

Article

COVID-19 messages targeting young people on social media: content analysis of Australian health authority posts

Melody Taba^{1,2,*}, Julie Ayre¹, Becky Freeman³, Kirsten McCaffery¹, and Carissa Bonner^{1,2}

¹Sydney Health Literacy Lab, School of Public Health, Faculty of Medicine and Health, The University of Sydney, Sydney, Australia

²Menzies Centre for Health Policy & Economics, Faculty of Medicine and Health, The University of Sydney, Sydney, Australia

³Prevention Research Collaboration, School of Public Health, Faculty of Medicine and Health, The University of Sydney, Sydney, Australia

*Corresponding author. E-mail: melody.tab@sydney.edu.au

Summary

Health authorities utilized social media during the COVID-19 pandemic to disseminate critical and timely health messages, specifically targeting priority groups such as young people. To understand how social media was used for this purpose, we investigated the content of COVID-19-related social media posts targeting young people (16–29 years old) shared by Australian health departments. Posts targeting young people with COVID-19 information were extracted from all eight Australian State and Territory health department Facebook, Instagram and TikTok accounts over 1 month of the Delta outbreak (September 2021) and analysed thematically. In total, 238 posts targeting young people were identified from 1059 COVID-19 posts extracted. All eight health departments used Facebook, five used Instagram and only one used TikTok. The majority of posts implicitly targeted young people; only 14.7% explicitly mentioned age or 'young people'. All posts included accompanying visuals; 77% were still images like photos or illustrations whilst 23% were moving images like videos and GIFs. Communication techniques included calls to action (63% of posts), responsive communication (32% of posts) and positive emotional appeal (31% of posts). Social marketing techniques catering to young people were used to varying extents despite receiving higher levels of engagement; 45% featured emojis whilst only 16% used humour, 14% featured celebrities and 6% were memes. Priority groups like ethnic/cultural groups and chronic health/disability communities were rarely targeted in this communication. The findings indicate a lack of health communication on social media directed towards young people, highlighting an opportunity for increased use of platforms like TikTok and trends popular with young people online.

Keywords: social media, youth, adolescent, health communication, COVID-19

INTRODUCTION

The COVID-19 pandemic has highlighted the importance of communicating reliable health messages to the community during public health emergencies (Lazarus *et al.*, 2022). Given its accessibility and time-sensitivity potential, social media technologies are playing an increasingly significant role in the health communication of governments and public health authorities

(Hilliard *et al.*, 2021). During the COVID-19 pandemic, platforms like Facebook, Twitter, Instagram and TikTok emerged as major sources of health information for the public (Chesser *et al.*, 2020). Health authorities can use these platforms as an effective tool to increase public health awareness through dissemination of brief messages to general or targeted populations (Hyland-Wood *et al.*, 2021). Studies have already shown that this use of social media can positively influence

awareness of public health measures and preventative behaviours (Al-Dmour *et al.*, 2020; Li and Liu, 2020; Mahmood *et al.*, 2021; Mat Dawi *et al.*, 2021). Users of social media were three times more likely to follow the COVID-19 health rules than non-users (Sharif *et al.*, 2021) and daily social media users were more likely to engage in protective, social distancing behaviours (Cato *et al.*, 2021).

Young people are a key social media user group active on an average of five social media platforms (Volkmer, 2021). They frequently use social media to find health information (Armstrong *et al.*, 2021) and receive the majority of their COVID-19 information from the internet and social media (Chesser *et al.*, 2020). However, the abundance of unverified health information and misinformation on social media makes it difficult for the general public to identify accurate information, thus impeding governmental health-related communication efforts (Bin Naem and Kamel Boulos, 2021). The Director-General of the World Health Organization (WHO) termed the COVID-19 misinformation situation as an ‘infodemic’ (i.e. misinformation epidemic or misinformation pandemic) due to the proliferation of conspiracy theories, propaganda and unproven scientific claims regarding the diagnosis, treatment and prevention of the disease (Zarocostas, 2020). This presence of misinformation can obscure reliable information on social media and make it harder to discern, which is of particular concern for individuals with lower levels of health literacy. Whilst young people may have high levels of digital literacy, they tend to have comparatively low levels of critical health literacy, limiting their ability to critically evaluate online health information (Stellefson *et al.*, 2011; Taba *et al.*, 2022). Even university students with well-developed digital health literacy still face difficulties discerning accurate and reliable COVID-19 health information online (Chesser *et al.*, 2020; Dadaczynski *et al.*, 2021). Furthermore, young people in priority populations at greater risk of COVID-19 infection and adverse outcomes (e.g. individuals from Aboriginal and Torres Strait Islander and culturally and linguistically diverse communities and individuals living with chronic health conditions) may face compounded difficulty due to the lack of tailored and targeting COVID-19 messaging from health authorities (Ayre *et al.*, 2022; Seale *et al.*, 2022). These health literacy concerns are further compounded by the fact that social media platforms that young people use frequently host content that discourages vaccination and compliance with government mandates and/or prevention measures. For example, one study identified over 50% of TikTok videos about COVID-19 vaccination were discouraging vaccination through parodies and memes of adverse reactions to the vaccination (Basch *et al.*, 2021).

Young people were a key interest group for Australian health authorities during the COVID-19 response, as they represented high proportions of COVID-19 cases throughout the pandemic (Collin *et al.*, 2020; Wark, 2021). Young people were also excluded from the early stages of the Australian COVID-19 vaccination roll-out and received mixed messages around eligibility and blood clotting risk associated with the AstraZeneca vaccine (Cunningham, 2021; Hyland-Wood *et al.*, 2021). Furthermore, young people were found to be more vaccine hesitant (Khan *et al.*, 2021; Robertson *et al.*, 2021) and to endorse misbeliefs about COVID-19 more readily than other age cohorts (Allington *et al.*, 2021; Pickles *et al.*, 2022) which can negatively impact other preventative behaviours (Romer and Jamieson, 2020). These factors motivated health authorities to target this population with communications and interventions during the COVID-19 pandemic.

Social media has the potential to be an important tool to communicate reliable and timely health information to young people, thus it is essential to understand how official social media channels are currently being used for this purpose. An Australian study conducted prior to the COVID-19 pandemic found public health Facebook accounts utilize social marketing principles, relying on humour and celebrity endorsements for higher engagement of their health messages (Kite *et al.*, 2016). However, there has been limited research into the way health authorities target young people with COVID-19 messages and use social media strategies in their messaging. Preliminary research conducted in the first few months of the COVID-19 pandemic in 2020 by Dimanlig-Cruz *et al.* (Dimanlig-Cruz *et al.*, 2021) found Canadian authorities rarely targeted young people explicitly in their social media posts on COVID-19-related physical distancing. Further research is required to understand how other health authorities used social media during different points of the pandemic to target young people with COVID-19 messages.

Objectives

This study aimed to describe and identify the characteristics of COVID-19 health communication targeting young people on social media shared by Australian health authorities during the Delta outbreak (September 2021) by investigating the following research question:

How do Australian health authorities use social media to communicate COVID-19 health messages to young people (16–29 years)?

METHODS

Study design

We conducted a content analysis of social media posts targeting young people with COVID-19 messages shared by Australian State/Territory government health authorities. Social media posts were extracted in two stages; In Stage 1, all COVID-19-related posts were extracted from the accounts and subsequently in Stage 2, posts targeting young people were identified from the Stage 1 sample.

We identified the social media accounts of eight State/Territory government health authorities across Australia: Australian Capital Territory, Northern Territory, New South Wales, Victoria, Queensland, South Australia, Tasmania and Western Australia ([Appendix 1](#)). This study focussed on Facebook, Instagram and TikTok platforms due to their frequent use by young people; users aged 18–24 are the largest user group on Instagram and TikTok, and the second largest on Facebook following users aged 25–35 years ([We Are Social, 2022](#)). All data used in the study are publicly available.

Australian COVID-19 context

Australia has a federal system of governance; pandemic response responsibilities are split across Commonwealth, State and Territory governments. The coordination of COVID-19 communication is delegated to the State and Territory level, primarily led by State and Territory government health departments via their official media channels ([Karidakis et al., 2022](#)).

This study focussed on social media posts shared over the month of September 2021, during the Delta outbreak in the Eastern States of Australia. The Australian Capital Territory, New South Wales and Victoria were under ‘stay at home’ orders due to high COVID-19 caseload (referred to as the ‘outbreak states’ henceforth), whilst the Northern Territory, Queensland, South Australia, Tasmania and Western Australia had no major outbreaks (referred to as the ‘non-outbreak states’). Health departments across the country were focussed on rapidly increasing vaccination rates; at the beginning of the month, 36% of eligible Australians aged 16 years and over had received two doses of a COVID-19 vaccine. By the end of September, 54% had received two doses ([Australian Government Department of Health and Aged Care, 2022](#)). The COVID-19 vaccination roll-out was staggered by age (with the exception of individuals with chronic conditions, or Aboriginal and Torres Strait Islander background); the 16- to 30-year age group were eligible for the Pfizer COVID-19 vaccine (the recommended vaccine for the age group) at the end August 2021.

Data collection

Stage 1: extraction—all COVID-19-related posts

All posts related to COVID-19 shared by the identified accounts from 1 to 30 September 2021 were extracted. This included content posted by other accounts and reposted by the identified accounts. We also included duplicate posts that were cross-posted by the departments across their multiple platforms. Extracted posts were saved as screenshots and URLs using a data extraction spreadsheet stored on the University’s password protected cloud server.

Stage 2: extraction—posts targeting young people

From the extracted posts, posts that targeted young people were subsequently identified if they satisfied one of the following selection criterion: (i) specific mention of the terms ‘youth’, ‘teen’, ‘young person’ or an age/range within 16–29 years; (ii) featuring internet trends and memes; (iii) shared via TikTok; (iv) predominately/solely featuring actors or characters in the age range; (v) featuring stylistic elements that appeal to young people (e.g. bright colours, cute illustrations that are appealing in an endearing way) or (vi) mention of themes relevant to the age group (e.g. dating, sexual activity, going to university). Examples included in [Appendix 2](#).

The criteria were developed in consultation with young people; two young people (aged 25 and 26) and a researcher (aged 26) discussed criteria used in research conducted by Dimanlig-Cruz et al. ([Dimanlig-Cruz et al., 2021](#)) and adapted accordingly. Much of the criteria from Dimanlig-Cruz et al. ([Dimanlig-Cruz et al., 2021](#)) were retained, along with the same youth age range of 16–29. This study added a TikTok criterion, given it was unique for health authorities to use this youth-centric platform at the time. The criteria were purposely generous to ensure any posts the departments had intended to target young people were captured. Criteria were pilot tested with the data extraction method before use. Two coders who were in youth age range (both aged 26) were trained in content analysis methods and coded the same sample ($n = 106$) of randomly selected posts independently to test the criteria before completing the Stage 2 extraction. We assessed the level of agreement between the coders using Cohen kappa statistic, which indicated high agreement ($k = 0.878$). Coders compared selections and resolved any discrepancies with assistance from other study researchers.

Descriptive data collection

Descriptive data were collected before content analysis was undertaken. We noted post type (e.g. image,

video, GIF, etc.), selection criteria satisfied, URL, caption, hashtags, date shared and cross-posts in the data extraction spreadsheet.

We recorded the followers of each account and the following engagement metrics for each individual post in the extraction spreadsheet: (i) Facebook—likes/reactions, comments, shares; (ii) Instagram—likes, comments (share data unavailable); (iii) TikTok—likes, comments, shares. All metrics were captured on 1 February 2022 to ensure posts were afforded ample time to receive engagement. Likes/reactions were the only metric consistent across the platforms and the only metric that was never disabled by the social media platform/accounts.

Data analysis

We conducted a content analysis (Hsieh and Shannon, 2005) of the posts, systematically categorizing the posts into a predetermined coding framework outlined in Table 1. The framework was developed using previous research focussing on social marketing principles (Kite et al., 2016). Modifications were included after iterative testing to ensure relevance to COVID-19 communication to young people (e.g. capturing memes, emojis and responsive posts) and relevant priority groups. Apart from post type, codes were not mutually exclusive; multiple codes may be applied to a single post. To evaluate reliability of coding, two coders who were in youth age range (aged 25 and 26) and trained in content analysis methods coded the same sample ($n = 24$) of randomly selected posts independently. We assessed the level of agreement between the coders using Cohen kappa statistic, which indicated high agreement ($k = 0.841$).

Descriptive statistics were calculated to summarize the frequency of occurrence of each code, and metrics for each account and code.

RESULTS

We identified 1058 posts about COVID-19 shared by the eight State/Territory health departments over the month of September 2021. Of these, less than a quarter (238 posts) specifically targeted young people. Breakdown provided in Figure 1.

Platform

As seen in Figure 1, all eight health departments shared Facebook posts, five shared via Instagram and only one shared via TikTok. The departments sometimes shared the same post across their Facebook and Instagram account (8.4% of posts ($n = 20$) were cross-posted) but TikTok posts were unique to the platform. The overall dataset consisted mostly of

Facebook posts (72.3%; Figure 2) whereas TikTok and Instagram posts were 17.6 and 10.1% of the dataset, respectively. The majority (86.6%) of the posts were shared by the departments of the outbreak states and the remaining 13.4% were shared by the non-outbreak states.

Youth criteria

Only 14.7% of posts *explicitly* targeted young people by including specific mention of age, 'youth' or 'young person'. The majority of posts *implicitly* targeted young people, included in the dataset because they contained stylistic elements that appealed to young people (71.4%), actors or characters of relevant age (37.0%), were shared on TikTok (18.1%), included themes relevant to young people (9.2%) or used youth-centric internet trends or memes (7.1%). Notably, 48% of posts included satisfied two or more youth criteria, with posts that satisfied the TikTok criteria always satisfying other criteria.

Format

All posts were accompanied by visuals; 76.5% were still images and 23.5% were moving images like videos or GIFs. Of the still images, 78.6% were illustrations, 18.7% were photos, 10.4% were infographics and 3.3% were graphs. The majority (96.4%) of moving images were videos and the remaining 3.6% were GIFs. The video lengths ranged from 11 s to 4 min, with the majority (66.7%) being under 30 s in length. This is in part due to the high proportion TikToks from New South Wales Health's daily COVID-19 communication campaign, the '#20sectakeaway'. These TikToks featured a celebrity TV show host presenting COVID-19 information using popular TikTok filters and transitions. Other TikToks included Q&A style videos with a 'real' young person and people of authority (e.g. a prominent adolescent physician).

COVID-19 issues

There were a range of COVID-19-related issues raised in the communications, with 10% of the posts ($n = 24$) covering more than one COVID-19 issue. Issues frequently raised included testing (33.2% of posts), vaccination (32.8%), restrictions (13.4%) and social distancing (6.7%). Misinformation was rarely posted about; the three posts about misinformation included debunking circulating misinformation or educating public on how to spot misinformation.

The departments of the outbreak states most frequently communicated about testing (41.3% of outbreak state posts) and vaccination (26.7% of

Table 1: Coding framework and definitions

Item	Definition
Post type	Whether the post was an image, video, GIF or text-only.
Image format	
Illustration	Drawing/cartoon representing characters/scenario.
Photo	Photographic image taken by a camera.
Infographic	Visual representation of information and data (can include illustrations, photos and graphs).
Graph	Organized plot of data.
COVID issue	
Testing	Related to PCR or rapid test to identify presence of COVID-19 infection.
Vaccination	Related to COVID-19 vaccine and immunization.
Restrictions	Related to public health orders introduced by government to reduce COVID-19 spread.
General	Any non-specific COVID-19 issue, e.g. information about the disease.
Social distancing	Related to maintaining physical distance from other individuals in social contexts.
Masking	Related to mask wearing, etiquette, mask care, cleaning and disposal.
Transmission	Related to infection spread and control, information about virus transmission.
Contact tracing	Related to the process of identifying individuals who may have come in contact with the COVID-19 virus.
Handwashing	Related to handwashing practice.
Misinformation	Related to incorrect or misleading information about the COVID-19 virus and pandemic.
Communication technique	
Factual	Reporting COVID-19 information (e.g. case/vaccination numbers, new public health restrictions or news media headlines) in a straightforward and factual manner.
Call to action	Whether post includes a call to a specific action related to COVID-19 (e.g. 'go and get vaccinated today').
Educational	Presenting information with a focus on educating user on the topic (e.g. presenting information about the way the COVID-19 virus is transmitted).
Positive emotional appeal	Aims to elicit positive emotions like hope and other positive emotions (e.g. 'we can beat COVID-19 together!').
Fear appeal	Aims to elicit fear or other negative emotion (e.g. 'your loved ones could die from COVID-19').
Responsive	Post that responds to an immediate/time-sensitive COVID-19 issue (e.g. testing site waiting times).
Social marketing elements	
Testimonial	Use of 'real' people and personal stories in messages.
Humour	Funny posts with humorous tone about COVID-19 issues (e.g. puns and jokes).
Celebrity	A public figure or celebrity in entertainment, media or sport.
Person of authority	Any other person used for the purpose of lending their personal or positional authority to health issue (e.g. doctor, academic, scientist and politician).
Emoji	A small digital image or icon expressing idea or emotion.
Meme	Humorous idea/visual adapted, copied and spread by users on the internet.
Priority groups	
Aboriginal and Torres Strait Islander	Post specifically mentioning or featuring Aboriginal and Torres Strait Islander individuals and communities.
Other culturally and linguistically diverse	Post specifically mentioning or featuring culturally and linguistically diverse individuals and communities.
Mental health	Post about mental health issues during and due to COVID-19 (e.g. mental health issues related to social isolation).
Chronic health and disability	Post specifically mentioning or featuring chronic health or disability.

outbreak state posts). For example, testing posts included health promotional messages encouraging the public to get tested, updates on testing clinic wait

times and daily testing rates. Similarly, vaccination posts included health promotional posts, daily vaccination rates and acknowledgements of important

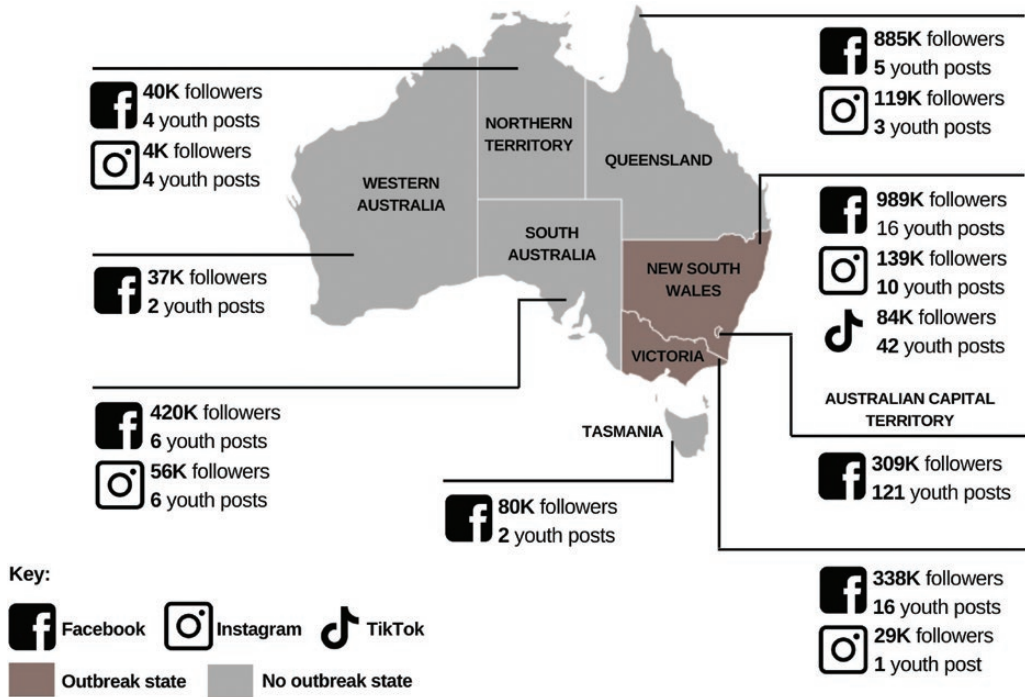


Fig. 1: Frequency of COVID-19 social media posts targeting young people shared by Australian State/Territory health departments.

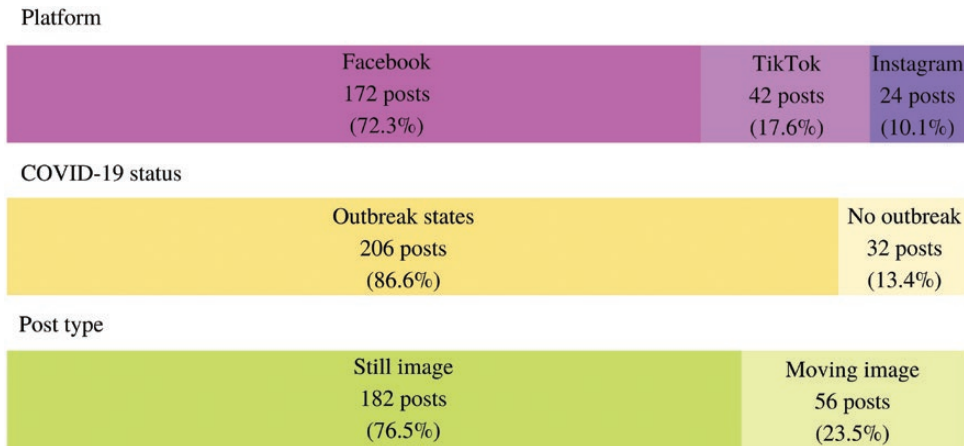


Fig. 2: Characteristics and frequency of posts about COVID-19 targeting young people shared by Australian health departments.

vaccination milestones. Testing was not posted about in the non-outbreak states; communication was concentrated predominately on vaccination (71.8% of non-outbreak state posts) and to a lesser extent on masking (25.0% of non-outbreak state posts).

Communication technique

Over half (59.7%) of posts reported COVID-19-related facts such as updates about case and vaccination

statistics and restrictions. These posts included daily case numbers or vaccination milestones. About 23% of posts were educating the public about COVID-19, the vaccine and other preventative measures (e.g. infographic outlining vaccine ingredients).

Almost one-third (31.9%) of posts featured positive emotional appeal such as encouraging the public to engage in health promoting behaviours (e.g. ‘we can do this together’ or Rosie the Riveter type imagery with plaster on upper arm). Departments also expressed

gratitude for the COVID-19 effort by healthcare workers and the public. Rarely did the posts include fear-based techniques; the three posts that did use this approach included ominous and abstract references like ‘the virus is ripping families apart’, or ‘every day you delay getting tested is a risk to you, your family and the community’.

Additionally, 62.6% of posts included a specific call to action (e.g. ‘go and get vaccinated today’). Nearly one third (31.9%) of the posts utilized social media time sensitivity and were responsive to a COVID-19-related event in the community (e.g. addressing long wait times at testing clinics or addressing negative comments on a previous post).

Social marketing techniques

All the health departments employed social marketing techniques in their communication and used engagement strategies to appeal to young people specifically. Humour was present in 16% of posts and just over 5% (5.5%) of posts were memes. Emojis featured frequently, either in the text caption or visuals of 45.4% of posts. Celebrities (generally sportspeople, social media influencers or popular media show hosts) were also featured in 14.3% of posts. To a lesser extent, (6.7%) posts included other people of authority (including prominent healthcare workers, scientists, politicians or community representatives).

Priority groups

Posts rarely contained information about priority groups that young people may be a part of such as cultural and ethnic groups or chronic health and disability groups. Only 4.6% of posts targeted Aboriginal and Torres Strait Islanders with specific messaging, these posts being shared by two health departments (New South Wales and Northern Territory) and 1.3% targeted other culturally and linguistically diverse communities, shared by three health departments (Australian Capital Territory, South Australia and Tasmania). These posts delivered health messages in languages other than English and/or promoted the availability of translated health information. Posts targeting young people living with chronic health conditions and disability were also rare, representing only 2.9% of the dataset. Mental health issues in the context of COVID-19 were raised slightly more frequently and featured in 6.7% of the posts.

Engagement metrics

The accounts had large variations in follower counts, ranging from 3769 followers (Northern Territory Health Instagram) to 989 495 for (New South Wales

Health Facebook). To some extent this was reflective of the population in the state (e.g. Northern Territory has the lowest population across the States/Territories whereas New South Wales has the greatest), but some accounts from less populous States had larger social media following (e.g. South Australia Health’s Facebook with 420 thousand followers) than populous states (e.g. Victoria Department of Health with 338 thousand followers). Detailed metrics data in [Appendix 3](#).

The public’s engagement with the 238 posts also varied. Overall, a small percentage (1.7%) of posts had 10 or less likes, 35.3% had between 11 and 100 likes, 37.0% had between 101 and 1000 likes, 25.6% had between 1001 and 10 000 likes and only 0.4% (1 post) had over 10 000 likes.

Posts that performed well in the sample on one platform and were cross-posted on other platforms were also likely to perform well on the other platform; 25% of posts appeared twice in the top 10% performing posts (3 different posts that were cross-posted on the departments’ Facebook and Instagram).

Some features seemed to receive higher likes than others in the sample ([Table 2](#)). For example, posts on TikTok received higher median likes (1086 likes) than posts on Facebook (111.5 likes) and Instagram (566 likes). Posts that included relevant themes for young people and included internet trends were also relatively popular. Videos under 30 seconds received higher median likes than videos 30 seconds and longer (1490.5 vs. 605.5 median likes). In terms of COVID-19 issues, the few posts that addressed misinformation received relatively high median likes (3548 likes) in comparison to posts about testing which were posted very frequently but received low median likes. Posts containing the social marketing elements of humour, emojis and celebrities received higher number of likes, whereas testimonials received the least. Additionally, the small number of fear-based posts received high median likes.

DISCUSSION

This study identified and described the characteristics of social media posts shared by Australian health departments targeting young people with COVID-19-related messages during the Delta outbreak. Notably, there is a lack of posts targeting young people with these messages, which reinforces the need for health departments to increase messaging to young people during health emergencies to ensure this priority group receives clear and accurate health information. The findings presented in this paper provide public health authorities with current strengths and areas of need so future health communication via social media to this group can be improved.

Table 2: Features identified in COVID-19 social media posts targeting young people ($n = 238$)

	<i>n</i> (%)	Median likes	IQR
<i>Platform</i>			
Facebook	172 (72.3)	111.5	493.8
TikTok	42 (17.6)	1086	1693.3
Instagram	24 (10.1)	566	1014.3
<i>Youth criteria</i>			
Stylistic elements	170 (71.4)	142.5	904
Actors/characters of age	88 (37.0)	215	850
TikTok	42 (17.6)	1086	1693.3
Specific age mention	35 (14.7)	470	1042.5
Relevant themes	21 (8.8)	1523	2541
Internet trends	17 (7.1)	1092	2325
<i>Post type and format</i>			
Still image	182 (76.5)		
Illustration	143 (60.1)	70	480.5
Photo	34 (14.3)	325.5	528.3
Infographic	19 (8.0)	929	2685.5
Graph	6 (2.5)	811	714.3
Moving image	56 (23.5)		
Video	54 (22.7)		
Length: under 30 s	36 (15.1)	1490.5	2030.5
Length: 30 s and over	18 (7.6)	605.5	676
GIF	2 (0.8)	198	111
<i>COVID issue</i>			
Testing	79 (33.2)	48	25
Vaccination	78 (32.8)	653.5	1210.8
Restrictions	32 (13.4)	1520.5	2880.8
General	25 (10.5)	760	1259
Social distancing	20 (8.4)	1375	1130.5
Masking	15 (6.3)	697	1871
Transmission	12 (5.0)	330	440.3
Misinformation	3 (1.3)	3548	3765
Contact tracing	2 (0.8)	683	277
Handwashing	2 (0.8)	164	77
<i>Communication technique</i>			
Factual	142 (59.7)	70	1043.5
Call to action	149 (62.6)	96	920
Educational	54 (22.7)	279	531
Positive emotional appeal	74 (31.1)	584	1441
Fear	3 (1.3)	2543	2305
Responsive	76 (31.9)	45.5	24
<i>Social marketing elements</i>			
Emoji	108 (45.4)	1020.5	1973
Humour	38 (16.0)	1112.5	1963.8
Celebrity	34 (14.3)	1552	1608.5

Table 2. Continued

	<i>n</i> (%)	Median likes	IQR
Person of authority	16 (6.7)	765.5	865.3
Testimonial	14 (5.9)	403.5	558.5
Meme	13 (5.5)	620	2339
<i>Priority groups</i>			
Aboriginal and Torres Strait Islander	11 (4.6)	52	747.5
Other culturally and linguistically diverse	3 (1.3)	94	124.5
Mental health	16 (6.7)	476	1151.3
Chronic health and disability	7 (2.9)	159	271.5

Comparisons with prior work

We found that not only were health authorities infrequently targeting young people with COVID-19 messages on social media, but that they also infrequently used platforms popular with young people in favour of Facebook. Similar trends have also been identified in other countries; Canadian health authorities predominantly used Twitter and Facebook to communicate COVID-19 physical distancing messages to young people (Dimanlig-Cruz *et al.*, 2021). However, young people have been shifting towards other platforms like Instagram and TikTok in recent years, whereas Facebook has lost 11% of users aged 18–24 from 2017 to 2020 (Mai and Gruz, 2022). TikTok in particular saw a major rise in users during the COVID-19 pandemic (Mai and Gruz, 2022), yet only one Australian health department shared content on this platform. The underutilization of these platforms with greater youth presence in favour of Facebook may reflect the skills and experience of health department staff, rather than the preferences of the intended consumer. Health authorities should consider platform relevance and appropriateness in future messaging to young people to ensure greatest health benefit from their health communication efforts (Lazarus *et al.*, 2022).

This study also found that health departments in jurisdictions with no major COVID-19 outbreaks rarely shared COVID-19 posts targeting youth. Whilst their community may not have been experiencing the COVID-19 burden at the time, previous research indicates that health organizations should establish a strong presence on multiple social media platforms as a preparedness measure to improve crisis communications in future emergencies (Guidry *et al.*, 2017). Furthermore, health authorities can actively cultivate trust and ‘brand’ awareness in a similar way to private businesses on social media by establishing frequent

and consistent interactive communication with the public (Guidry *et al.*, 2017). By raising their social media profile in an appealing way and building relationships with their consumers, young people may be more engaged with future health messages and better understand how health departments work to protect them (Svoboda, 2022; Walsh *et al.*, 2022).

However, posts shared by the Australian health authorities were generally in line with best practice communication techniques (Centers for Disease Control, 2012). For example, all posts were accompanied with visuals rather than being text-only, an important factor in communicating health messages, but also important for social media platform algorithms which often favour visual over text-based content (Guidry *et al.*, 2017). Video posts were also generally short in length, as recommended by social media marketers for engagement, especially for younger populations (Hootsuite, 2022). Posts frequently included calls to action, a strategy other international health authority accounts communicating COVID-19 messages via social media also practiced (MacKay *et al.*, 2022). Australian health departments also frequently shared responsive posts, capitalizing on social media's unique ability to disseminate information to the community in real time. This reactivity can maintain public trust during emergencies when there is high levels of uncertainty and anxiety (Guidry *et al.*, 2017), and has led to higher public engagement with health messages during the Ebola crisis (Guidry *et al.*, 2017) and the COVID-19 pandemic (Slavik *et al.*, 2021a).

The Australian health authorities rarely used fear appeal in their COVID-19 social media communications, which is notable given that these posts received high engagement from users. Previous research also found that COVID-19-related TikToks shared by official accounts that conveyed alarm, concern and disease severity received higher user engagement (Li *et al.*, 2021). Interestingly, the health departments' focus on positive emotional appeal when reporting about COVID-19 diverged from that of traditional media who tended to focus on negative emotions and death associated with the disease (Basch *et al.*, 2020b). Whilst discussing the negative aspects of disease outbreaks and validating normal fear response is an important way to engage the public, fear appeals alone are rarely useful in altering behaviour, especially without encouraging self-efficacy or a sense that people can do something to avoid the danger (Basil, 2019). Additionally, it is typically recommended that negative messages be counterbalanced by a greater number of positive messages since negative information tend to receive significantly greater weight in an individual's risk perception (Guidry *et al.*, 2017). Furthermore, including

emotional appeals in COVID-19 health communications has been associated with inducing empathy for people most vulnerable to the virus, and motivates adherence to preventative measures (Pfattheicher *et al.*, 2020; Svoboda, 2022).

Infodemic management

Another key finding was that the health department accounts rarely posted about misinformation despite these posts receiving high levels of engagement. Similar trends have been identified in analysis of Canadian public health tweets (Slavik *et al.*, 2021b; MacKay *et al.*, 2022). MacKay *et al.* also found less than 1% of Canadian health authority tweets corrected COVID-19 misinformation despite receiving higher than average engagement than other crisis communication tweets (MacKay *et al.*, 2022). Similar trends were noted during the Ebola epidemic, with less than 3% of Instagram posts and 1% of tweets by the major health organizations of Centres for Disease Control and Prevention, World Health Organisation and Médecins Sans Frontiers addressing Ebola-related misinformation (Guidry *et al.*, 2017). Addressing misinformation is key in infodemic management (WHO, 2022), especially for young people who may have lower levels of health literacy and therefore greater vulnerability to misinformation. A recent multidisciplinary Delphi study on ending the COVID-19 public health threat recommended that institutions should proactively monitor false health information and collaborate with trusted community leaders to refute it and enhance trust (Lazarus *et al.*, 2022). Health authorities are uniquely placed to bust these myths circulating on social media and ensure accurate information is predominant during public health emergencies (Steffens *et al.*, 2019).

Social marketing elements

Whilst we found the health departments frequently used emojis in their communication to young people, other social marketing techniques that appeal to young people like humour, celebrities and memes were infrequently used despite receiving high levels of engagement (Kothari *et al.*, 2022). It is noteworthy however, that in comparison to previous content analysis of Australian public health posts on Facebook pre-pandemic by Kite *et al.* (Kite *et al.*, 2016), contemporary health departments leveraged social marketing techniques more frequently. For example, we found at least double the proportion of celebrity and humour posts in comparison to Kite *et al.* who found 5% of public health posts shared on Facebook featured celebrities and 8% were humorous. As well as attracting higher levels of engagement (Kothari *et al.*, 2022), social marketing elements like humour and

entertainment have been perceived as effective in driving attention to public health communications, with research recommending a divergence from messages that are too didactic (Steffens *et al.*, 2020). However, it is still unclear how humour in public health campaigns can translate to meaningful behaviour change (Fraustino and Ma, 2015). There may also be risks and unanticipated consequences for using social marketing techniques for the health authorities (e.g. going viral for the wrong reasons) or that creativity and humour may overpower the main message (Algie and Mead, 2019). Instead of wearing the risk associated with humorous or experimental content, health authorities may benefit from other social marketing techniques such as sharing popular user generated content or influencer content that aligns with their aims and values (Hilliard *et al.*, 2021; Volkmer, 2021). For example, preliminary research into the role of TikTok influencers and COVID-19-related content found that the most popular US TikTok influencers created content that usually demonstrated adherence to public health guidance at the time (Selkie *et al.*, 2022). Since this content reaches millions of users on a platform mainly used by young people, it indicates there are positive implications for influencer marketing for health promotion on the social media platform (Basch *et al.*, 2020a).

Priority groups

We found limited communication to priority groups young people are a part of like cultural and ethnic groups or chronic health and disability groups, in this study. Ensuring there is adequate, relevant and appealing communication to these priority groups is key during public health emergencies given the disproportionate impacts of the pandemic on vulnerable groups to date (Magesh *et al.*, 2021; Mude *et al.*, 2021). For example, in Australia, infection rates for people who identify as Aboriginal and/or Torres Strait Islander during the Delta outbreak was twice the rate of non-Aboriginal and/or Torres Strait Islander Australians (Guardian, 2021). COVID-19 age-adjusted mortality was also 2.5 times higher for people born overseas than those born in Australia (Australian Institute of Health and Welfare, 2022). Similarly, communicating preventative measures to individuals with chronic disease is especially important given the increased risk of severe COVID-19 illness and potential worsening of existing conditions due to COVID-19 disruptions to their care (Parkinson *et al.*, 2022).

Including priority groups in official health department social media messaging is important to ensure these groups are not left out in mainstream health communication and to maximize the impact of collaborations.

Strengths and limitations

This study was strengthened by youth consultation to ensure posts analysed were targeting young people aged 16–29 years. Youth involvement also spanned into the data analysis stage to ensure findings were youth-centred. We note that the young people involved in the study were in the older range of the age group so their views may differ from younger adolescents.

We also note that because this study focussed on posts shared by the Australian Government State/Territory Health departments it does not reflect the full breadth of youth health campaigns by other organizations; posts from other accounts were not captured unless reposted by the health departments. Facebook reactions were considered to operate as likes in this study and since user comments were not analysed we do not know if public approved or disapproved of the messaging (Li *et al.*, 2021). Engagement metrics are also not always a reliable way to identify the success of health communication; accounts may disable certain metrics, algorithms can favour certain posts and boost sponsored posts, and posts may go viral for unintended reasons or negative comments (Pantano, 2021).

Additionally, this study captured content shared in 1 month during the Delta wave of the pandemic in Australia and therefore only reflects content from that period. Health departments may have removed or deleted posts by the time of data extraction or shared ephemeral content (e.g. Stories) which could not be captured in the study.

Implications

Our findings provide practical implications for use of social media to communicate COVID-19 and other health messages. Social media health communication to young people should be increased, especially on platforms they use frequently like Instagram, TikTok and other emerging platforms. This type of communication should be prioritized for health promotion purposes and can be developed into a trusted source of health information in community messaging. Messages should aim to encompass the diverse range of needs of young people, including specific priority populations who may be in greater need of health information, whether this is by creating specific content or reposting collaborations with other relevant organizations. Social marketing techniques like utilizing influencer marketing, internet trends and memes can also be explored to increase the engagement of these health messages amongst young people. Ultimately, it is important to understand the perspectives and needs of young people themselves to optimize this health communication during COVID-19 and beyond. Consultation and co-design methods are imperative in ensuring future health

communication resonates with young people for the greatest public health benefit. Future research is needed to understand how COVID-19 health communication has changed over time as public health needs progress throughout the course of the pandemic.

CONCLUSION

Communicating health messages to young people via social media will remain a critical facet of the COVID-19 pandemic response as priorities shift from testing to vaccination and booster roll-out and long-term health impacts. There is a need for Australian health authorities to prioritize the development of social media health communication that engages with young people, particularly those most at-risk. Young people need easily accessible, reliable and trustworthy health information that is tailored to their changing needs and concerns and combats the misinformation they see online. Health authorities can explore increasing their social media communication to this group and apply the relevant social marketing strategies in consultation with youth advisors to ensure messages are appealing and youth-centred.

Supplementary Material

Supplementary material is available at *Health Promotion International* online.

Acknowledgements

We would like to thank Raveena Kapoor, Carys Batcup and Brian Chau for generously providing their perspectives as young people to the team throughout this study.

REFERENCES

- Al-Dmour, H., Masa'deh, R., Salman, A., Abuhashesh, M. and Al-Dmour, R. (2020) Influence of social media platforms on public health protection against the COVID-19 pandemic via the mediating effects of public health awareness and behavioral changes: integrated model. *Journal of Medical Internet Research*, **22**, e19996.
- Algie, J. and Mead, N. (2019) Fun ways to engage with rail safety through the Dumb Ways to Die social marketing campaign. In Basil, D. Z., Diaz-Meneses, G. and Basil, M. D. (eds), *Social Marketing in Action Cases from Around the World*. Springer International Publishing, Switzerland, pp. 93–110.
- Allington, D., Duffy, B., Wessely, S., Dhavan, N. and Rubin, J. (2021) Health-protective behaviour, social media usage and conspiracy belief during the COVID-19 public health emergency. *Psychological Medicine*, **51**, 1763–1769.
- Armstrong, M., Halim, N. K., Raeside, R., Jia, S. S., Hyun, K., Boroumand, F. et al. (2021) How helpful and what is the quality of digital sources of healthy lifestyle information used by Australian adolescents? A mixed methods study. *International Journal of Environmental Research and Public Health*, **18**, 12844.
- Australian Government Department of Health and Aged Care. (2022) COVID-19 vaccination rollout update. COVID-19 Vaccine Rollout. <https://www.health.gov.au/resources/collections/covid-19-vaccination-rollout-update> (last accessed 1 December 2022).
- Australian Institute of Health and Welfare. (2022) *Australia's Health Report in Brief 2022*.
- Ayre, J., Muscat, D. M., Mac, O., Batcup, C., Cvejic, E., Pickles, K. et al. (2022) Main COVID-19 information sources in a culturally and linguistically diverse community in Sydney, Australia: a cross-sectional survey. *Patient Education and Counseling*, **105**, 2793–2800.
- Basch, C. H., Hillyer, G. C. and Jaime, C. et al. (2020a) COVID-19 on TikTok: harnessing an emerging social media platform to convey important public health messages. *International Journal of Adolescent Medicine and Health*, **34**, 367–369.
- Basch, C. H., Hillyer, G. C., Erwin, Z. M., Mohlman, J., Cosgrove, A. and Quinones, N. (2020b) News coverage of the COVID-19 pandemic: missed opportunities to promote health sustaining behaviors. *Infection, Disease & Health*, **25**, 205–209.
- Basch, C. H., Meleo-Erwin, Z., Fera, J., Jaime, C. and Basch, C. E. (2021) A global pandemic in the time of viral memes: COVID-19 vaccine misinformation and disinformation on TikTok. *Human Vaccines & Immunotherapeutics*, **17**, 2373–2377.
- Basil, M. D. (2019) Theory in social marketing. In Basil, D. Z., Diaz-Meneses, G. and Basil, M. D. (eds), *Social Marketing in Action: Cases from Around the World*. Springer International Publishing, Cham, pp. 59–78.
- Bin Naeem, S. and Kamel Boulos, M. N. (2021) COVID-19 misinformation online and health literacy: a brief overview. *International Journal of Environmental Research and Public Health*, **18**, 8091.
- Cato, S., Iida, T., Ishida, K., Ito, A., Katsumata, H., McElwain, K. M. et al. (2021) Social media infodemics and social distancing under the COVID-19 pandemic: public good provisions under uncertainty. *Global Health Action*, **14**.
- Centers for Disease Control. (2012) CDC's guide to writing for social media. Centers for Disease Control and Prevention. <https://www.cdc.gov/socialmedia/tools/guidelines/pdf/GuidetoWritingforSocialMedia.pdf> (last accessed 1 December 2022).
- Chesser, A., Drassen Ham, A. and Keene Woods, N. (2020) Assessment of COVID-19 knowledge among university students: implications for future risk communication strategies. *Health Education & Behavior*, **47**, 540–543.
- Collin, P., Skinner, S. R. and Kang, M. (2020) COVID-19 Cases Are Highest in Young Adults. *We Need to Partner with Them for the Health of the Whole Community*.
- Cunningham, M. (2021) Calculated risk: age-old question as young decide whether to get AstraZeneca jab. *Sydney Morning Herald*. smh.com.au
- Dadaczynski, K., Okan, O., Messer, M., Leung, A. Y. M., Rosário, R., Darlington, E. et al. (2021) Digital health literacy and web-based information-seeking behaviors

- of university students in Germany during the COVID-19 pandemic: cross-sectional survey study. *Journal of Medical Internet Research*, **23**, e24097.
- Dimanlig-Cruz, S., Han, A., Lancione, S., Dewidar, O., Podinic, I., Haqani, B. *et al.* (2021) Physical distancing messages targeting youth on the social media accounts of Canadian public health entities and the use of behavioral change techniques. *BMC Public Health*, **21**.
- Fraustino, J. D. and Ma, L. (2015) CDC's use of social media and humor in a risk campaign—"Preparedness 101: Zombie Apocalypse". *Journal of Applied Communication Research*, **43**, 222–241.
- Guardian. (2021) *Indigenous People Infected with Covid Delta Strain at Twice the Rate of Other Australians*. The Guardian, Australia.
- Guidry, J. P. D. *et al.* (2017) Ebola on Instagram and Twitter: how health organizations address the health crisis in their social media engagement. *Public Relations Review*, **43**, 477–486.
- Hilliard, M. M. C. C. H. M. *et al.* (2021) Social media for emergency messaging with youth and families during the coronavirus 2019 (COVID-19) pandemic: getting it right. *Journal of Emergency Management*, **19**, 109–116.
- Hootsuite. (2022) How long should a social media video be? Tips for every network. <https://blog.hootsuite.com/how-long-should-a-social-media-video-be/> (last accessed 1 December 2022).
- Hsieh, H.-F. and Shannon, S. E. (2005) Three approaches to qualitative content analysis. *Qualitative Health Research*, **15**, 1277–1288.
- Hyland-Wood, B., Gardner, J., Leask, J. and Ecker, U. K. H. (2021) Toward effective government communication strategies in the era of COVID-19. *Humanities and Social Sciences Communications*, **8**.
- Karidakis, M., Woodward-Kron, R., Amorati, R., Hu, B., Pym, A. and Hajek, J. (2022) Enhancing COVID-19 public health communication for culturally and linguistically diverse communities: an Australian interview study with community representatives. *Qualitative Health Communication*, **1**, 61–83.
- Khan, M. S. R., Watanapongvanich, S. and Kadoya, Y. (2021) COVID-19 vaccine hesitancy among the younger generation in Japan. *International Journal of Environmental Research and Public Health*, **18**, 11702.
- Kite, J., Foley, B. C., Grunseit, A. C. and Freeman, B. (2016) Please like me: Facebook and public health communication. *PLoS One*, **11**, e0162765.
- Kothari, A., Walker, K. and Burns, K. (2022) #CoronaVirus and public health: the role of social media in sharing health information. *Online Information Review*, **46**, 1293–1312.
- Lazarus, J. V., Romero, D., Kopka, C. J., Karim, S. A., Abu-Raddad, L. J., Almeida, G. *et al.*; COVID-19 Consensus Statement Panel. (2022) A multinational Delphi consensus to end the COVID-19 public health threat. *Nature*, **611**, 332–345.
- Li, Y., Guan, M., Hammond, P. and Berrey, L. E. (2021) Communicating COVID-19 information on TikTok: a content analysis of TikTok videos from official accounts featured in the COVID-19 information hub. *Health Education Research*, **36**, 261–271.
- Li, X. and Liu, Q. (2020) Social media use, eHealth literacy, disease knowledge, and preventive behaviors in the COVID-19 pandemic: cross-sectional study on Chinese netizens. *Journal of Medical Internet Research*, **22**, e19684.
- MacKay, M., Cimino, A., Yousefinaghani, S., McWhirter, J. E., Dara, R. and Papadopoulos, A. (2022) Canadian COVID-19 crisis communication on Twitter: mixed methods research examining tweets from government, politicians, and public health for crisis communication guiding principles and tweet engagement. *International Journal of Environmental Research and Public Health*, **19**, 6954.
- Magesh, S., John, D., Li, W. T., Li, Y., Mattingly-App, A., Jain, S. *et al.* (2021) Disparities in COVID-19 outcomes by race, ethnicity, and socioeconomic status: a systematic-review and meta-analysis. *JAMA Network Open*, **4**, e2134147.
- Mahmood, Q. K., Jafree, S. R., Mukhtar, S. and Fischer, F. (2021) Social media use, self-efficacy, perceived threat, and preventive behavior in times of COVID-19: results of a cross-sectional study in Pakistan. *Frontiers in Psychology*, **12**.
- Mai, P. and Gruzd, A. (2022) *As Pandemic Measures Are Lifted, Social Media Use Has Declined with the Exception of TikTok*.
- Mat Dawi, N., Namazi, H., Hwang, H. J., Ismail, S., Maresova, P. and Krejcar, O. (2021) Attitude toward protective behavior engagement during COVID-19 pandemic in Malaysia: the role of E-government and social media. *Frontiers in Public Health*, **9**.
- Mude, W., Oguoma, V. M., Nyanhanda, T., Mwanri, L. and Njue, C. (2021) Racial disparities in COVID-19 pandemic cases, hospitalisations, and deaths: a systematic review and meta-analysis. *Journal of Global Health*, **11**, 05015.
- Pantano, E. (2021) When a luxury brand bursts: modelling the social media viral effects of negative stereotypes adoption leading to brand hate. *Journal of Business Research*, **123**, 117–125.
- Parkinson, A., Matenge, S., Desborough, J., Hall Dykgraaf, S., Ball, L., Wright, M. *et al.* (2022) The impact of COVID-19 on chronic disease management in primary care: lessons for Australia from the international experience. *Medical Journal of Australia*, **216**, 445–448.
- Pfattheicher, S., Nockur, L., Böhm, R., Sassenrath, C. and Petersen, M. B. (2020) The emotional path to action: empathy promotes physical distancing and wearing of face masks during the COVID-19 pandemic. *Psychological Science*, **31**, 1363–1373.
- Pickles, K., Copp, T., Meyerowitz-Katz, G., Dodd, R. H., Bonner, C., Nickel, B. *et al.* (2022) COVID-19 vaccine misperceptions in a community sample of adults aged 18–49 years in Australia. *International Journal of Environmental Research and Public Health*, **19**, 6883.
- Robertson, E., Reeve, K. S., Niedzwiedz, C. L., Moore, J., Blake, M., Green, M. *et al.* (2021) Predictors of COVID-19 vaccine hesitancy in the UK household longitudinal study. *Brain Behavior and Immunity*, **94**, 41–50.
- Romer, D. and Jamieson, K. H. (2020) Conspiracy theories as barriers to controlling the spread of COVID-19 in the U.S. *Social Science & Medicine*, **263**, 113356.
- Seale, H., Harris-Roxas, B., Heywood, A., Abdi, I., Mahimbo, A., Chauhan, A. *et al.* (2022) The role of community leaders

- and other information intermediaries during the COVID-19 pandemic: insights from the multicultural sector in Australia. *Humanities and Social Sciences Communications*, **9**.
- Selkie, E., Teng, D. and Adkins, V. (2022) 9. Adherence to public health recommendations in TikTok content during the early days of the SARS-CoV-2 pandemic. *Journal of Adolescent Health* **70**, S5–S6.
- Sharif, N., Opu, R. R., Alzahrani, K. J., Ahmed, S. N., Islam, S., Mim, S. S. *et al.* (2021) The positive impact of social media on health behavior towards the COVID-19 pandemic in Bangladesh: a web-based cross-sectional study. *Diabetes & Metabolic Syndrome: Clinical Research & Reviews*, **15**, 102206.
- Slavik, C. E., Buttle, C., Sturrock, S. L., Darlington, J. C. and Yiannakoulis, N. (2021a) Examining tweet content and engagement of Canadian public health agencies and decision makers during COVID-19: mixed methods analysis. *Journal of Medical Internet Research*, **23**, e24883.
- Slavik, C. E., Darlington, J. C., Buttle, C., Sturrock, S. L. and Yiannakoulis, N. (2021b) Has public health messaging during the COVID-19 pandemic reflected local risks to health? A content analysis of tweeting practices across Canadian geographies. *Health & Place*, **69**, 102568.
- Steffens, M. S., Dunn, A. G., Leask, J. and Wiley, K. E. (2020) Using social media for vaccination promotion: practices and challenges. *Digital Health*, **6**, 205520762097078.
- Steffens, M. S., Dunn, A. G., Wiley, K. E. and Leask, J. (2019) How organisations promoting vaccination respond to misinformation on social media: a qualitative investigation. *BMC Public Health*, **19**.
- Stellefson, M., Hanik, B., Chaney, B., Chaney, D., Tennant, B. and Chavarria, E. A. (2011) eHealth literacy among college students: a systematic review with implications for eHealth education. *Journal of Medical Internet Research*, **13**, e102.
- Svoboda, E. (2022) Mastering the art of persuasion during a pandemic. *Nature*, **610**, S34–S36.
- Taba, M., Allen, T. B., Caldwell, P. H. Y., Skinner, S. R., Kang, M., McCaffery, K. *et al.* (2022) Adolescents' self-efficacy and digital health literacy: a cross-sectional mixed methods study. *BMC Public Health*, **22**, 1223.
- Volkmer, I. (2021) *Social Media and COVID-19: A Global Study of Digital Crisis Interaction among Gen Z and Millennials*. Wunderman Thompson, University of Melbourne, Pollfish and the World Health Organization, Melbourne, Australia.
- Walsh, L., Hyett, N., Juniper, N., Li, C. and Hill, S. (2022) The experiences of stakeholders using social media as a tool for health service design and quality improvement: a scoping review. *International Journal of Environmental Research and Public Health*, **19**, 14851.
- Wark, P. (2021) Younger adults can get very sick and die from COVID too. Here's what the data tell us. <https://theconversation.com/younger-adults-can-get-very-sick-and-die-from-covid-too-heres-what-the-data-tell-us-165250> (last accessed 1 December 2022).
- We Are Social. (2022) *Digital 2022*. We Are Social Blog, Sydney Australia.
- WHO. (2022) *WHO Policy Brief: COVID-19 Infodemic Management*. Policy Brief, Geneva, Switzerland.
- Zarocostas, J. (2020) How to fight an infodemic. *Lancet*, **395**, 676.