

# News media's framing of telehealth before and during the COVID-19 pandemic

*Le cadrage de la télésanté par les médias d'information avant et pendant la pandémie de COVID-19*

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## ABSTRACT

This research contributes to the literature on journalistic news framing by analyzing the portrayal of telehealth as a particularly relevant topic during the COVID-19 pandemic. Frames before and after the onset of the pandemic were examined across four news regions: Canada, Australia, the U.K., and the U.S.A. A mixed-methods news framing analysis combined computational linguistic analysis with manual coding methods and determined five general frames through which telehealth is discussed in the news. Results show differences in non-pandemic and pandemic news frames, and in national frames.

## RÉSUMÉ

Cette recherche contribue à la littérature sur le cadrage des nouvelles journalistiques en analysant la représentation de la télésanté comme un sujet particulièrement pertinent pendant la pandémie de COVID-19. Les cadrages avant et après le début de la pandémie ont été examinés dans quatre régions d'information : Une analyse de cadrage des nouvelles à l'aide de méthodes mixtes combinant l'analyse linguistique informatique et les méthodes de codage manuel a permis de déterminer cinq cadres généraux à travers lesquels la télésanté est abordée dans les nouvelles. Les résultats montrent des différences dans les cadres d'information non pandémiques et pandémiques, ainsi que dans les cadres nationaux.

## ARTICLE INFO

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## INTRODUCTION

This research provides insights on journalistic news framing (de Vreese, 2009) by examining the framing of telehealth in the news before and after the onset of the COVID-19 pandemic. Our research examines news frames in a watershed moment of global health communication. We join many scholars who are interested in how health communication appears in news media (Bednarek & Carr, 2021). How health information is portrayed by the news is important, especially during a transformative period such as a global health pandemic, as news outlets are said to “reflect the psychological dynamics of society” (Gortner & Pennebaker, 2003, p. 583). This, in turn, can have ramifications for public health, including influencing public perception of the pandemic, as well as disseminating best practices that contribute to slowing the spread of viral diseases (Mutua & Oloo, 2020).

This study of health-focused news media reporting focuses on news frames as tools to convey information and opinions (Baden, 2019). A news frame is understood as a central idea embedded in news media publications that provides meaning for interpretation (Gamson & Modigliana, 1987). News media frames shape the understanding of an event and therefore can generate bias (Boudana & Segev, 2017), especially if these news frames are used repeatedly across publications and over time. News information, and therefore the understanding of events promoted by news frames, has pronounced influence over human consciousness (Entman, 1993). This influence has been confirmed in pandemic news coverage as well, with news frames playing “a critical role in shaping the public’s understanding of a highly contagious viral disease” (Lee & Basnyat, 2013, p. 120).

We have selected the topic of technologically-mediated healthcare interactions, also known as telehealth, as a site of study to better understand health communication and news frames during pandemics. Telehealth is an umbrella term that covers any health care service that is mediated via technology (Kang et al., 2021; Shaw et al., 2017). These activities, especially telehealth ser-

VICES that replace in-person healthcare, increased during the COVID-19 pandemic. Telehealth was a pertinent news topic during the COVID-19 pandemic as it allows for the traditionally face-to-face practices of healthcare to be mediated, or engaged remotely (Matusitz & Breen, 2007), reducing opportunities for the transmission COVID-19. With telehealth uptake reported as increasing drastically during the first waves COVID-19, studies have concluded that utilization of such healthcare services can have positive impact in contexts where people need to stay home (Monaghesh & Hajizadeh, 2020; Koonin et al., 2020; Drerup et al., 2021). While reporting on the topic of telehealth has increased, analysis of this reporting remains under-researched.<sup>1</sup> In a Scopus<sup>2</sup> search of English language titles, abstracts, and keywords for “news media” and “telehealth” or “telemedicine” or “virtual care,” seven documents were returned, with only two articles analysing news coverage of telehealth (Rush et al., 2021; Kang et al., 2022) (data retrieved from Scopus.com/sources.uri on Feb 22, 2024). Rush et al.’s work is of particular interest in our research, as they offer a manual analysis of news reporting on virtual care in Canada, on articles collected between February 1 and August 31, 2020. Our research expands upon Rush et. al.’s work, introducing a comparative approach that analyzes news articles from three countries in addition to Canada, articles from pre-and post-COVID-19 onset, and articles from two different journalistic styles (traditional and explanatory).

This paper centres telehealth discussions that consider people’s experiences in the digital health space, as opposed to technology- or data-centred discussions. This specification is nuanced, but intentional, as it is known that discussions of technology in the news became more positive during the onset of the COVID-19 pandemic (Dwyer et al., 2023). Our focus on experiences with technology such as telehealth attempts to bridge a gap; that is, to determine if discussions of experiences with technology also became more positive during the onset of the COVID-19 pandemic. If positive (or negative) experiences of telehealth are framed as such by news media, and as news frames have influence over public perception, systemic policy changes in healthcare towards (or away from) telehealth services may be recommended, at least in consideration of pub-

<sup>1</sup> This stands in contrast to the remarkable number of published framing studies on healthcare related to the COVID-19 pandemic (see, for example, Ebrahim, 2022; Mutua & Oloo, 2020; Ogbodo et al., 2020; Park et al., 2020).

<sup>2</sup> Scopus is considered a standard within the bibliographic database product category even though there is some lack of coverage of the social sciences and humanities (Pranckutė, 2021; Singh et al., 2021).

lic calls for (or against) these services.

We focus on news outlets from four English-speaking countries: Canada, Australia, the U.K., and the U.S.A. In each region during the pandemic, telehealth activities were recommended where possible to avoid unnecessary physical contact between practitioners, administrative staff, and the public (Government of Canada, 2020; Telehealth.HHS.Gov, 2021; Department of Health and Social Care and Hancock, 2021; Australian Government Department of Health, 2021). While the COVID-19 pandemic was discussed as the catalyst for the uptake in discussion about telehealth activities in the news (Rush et al., 2021), our research has shown that telehealth services have been available and discussed in the news of these regions for decades.

This research takes a novel approach and examines news articles in mainstream journalism as well as an online entity titled *The Conversation*, a news outlet that features news articles authored by academic research, and that self-identifies as an example of “independent, high-quality, authenticated, explanatory journalism” (*The Conversation*, n.d.). Explanatory journalism is characterised by the prioritization of contextualization and fact-checking (Dan & Rauters, 2021, p. 7), and is said to provide an opportunity to combat the recent onslaught of misinformation and hoaxes accompanying the increased production and consumption of news online (Bielik & Višňovský, 2021). Particularly during the COVID-19 pandemic, we have seen the highly adverse impact of misinformation on the population, resulting not only in low vaccination rates in certain populations but also increasingly hostile stances towards healthcare professionals. We expected to see differences in explanatory news frames, perhaps featuring content that contextualizes telehealth discussions historically or politically, as is commonly found in articles written in this journalistic style (Chen, 2022). Ultimately, we found minimal differences in journalistic writing style choices rather than content covered in pandemic news frames.

Below we provide a review of news frames and health communication, before introducing our methodological approach, where we offer a novel variation of an existing, prescriptive, mixed computational/manual method used to systematically develop news frame packages. We then showcase

an analysis of news frames through which telehealth is commonly portrayed. The discussion that emerges from our analysis contextualizes the findings. Differences in news frames occurred most in pre- and post-onset of COVID-19 pandemic news, followed by differences in national news frames, and least between explanatory and traditional journalism practices.

## THEORETICAL FRAMEWORK

Beyond direct interactions with their healthcare providers, news media are primary sources of scientific information for the public (Ruhrmann et al., 2015), and have an important role to play in building public understanding of healthcare (Lewis et al., 2018). The study of news frames as a form of health communication aims to understand what information and opinions their intended audiences (patients and practitioners, among other stakeholders) are offered, on the basis that this has an impact on the overall health outcomes of those populations that engage with health-related news media.

### News framing

News framing analyses discover frames commonly used by journalists to describe news events. Within the fields of sociology and journalism studies, Goffman and Entman are key theorists of framing. Goffman defines frames as “schemata of interpretation that enable individuals to locate, perceive, identify and label occurrences within their life space and their world at large” (1974, p. 464). Entman’s definition aligns with this, but offers a more prescriptive outline of how framing is achieved: by repetition of identical or similar words and symbols used to portray a news item or event across different contexts, with the ultimate result of influencing audience interpretation (Entman et al., 2009). Additionally, news framing occurs when journalists select aspects of an event or phenomenon to include in the news presentation, which ultimately influences how issues are presented in the news (Collins et al., 2006).

How news media frame healthcare events and information can influence patients’ perceptions, physician behaviour (Diedrich and Dockweiler, 2021), and even policy-makers’ and health-care

professionals' awareness of health-related issues, with the potential to affect regulation, litigation, and research and development (Maniatopoulos et al., 2019). Ultimately, news media structure the delivery of healthcare information, which may influence the public's feelings and actions regarding their own health (Maniatopoulos et al., 2019), or the delivery of healthcare to others (Viladrich, 2019). The public can then call for political and systemic changes should there be strong enough uptake of a particular opinion of a health-related issue. Therefore, it is important to understand how news media portray healthcare, including new forms of healthcare delivery such as telehealth, as these portrayals can influence attitudes and formulation of positions (Diedrich & Dockweiler, 2021).

News framing studies focused on healthcare have looked at a wide array of topics. Van Gorp and Vercruyse used an inductive framing analysis approach to understand dominant frames of dementia in Belgian news and popular media (2012). They found a major frame that focused on duality of human life as consisting of a material body and immaterial mind, where dementia negatively affects the immaterial mind and therefore has an overall impact on the quality of an affected human's life (Van Gorp & Vercruyse, 2012). Ruhrmann et al. (2015) conducted a framing analysis of clips from scientific television programs. They found four major frames: scientific uncertainty and controversy, scientifically certain data, everyday medical risks, and conflicting scientific evidence; each treated scientific framing evidence and the risks of molecular medicine differently (Ruhrmann et al., 2015). A critical discourse analysis of Canadian daily newspapers was conducted by Reitmanova et al. (2015), who found "that racial discourses...continue to materialize in contemporary Canadian press coverage" when it comes to discussions of immigrant health (p. 471). More recent news framing studies of health news include Viladrich (2019), who reviewed articles in the *New York Times* for frames about who can or should receive healthcare; the contribution of news frames in British tabloids to negative stereotypes regarding certain mental health diagnoses (Bowen et al., 2019); and how the failure of specific medical treatments is framed in daily British newspapers (Maniatopoulos et al., 2019).

News frame analysis has been used in studies of COVID-19 pandemic news coverage, for example by comparing the coverage from international media organizations, where four consistent news frames were found to include topics of Sinophobia, crime-related topics, misinformation and fake news call-outs, and geopolitics and international relations topics (Mutua & Oloo, 2020). The news frames uncovered by Mutua and Oloo would fall into Park et al.'s (2020) category of "nonmedical frames." Their research aligns with Park et al.'s finding that there were more links to news articles with nonmedical frames than medical frames (those frames specifically concerned with health or medical issues) in Korea's "Twitterverse," however, they do note that tweets with links to news with medical frames were more popular.

## Health communication

Health communication is a multidisciplinary field with many definitions. After a scoping review, Schiavo (2013) concludes that health communication is:

concerned with reaching different populations and groups to exchange health-related information, ideas, and methods in order to influence, engage, empower, and support individuals, communities, health care professionals, patients, policymakers, organizations, special groups and the public, so that they will champion, introduce, adopt, or sustain a health or social behavior, practice, or policy that will ultimately improve individual, community, and public health outcomes. (p. 9)

This definition is all-encompassing. In short, health communication is a field that examines communication strategies to inform and ultimately positively influence populations. The largest subfield of health communication research focuses on interactions between patients and practitioners, or practitioners amongst each other (Thomas, 2006). This type of interpersonal communication has been examined in face-to-face settings (Li et al., 2007; Robinson, 2003; Manning & Ray, 2002; Barnes, 2018), and through mediated communication, such as email (Roter et al., 2008;



Houston et al., 2003). Beyond interpersonal communication, health communication has been researched in newspapers (Greenberg et al., 2019; Lee & Basnyat, 2013; Young et al., 2017), on television news (Gearhart and Dinkel, 2016), and in online news (Gesser-Edelsburg et al., 2017). It has also been reviewed in digital media outlets such as YouTube (Briones et al., 2012), online forums (Shaw et al., 2006), and other social media networks (Ojo et al., 2021).

Most important to our research is the examination of health communication in the news. News platforms play an important role in the dissemination of health information, as explanations of health issues and diseases in news media can impact audiences and their resultant attitudes and behaviours (Lee & Basnyat, 2013). Studies of health communication in the news vary from examinations of information about widespread urgent health concerns such as the contagious outbreaks of H1N1 (Lee & Basnyat, 2013) or polio (Gesser-Edelsburg et al., 2017), to information about topics that are a bit more applicable to certain groups. These studies include, for example, examination of social representations of cyberbullying and adolescent suicide (Young et al., 2017), and analysis of breastfeeding information communicated via television news (Gearhart & Dinkel, 2016). Health communication studies of news media also include an examination of antimicrobial resistance in the U.K. news, where it was found that antibiotics themselves (and the infections they treat) were “instilled with agency” in the news stories studied (Collins et al., 2017, p. 251). Further examples showcase analysis news coverage of dementia (Bailey et al. 2021; Van Gorp & Vercruyse, 2012) and national differences in COVID-19 portrayal (Herat, 2020).

There are several key foundational frameworks that influence health communication, as it is a multidisciplinary field. These frameworks include theories from anthropology, sociology, medical models, marketing and social marketing, behavioural and social science, mass media, and new media (Schiavo, 2013). While there is a history of health-related content analysis in journalism studies—for example, Brown et al. (1987) found that 80% of wire stories covering health topics in major U.S. newspapers relied on official proceedings, press releases, and press conferences

(Macnamara, 2019)—there has been a lack of sharing theoretical frameworks between the fields of health communication and journalism studies. Stroobant et al. (2019) believe that, historically, health communication has been overlooked within journalism studies, as traditionally a large portion of research focuses on hard news such as political topics (Stroobant et al., 2019). More recently, the lack of overlap is more likely due to the narrow, namely linear, definition of health communication which, as outlined above, highlights a seemingly one-way flow of reaching people to inform them of some health issue, to positively affect public health (Stroobant et al., 2019). This definition does not account for newer journalism studies approaches such as journalism as discourse (Wahl-Jorgensen & Hanitzsch, 2019), or for the nature of the hybrid media system that involves audiences as co-creators of news (Stroobant et al., 2019).

There are, however, media-oriented theoretical frameworks that are used in both health communication and journalism studies. One such foundational theory is agenda-setting theory (McCombs & Shaw, 1972), which “holds that the news media can set the agenda for public thought and discussion” (McCombs & Reynolds, 2002, p. 1). Agenda-setting theory is often referenced alongside news framing in the field of journalism studies and news media effects, with some seeing framing as an extension of agenda-setting, although it should be noted that many differentiate between the two (Shah et al., 2009). The concepts converge on the argument that news media are central to informing and influencing the populations they serve (Moy et al., 2016). They differ in that agenda-setting selects which topics receive attention in news media, while framing entails the message construction around a topic (Shah et al., 2009). Agenda-setting theory has been used in health communication research in studies of health related media campaigns, as noted by Ogata Jones et al. (2006) to include anti-smoking (Pierce et al., 1986), health care reform (Hacker, 1996), AIDS policy (Backstrom & Robins, 1998), tobacco farming diversification (Altman et al., 1999), smoking policy (Sato, 2003), and breast cancer awareness (Ogata Jones et al., 2006). News framing is less popular in health communication studies, although an equally useful approach. Guenther et al. (2021) provide a scoping literature review of

307 articles (conducted in 2018) and argue that framing is a beneficial approach in the domain of health communication, as health information's portrayal in news media can impact audience perception and their health-related behaviours.

## Health communication and news framing

In news framing studies of health communication, two specific traditions of framing are likely to be used. Geunther et al. (2021) identify both a sociological tradition of framing and psychological tradition of framing to be most represented in their scoping review of news framing studies focused on health communication. Studies that fall under the sociological tradition of framing studies of health communication focus on questions related to specific health topics through a lens of societal or structural responsibility and/or impact (Geunther et al., 2021). The psychological tradition of framing studies of health communication sees a recurring theme of gain and loss frames, and typically asks about efficacy of gain- or loss-framed messages, especially within the promotion of healthy behaviour (Geunther et al., 2021). Our work falls under the former category, as our goal is to outline frames that are used on a specific health topic (telehealth), with the underlying knowledge that these frames impact overall public health.

Additionally, our research focuses on thematic frames, rather than episodic frames. Episodic frames showcase topics through discussion of a specific event or object, while thematic framing discusses topics more broadly, typically including historical or cultural/social context (Gross, 2008). Both Gross (2008) and Major (2018) reference a research study first presented by Iyengar (1991) that showed thematic framing to elicit more societal attributions and/or a shared sense of responsibility. Alternatively, episodic framing is seen to create more individualistic responses in news audiences (Gross, 2008). The characteristic of health communication that is action-oriented, with a desired positive effect on populations dovetails nicely with the research that shows thematic frames to foster a sense of shared responsibility that prompts collective action. Our analysis outlines a case where healthcare communication can be seen to be enabled by thematic news frames.

To understand what is being communicated

through news frames in the specific topic of telehealth-focused news, we applied a mixed-methods news frame analysis that combines computational linguistic analysis with manual coding methods. Our study responds to the following research questions:

**RQ1:** Do news frames of mediated health-care interactions (telehealth) differ pre- and post-onset of the COVID-19 pandemic?

**RQ2:** Do news frames of telehealth differ based on nationality?

**RQ3:** Do news frames of telehealth differ between traditional and explanatory journalism outlets?

## METHOD

### News corpus building

We decided to focus on news articles from Canada (CA), Australia (AU), the United Kingdom (UK), and the United States of America (US) due to the similarities in healthcare and communication technologies, and as each region hosts an edition of *The Conversation*, an explanatory news outlet that features articles written by university-affiliated academics. Each of these countries have health systems that include both privatized and publicly-funded healthcare (to different extents), and these regions reduced regulatory barriers to increase access to telehealth care during the pandemic. All four regions are also relatively well-supported with internet and/or telephony services (needed for telehealth access).

We pulled articles featuring search terms related to telehealth (telehealth, telemedicine, eHealth, digital health, virtual care, etc.) from a combination of NexisUni and *The Conversation* website, including all articles available in the NexisUni database and *The Conversation* website up until July 2021. The resulting dataset comprised 1,000,412 words across 1,198 news articles. Certain articles about telehealth were excluded from this study's dataset. Our focus was on telehealth discussions that consider people's experiences in the digital health space, as opposed to technology- or data-centred discussions. For example, articles that discussed electronic health records (EHRs) were

only considered for this study if the discussions around them centred healthcare users, as opposed to news articles on EHRs that centre technology issues, such as system management or privacy features.

Our publication selection was purposefully strategic in collecting articles from the highest circulating left-centre and right-centre leaning newspaper outlets from each country, along with articles

from the country's *The Conversation* online news source.<sup>3</sup> The dataset was split into subsets based on publication date (pre- or post-COVID articles). While we recognize that the COVID-19 pandemic was still ongoing during the time of analysis, we titled this subset 'post-COVID' for ease of use, to denote post-onset of COVID-19. Table 1 shows the makeup of our dataset.

<sup>3</sup> A summary of publications, along with their article and word counts, is available in Appendix 1a.

**Table 1:** *Number of articles in the telehealth news dataset*

Region	Total Articles	Pre-COVID Articles	Post-COVID Articles
CA	314	241	73
AU	329	214	115
UK	242	185	57
US	313	99	214

## News corpus analysis

Corpus linguistic studies are concerned with language specific details and describe the use of linguistic forms in context (Biber, 2007). In practice, corpus linguistic studies are characterized by four main features, italicized here for emphasis. Foremost, *they examine a corpus* (dataset), that is “a large principled collection of naturally-occurring texts” (Conrad, 2002, p. 77). These studies employ *computer-assisted analysis techniques* that are used to *emphasize empirical analysis of language use patterns* (Conrad, 2022). Conrad explains that while corpus linguistic studies often “include intuitive impressions about the impact of particular language choices,” the main purpose of this approach is empirical observation (2002, p. 77). The final feature of corpus linguistic studies is that they *utilize both quantitative and qualitative/ interpretive techniques* (Conrad, 2022).

A computational approach to corpus linguistics is advantageous in the study of news frames in that this approach can: uncover latent patterns of language that may go unnoticed by other types of analysis; allows for the rapid analysis of large data-

sets; and is reproducible (Bednarek & Carr, 2019). Most important for our research, computational linguistic analysis has been used to examine health communication through the news (Lee & Basnyat, 2013; Gesser-Edelsburg et al., 2017; Young et al., 2017; Gearhart & Dinkel, 2016; Collins et al., 2017; Bailey et al., 2021; Herat et al., 2020). In particular, a computational linguistics approach pairs well with framing analyses, with the ability to identify *high frequency words* (words that are used in a particular dataset more frequently than others), and *keywords* (words that are used more frequently in a particular dataset more often than in larger sample of genre and content agnostic “reference dataset” that may be representative of, for example, the English language at a particular time). Being able to identify high frequency words and keywords aligns with Entman’s definition of framing being achieved by repetition of identical or similar words and symbols used to portray a news item or event (2009).

Our mixed-methods approach is based on the work of Touri and Koteyko, (2015) and Zottola et al., (2020), and uses a combination of AntConc, a non-proprietary software for corpus linguistics

analysis (Anthony, 2020)<sup>4</sup> and manual coding analysis. Both Touri and Koteyko's and Zottola et al.'s works combine computer-assisted linguistic analysis with Van Gorp's systematic frame analysis procedure. We elected to use this method mix over an entirely manual content analysis due to the size of our corpus, which includes 1,198 news articles. Upon a review of health-related news studies, we found that manual coding methods were typically used to examine corpora under 400 articles (Ogbogu and Hardcastle, 2021; Viladrich, 2019; Maniatopoulos et al., 2018; Diedrich and Dockweiler, 2021; Collins et al., 2006). For analysis related to each of our research questions, we created subsets out of our telehealth dataset, made up of articles pre- or post-onset of COVID-19 (based on publication date), grouped by country (based on publication location), and grouped by journalism style (whether explanatory or traditional).

In both Touri and Koteyko's, and Zottola et al.'s work, computational linguistics methods are used to determine keywords (those statistically significant words when compared to a larger and more general dataset) and then to isolate the sentence fragments surrounding these keywords within articles. Similarly, our analysis found keywords in our telehealth subsets,<sup>5</sup> and then determined which keywords appeared in the majority of articles within the dataset. Given that keywords are identified via pre-determined statistical calculations, they provide a simple prescriptive tool (using computational and quantitative approaches) for detecting high-level frames.

Once keywords of importance were identified, we determined the top three *co-located words* (those words statistically more likely to appear close to the keyword) of each keyword. This stage pinpointed word combinations that news audiences would see together most often, following Entman's main characterization of frames as using the presence of certain "keywords, stock phrases, stereotyped images, sources of information" (Entman, 1993, p. 52), as a main tool draw attention to, or reinforce, certain aspects of a news story. Accordingly, we pulled each pairing of a keyword and one of its top three co-located words out of our

data, along with the surrounding context, creating lists of sentence fragments that each contained statistically significant words. It is the sentence fragment examples (called concordances in corpus linguistics analysis, showcasing the keywords in context) that are theorized as hosting repeating themes that ultimately can be built out into news frames. It is this potential for representation of themes that was then qualitatively investigated using Van Gorp's frame analysis procedure, like a traditional manual news frame analysis.

In the frame analysis, manual coding analysis saw the development of overarching themes apparent across the concordance examples and the building out of these themes into full frame packages. This stage saw repeated qualitative review of the concordance list. Like Touri and Koteyko (2015), we "identified similarities, differences and contrasts between the various devices and reduced them to broader meanings or dimensions" (p. 608). Throughout our iterative manual coding, key- or co-located words were found to have frequent association with certain themes or topics, or were frequently used in the same way. For example, the keyword/co-located word combination of 'time' and 'real' could easily be categorised under a "time" frame. However, after manual analysis, it became clear that these words were almost always used in combination as "real-time," which is a descriptor of the technological affordance of live or synchronous mediated interaction rather than a description of a time-period or timeliness.

De Vreese (2005) differentiates between generic frames and issue-specific frames, defining the latter as frames that are event- or topic-specific. Generic frames overarch different topics, time, or cultural contexts (de Vreese, 2005). During our iterative open-coding analysis we noticed that there was significant thematic cohesion in concordance examples from the pre- and post-COVID subsets that dealt with the same topic but in different ways—showcasing generic frames that could be identified over the two different time periods. These five *generic frames* were: access; location; services; technology; and time. We then identified issue-specific frames that were more strongly as-

<sup>4</sup> Lemmatization of the word lists created in AntConc was based on the ANT BNC Lemma List version 4 (Anthony, 2021), which was further edited to include the term *dr* as a lemmatization of *doctor*.

<sup>5</sup> We compared our telehealth dataset to the 1994 written language British National Corpus (Anthony, 2021), and additionally compared our subsets to our entire telehealth dataset to find which keywords were significant within each subset.



sociated with a certain time period (pre- or post-COVID) under most of the generic frames.

## RESULTS

Overall, eight frame packages were identified based on the methodological approach described above. These eight issue-specific frames fall under five generic frames of access, location, time, technology, and services. Our analysis resulted in five frame matrices that are displayed in Appendices 2a through 2e. These matrices were analysis tools that were used to distill key frame characterizations from the long lists of concordances associated with our key and co-located word combinations. We have elected to display concordance examples rather than these matrices in this results section, as they better contextualize our discussion of frames. It should be noted that these concordance examples are rarely full sentences, as the concordance analysis produced a list of fragments that show the keyword in context, based on a set number of characters surrounding each keyword. The examples serve to showcase the combinations of keywords and co-located words that are operationalized within news stories, and how these uses may highlight differing or similar opinions. The keywords and co-located words used in our analysis are **bolded** in the examples below.

## Access frames

The generic frame of access was found to appear in both the Pre-COVID and Post-COVID subsets. In the Pre-COVID subset, the issue-specific frame centred on access to electronic health record (EHR) data, and more specifically how increased access to EHR data for both practitioners and patients would result in more streamlined healthcare services. An example of this frame can be seen in Table 2 in the quote from the *Herald Sun*. A counter-frame to this was also found in the Pre-COVID subset, where access to EHR data may not be beneficial for *both* patients and doctors (exemplified in Table 2, where it is quoted that access to health data is relatively unimportant for doctors, but still beneficial for patients, in *The Conversation*, AU). Instances of this counter-frame appearing in news publications were rare, with most discussion featuring positive benefits for patients and/or doctors, among other stakeholders. In the post-COVID subset, the framing of access turned to focus on accessing healthcare services, rather than EHRs. Specifically, this frame points towards an overall decrease in access to existing (in-person) healthcare services, largely due to the pandemic and the need for social distancing. The articles in this subset were likely to describe how this decrease in access can be aided via telehealth services and technology, as can be seen in this example from *The Conversation*, USA.

**Table 2:** Access frames with supporting examples

Frames	Example
Pre-Covid:	
Access to EHR data increases healthcare efficiency	"...practitioner could <b>access</b> your healthcare <b>records</b> at the click of a mouse. The emergency department could treat you more quickly, specialists could compare test results instantly and you wouldn't have to..." (The Herald Sun, Australia, Pre-Covid)
	"what is useful to the patient is the data that the patients themselves can measure directly. Having <b>access to information</b> held by the doctor is relatively unimportant..." (The Conversation, Australia, Pre-Covid)
Post-Covid:	
Decrease in access to in-person care can be mitigated via telehealth	"With <b>access</b> to <b>in-person</b> care extremely limited - and potentially dangerous - many hospitals have started treating and meeting patients through phone calls and over the internet." (The Conversation, USA, Post-Covid)

## Location frames

The issue-specific frames found under the generic frame of location were nearly opposites when discussing healthcare services, in that Pre-COVID examples discuss the hospital while Post-COVID examples discuss the home. However, in both Pre- and Post-COVID subsets, regardless of location, the generic frame regarding telehealth tech saw it as a beneficial way for patients to receive care and practitioners to provide care off-site, out-of-hospital, or at the patient’s home or location. In par-

ticular, the examples from the Pre-COVID subset framed telehealth technology as allowing hospital workflows to become more streamlined, as exemplified by the example in Table 3 below. In the Post-COVID subset, frames about location saw telehealth technology as allowing patients to receive care from home, to still receive care during the pandemic. Additionally, many examples in our concordance analysis included the sentiment that home was the safest place for patients to be in the early pandemic.

**Table 3:** Location frames with supporting examples

Frames	Example
Pre-Covid:	
Telehealth solves hospital congestion	“Beyond easing access to care and improving <b>patient</b> outcomes, the virtual <b>hospital</b> at Women’s College <b>Hospital</b> can also reduce avoidable hospital admissions, saving money for the health-care system” (The Globe and Mail, CA, Pre-Covid)
Post-Covid:	
Telehealth allows for care from home	“...they will continue using it after this pandemic. Digital healthcare will keep <b>people</b> at <b>home</b> and therefore save lives. Ultimately, I believe, it will lead to a revolution in healthcare.” (The Independent, UK, Post-Covid)

## Time frames

In the Pre-COVID subset, the framing of time and telehealth was typically future oriented. The examples in this frame looked at how new telehealth technologies are developing, the rate at which they are being researched, funded, or sought by users (mostly patients), and how they might help patients and practitioners in the future. This can be seen in the examples in Table 4. In the Post-COVID subset, the framing of time and telehealth focused mostly on the present, or what has occurred since the onset of the pandemic. The examples here looked at how regulators have “allowed” for systems, practitioners, and patients to uptake telehealth services. Some of these fragments were also future-oriented, looking towards “post-pandemic” telehealth regulation. Overall, the issue-specific Post-COVID frame discussed how telehealth technology is available (which was still seen as developing in the Pre-COVID subset), but that its systemic use is now developing.

A minor topic of note that was consistent-

ly brought up in the generic time frame, in both the Pre- and Post-COVID sub-datasets, is that of saving time. This was an instance where key- and co-located words were difficult to place into frames (generic or issue-specific), as discussions of saving time do relate to time, however in these examples it was clear that saving time was a characteristic of telehealth technology. Telehealth technology and services were seen as time savers for both patients and practitioners.

Phone consultations make up a significant part of our daily workload and **save time** for both doctors and patients by helping to sort the wheat from the chaff...”. (The *Times*, UK, Pre-COVID)

Telemedicine is more efficient and often just as effective as an office visit. It **saves time** and effort for patients, especially those with limited mobility or who live in remote places.” (The *New York Times*, US, Post-COVID)

**Table 4: Time frames with supporting examples**

Frames	Example
Pre-Covid:	
Telehealth tech will innovate and develop over time	“He added that he believed such treatment apps might <b>one day</b> improve results for patients with psychiatric disorders.” (The New York Times, US, Pre-Covid)
	“While these robots do not yet care for patients, they might be replacing nurses <b>one day</b> in the not-so-distant future.” (The Conversation, CA, Pre-Covid)
Post-Covid:	
Systemic telehealth is currently innovating and developing	“Belgium is setting up a regulatory framework for telemedicine for the <b>first time</b> , while others like the U.S. and China have loosened restrictions, at least temporarily, on Insurance.” (The Wall Street Journal, US, Post-Covid)
	“...psychiatrist has been suddenly catapulted into the digital age by COVID-19. I am (for the <b>first time</b> ever) providing mental-health care over the phone and the internet.” (The Globe and Mail, CA, Post-Covid)

**Technology frame**

Examination of the examples that were coded as focusing on the qualities and capabilities of telehealth technologies revealed that these examples were mostly found in the Pre-COVID subset. A frame package could not be built out for an issue-specific technology frame in the Post-COVID subset (similarly for the service frame in the Pre-COVID subset discussed in the next section) due to a lack of concordance examples to analyze. The tech frame discussed how telehealth technologies are being developed, up-taken by users (patients and/or practitioners) and regulated, and then developed further. Technology was rarely showcased as a solution to actual health diagnoses; rather, it

is primarily showcased as a solution for service delivery. While there were some hesitant sentiments about the adoption of telehealth technology, mainly from practitioner viewpoints (including potential for inaccurate diagnoses, job loss, less connection between patients/practitioners, and questioning ability of users to successfully use tech), the overall outlook on technological acceptance was positive.

It was typically posited in this frame, as shown in the first two quotes in the table below, that regulators are the gatekeeper of telehealth technology implementation, with users such as patients and practitioners being the instigators of telehealth tech adoption. There was also a small trend within this technology frame that problema-

**Table 5: Tech frame with supporting examples**

Frame	Example
Pre-Covid:	
User uptake initiates further telehealth technology development	“...College of General Practitioners president Dr Bastian Seidel said doctors wanted to embrace <b>new technology</b> but Medicare did not provide rebates for electronic GP consultations.” (The Herald Sun, AU, Pre-Covid)
	“Accelerate approval for <b>new technologies</b> to balance safety and efficiency- Regulators should create simpler evaluation pipeline” (The Conversation, CA, Pre-Covid)
	“... and so far there’s no “clinical evidence” of better health because of <b>new technology</b> , he says. “Most people believe it will (result in better health care) but physicians want evidence...” (The Toronto Star, CA, Pre-Covid)

tizes the lack of uptake or slow uptake of telehealth technology by practitioners. This frame was most likely to be found in the Canadian newspapers (such as the example in Table 5 from the *Toronto Star* that points to a lack of technology uptake being due to lack of evidence that it will improve healthcare), followed by the Australian newspapers.

### Service frame

In the Post-COVID subset, the service frame was that the pandemic, alongside the availability of telehealth technology, has led to an increase in uptake of telehealth services in general. While there are discussions of telehealth services in the Pre-COVID subset, the frame was far more likely to appear in the Post-COVID subset, with 83% con-

cordance examples referring to services occurring Post-COVID. The focus of the service frame was on the widespread uptake of telehealth *services* by patients and practitioners alike, rather than the uptake of technologies, as services involve at least two users in healthcare activities (commonly a practitioner and patient), while telehealth technologies can be used by just one user (commonly a patient accessing an health-oriented mobile app). The following examples in Table 6 show the discussions about increased demand and increased uptake of telehealth services.

Additionally, it is of note that the topic of mental telehealth services was frequently discussed in the Post-COVID sub-dataset, particularly in Australian publications. The word *mental* was the 12<sup>th</sup> most used keyword in the Australian publications, although it did not appear within the top 20 most

**Table 6:** Service frame with supporting examples

Frame	Example
Post-Covid:	
Telehealth service availability increases during pandemic, prompts user uptake	“...to existing coverage provided by an employer. Consumer demand for telemedicine and <b>virtual health care</b> has exploded during the pandemic. Stephen Morgan, a medical professor at Virginia Tech and chief...” (The Independent, UK, Post-Covid)
	“Simon Hagens saw signs that Canada was slowly adopting <b>virtual health care</b> , but the country lagged behind other developed countries. Then came the pandemic and, suddenly, the...” (The Globe and Mail, CA, Post-Covid)
	“But there are also some genuinely new initiatives. Some A\$11.1 million has been designated to community-based <b>mental health services</b> to...” (The Conversation, AU, Post-Covid)

used keywords in the other regions. An example of how this topic is discussed as a service frame is included as the third quote in the table below.

### Other results

Aside from identifying the above news frames, our analysis also highlighted findings regarding journalistic style. We followed Bednarek and Carr (2021), who recommend a bespoke corpus linguistic approach when it comes to project-specific questions. Instead of solely focusing on news frames, we conducted a separate, targeted linguistic analysis to discern differences in the two styles

of journalism. The way health information is communicated by journalists and academics or scientists differs stylistically. In *The Conversation* articles, or our explanatory journalism sub-dataset, we observed a theme of “modal language” words (*could, may, would*), coming up as keywords. The journalism articles from the other outlets, or our mainstream journalism sub-dataset, consistently featured the keywords *said* and *says*, which were commonly used to reference other voices within articles (beyond the author’s voice).

A further finding of some note is the discussion of minority communities in both the explanatory and mainstream sub-datasets. During the explo-



ration phase of our analysis, we used AntConc's advanced search term function and recorded the frequencies of the terms *racial*, *minority*, *ethnic*, *gay*, *lgbt*, and *lgbtq*. Overall, these terms appeared 66 times over 5% of articles in the explanatory sub-dataset and 55 times over 3% of the mainstream sub-dataset.

## DISCUSSION

While news framing differences between pre- and post-COVID subsets, national subsets, and the traditional and explanatory journalism subsets exist, there was one major consistency across the entire telehealth news dataset. In all regions examined and in both pre- and post-COVID time periods, telehealth was overwhelmingly presented as a solution to many healthcare system issues. Like Diedrich and Dockweiler (2021), we found that the majority of concordance examples that mention technology tend to do so with a neutral to positive connotation. This is consistent with previous research that focuses on sentiments around technology in news frames during the first wave of the pandemic (Dwyer et al., 2023). Telehealth technology is framed as a tool or service that has the ability to overstep access barriers that exist in healthcare, so that those who are not able to experience in-person care may still receive health attention and treatment. The explanatory journalism subset hosts the majority of articles where you can find arguments that those experiencing barriers may not be helped by increased telehealth services, for a variety of reasons. Overall (like Rush et al., 2021), the pandemic is seen across our dataset as a defining moment that has pushed regulators, practitioners, and patients to adopt telehealth in some or all aspects of their care or healthcare service.

Further to this positive framing of telehealth, a consistent theme across all frames is that regulators are largely responsible as gatekeepers of both technological use and services. The trend of regulation increasing access to telehealth is apparent, with the analyzed examples reporting that more people are experiencing, and/or wanting to experience, telehealth services, rather than people shying away. Concordance examples analysed under all frames nodded towards collaboration being required between all stakeholders, including

governments, healthcare systems, practitioners, patients, and technology developers. There was consistent onus placed on governments and insurance providers, alongside technology developers, to facilitate the development of telehealth technology and services, which hierarchically positioned practitioners as users alongside patients, that were “merely” consulted by developers or regulators. This division of users (practitioners/patients) versus developers and gatekeepers (government/insurance providers) also applies to where responsibility lies when looking to solve existing issues with telehealth technologies and services. Concerns regarding privacy and security of telehealth services are seen in our corpus as being solvable with protection-oriented regulation and further technological innovation.

Our research questions asked if news frames differ pre- or post-onset of the COVID-19 pandemic, or if frames differ based on region or journalistic style. While our analysis resulted in the discovery of consistent news frames across our dataset, there were some notable differences.

### **RQ1: Telehealth news frames pre- and post-onset of COVID-19**

The major differences in frames of telehealth in the Pre- and Post-COVID subsets include who uses telehealth and who benefits from telehealth services. In pre-COVID news articles, telehealth was described more often as a hobbyist activity for early adopters. It was discussed more on an individual level, with telehealth more commonly referred to as a technology. The articles in the post-onset of the COVID-19 pandemic subset tended to discuss telehealth more often as a service, with discussion focusing more on regulation and systemic uptake. In this subset, rather than a technology frame, a service frame was more likely to be found, where user uptake was dependent on telehealth service availability, and where increase in usage would ultimately result in further development of such services. A key difference here is that while a telehealth technology can be used individually, a telehealth service necessitates at least two users, one of which, in post-COVID news frames, is typically understood to be a patient. This finding fits with the historical development of telehealth. Telehealth interactions were developed first in hospital-based

healthcare settings, with the majority of interactions occurring between doctors (Mechanic et al., 2023). Mechanic et al. note that patient-to-doctor telehealth interactions are growing, which aligns with our findings of telehealth being viewed as a technology for individuals to play with pre-pandemic, and telehealth being viewed as a service that connects practitioners and patients post-onset of the pandemic. Additionally, this pairs with our findings in the generic access frame, which showcase that telehealth services, post-pandemic, increase access options for patients to connect with their healthcare providers.

In addition to who uses telehealth services, our findings indicate a difference in how frames narrate who benefits from telehealth services. In our Pre-COVID data subset, frames were consistent in outlining that hospitals benefit from efficiencies created by telehealth. After a scoping literature review, Snoswell et al. (2020) discuss four areas of potential savings when telehealth is introduced into universal healthcare systems: practitioner productivity gains; reducing need for follow-up hospital care; diverting cost to a public healthcare system by introducing telehealth as an out-of-pocket service; and telementoring, where primary care staff upskill via videoconference sessions. (Snoswell et al., 2020). Snoswell et al. do clarify in their findings that not all four of these categories have been proven to have a cost-savings effect in the research included in their literature review (2020). Post-COVID, our analysis indicates that a focus on cost and time efficiencies for those working in hospitals transformed into discussions of broader benefits for the entire public. This is seen in the post-COVID “location frame” that showcases telehealth as allowing patients and practitioners to stay at home, which ultimately benefited the public during the first few waves of the pandemic in that it slowed the transmission of COVID-19. Proof of this benefit for countries that introduced social distancing (stay-at-home) policies has been shown in studies of aggregate nationally collected data (Fazio et al., 2021; Glogowsky et al., 2021). The post-COVID framing of using telehealth as being a benefit to the public in this way echoes Iyengar’s (1991) thematic framing characteristic that entices audiences of news media to act collectively, displaying quite clearly the

health communication strategy to have a positive impact on public health. The uptake of telehealth due to the need for social distancing, even by those patients and practitioners who may have held hesitation towards telehealth adoption, can be viewed through the lens of thematic framing and health communication as collective action for the good of public health.

## **RQ2: Differences in national news frames of telehealth**

The majority of frames were found in all four regions included in our study. We expected differences in frames based on publication location, as regional trends have been seen in previous work. For example, framing differences in political news have been found repeatedly across different nations and cultures (Dimitrova et al., 2012; Godefroidt et al., 2016). With healthcare being heavily politicised during the COVID-19 pandemic (Van Scoy et al., 2021; Capurro et al., 2021), we hypothesised regional political frame differences may overlap with frames of healthcare delivery, telehealth in particular, especially as universal healthcare is not as equally available in our regions of study. We found this not to be the case in our analysis. Only two topics were noted as being “nationally heavy” in that they were more likely to be found in one region rather than others, although these topics were still discussed via the same major frames found across all four regions.

The topic of virtually provided mental health services was discussed more frequently in the Australian subset, as access to mental health telehealth services was government-funded during the pandemic in Australia and, therefore, news on this topic was prevalent to inform the public of this service. Similar government-funded telehealth services were not available (or widely publicized) in other regions included in this study. Specific research has been conducted on news frames of mental health in Australia during the COVID-19 pandemic, with Horwood et al. (2022) reporting that frames indicate an “individual responsibility for mental health,” that they problematise, suggesting social determinants of mental health need to be discussed more often in the news (p. 677).

A topic that was not explicitly stated in the

frames, but was still noted during analysis, was that mental health services are seen as separate from other physical health services. Mental health services were always specified as such, with the development and regulation of mental telehealth services receiving separate attention from more general telehealth services. There have been calls from the medical research community for mental health and physical health to be recognized as interwoven (and regulated as such), as studies of the bi-directional relationship between mental health and physical health have increased over time (Kollappa et al., 2013; Luo et al., 2020; Koban et al., 2021). As our dataset included articles collected from 1984 to 2021, it may be representative of the more separate view of mental and physical health that was historically popular. As the media play an important role in policy regulation and public understanding of mental health (Zhang, Jin., & Tang, 2015; Major 2018), it is key for news reporting to discuss aspects of physical and mental health as being interwoven.

The theme of hesitation regarding the uptake of technology found in the Canadian subset aligned with more of a technology counter frame, which positioned practitioners as gatekeepers of telehealth service uptake. This frame, which sees practitioners (at least physicians and surgeons) as gatekeepers of virtualized healthcare methods, aligns with Ontario healthcare policy being largely unregulated in this respect (leaving decision making regarding medium of communication up to practitioners) until December of 2022 (MOH & MOLTC, 2022). The largest newspapers in Canada are headquartered in Ontario, so this framing of practitioners as gatekeepers would likely be different if this analysis were run in the latter half of 2022, as news stories revolving around the new Ontario Health Insurance Plan (OHIP) billing rules regarding virtualized healthcare became mainstream. In an exploratory analysis of recent news, the Ontario government and the Ontario Medical Association (OMA), the representative body for physicians and surgeons in Ontario, are largely cited as the establishers of OHIP billing regulations (Casey, 2022; Winsa, 2022; Lee-Shanok 2022; Weeks, 2022), which may (with more formal analysis) indicate a transition from citing practitioners as gatekeepers to regulatory groups as gatekeepers.

### **RQ3: Differences in news frames of telehealth based on journalistic style**

Our analysis showed no significant difference between explanatory journalism and mainstream journalism. Overall, our largest finding was that the explanatory journalism articles from *The Conversation* in our corpus had longer article lengths, with each national edition having the highest number of average words per article when compared to other news outlets examined in that region (with the exception of the U.S., where the *New York Times* had the highest average words per article). In terms of content, articles from *The Conversation* largely featured the same frames, however we did note the journalistic style to be slightly different.

Our findings follow previous research that showcases health information taking on new linguistic characteristics depending on who is sending the message, especially in regard to our findings on modal language and quoting. MacDonald (2005) used linguistic analysis to compare the linguistic structure of science or academic reporting and mainstream journalism on the same topic, that of hormone replacement therapy. She found that information output by mainstream journalists was more likely to be “less tentative,” more human-oriented, and “better suited for increasing the narrative potential or emotionality of scientific news than for raising or adjudicating questions about its validity” (p. 292). The increased use of modal language (*could, may, would*) in *The Conversation* articles points towards more tentative linguistic choices, following MacDonald’s findings in our theoretical framework section above. The significant use of modal language used in *The Conversation* is more indicative of authors being academics, rather than professionally trained journalists, and may not be exemplary of all explanatory journalism. Alternatively, the mainstream journalism articles authored by professionally trained journalists consistently featured the keywords *said* and *says*, denoting the common professional journalism practice of quoting.

Finally, our anecdotal finding of *The Conversation* articles using the terms *racial, minority, ethnic, gay, lgbt, and lgbtq* more often than mainstream outlets that resulted from our exploratory phase of analysis also differentiates the two jour-

nalistic styles. While the difference we noted in the frequency of appearance of these words within articles is small, this adds to the discussion of minority issues in the news. Bednarek and Carr (2019) found and problematized a lack of inclusion of Indigenous voices when discussing Indigenous issues (re. diabetes) in newspapers in Australia. This is an interesting juxtaposition to our findings because our explanatory journalism articles from *The Conversation* are more likely to discuss minority issues, while simultaneously following Bednarek and Carr's (2019) finding in that they are less likely to quote first person sources (with the word "said" being more statistically significant in the mainstream news subset). Overall, while explanatory journalism may be slightly more likely to discuss minority topics, there is still room for improvement when it comes to the inclusion of diversity of voices.

## SUMMARY

Post-pandemic, many healthcare systems are experiencing a period of growth and regulation when it comes to telehealth. The key finding in our analysis is the overwhelmingly positive framing of telehealth services and the calls for further telehealth development and use post-pandemic. Those who are in positions of power when it comes to the choice to employ telehealth technology and services (practitioners and/or regulators) should consider public need and preference which is simultaneously created and echoed by news reporting and news frames. The thematic news frames of health communication outlined above showcase telehealth as beneficial for public health, especially post-onset of the COVID-19 pandemic, and the continued use and development of such services are framed as having the potential to maintain or improve access to healthcare services.

This research presents two limitations of note: our use of the 1994 version of the British National Corpus; and the limited number of coders used during the manual coding section of our methodological approach. The BNC1994 was used as a reference corpus over the more recent BNC2014 due to its availability on the AntConc website in

a pre-formatted package that was compatible with the AntConc software (the BNC2014 reference corpus is not available in such a format as of yet). The BNC1994 corpus, "despite its age" is still widely used as a reference corpus in corpus linguistics analysis (Love et al., 2017, p. 320).<sup>6</sup> In terms of the number of coders, our study saw one coder review examples in stage 2 and 3 of our analysis. We contend that human error and bias is mitigated to a certain extent in our analysis due to the initial stages of our analysis relying on computational methods. Touri and Koteyko (2015) note that in their method, as the key words or central ideas are empirically extracted via computational software, the subjectivity that is usually associated with human judgement is removed. Additionally, our coding process was iterative, which allowed for each text segment to be accurately coded after a codebook was developed inductively from the entire list of examples.

Ultimately, this study has determined five generic frames and eight issue-specific frames associated with telehealth in the news, before and after the onset of the COVID-19 pandemic and across four English speaking regions. Despite the limitations of this study, we believe that our work has extended existing health communication and news framing literature. Like Lee and Basnyat (2013), we have added to the literature on pandemic news framing practices by showing how they differ from regular, non-pandemic frames. We also add to news framing and health communication literature, specifically naming the common goals of thematic framing and health communication. In addition to minor national differences in our dataset, we found that explanatory journalism and mainstream journalism do tend to cover the same topics using the same frames, while specific nuances may differ (especially within the application of these topics to the experiences of minority populations). Future research will continue to build on our findings, to further understand the impacts of mass media-based health communication and news framing on public health.

<sup>6</sup> The 2010 edition of *The Routledge Handbook of Corpus Linguistics* (O'Keeffe and McCarthy), which cites the BNC1994 as a standard and widely used reference corpus, has only recently been updated, with the newer 2022 edition still referencing BNC1994, although more emphasis is placed on the 2014 edition.



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## APPENDICES

### Appendix 1a

#### *Telehealth Corpus Characteristics*

Region	Outlet	Time range of articles	No. of Articles	Word Count
CA	The Conversation	2017 - 2021	17	15,961
CA	The Globe & Mail	1984 - 2021	153	125,232
CA	The Toronto Star	1995 - 2021	144	114,649
AU	The Conversation	2011 - 2021	69	66,379
AU	The Herald Sun	1995 - 2021	124	54,791
AU	The Age	1995 - 2021	136	94,194
UK	The Conversation	2015 - 2021	18	18,248
UK	The Times	1993 - 2021	130	84,576
UK	The Independent	1993 - 2021	94	86,202
US	The Conversation	2014 - 2021	61	62,931
US	The Wall Street Journal	2017 - 2021	148	139,098
US	The New York Times	2017 - 2021	104	138,151

### Appendix 2a

#### *Access Frame Packages*

Subcorpus	Issue Definition	Cause	Consequence	Solution/action	Lexical Choices
Pre-COVID	Increasing access to EHRs streamlines healthcare services	EHR access increases due to patient and practitioner uptake, tech availability, and government incentivisation	Service provision can be streamlined, but potential for security and privacy issues increases	Security issues to be resolved by more technology and government regulation	Keyword: access Collocates: information, patients, records
Post-COVID	Decreased access to healthcare services can be improved via telehealth	Access to healthcare limited by natural events, regulation, demographics, location, tech availability	Decreased access to healthcare can lead to health complications	Increase access to healthcare via pro-telehealth regulation and/or tech innovation* *OR patient action required (travel)	Keyword: access Collocates: abortion, people, services

## Appendix 2b

### Location Frame Packages

Subcorpus	Issue Definition	Cause	Consequence	Solution/action	Lexical Choices
Pre-COVID	Telehealth technology solves hospital congestion	Pre/post and in-hospital care coordination can be expensive, unorganised, inconvenient	Potential for poor treatment within hospital, or poor health outcomes due to “at-home self treatment” or no treatment	Telehealth technology allows for at-home monitoring, accessing healthcare services & records, keeping patients at home, and practitioners better informed of patient status	Keyword: hospital Collocates: general, hospital, patients
Post-COVID	Telehealth technology allows for care from home	Pandemic/personal preference increase desire for in-home or telehealth administered care	Telehealth relieves stress about catching COVID, reduces pressure on overwhelmed hospitals	Use telehealth for accessing some healthcare services, so both patients & practitioners can stay home	Keyword: home Collocates: patients, people, stay

## Appendix 2c

### Time Frame Packages

Subcorpus	Issue Definition	Cause	Consequence	Solution/action	Lexical Choices
Pre-COVID	Telehealth tech will innovate and develop over time	Tech innovation in health space is occurring, patients independently using	Health practices change, potential improvements in efficiency, saving time & money	“One day” healthcare system(s) will use telehealth tech to solve efficiency problems	Keyword: one Collocate: day
					Keyword: time Collocates: first, patients
					Keyword: year Collocates: last, million
Post-COVID	Systemic telehealth is currently innovating and developing	Pro-telehealth regulation, due to pandemic but also due to innovation making telehealth tech more available	Patients & practitioners allowed to uptake telehealth en masse “for the first time”	Further pro-telehealth regulation in the future, beyond “Pandemic specific temporary allowances”	Keyword: time Collocates: first, patients
					Keyword: year Collocates: last, million

## Appendix 2d

### Tech Frame Package

Subcorpus	Issue Definition	Cause	Consequence	Solution/Action	Lexical Choices
Pre-COVID	User uptake initiates further telehealth technology development	Patient and practitioner initiated uptake, pro-regulation, and gov/private funding for development	Affordances and efficiencies of healthcare tech, some concerns (listed below)	Further development needed as tech provides solution for healthcare issues (mostly access related)	Keyword: time Collocate: real
					Keyword: technology Collocates: use, also, information
					Keyword: new Collocates: technologies, system, technology

## Appendix 2e

### Service Frame Package

Subcorpus	Issue Definition	Cause	Consequence	Solution/Action	Lexical Choices
Post-COVID	Telehealth service availability increases during pandemic, prompts user uptake	Pandemic, also available tech, results in mass uptake of telehealth services (in both public and private sectors)	Comparison between in-person and telehealth services, discussion of limitations, discussion of affordances & benefits	Recommendations for extending pro-telehealth regulation and development/improvement of services offered	Keyword: care Collocates: patients, primary, virtual
					Keyword: doctors Collocate: virtual
					Keyword: health Collocate: mental
					Keyword: help Collocates: need, get
					Keyword: services Collocates: health; make, medical, telehealth, mental
					Keyword: system Collocate: health
					Keyword: telehealth Collocates: medicare, via, pandemic, use
Keyword: use Collocate: people, telemedicine					