

Social media for emergency messaging with youth and families during the coronavirus 2019 (COVID-19) pandemic: Getting it right

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ABSTRACT

Disaster communications are frequently included as an area of improvement in the majority of incident after action reports. One segment of the population that is overlooked or intentionally excluded from messaging constructs is adolescents and transitional aged youth. Social media, the preferred mechanism of this population, has the capacity to both educate as well as misinform. Thoughtful and intentional utilization of social media channels for adolescent audiences can convey facts and motivation for appropriate community action when mindfully incorporated into a crisis communication plan by emergency managers. Increasing methods of accurately conveying life-safety issues during the COVID-19 pandemic and its increasing variants must be done correctly and timely.

Key words: COVID-19; social media; emergency management; crisis communications

INTRODUCTION

Adolescence is a dynamic and unique developmental period where the need to individuate from family and connect to peers is fundamental. However, the loss of in-person social interactions created by stay-at-home mandates and social distancing during COVID-19 puts tremendous strain on these developmental needs, particularly for the duration and extent of mitigation requirements by communities around the world. Furthermore, the prolific use of social media (SM) by this population makes it all the more critical that youth receive accurate and timely information so as to promote engagement in healthy

behaviors for their own well-being in addition to communities as a whole.

The challenges presented by COVID-19 for this age group are many; however, opportunities are available to shift the dynamic from isolationism to active-yet-socially-distant participation. Engagement can inspire sustainable healthy behaviors in youth by messaging from official health expert organizations. Just as adolescents have driven initiatives such as the climate change movement, the “March for Our Lives” rallies after gun violence, and other actions, eg, advocacy, fundraising, after crises around the world, so too could they be proactive in promoting adolescent health during COVID-19 if health messaging from Emergency Managers as well as health organizations use the preferred adolescent SM avenues to address their demographic needs. This inclusiveness could inspire adolescents to not only drive desirable public health behaviors in their family units but also inspire motivation in others to behave in the safest community-oriented manner for the greater good.

SM USE BY ADOLESCENTS AND TRANSITIONAL AGED YOUTH

During this pandemic, the use of SM has increased across platforms,¹ even expanding the use of particular SM channels,² and has supplanted publications as the primary source of information.³ For many SM platforms, particularly those with a large number of adolescent users, the number of new downloads/accounts created and daily use achieved all-time highs during the pandemic.⁴ This creates a myriad of challenges as well as opportunities.

Adolescents and transitional aged youth (ATAY) have nearly ubiquitous and continuous access to SM.⁵ Per Pew,⁶ parents are concerned about the effects of screen time on children. YouTube data show that ATAY use SM as their primary sources to learn about current events in lieu of traditional media outlets, and that a substantial majority of adolescents in the United States identify the importance of following current events⁷ even as teens get their news more frequently from SM sites, eg, Facebook and Twitter, or YouTube than directly from news organizations.⁷ Regarding video distribution channels and reports from Common Sense Media, 69 percent of teens watch online videos daily, again with YouTube as the primary outlet⁸; when YouTube is not part of the utilization rankings, 34 percent prefer Snapchat, with 29 percent preferring TikTok as of Fall 2020.⁹

Among surveyed ATAY individuals, less than half report using print, TV, or online news organizations to access news; only one-third rely on family and friends to disseminate updated news¹⁰; however (and not surprisingly), some of the biggest influencers on adolescents are other teens, though these peers may not be well informed. Half of this age demographic accesses news through Instagram, Facebook, Twitter, and YouTube with a tenfold likelihood of news consumption based on recommendations from celebrities, “influencers”, and YouTube personalities.¹⁰ This preference may be due to the appeal of visual representation of facts and media over the written word or soundbyte as is customary with traditional news outlets. Visual format, however, may impair the ability to readily comprehend the content (and though preferable to reading updates, ATAY acknowledge that traditional news outlets may provide more understandable material).¹⁰

Aligning with the primary motivators of adolescent information-seeking behaviors, SM users generally are seeking valid, stigma-free, time-sensitive information. In the past, users’ entertainment motivation was not necessarily aligned with health and government authorities’ intentions that were trying to educate as trusted sources to reduce dis-information. During COVID-19, these organizations have incorporated more graphics, voice, video, or live simulcast to

add empathy and humanity to the delivery in order to meet the needs as well as preferred viewing modalities of end users rather than as a channel predominantly for visibility or branding. The safe, personalized, and immediate availability to guidance reduces fear of hearsay as well as rumor, which in this pandemic response can cost lives.

SM IN DISASTER COMMUNICATION AND HEALTH PROMOTION

SM intention has shifted during the pandemic to be a source of not only entertainment as its predominant role in the recent past but also an increasingly primary source of education and authority messaging. One reason for the shift to communications through SM platforms is due to extensive community reach.¹¹ In greater volume regarding health promotion in particular, users are seeking support from reliable factual experts to apply a filter to the rumors generated by “influencers.” Though media has traditionally been an outbound mechanism to communicate, SM thrives with dynamic interaction. This conversational aspect (or appearance thereof if bots are active) allows authorities and experts a well-used avenue to relay much-needed fact during a time of unrest and critical concerns that extends beyond traditionally more static methods of television or print media.

The convergence of media communications during rapidly changing healthcare situations has elevated the predominance of SM for use by government personnel and healthcare providers as a mechanism to deliver credible and timely information in addition to important education. During disasters such as in the United States, government messaging—and, in particular, health as well as Emergency Management officials relying on scientific expertise—elevated SM avenues to the top of all messaging platforms so as to help deliver accurate information in the most timely manner. This application with SM is an evolution of the Centers for Disease Control and Prevention (CDC)’s “CERC” process—Crisis and Emergency Risk Communication.¹² The basic principles of CERC ensure that real-time information meets certain thresholds of reliability and credibility by leadership in messaging.

Communication from expert reliable sources during disaster events is an effective public health

intervention to inform people about resources in addition to promoting healthy behaviors. In a healthy use of SM and available apps, adolescents currently use SM to help interact and manage their mental health,¹³ and this willingness to learn and interact is imperative for accurate information dissemination and healthy activism. The ability to find information in a timely fashion, particularly when other established communication channels may be disrupted, creates access with dynamic interaction beyond traditional methods and also supports the elevation of SM to a priority channel of disaster communication.

One of the most helpful aspects of SM during COVID-19 is the interactive, responsive, and time-critical conversations that engage a variety of speaker/listener types in order to transmit the right message on the right platform at the right time by Emergency Management and public health organizations disseminating facts about COVID-19. Those engaging on SM channels want instant trustworthy and timely information for a variety of reasons, and the ability for answers to be readily found encourages increased utilization—when something works, it is continually used. Despite the prevalent use of SM by ATAY as well as the potential public health benefits of communicating with this cohort, it is paramount that Emergency Management professionals as well as public health officials examine their current state of disaster communication on SM platforms in the context of COVID-19 to retool targeted pandemic messaging to reduce the negative impacts/stress on the mental health of this vulnerable population.

In a positive application of lessons learned from past disasters, SM use in disasters has recently become widespread in practice. Organizations such as the American Red Cross and Federal Emergency Management Agency (FEMA) had increasingly begun to utilize web-based technologies to inform the public and provide news updates during crises with acceleration in reliance on SM,¹⁴⁻¹⁶ particularly during the coronavirus pandemic. A new field, crisis informatics, has emerged focusing on SM use in emergencies. Its central tenet “is that people use personal information and communication technology to respond to disaster in creative ways to cope with uncertainty”¹⁷ by

providing factual context for events SM users may be witnessing or experiencing themselves.

The use of SM to broadcast emergency-related information systematizes communication between authorities and citizens and allows amplification of dissemination. This includes warnings, advice, and guidance on how to cope with or prevent emergencies/disasters; it also advises on how to behave during an emergency, directs volunteers, summarizes information after an emergency, and coordinates activities. For adolescents in particular, the use of SM may also be associated with increased civic engagement.¹⁸ Currently, agencies’ use of SM has increased from 81 to 96 percent during the last five years due to the perceived suitability of SM platforms by US authorities as well as generally positive attitudes by the general population.¹⁷

However, SM platforms have also been linked to the spread of rumors, misinformation, and disinformation¹⁹ whereby recommendations by authorities may be lost in the digital noise. The need during COVID-19 for a “Mythbusters” webpage by the World Health Organization (WHO)²⁰ and a “Myth versus Fact” section of the CDC website²¹ was even created to combat the furious rate of misinformation being reported particularly early in the pandemic. This was necessary for public health leadership to combat the abundance of contradictory material on SM as misinformation confuses the average consumers, especially ATAY, who reportedly often rely on “influencers” rather than subject matter authorities.

The WHO also identifies this excessive information as a parallel “infodemic” to combat and highlights the risk of amplification of misinformation through SM use.²² This spread may contribute to heightened rates of anxiety, vulnerability, and discrimination against certain populations²³ and adds to the existing risks of excessive screen time on youths’ mental health. During adolescence, a time of rapidly expanding capabilities, expectations of autonomy, and identity exploration, digital tools have a paramount role in youth empowerment through civic engagement—in this case, with knowledgeable experts.

There are benefits to the digitalization of health media and opportunities to advance health through

SM partnerships. Similar to using SM and online platforms to access news about current events, ATAY employ the internet and mobile apps to search health topics. Social networking sites, a type of SM, have been leveraged to address sexual behavior, mental health issues, and medical conditions, eg, diabetes, obesity, and provide general guidance around nutrition. Although the current uptake for bidirectional SM communication by healthcare providers/organizations and ATAY is in a nascent stage, multiple authors have identified SM technology as an engaging and successful means to communicate with patients.²⁴

RISK COMMUNICATION: BEST PRACTICE AND APPLICATION TO ADOLESCENTS

Established authorities provide communications during public health events by using consistent patterns; when applied to the SM schema, it helps listeners of all categories differentiate signal (true facts) versus noise (static and misinformation).²⁵ Using the CERC method, it allows adolescents to have inclusive access to critical information and empowers them to understand facts as they evaluate their application of information in addition to potential participation in educating others, ie, reposting on various channels or discussing with peers. In SM, given its intentionally brief messaging structure, Emergency Management messaging needs to successfully harness the output of a knowledge funnel process (data gathering–information filtering–intelligence content) to give directive insights leading to appropriate decisions.²⁵

The six basic principles of CERC as developed by the CDC (including the need to be first, be right, and be credible as well as to express empathy, promotion action, and show respect) all still apply¹²; through SM, it is now possible to add a seventh aspect “be interactive” to meet SMART objectives²⁶ for in a more time-sensitive manner for life-critical topics. The interactive nature of SM has shifted the traditional emphasis of CERC from the sender (the Emergency Management agency or, in pandemic, healthcare organization) to the receiver (those experiencing the crisis or risk). It is a lesson learned that has been put into practice that public officials and public health experts are dynamically conversing promptly and

effectively with the community in this current pandemic.

SM content must create messaging resonance in order for anyone to take action appropriately during disasters such as this COVID-19 pandemic wherein instruction to the public shifts (sometimes rapidly) based on evolving scientific information. The encouragement of adolescents to learn and apply healthy behaviors is essential for the ATAY population, regardless of pandemic evolution, as they work on developing their identities using the available (and evolving) tools at hand and SM provides not only information gathering but also provides an alternative recognition outlet during the ongoing uncertainty in the pandemic as they work on maintaining social inclusion to recognize their milestone achievements while separated from peers.

Professionals in Emergency Management know well that the disaster cycle has phases of readiness as well as actionable steps for individuals and to which CERC applies with slight variation such as word choices, syntax, and directions. As SM is a newer tool for Emergency Managers to employ than were available during the H1N1 global pandemic of 2009, it is now possible to create developmentally appropriate and inclusive messaging to be disseminated via targeted SM channels to reach more adolescents and families than previous public health outbreaks. It is nearly certain that every COVID-19 after-action report will include a lesson learned of incorporating SM into not only monitoring for hazards and threats but also to recognize flexible communication opportunities that must be engaged at every step of the lifecycle—mitigation, preparedness, response, recovery as well as a fifth category that is sometimes included, prevention—in future disasters beyond pandemic response. The fluid nature of emergencies is well suited to the portable and preferred means by which adolescents search for information.

This rationale extends to the adolescent community and the family challenges to get this age group in particular to understand the severity of the pandemic issues. Regardless of sophistication of the listener, the “knowledge–attitude–practice” health education model²⁷ incorporating updated message

delivery techniques now permeates communication mechanisms to have the “informational campaign” heard. Education is designed with the listener’s process of adaptation—a similar premise is used by the marketing industry for insight-driven campaigns with their goals is “buy in” for product purchase and to sustain purchasing (behavior) change because it works. Wherein “insight” is the driving goal to give accurate knowledge by the authority providing the message and “attitude” is the desired learning outcome from the messenger’s crisis communication plan, using the rapid dissemination of SM coupled with the predominant features of the various channels to reach the very people who need to take action influences the “practice” of the intended audience just as with consumer advertisements. Tools help experts shift schemas when necessary social distancing is misconstrued as isolation, thereby using the SM as a tool to reduce or eliminate incorrect information to both an individual and the population at large.

In many cases, the receiver has become the sender particularly when recipients are adolescents who take on the role of senders by sharing, commenting, or reposting messages.²⁵ Applying the CERC principles to SM tools routinely to interact with local communities or those who have local connections is important as is knowing the unscripted rules (like the appropriate number of hashtags for attracting readers without alienating via “shotgun” randomization, ie, applying SM etiquette and professionalism). Using CERC provides the “be right” narrative that is so important when the content is reposted or shared, particularly with adolescents who turn to each other for insights and information. It is key for Emergency Managers, however, to identify the appropriate channel and engage where the receivers are hearing messages rather than remaining reliant on traditionally preferred methods in order to ensure the content reaches the SM user.

CURRENT RISK EFFORTS ON SM

During the COVID-19 pandemic, there have been recognizable efforts to utilize the CERC model’s principles. Many public health and medical organizations did not have accounts on SM platforms that were

popular among adolescents; if they did, there was not targeted educational purposing for those accounts (anecdotally, the perception of SM was to function as a marketing channel to drive business). However, the COVID-19 pandemic has spurred some of these authorities to increase the use of (or create) these channels—not only for vaccination availability as one example but also education on gatekeeping steps from government officials or shifts to caregiver access/requirements.

Recently, both the WHO and the CDC have collaborated with several SM platforms to increase outreach. For instance, the WHO started a TikTok account in the wake of COVID-19. Conversely, the CDC has used YouTube in the past two decades but does not have a dedicated Snapchat or TikTok account (though TikTok recently supported the CDC Foundation during the 2020 National Public Health Week with \$15 million USD to support health workers).²⁸ More credible organizations and authorities need accounts that reach a more diversely aged target population, reaching those audiences where they glean information.

Although it is a positive development that credible sources are using platforms that are popular among adolescents, the content on most SM accounts is not tailored to adolescents. Credible organizations have mainly posted content geared toward adults. Further, while there have been empathic responses to acknowledge emotions, there has been less tailored content focusing on the unique adolescent challenges such as remote schooling, and loss of sports activities and rituals like prom. In some cases, in instances where adolescents have attempted to normalize risky behaviors by posting/reposting on SM, it may be attributable to “likes” and “reposts” being used currently as socially distant substitutes for in-person acceptance stimuli. Activity of the dopaminergic system increases the feeling of reward and heightens reward processing.²⁹ A causality effect may be counteracted by leveraging empathy and respect in more tailored messaging during disasters so as to engage adolescents in appropriate healthy behaviors.

Authorities and SM platforms have found creative ways to promote action and need to

constantly validate credible sources and removing misinformation/disinformation to improve fact-sharing and reliable data. It also can remain engaging while true. For example, the City of Chicago collaborated with Snapchat to make a new lens, also known as augmented reality animations, that encourages behaviors that decrease the spread of COVID-19 like selecting face masks.³⁰ Snapchat also worked with the WHO to create a lens used to encourage hand washing, while Instagram launched a stay-home feature to promote social distancing³¹ as well as overlay stickers depicting or promoting protective practices.

Other “challenges” have increased engagement with ATAY. Spotify’s song selection for washing hands has been started to inspire healthy behaviors targeting younger children along with other organically driven or designed in collaboration with the WHO.³² Proctor and Gamble hired the top influencer on TikTok, a 15-year-old adolescent with nearly 50 million followers, to perform a dance promoting social distancing. Snapchat has also leveraged its location-sharing app, Zenly, to gamify sheltering in place.³³ The Vietnamese “Jealous Coronavirus” (Ghen Co Vy) song and the related #GhenCoVyChallenge dance have been used to promote protective behaviors as a challenge video.³⁴ Connecting to adolescents via influencers is just one of the areas of improvement that Emergency Managers as well as public health officials could take as an opportunity for improvement during this pandemic response.

RECOMMENDATIONS AND NEXT STEPS

Since the onset of the pandemic, ATAY have increased their use of conventional news platforms for information³⁵ though SM use remains high. SM traffic, particularly channels with a large number of ATAY users, has seen significant increases.³⁶ On Twitter, over 20,000,000 tweets were sent on March 17, 2020, using the #COVID-19 #Coronavirus hashtags³⁷ though the log stopped tracking on May 20, 2020, once 638,809,016 tweets had been reached starting January 18, 2020. Though there may be some level of learning or entertainment in SM for ATAY during COVID-19, there is significant concern that the detrimental impact on psychological well-being of many messaging channels is a maladaptive coping strategy

that needs to be addressed. One important way to combat some of these issues during a disaster event for adults and adolescents alike is for Emergency Managers and public health officials as well as healthcare organizations leveraging technologic creativity to target and engage the public with accurate and timely information about this coronavirus.

Organizations such as the WHO and CDC have proficiently adapted to news dissemination strategies, but saturation by the agencies into additional SM channels is necessary to reach the ATAY target audience. Likewise, Emergency Managers can support government officials by incorporating messaging with the Public Information Officer into scheduled message delivery and ongoing situation-relevant content creation. Continued efforts using SM for educational purposes as well as motivation or recognition of “healthcare heroes” have been an effective way to connect to the importance of safety measures without drawing messaging toward scare tactics or morose imagery that could be trigger points for anyone—not just children and adolescents—having experienced the morbidity or mortality of COVID-19. The use of SM for disaster risk communication offers a tremendous opportunity to connect with adolescents during the COVID-19 pandemic and future disasters. To realize its potential, more thoughtfulness and collaboration between authorities, SM platforms, influencers, and adolescents themselves is necessary.

In light of COVID-19 school closures, social distancing, and isolation recommendations, it seems likely that anxiety, depression, substance use, and risk of interpersonal violence may increase for ATAY. In order for healthcare providers to best impact the care of youth through SM, they must be aware of the virtual landscape conjoined with patient behaviors, understand the associated advantages and risks of SM engagement, and take an active health role in discussing these forums with their patients and families. Pediatricians should be aware of reliable sources for online information and encourage the preferential use of digital technology to maintain connectedness, offset loneliness, and reduce isolation even in the context of social distancing directives. Also, SM can connect groups to trusted sources for medical and mental

health support; delivery of care has been increasing via telemedicine and virtual mental health appointments. “Necessity is the mother of invention” and these unprecedented times offer a tremendous opportunity to advance informed use of SM during COVID-19 to the benefit of our patients and their families.

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REFERENCES

1. Wold S: COVID-19 is changing how, why and how much we’re using social media. Digital Commerce 360. September 16, 2020. Available at <https://www.digitalcommerce360.com/2020/09/16/covid-19-is-changing-how-why-and-how-much-were-using-social-media/>. Accessed March 30, 2021.
2. Molla R: Posting less, posting more, and tired of it all: How the pandemic has changed social media. Vox. March 1, 2021. Available at <https://www.vox.com/recode/22295131/social-media-use-pandemic-covid-19-instagram-tiktok>. Accessed March 30, 2021.
3. Gaskins B, Jerit J: Internet News: Is it a replacement for traditional media outlets? *Int J Press/Politics*. 2012; 17(2): 190-213. DOI: 10.1177/1940161211434640. Accessed March 30, 2021.
4. Samet A: How the coronavirus is changing social media usage. *eMarketer*. July 29, 2020. Available at <https://www.emarketer.com/content/how-coronavirus-changing-us-social-media-usage>. Accessed March 30, 2021.
5. Englander E: Back to the drawing board with cyberbullying. *JAMA Pediatr*. 2019; 173(6): 513-514.
6. Pew Research Center: Parenting children in the age of screens. July 28, 2020. Available at <https://www.pewresearch.org/internet/2020/07/28/parenting-children-in-the-age-of-screens/>. Accessed March 20, 2021.
7. Common Sense Media: Teen news engagement: Key findings and topline. August 13, 2019. Available at https://www.commonsensemedia.org/sites/default/files/uploads/pdfs/2019_cs-sm_summarytoplines_release.pdf. Accessed May 6, 2020.
8. Baig EC: Too much YouTube? Online video usage among teens is going through the roof, survey says. *USA Today*. October 29, 2019. Available at <https://www.usatoday.com/story/tech/2019/10/29/youtube-screen-time-overload-among-teens-and-tweens/2490553001/>. Accessed March 30, 2021.
9. Statista: Most popular social networks of teenagers in the United States from fall 2012 to fall 2020. January 28, 2021. Available at <https://www.statista.com/statistics/250172/social-network-usage-of-us-teens-and-young-adults/>. Accessed March 30, 2021.
10. Common Sense Media: Teen News Engagement.
11. Young Entrepreneur Council: How to reach your target audience on social media more effectively, 2019. Available at <https://www.inc.com/young-entrepreneur-council/how-to-reach-your-target-audience-on-social-media-more-effectively.html>. Accessed May 15, 2020.
12. Centers for Disease Control and Prevention: CERC Introduction 2018. Available at https://emergency.cdc.gov/cerc/ppt/CERC_Introduction.pdf. Accessed May 15, 2020.
13. Rideout V, Fox S, Peebles A, et al.: Coping with COVID-19: How young people use digital media to manage their mental health. San Francisco, CA: Common Sense and Hopelab, 2021. ISSN 2767-0163. Available at <https://www.commonsensemedia.org/sites/default/files/uploads/research/2021-coping-with-covid19-full-report.pdf>. Accessed March 29, 2021.
14. Briones RL, Kuch B, Liu BF, et al.: Keeping up with the digital age: How the American Red Cross uses social media to build relationships. *Publ Relations Rev*. 2011; 36(1). Available at DOI:10.1016/j.pubrev.2010.12.006. Accessed May 15, 2020.
15. Federal Emergency Management Agency: Social media and emergency preparedness (update March 18, 2021). Available at <https://www.fema.gov/press-release/20210318/social-media-and-emergency-preparedness>. Accessed March 30, 2021.
16. United States Department of Homeland Security: Innovative uses of social media in emergency management. September 2013. Available at https://www.dhs.gov/sites/default/files/publications/Social-Media-EM_0913-508_0.pdf. Accessed May 6, 2020.
17. Reuter C, Kaufhold M: Fifteen years of social media in emergencies: A retrospective review and future directions for crisis informatics. *J Conting Crisis Manag*. 2018; 26: 41-57.
18. Middaugh E, Clark LS, Ballard PJ: Digital media, participatory politics, and positive youth development. *Pediatrics*. 2017; 140 (Supplement 2): S127-S131.
19. Vraga EK, Bode L: Addressing COVID-19 misinformation on social media preemptively and responsively. *Emerg Infectious Dis*. 27(2): 396-403. Available at DOI:10.3201/eid2702.203139. Accessed March 30, 2021.
20. World Health Organization: Mythbusters (website). Available at <https://www.who.int/emergencies/diseases/novel-coronavirus-2019/advice-for-public/myth-busters>. Accessed May 15, 2020.
21. Centers for Disease Control and Prevention: Myth versus fact (website). Available at <https://www.cdc.gov/coronavirus/2019-ncov/vaccines/facts.html>. Accessed May 15, 2020.
22. Zarocostas J: How to fight an infodemic. *Lancet*. 2020; 395 (10225): 67.
23. Barua Z, Barua S, Aktar S, et al.: Effects of misinformation on COVID-19 individual response and recommendations for resilience of disastrous consequences of misinformation. *Progress Disaster Sci*. 2020; 8. Available at DOI:10.1016/j.pdisas.2020.100119. Accessed March 30, 2021.
24. Yonker LM, Zan S, Scirica CV, et al.: “Friending” teens: Systematic review of social media in adolescent and young adult health care. *J Med Internet Res*. 2015; 17 (1): e4.
25. Sobowale K, Hilliard H, Ignaszewski MJ, et al.: Real-time communication: Creating a path to COVID-19 public health activism in adolescents using social media. *J Med Internet Res*. 2020; 22(12): e21886. DOI:10.2196/21886.
26. Centers for Disease Control and Prevention: Develop SMART objectives. Available at https://www.cdc.gov/phcommunities/resourcekit/evaluate/smart_objectives.html. Accessed March 30, 2021.
27. Bettinghaus, EP: Health promotion and the knowledge-attitude-behavior continuum. *Preventive Med*. 1986; 15(5). Available at DOI:10.1016/0091-7435(86)90025-3. Accessed March 31, 2021.

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28. CDC Foundation: Press release. Available at <https://www.cdcfoundation.org/blog/public-health-week-tiktok-donates-15-million-support-frontline-public-health-workers-coronavirus>. Accessed March 30, 2021.
29. Steinberg, L: A social neuroscience perspective on adolescent risk-taking. *Rep Dev. National Institutes of Health*. 2008; 28(1): 78-106. DOI:10.1016/j.dr.2007.08.002. Accessed March 31, 2021.
30. City of Chicago: First-of-its-kind Snapchat lens encouraging residents to wear masks. Press Release. August 24, 2020. Available at https://www.chicago.gov/city/en/depts/mayor/press_room/press_releases/2020/august/SnapchatLens.html. Accessed March 30, 2021.
31. Brown, D: How Snapchat, Instagram and others are teaching kids, Gen Z about coronavirus. *USA Today*. April 2, 2020. Available at <https://www.usatoday.com/story/tech/2020/04/01/coronavirus-snapchat-instagram-and-others-remind-teens-wash-hands/5101865002/>. Accessed March 30, 2021.
32. Wickramanayake J: Meet 10 young people leading the COVID-19 response in their communities. United Nations. 2020. Available at <https://www.un.org/africarenewal/web-features/coronavirus/meet-10-young-people-leading-covid-19-response-their-communities>. Accessed May 15, 2020.
33. Constine J: Snapchat's Zenly launches shelter-in-place leaderboard. *TechCrunch*. 2020. Available at <https://techcrunch.com/2020/03/24/zenly-stay-home/>. Accessed May 15, 2020.
34. Wang K: How a coronavirus safety-themed dance took the world by storm, according to the TikTok star who created it. *Business Insider*. 2020. Available at <https://www.businessinsider.com/coronavirus-song-dance-wash-hands-quang-dang-2020-3>. Accessed May 15, 2020.
35. Common Sense Media: How teens are coping and connecting in the time of the coronavirus. April 8, 2020. Available at https://www.commonsensemedia.org/sites/default/files/uploads/pdfs/2020_surveymonkey-key-findings-toplines-teens-and-coronavirus.pdf. Accessed May 6, 2020.
36. Fernandes B, Biswas UN, Tan-Mansukhani R, et al.: The impact of COVID-19 lockdown on internet use and escapism in adolescents. *Revista de Psicología Clínica con Niños y Adolescentes*. 2020; 7(3). DOI:10.21134/rpcna.2020.mon.2056. Accessed March 31, 2021.
37. Twitter Tweetbinder: #Covid19 #Coronavirus tweets per day. Available at <https://www.tweetbinder.com/blog/covid-19-coronavirus-twitter/>. Accessed March 30, 2021.