)	.10 (4)	.24 (31)
Recognizing Role and Responsibility	.53 (20)	.15 (8)	.05 (2)	.23 (30)
Prioritizing Safe School Reopening	.26 (10)	.11 (6)	.21 (8)	.18 (24)
Total Frames	246	210	91	547
Total Frames Per Article (n)	6.47	3.89	2.33	4.18

TABLE 5. Frequency of Negative Key Message Frames by Communicating Group

Frame Title	CNN (N=54)	Fox News (N=39)	All (n=93)
	Avg frame use per article (n)	Avg frame use per article (n)	Avg frame use per article (n)
Not Communicating Effectively	.11 (6)	.31 (12)	.19 (18)
Misinterpreting or Misrepresenting Science	.04 (2)	.21 (8)	.11 (10)
Creating Vaccine Barriers	.09 (5)	.08 (3)	.09 (8)

Disregarding Study Limitations	.04 (2)	.08 (3)	.05 (5)
Not Addressing Equity	0 (0)	.03 (1)	.03 (1)
Total Frames	15	27	42
Total Frames Per Article	.28	.69	.45

DISCUSSION

This study was concerned less with the frequency of frame application and more on a qualitative analysis of how stories and embedded key message frames developed by the CDC mutated into news media coverage, and the extent to which political leaning affected how news media applied those frames. However, I made the following frequency observations during the study which helps situate a content analysis:

1. CNN articles included for analysis (those related to CDC communications about the COVID-19 vaccine) trended much longer than those published by Fox News. It's likely that this distinguishing factor is a result of broader journalistic practices/agendas set at the organization and is thus not specific to its topical news coverage in this instance or amid this timeframe.

2. As a byproduct of this variable, CNN cited more quotes, included more sources, used more frames and generally presented more content for analysis than Fox News.

To further dissect these topline findings, I categorized an in-depth reading of the text by dominant frame, or key message, used by the CDC. The following discussion focuses largely on the top three positive key message frames and their application by the communicating groups—CDC, CNN and Fox News—to present a narrative, weaving in additional, though less common, dominant frames as applicable, in order to better understand how and why frames were or were not used in certain releases and amid certain thematic events during the EUA phase of the COVID-19 vaccine rollout.

Frame: Relying on Science and Data

As "the nation's health protection agency," the CDC notes on its website that it "works 24/7 to protect America from health, safety and security threats… and fights disease and supports communities and citizens to do the same." To accomplish this goal, the CDC "conducts critical science and provides health information that protects our nation against expensive and dangerous health threats and responds when these arise" (Centers for Disease Control and Prevention, 2019). In discussing dominant frames used by the CDC, it stands to reason that the most frequently applied frame would be the one directly linked to its mission statement.

Across communications about the initial vaccine rollout during the EUA phase, the CDC contextualized messaging to media about its efforts and strategies managing the COVID-19 vaccine by referencing its reliance on scientific evidence and a data-oriented approach to public health communication. From an organizational perspective, communications often used statements reflecting the following sentiment: "As the science evolves and more people get vaccinated, we will continue to provide more guidance to help fully vaccinated people safely resume more activities" (Centers for Disease Control and Prevention, 2021b).

The dominant frame is more clearly stated in direct quotations from CDC officials. In a press release which announced updates to operational guidance on physical distancing in classrooms, CDC Director Rochelle Walensky referenced a "commitment to leading with science and updating our guidance as new evidence emerges" (Centers for Disease Control and Prevention, 2021d). Likewise, the first official statement attributed to Director Walensky announcing her posting noted, "Just as it has since the beginning of the pandemic, CDC will continue to focus on what is known — and what more can be learned — about the virus to guide America" (Centers for Disease Control and Prevention, 2021a).

Contextually, the CDC used "hope" as a method for managing public expectations in response to its messaging related to its reliance on scientific evidence. In a joint press release with the National Institutes of Health (NIH), CDC quoted NIH Director Francis S. Collins using a shared frame: "We hope to gain foundational data that can guide how communities can use self-administered tests to mitigate viral transmission during this and future pandemics" (Centers for Disease Control and Prevention, 2021e). While based in science, this language speaks to a balance for public health communicators in sharing encouraging yet realistic information.

In communicating this frame to the media, the results on how the message mutated into news coverage was in fact split based on political ideology. CNN published more articles which included the *Relying on Science and Data* frame more often, typically when directly quoting representatives from the CDC, or affiliated government organizations which shared the same frame (engendering trust in the government's scientific response to the COVID-19 pandemic). For instance, in its article on the initial CDC vote in December 2020 to recommend EUA of the Pfizer-BioNTech vaccine, CNN included quotes from ACIP (Advisory Committee for Immunization Practices). ACIP member Dr. Beth Bell, clinical professor of global health at the

University of Washington, noted: "I do believe that the process that we have used here in the ACIP to reach this decision is transparent, is science based… and is, for this moment, the absolute best that we can do." Member Dr. Peter Szilagyi in the same CNN article later noted, "I want to say that I voted for the vaccine because of the clear evidence of its efficacy/safety profile and benefit-risk profile, based on our evidence and policy framework." (Gumbrecht et al., 2020)

Fox News published less stories which applied the frame; When using, the outlet often relied on directly quoting the CDC release or statement, or a quote within the release or statement, itself. In its coverage of the first set of guidelines for fully vaccinated individuals, Fox News cited Dr. Walensky's statement as it appeared in the CDC press release: "As vaccinations increase, this guidance represents a first step toward returning to everyday activities in our communities, and CDC will update these recommendations as more people are vaccinated, rates of COVID-19 in the community change, and as additional science and evidence become available." In the same article, the outlet reiterated CDC's "hopeful" messaging regarding the science, quoting Walensky: "We are really trying to restrain travel at this current period of time and we're hopeful that our next set of guidance will have more science around what vaccinated people can do, perhaps travel being among them" (Rivas, 2021).

Additional dominant frames used alongside *Relying on Science and Data* included, primarily, *Communicating Timely, Reliable Information,* which reflected the hand-in-hand nature of the CDC detailing how managed its operational strategy in communicating those science-backed recommendations, as well as the frames *Using Phased Approaches*, *Recognizing Role and Responsibility* and *Addressing Health Inequities.* Using language to reflect its "commitments" or "priorities" naturally dovetailed with many instances of its messaging around a reliance on science and data. One of those priorities, mentioned occasionally, was a focus of

the CDC on addressing and solving health inequities, including but not limited to equitable distribution of the vaccine.

Frame: Communicating Timely, Reliable Information

The second most dominant frame categorized the CDC's emphasis on strategically communicating to the American people timely guidelines and recommendations relevant to the COVID-19 vaccine. The organization used phrases emphasizing the time-sensitive nature of its messaging, such as outgoing Director Robert Redfield signing ACIP's initial EUA recommendation: "As COVID-19 cases continue to surge throughout the U.S., CDC's recommendation comes at a critical time…" (Centers for Disease Control and Prevention, 2020). This language implies that the CDC delivered messaging when Americans most needed it, yet is still somehow passive – potentially giving the public an impression that recommendations from the CDC developed alongside surges in COVID-19 or, possibly, that the CDC waited until the most critical junctures to release updated guidance, avoiding "jumping the gun."

Reliability was included in this frame due to the CDC's repeated promises of ongoing information transmission, which emphasized how the CDC continuously asked the media (and public, by proxy) to trust that it would continue to act as a source-of-truth about the vaccine. For example, multiple releases included promises that the CDC "will continue to provide more guidance…" (Centers for Disease Control and Prevention, 2021b). Reliability was also a method for using language and words related to how the CDC's communication continually built on its prior actions, using phrases such as "updated guidance complements CDC's existing guidance" or noting how scientific "findings support CDC recommendations…" – a recognizable public relations tactic to boost trust for the organization and a possible inflection point relative to

common criticism or public perception of its messaging amid the pandemic, with many calling it "fractured and confusing."

In association with the first dominant positive frame, words such as "rapid" and "transparent" were used to describe its review and dissemination of scientific data to the American public. In a late July release explaining its updated masking recommendations for fully vaccinated people, Director Walensky noted that the CDC worked "every day to use the best available science and data to quickly and transparently inform the American public about threats to health" (Centers for Disease Control and Prevention, 2021i). A release announcing the end of the temporary pause to the Johnson & Johnson COVID-19 vaccine cited ACIP's "commitment to be vigilant and responsive to additional information that could impact the risk benefit analysis of any of these vaccines" (Centers for Disease Control and Prevention, 2021g). In this instance, given the national conversation reflecting public concerns around the blood clotting issues related to the Johnson & Johnson vaccine, the decision by the CDC to emphasize its vigilance and responsiveness reflected its reassurances to maintain public trust.

In terms of message mutation, CNN included this frame in its coverage more often than Fox News, but the difference was narrowed relative to *Relying on Science and Data*. Both publications cited quotes from government officials testifying to CDC's "transparency." On the initial EUA, CNN quoted Federal Drug Administration (FDA) Commissioner saying: "We believe that that (sic) transparency, as well as the rigorous scientific review that we've done, goes a long way to providing confidence and trust…" (Gumbrecht et al., 2020b).

Interestingly, Fox News often called on third-party officials to weigh in on CDC guidance, implying an inherent distrust in the communication frame and a need to verify messaging. Notably, this third-party verification was sometimes positive, as in the case of Fox

News' coverage of travel recommendations for fully vaccinated people, issued in April by the CDC, which quoted an infectious disease physician at Stanford: "'This guidance is really thoughtful,' Dr. Anne Liu, infectious disease physician at Stanford Health Care, wrote to Fox News last month. 'It balances removing some precautions under low risk conditions while maintaining them in high risk and public situations'" (Schmidt, 2021). However, the outlet's use of outside experts was most often negative, and this study found the outlet referenced the anti-CDC key message frame *Not Communicating Effectively* twice as often as CNN.

In events such as school-based guidance, CNN also cited experts or quoted officials on opinions that the CDC's communication was not effective. On the CDC's July decision to lift mask-wearing recommendations for fully vaccinated people, CNN quoted United Food and Commercial Workers union president Marc Perrone: "While we all share the desire to return to a mask-free normal, today's CDC guidance is confusing and fails to consider how it will impact essential workers who face frequent exposure to individuals who are not vaccinated and refuse to wear masks…" (Fox, 2021). This criticism toward the CDC is notable for two reasons: First, the criticism is directly pro-preventive measure – a notable distinction from instances of third-party criticism published by Fox News. Secondly, the source of the quote is union-affiliated, theoretically highlighting the political divide between the two media outlets.

This study found that, while CNN outpaced Fox News in terms of using neutral reporting of the COVID-19 vaccine and CDC communications, Fox News did trend toward similarly neutral coverage. However, a few key articles captured by the parameters of the search were noticeably and strikingly different in tone, emphasizing the lack of trust in the CDC and the disagreements held by outside experts.

In an article reporting a back-and-forth argument levied by Senator Susan Collins, R-Maine, against Director Walensky as part of a Senate committee hearing shortly following the public communication. Specifically, Fox News quotes Collins as saying "We have got to get the schools reopened and you've presented no timeline at all for doing that and the CDC recommendations particularly on physical distancing at least 6 feet are just not in sync with what most public health experts are recommending…" In the same article, Fox News reported the agency's plans for updated school communication, noting that, "When pressed on when the public could see the agency issue a change to current guidance she had said the CDC is 'looking to do it soon,' but stopped short of giving a specific timeline" (Hein, 2021). A separate article focused entirely on a conversation with Norwegian Cruise Line Holdings CEO Frank Del Rio, cited comments from Del Rio "blasting" CDC guidelines as "unfair" and "never consistent" (Giang-Paunon, 2021).

Communicating Timely, Reliable Information was often correlated, as noted, with *Relying on Science and Data*. However, many of the other frames were included in the mix, often providing context for the theme or topic of the communication issued by the CDC. The frame *Recognizing Role and Responsibility*, which highlighted instances where the CDC emphasized messaging related to its "commitments," "priorities" or "responsibilities," also appeared as the CDC ensured the public that reliable and transparent communication was part of its operating agenda.

Frame: Using Phased Approaches

Through this analysis, one of the most common devices used by the CDC in its messaging about the COVID-19 vaccine was in its reminders to the public about "next steps" –

reflecting a thematic extension of the prior two frames in communicating timely, reliable, scientifically-backed information with the additional context of cautioning audiences to remember that the temporal limits for its guidance and recommendations could, in some ways, be limited in applicability or relevance by the timing of the communications themselves.

In its releases and statements, the CDC often used phrases such as "interim guidance" or referred to the "pivotal phase" of the pandemic in which the U.S. was entering. More directly, the CDC would frame its messaging about the vaccine by explaining that certain strategies were "consistent with the current phase of the pandemic," often even allowing a "first step toward returning to everyday activities" (Centers for Disease Control and Prevention, 2021b). This type of cautionary frame is evident in the CDC's release marking the one-year anniversary of the pandemic, shortly following its release of evidence-based guidance for fully vaccinated individuals. Regarding those recommendations, the later release reminds the public of its duty to contextualize the guidance issued by the organization, reminding audiences of the larger goal: "These new recommendations are a first step in our process of returning to everyday activities – safely spending time with family and friends, hugging our grandparents and grandchildren, and celebrating birthdays and holidays" (Centers for Disease Control and Prevention, 2021c). In direct encouragement of vaccination, the CDC elsewhere reminded Americans not only of their duty but of the phases ahead: "We continue to encourage every American to get vaccinated as soon as it's their turn, so we can begin to safely take steps back to our everyday lives" (Centers for Disease Control and Prevention, 2021f).

An interesting finding of this in-depth content analysis was the discovery of a common motivational phrase used by the CDC in many of these releases and statements, often involving language referring to the "end of the pandemic." At time of writing, the pandemic is still ongoing

and many public conversations focus on bringing the pandemic into endemic status, rather than focusing on the possibility of absolute removal of the pandemic from life altogether. But the CDC commonly used the "end of the pandemic" language to contextualize its key messages, including in the release marking the one-year anniversary of the outbreak, in which Director Walensky notes: "This pandemic will end. And, our public health work will continue…" (Centers for Disease Control and Prevention, 2021c). In a later statement attributed to Director Walensky, endorsing the Pfizer-BioNTech vaccine for adolescents age 12 and older, she notes: "This official CDC recommendation follows Monday's FDA decision to authorize emergency use of this vaccine in 12- through 15-year-old adolescents, and is another important step to getting out of the COVID-19 pandemic…" (Centers for Disease Control and Prevention, 2021h).

These "end of the pandemic" phrases largely carried over into news media coverage by both CNN and Fox News. Likewise, the impact of political leaning on *Using Phased Approaches* appears to be relatively narrow, and an in-depth analysis illustrates that, in both cases, frames usually appeared within the context of a direct quote, usually by a CDC official. This suggests that an "end of the pandemic" frame might secure interest from news media in its coalescence around a common goal that trumps political lines. But it might also serve as a point of reference for future news media coverage, positive or negative, about the CDC and its messages about the pandemic, including whether the COVID-19 vaccine succeeded in getting the public to the "end."

CONCLUSION

In March 2022, news publication Axios published the results of survey data captured amid the pandemic, which found that a key factor determining levels of trust in the CDC through the pandemic was where Americans received their news. According to the poll results, trust in the CDC among consumers of left-leaning publications like CNN or MSNBC fell just two percentage points; Trust in the CDC among consumers of Fox News or similar right-leaning publications fell 70 percentage points (Alberti, Talev, and Bettelheim, 2022). While this factor is likely correlated with individual political leaning and the fact that many Americans consider the CDC "vulnerable to political influence" (Kirzinger et al., 2020; as cited by Koplan et al., 2021), it still reflects the significant challenge news media can present to public health authorities aiming to instill trust in their motives and messaging. The CDC needs to understand in advance of future health crises similar to COVID-19 why its messaging tactics amid the pandemic, and vaccine rollout phase, in particular, were ineffective at increasing—even sustaining—trust among this population, and the degree to which news media may be exacerbating this lack of trust through manipulation and mutation of key public health messages.

In conversation with the Axios/Ipsos results, among others cited, this study used the concept of framing to gain a greater understanding on how exactly the CDC tactically communicated to the news media about one key moment in the pandemic – the rollout of the emergency authorized vaccine. Answering our research questions, the CDC used self-reflexive public relations tactics, or key messages, as dominant framing devices in its communications about strategies to manage the COVID-19 vaccine. With the top three dominant positive frames especially, the CDC reiterated a few common themes, phrases and statements around its priorities and assurances designed to emphasize its role and successes. These key messages,

while all issued amid the EUA phase and making mention of the COVID-19 vaccine, were often but not always specifically focused on vaccination efforts. In fact, this study found that direct encouragement or pleas by the CDC were relatively uncommon. These trends broadly illustrate a mission by the CDC, as the nation's preeminent public health authority, to reinforce rationale for total public trust in its messages as they circulated among the news media and public discourse.

Given public relations tactics are measured as effective based on the degree to which those tactical messages are picked up by the intended recipient, it seems that the CDC was largely effective in seeding its framing in the news media, regardless of partisan leaning. Based on our interpretative content analysis, this study shows that both news media outlets usually picked up dominant positive frames—*Relying on Science and Data* and *Communicating Timely, Reliable Information,* particularly, though Fox News applied frames less often than CNN. In terms of the most applied dominant positive frames, CNN matched the order of most frequent dominant frames created by the CDC. This suggests a more synchronous relationship between the CDC and the left-leaning news outlet, relative to Fox News – which showed slight preference for *Prioritizing Safe School Reopening*, rather than details in *Using Phased Approaches*, and published stories with approximately twice as many negative frames as CNN. Most of the negative key message frames published by Fox News related to the CDC *Not Communicating Effectively* or *Misinterpreting or Misrepresenting Science* about the COVID-19 vaccine. Thus, while frames did translate from the CDC, this study found that political leaning likely influenced message mutation between the communicating groups, particularly in how CNN and Fox News used their own reporting to contextualize CDC frames through the lens of political priorities.

In terms of limitations and suggestions for future research, this study examined only time-limited online content from the CNN and Fox News directly correlated with press releases

and media statements from the CDC about the COVID-19 vaccine. Future research would be beneficial in studying a broader, more contextual analysis of news coverage on the COVID-19 vaccine, or the external press messages from the CDC about the vaccine (such as in news briefings or press appearances not related to officially recorded press communications). These additional sources would be a valuable addition to this work. Additionally, the CDC morbidity and mortality weekly report (MMWR) would be a rich source for future analysis given its frequent citations in news media not included in this analysis. Lastly, this study is also limited to content published within 5 days of a corresponding CDC news release, with the rationale of preference for near-term news coverage rather than long-term references to prior guidance, given how often the CDC was often updating its guidance and recommendations related to the COVID-19 vaccine. Future work examining a broader time frame would likely present a more complete picture of framing devices and message mutation around CDC communications.

From a theoretical perspective, this study used Framing Theory through the examination of framing devices, categories and codes as they originated in CDC communications – and not as they originated in the news media (which may have affected downstream communication by the CDC). Future work building on the concept of two-way frame changes between authorities and the news media would provide valuable context for this study. As noted, this study relied on an inductive coding approach rather than a deductive application of pre-existing framing devices in the literature. While there are many studies using deductive methods in analyzing news media framing, additional research on health communication specifically that examines how existing frames are or are not applied could have value in understanding the unique aspects of public health communication and news coverage of public health topics.

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