Social media influencers can be used to deliver positive information about the flu vaccine: findings from a multi-year study

Erika Bonnevie1,*, Sierra M. Smith1, Caitlin Kummeth2, Jaclyn Goldbarg3 and Joe Smyser3

1Research Department, The Public Good Projects, 2308 Mt Vernon Ave, Suite 758, Alexandria, VA 22301, USA, 2Marketing Department, The Public Good Projects, 2308 Mt Vernon Ave, Suite 758, Alexandria, VA 22301, USA and 3Operations Department, The Public Good Projects, 2308 Mt Vernon Ave, Suite 758, Alexandria, VA 22301, USA

*Correspondence to: E. Bonnevie. E-mail: erika.bonnevie@publicgoodprojects.org

Received on 18 November 2020; accepted on 31 March 2021; editorial decision on 30 March 2021

Abstract

Large-scale digital flu vaccine campaigns have experienced difficulty increasing vaccination coverage among African Americans and Hispanics, and are routinely inundated by negative responses from vaccine opponents. A digital campaign employing user-generated content from social media ‘micro’ influencers who are predominantly followed by African Americans and Hispanics was implemented during the 2018–19 and 2019–20 flu seasons to disseminate positive information about the flu vaccine. At the time, this constituted the largest influencer-driven health campaign focused on these communities in the United States. Comments on posts were qualitatively coded to determine content perceptions among those exposed to posts. Digital metrics were also analyzed. During Year 1, posts reached 9 million+ social media users and generated 64 612 likes or shares, and 1512 responses. In Year 2, posts reached 8 million+ users and generated 155 600 likes or shares, and 3122 responses. Around 94% of public responses to posts were positive, suggesting this is a promising strategy to communicate health information and could shift social norms, particularly for heavily debated topics such as vaccination. This strategy represents a more community-led and participatory approach than most large-scale vaccination campaigns have attempted, with immediate applicability to communications about the COVID-19 vaccine.

Introduction

Each year millions of people across the United States contract influenza (flu), resulting in 12 000–56 000 fatalities annually [1]. Although the flu vaccine is the most effective preventive intervention against flu infection, rates of vaccine uptake have historically been low, particularly among African American and Hispanic populations. In the 2019–20 flu season, around 41% of non-Hispanic African Americans and 38% of Hispanics received the flu vaccine, compared with 53% of their white counterparts [2]. Both African Americans and Hispanics may hold negative views and social norms that discourage flu vaccination, which can contribute to their lower vaccination rates [3–5]. Despite the need for education about the benefits of the flu vaccine, health communications campaigns around the topic often find themselves mired in debates, particularly on social media [6]. Pro-vaccine messaging on social media is often flooded with negative comments from often highly organized vaccine opponents [7–9]. There is a need for health communications strategies that can effectively reach at-risk audiences without drawing the ire of the well-established networks of vaccine opponents.
Using social media influencers to communicate flu vaccine-related information is an underutilized approach. For a decade, the marketing world has tapped into the power of social media influencers as a cost efficient and effective way to sell products [10–12]. Social media influencers are individuals who have built a reputation and following on social media, oftentimes specializing in a niche topic area [13]. Research has shown that people tend to follow influencers with whom they can identify, which has created audience segments that can be reached more directly and personally than traditional celebrities, who tend to reach a mass audience and are less relatable to the average person [12, 14]. People consider Instagram ‘celebrities’ to have a higher level of trustworthiness than traditional celebrities; in addition, approximately one-fifth of respondents in another survey claimed they would buy a product simply because their favorite influencer endorsed it [14–17]. Despite the fact that a majority of US adults believe that social media platforms have too much influence in news, 55% of US adults also report often relying on social media for their news, and 15% report frequently purchasing goods from social media ads [14, 17–19]. Other research has shown that consumers have positive attitudes toward micro-influencers [20]. This leaves influencers with a clear ability to sway their followers’ decision making and promote positive perceptions toward a brand or issue [21]. Social media influencers have recently started to be explored for the promotion of health topics, with promising results shown across topics including HPV vaccination, healthy eating, tobacco prevention and skin cancer prevention [16, 22–24].

From September 2018 to March 2019 and September 2019 to March 2020, nonprofit organization The Public Good Projects (PGP) implemented a social media influencer-led digital campaign to promote the flu vaccine. The campaign used social media ‘micro-influencers’ who are predominantly followed by African Americans or Hispanics in one of eight regions or states (corresponding to the funder’s service regions). Prior research has separated priority audiences for flu vaccination messaging into three groups based on their likelihood of getting the vaccine: (i) Those who believe in the value of vaccination and typically receive a vaccine, (ii) Those who may have questions about the value of vaccination and sometimes receive the flu vaccine and (iii) Those who reject the value of vaccination and never receive the vaccine [25]. Using Perkins and Berkowitz’s Social Norms Approach, which states that changing perceived norms can impact behavior, this intervention targeted the first and second groups through personalized message delivery from influencers they follow, with the aim of increasing positive normative perceptions of flu vaccination [26–28]. An evaluation from Year 1 of the Stop Flu campaign showed significant increases in positive attitudes toward the flu vaccine in areas that received the intervention [29]. This study expands upon this evaluation, reporting on the qualitative analysis of comments posted in response to influencer posts throughout Years 1 and 2 of the campaign, as well as digital metrics from influencer posts. The specific aims of this study are to: (i) Describe the process of creating a social media intervention with influencers to change social norms around vaccination; (ii) Examine the quantity and sentiments of comments on influencer posts; and (iii) Discuss lessons learned and recommendations for the use of influencers to deliver health information that is often rendered ineffective through opposition.

Materials and methods

Influencer campaign

Influencers with followings typically between 1000–50,000 were recruited from an influencer recruitment software platform. Two influencers had followings of 150,000 at the time of posting; one was located in Hawaii and one in California. Each influencer was paid to post one time to their followers on at least one platform. Specific costs paid to each influencer were determined by the platform; typically, influencers with a larger reach also request more money per post. Influencers with followings up to 50,000 were selected because their costs typically fit within the project budget; the two influencers with larger followings charged fees within
the project budget. Each influencer was required to deliver at least one vetted and scientifically accurate health fact about the flu vaccine, using their own voice and style. Influencer selection criteria included that they were 21–60 years old, with a majority of their followers being either African American and/or Hispanic, and whose followers were predominantly located in specific geographic regions. Parents or guardians are typically the deciding factor for whether a child gets vaccinated [30]. Therefore, influencers were often selected if they were in a caregiving position, such as a being parent of a child. More information about the types of influencers involved in the campaign can be found published elsewhere [29]. The influencer recruitment software provides information on each influencer, including the influencer’s reach to specific demographic groups, examples of top content and location of their followers; this allowed for PGP to purposely select influencers who fit the selection criteria above. Influencers were provided with 1–3 health facts to focus on in their posts, which were selected by PGP from an overall list of 26 health facts. Health facts were selected intentionally, to appeal to the specific audience that the influencer reached. Health facts and messages were also designed to correspond to three phases of the flu season: (i) Pre-flu season, during which time influencers highlighted preparation (September to October); (ii) Active flu season, during which time influencers highlighted the importance of getting the flu shot given the rise in flu cases (November to January); and (iii) End of flu season, during which time influencers highlighted that it is never too late to get the flu shot (February to March). Prompts for posts were also based on the time of month or around holidays; for example, at Thanksgiving influencers were asked to write a post about the tradition they would miss most if they were sick with the flu. All health facts and final posts were approved by PGP prior to posting. Health facts originated from previously published information from vetted health agencies, such as The Centers for Disease Control and Prevention or the Food and Drug Administration [31–35]. All health facts that were used by influencers, as well as the number of times those health facts were used throughout the campaign, are provided in Supplementary File S1.

Due to stigma around the word ‘vaccine’ and the fact that not all locations offer the nasal spray, all messages highlighted promotion of the flu shot specifically. Although influencers may have referenced their entire family getting their flu shots, flu shot promotion messages were general and not specifically tailored toward children (e.g. ‘Me and my whole family are getting our flu shots this year, and you should get your flu shot too’). Influencers were asked to use the following hashtags on their posts: #stopflu, #fightflu and during Year 2, #getyourflu-shot. Influencers were required to leave their posts up for the duration of the campaign; however, if after at least 48 h their content received any threatening or inappropriate comments, the influencers could remove or hide their post from their feed. During Year 2, influencers were initially asked to include #flufighter, which is the CDC’s campaign hashtag. However, in November 2019, due to negative comments from vaccine opponents, influencers were instructed to discontinue use of the hashtag and to edit all previously published posts to remove the hashtag.

**Qualitative analysis of post comments**

Two analysts reviewed all comments on each post across all platforms on which influencers posted. Posts were reviewed ~2 weeks after each influencer posted on social media. Data collected from posts included demographic and process information about each influencer, including their social media profile handle, post-URL, date that the health fact was posted, the channel(s) on which it was posted, gender, state/region where the influencer was located, and the number of followers the influencer had on the account where it was posted. In order to measure the amount of responses each post received, analysts recorded the total number of likes, shares and comments. All comments found on posts were manually coded into a theme, using Crabtree and Miller’s 5-Step Interpretive Process as guidance [36]. Comments were qualitatively analyzed by two analysts to determine: (i) The

---

E. Bonnevie et al.
proportion of comments that were negative or positive, and (ii) Within those that were positive and negative, the major themes found within those comments. Positive posts were defined as any posts that either adopted a positive tone or referenced the flu or flu vaccine in a way that was factual or not promoting vaccine opposition. Negative posts were defined as any post expressing negative sentiments toward the post or promoting negative views toward vaccination specifically. All data were organized and analyzed in Microsoft Excel. To ensure consistent coding, a codebook was created and all comments across ten influencer posts were cross-checked each year, to ensure that percentage agreement across analysts was above 90%.

Results

Influencer metrics
Across both years, 250 influencers took part in the campaign (117 in Year 1; 133 in Year 2). In Year 1, influencers were paid up to $360 per post, or an average of $84 per influencer; in Year 2, influencers were paid up to $325 per post, or an average of $97 per influencer. The majority of influencers posted on Instagram (68% in Year 1; 74% in Year 2), followed by Twitter (22% in Year 1; 13% in Year 2) and Facebook (10% in Year 1; 13% in Year 2). Percentages may exceed 100% because some influencers posted on multiple platforms. Although influencers were allowed to post text, an image, or a video, a majority chose to post an image in both years (86% image, 19% text, 5% video in Year 1; 97% image, 0% text, 4% video in Year 2).

During Year 1, influencer posts achieved 65 721 likes, a potential reach of 9.9 million followers, and an average of 0.042 likes per influencer follower. The potential reach calculation includes not only followers of the influencers’ account, but also followers of accounts who shared or re-tweeted the original post. During Year 2, influencer posts achieved 155 600 likes, a potential reach of 8.5 million followers and an average of 0.102 likes per influencer follower. Metrics by region were analyzed to understand the proportional number of likes per influencer posting. During both years, posts received the most likes per influencer within Southern California, with 931 per influencer in Year 1 and 4654 per influencer in Year 2. In contrast, during both years Colorado received the fewest likes per influencer at 280 per influencer in Year 1 and 314 per influencer in Year 2. Three regions achieved more likes per influencer during Year 1: Hawaii (+328 likes per influencer in Year 1), Oregon (+199) and Georgia (+86). Five regions achieved more likes per influencer during Year 2: Southern California (+3723 likes per influencer in Year 2), Washington (+390), Mid-Atlantic States (+208), Northern California (+180) and Colorado (+35).

During Year 1, influencers reached an average of 51 614 followers, compared with an average of 51 929 followers per account during Year 2 (Table I).

Qualitative analysis
Qualitative analysis was conducted across 117 influencers during Year 1 and 128 influencers during Year 2. During Year 2, five influencers removed their posts before analysts were able to analyze them. Although the digital metrics above include information from those five accounts, the qualitative analysis below excludes them, as the posts were unavailable to view on their social media accounts at the 2-week mark after they were posted. During Year 1, influencer posts achieved a total of 1515 comments, whereas Year 2 saw an increase to 3122 comments. During Year 1, comments predominantly came from the Mid-Atlantic States (22.1%), Southern California (18.5%) and Northern California (15.0%). The higher number of comments in Year 2 was primarily driven by influencers in Southern California (42.1%), with Northern California (18.2%) and Colorado (9.5%) following. By number, from Year 1 to Year 2 the number of comments increased in Colorado, Georgia, Hawaii, Northern California and Southern California. The number of comments decreased in the Mid-Atlantic States, Oregon and Washington (Table II).

Qualitative analysis of posts shows that a majority of comments during both Year 1 and Year 2...
expressed positive sentiment (92.9% and 94.8%, respectively). Examination of the specific themes shows that a majority of positive posts were general expressions of positive sentiment (80.5% Year 1 and 81.3% Year 2). This included any general positive affirmation that expressed approval toward the influencer’s post (‘Yes!’ or ‘Love it’). This theme was followed by posts advocating for or encouraging others to get the flu shot, (9.0% in Year 1 and 9.3% in Year 2). Expressions of having already received the flu shot, or intentions to get the flu shot followed.

Negative reactions to posts showed more variation in themes between the 2 years. Year 1 showed 108 negative comments to influencer posts (7.1% of all comments in Year 1), compared with 162 negative comments in Year 2 (5.2% of all comments in Year 2). General negative sentiment increased from Year 1 to Year 2 (30.6% Year 1; 50.0% Year 2). Posts expressing

### Table I. Cumulative digital metrics for stop flu social media influencer posts, Year 1 (2018–19) and Year 2 (2019–20), by campaign region

| Region                  | Year 1 (September 2018 to March 2019) | Year 2 (September 2019 to March 2020) |
|-------------------------|---------------------------------------|---------------------------------------|
|                         | No. of influencers | Total followers | Total likes | Likes per influencer | No. of influencers | Total followers | Likes | Likes per influencer |
| Colorado                | 10                     | 97 052          | 2797        | 280                  | 13                     | 243 374         | 4085  | 314                  |
| Georgia                 | 11                     | 882 639         | 4484        | 408                  | 20                     | 501 968         | 6435  | 322                  |
| Hawaii                  | 10                     | 1 991 503       | 8158        | 816                  | 15                     | 2 057 532       | 7318  | 488                  |
| Mid-Atlantic States     | 30                     | 460 871         | 8567        | 286                  | 20                     | 411 583         | 9863  | 493                  |
| Northern California     | 13                     | 233 207         | 7201        | 554                  | 28                     | 542 047         | 20 558 | 734                  |
| Oregon                  | 11                     | 390 978         | 6841        | 622                  | 7                      | 102 048         | 2958  | 423                  |
| Southern California     | 21                     | 1 646 418       | 19 561      | 931                  | 20                     | 2 514 289       | 93 081 | 4654                 |
| Washington              | 11                     | 331 211         | 8112        | 737                  | 10                     | 481 797         | 11 274 | 1127                 |
| Total                   | 117                    | 6 038 879       | 65 721      | 562                  | 133                    | 6 854 638       | 155 572 | 1170                 |

### Table II. Number of comments on stop flu social media influencer posts during Year 1 (2018–19) and Year 2 (2019–20), by campaign region

| Region                  | Year 1 | % of Year 1 Comments | Year 2 | % of Year 2 Comments |
|-------------------------|--------|----------------------|--------|----------------------|
| Colorado                | 131    | 8.6%                 | 296    | 9.5%                 |
| Georgia                 | 117    | 7.7%                 | 295    | 9.4%                 |
| Hawaii                  | 187    | 12.3%                | 224    | 7.2%                 |
| Mid-Atlantic States     | 335    | 22.1%                | 248    | 7.9%                 |
| Northern California     | 227    | 15.0%                | 569    | 18.2%                |
| Oregon                  | 113    | 7.5%                 | 63     | 2.0%                 |
| Southern California     | 281    | 18.5%                | 1313   | 42.1%                |
| Washington              | 124    | 8.2%                 | 114    | 3.7%                 |
| Total                   | 1515   |                      | 3122   |                      |
Social media influencers can be used to deliver positive information about the flu vaccine.

### Table III. Comment sentiment and themes

| Overall sentiment                  | Year 1 % (n) | Year 2 % (n) |
|-----------------------------------|--------------|--------------|
| Any positive                      | 92.9% (1407) | 94.8% (2960) |
| Any negative                      | 7.1% (108)   | 5.2% (162)   |

**Conversation theme**

| General Positive Statements<sup>a</sup>: Any comment with a positive sentiment that did not specifically reference the flu shot (‘So creative,’ ‘Yes,’ ‘Thanks for sharing’) | 80.5% (1133) | 81.3% (2319) |
| Positive Advocacy<sup>a</sup>: Any comment specifically referencing the flu shot that encouraged others to get a vaccine (‘Yes... as someone who had influenza B last year... Get your flu shot!!!’) | 9.0% (126) | 9.3% (265) |
| Positive Received the Shot<sup>a</sup>: Any comment that indicated the person has already received their flu shot (‘I already got mine’) | 4.8% (68) | 6.0% (170) |
| Positive Intention<sup>a</sup>: Any comment that indicated the person was going to receive their flu shot (‘I need to get my shot’) | 4.5% (63) | 5.3% (151) |
| General Negative Statements<sup>b</sup>: Any comment with a negative sentiment that did not specifically reference the flu shot (‘That is not a cute look’) | 30.6% (33) | 50.0% (81) |
| Negative Efficacy<sup>b</sup>: Any comment that claims the flu shot doesn’t work (‘Not worth it 27% success 2018 per CDC. You have better odds in Vegas’) | 34.3% (37) | 12.3% (20) |
| Negative No Intention<sup>b</sup>: Any comment that explicitly states that the person will not get the flu shot (‘I’m not getting vaxxed ever again, but do you’) | 21.3% (23) | 38.9% (63) |

<sup>a</sup>All percentages for positive themes were calculated out of the total number of positive responses (n = 1407 Year 1 and n = 2960 Year 2). One post could be coded into multiple themes.

<sup>b</sup>All percentages for negative themes were calculated out of the total number of negative responses (n = 108 Year 1 and n = 162 Year 2). One post could be coded into multiple themes.

no intention to receive the flu vaccine also increased (21.3% Year 1; 38.9% Year 2), whereas criticisms of the efficacy of the flu shot decreased (34.3% Year 1; 12.3% Year 2; **Table III**).

### Discussion

This study showed that social media influencers can positively communicate health information about vaccines among a large, targeted, at-risk audience. In comparing data across the 2 intervention years, digital metrics and qualitative analysis showed an increase in engagements and number of positive comments. Although there were some differences in the number of engagements by region (notably in Southern California, potentially due to an influencer with a following of 150,000, which contributed to an increase in followers that posts reached during Year 2), the proportion of positive comments remained high over time. This suggests that there was consistency in the approach of using influencers to communicate information about the flu vaccine in a way that was received positively by followers. Although most comments did not explicitly reference behavioral actions, community perceptions of vaccine acceptability are important drivers for positive social norms change, which in turn can drive behavior change [37, 38]. This approach has promising implications for communicating about other types of vaccines, with the most important recent example being the COVID-19 vaccines approved for use in the United States. Although African American and Hispanic communities have been disproportionately affected by COVID-19, they have also displayed more hesitancy toward the vaccines, compared with their white counterparts [39, 40]. Health communicators have recommended the adoption of a social norms and influencer-based approach to address COVID-19 vaccine hesitancy specifically [41]. The positive results shown in this study support these recommendations.

The approach used in this study carries with it various strengths. Through an influencer-led approach, messengers can be hyper-targeted. Using
influencer marketing software, interventions can engage individuals that have a specific reach in niche groups. These targeted influencers can be used to communicate tailored messages which have been identified as being effective in driving behavior change among specific groups. That messaging and hashtags could be refined mid-stream indicates that messaging can be flexible, taking into account events or topics as they happen, and shifting strategies to avoid vaccine opposition groups torpedoing the campaign. Flexibility in messaging is particularly critical during the COVID-19 pandemic, when facts and information about the virus and vaccine have changed often, depending on the phase of the pandemic. This study also showed that an intervention can reach a large group of at-risk populations while maintaining a small budget, with the average influencer receiving <$100 per post across both years. The budget advantages are particularly true relative to other large public health campaigns which typically spend more money to reach a non-targeted audience—and are often ultimately inundated by negative comments from vaccine opponents.

Through this study, we also learned the importance of using hashtags that are unaffiliated with other large-scale vaccination campaigns. The influence of vaccine opponents on social media has been well established, with numerous reports of vaccine opponents harassing physicians, lawmakers and pro-vaccine individuals online [42, 43]. In November 2019, one month after beginning to use CDC’s flu vaccine hashtag #flufighter, we required that influencers remove the hashtag from their posts. This was prompted by provocations from a handful of hostile vaccine opposers who appeared to be searching social media for uses of #flufighter and commenting with the same harassing statements on each post. Opponents appeared to be highly coordinated; anecdotally, we believed that several accounts may have originated from one person, based on posting patterns. We recommend that future influencer-based interventions avoid hashtags being used by organizations known to attract debates, unless an organization has the capability to respond quickly to comments, or to train influencers how to respond. It is important to note that once that hashtag was removed from influencer posts, the harassing comments from vaccine opponents stopped entirely.

This study also presents some areas of examination for future studies. The use of influencers to communicate about the COVID-19 vaccine is an important area of immediate study, particularly when vaccine distribution becomes open to the general public. Additionally, while this intervention utilized influencers who had followings within African American or Hispanic communities in their states, future research should examine within these targeted groups which personal characteristics are most likely to inspire positive engagements (e.g. gender, personal style or whether the influencer focuses on a specific theme such as health and wellness, beauty or dining). Social media platforms and size of influencer followings could also be studied to examine impacts on message receptivity and levels of engagement, by engaging a range of both macro and micro-influencers across a variety of platforms.

Limitations
Positive or negative perceptions of the flu vaccine could have been impacted by events or macro-cultural forces outside the control of the intervention. For example, the Year 2 intervention ended just as the COVID-19 pandemic began to spread through the United States. Due to the pandemic, the influencer campaign ended 2 weeks earlier than originally planned. However, by analyzing 2 years of data, we feel that the overarching results showing the potential for positive health communications are consistent. It is also unknown whether those who commented on posts previously had positive perceptions toward the flu vaccine, leaving them more likely to respond positively to the posts. Finally, it is possible that the metrics for reach were overstated, given that they account for all influencer followers plus those who shared the content. However, given that influencers posts on their own accounts, we are unable to view actual reach numbers, and this calculation is provided as a standard metric.
from the influencer recruitment platform. Other campaigns using influencer recruitment software would likely encounter similar challenges in estimating actual reach. Despite this challenge with estimating reach, the aim of the study was not to prove that an influencer campaign can garner high reach numbers, but rather to examine whether the approach can generate positive engagements among those it does reach. These positive engagements, in turn, may have positive impacts on the perceptions and social norms of those who may not comment on the posts but are exposed to the positivity in their feeds.

Conclusions

This study shows the potential for using social media influencers to inspire positive engagements on pro-vaccine health messaging. Even though a majority of the responses on posts did not disclose behavioral intentions to receive the flu vaccine, the overwhelming positivity of reactions may help in changing social norms toward positive perceptions of the flu vaccine. This type of intervention is a relatively inexpensive, consistent and wide-reaching approach to generate positive sentiment among an at-risk population. The approach is also dynamic enough to be able to handle feedback, quality improvement and refinement midstream. Lessons learned from this study can be applied to future research on vaccines and other health topics that may be susceptible to debates, with particular applicability in the current pandemic context and COVID-19 vaccine hesitancy.

Supplementary data

Supplementary data are available at HEAL online

Authors’ contributions

E.B. conceived of the study, designed the analysis, and wrote the article. S.M.S. analyzed data and wrote the results section. E.B. wrote article in consultation with J.G. and J.S. and with support from C.K.

Funding

This study was funded by Kaiser Permanente.

Conflict of interest statement

None declared.

References

1. Centers for Disease Control and Prevention. Estimated Influenza Illnesses and Hospitalizations Averted by Vaccination — United States, 2013–14 Influenza Season. Available at: https://www.cdc.gov/mmwr/preview/mmwrhtml/mm6349a2.htm. Accessed: 13 November 2020.
2. Centers for Disease Prevention and Control. Racial and Ethnic Minority Groups. Available at: https://www.cdc.gov/flu/highrisk/disparities-racial-ethnic-minority-groups.html. Accessed: 15 January 2021.
3. Shui I, Kennedy A, Wooten K et al. Factors influencing African-American mothers’ concerns about immunization safety: a summary of focus group findings. J Natl Med Assoc 2005; 97:657–66.
4. Quinn SC. African American adults and seasonal influenza vaccination: changing our approach can move the needle. Hum Vaccines Immunother 2018; 14:719–23.
5. Wooten KG, Wortley PM, Singleton JA et al. Perceptions matter: beliefs about influenza vaccine and vaccination behavior among elderly white, black and Hispanic Americans. Vaccine 2012; 30:6927–34.
6. Orr D, Baram-Tsabari A, Landsman K. Social media as a platform for health-related public debates and discussions: the Polio vaccine on Facebook. Isr J Health Policy Res 2016; 5:34.
7. Lee BY. How This Vaccination Video Went Viral, But Resulted In Threats Against Pediatrician. Available at: https://www.forbes.com/sites/brucelee/2020/01/19/how-this-pro-vaccination-video-went-viral-but-resulted-in-threats-against-pediatrician/. Accessed: 13 November 2020.
8. Bonnevie E, Goldharg J, Gallegos-Jeffrey AK et al. Content themes and influential voices within vaccine opposition on Twitter, 2019. Am J Public Health 2020; 110:8326–30.
9. Hoffman BL, Felter EM, Chu K-H et al. It’s not all about autism: the emerging landscape of anti-vaccination sentiment on Facebook. Vaccine 2019; 37:2216–23.
10. Magno F, Cassia F. The impact of social media influencers in tourism. Anatolia 2018; 29:288–90.
11. Lim XJ, Radzol ARM, Cheah J-H et al. The Impact of Social Media Influencers on Purchase Intention and the Mediation Effect of Customer Attitude. AJBR. 2017.
21. Facebook. State of Disruption Annual Report 2019. n.d.
22. Ortiz RR, Smith AM, Coyne-Beasley T. A systematic literature review to examine the potential for social media to impact HPV vaccine uptake and awareness, knowledge, and attitudes about HPV and HPV vaccination. Hum Vaccines Immunother 2019; 15:1465–75.
23. Kostygina G, Tran H, Binns S et al. Boosting health campaign reach and engagement through use of social media influencers and memes. Soc Media Soc 2020; 6:205630512091247.
24. Gough A, Hunter RF, Ajao O et al. Tweet for behavior change: using social media for the dissemination of public health messages. JMIR Public Health Surveill 2017; 3:e14.
25. Sheedy K. Communication Strategies for Increasing National Seasonal Influenza Vaccine Usage. WHO GAP-II Meeting, Geneva, Switzerland: NCIRD, 2011.
26. Berkowitz AD. An overview of the social norms approach. In: Changing the Culture of College Drinking. Cresskill, New Jersey: Hampton Press, INC, 2005, 193–215.
27. Perkins HW, Berkowitz AD. Perceiving the community norms of alcohol use among students: some research implications for campus alcohol education programming. Int J Addict 1986; 21:961–76.
28. Chen F, Stevens R. Applying lessons from behavioral economics to increase flu vaccination rates. Health Promot Int 2017; 32:1067–73.
29. Bonnevie E, Rosenberg SD, Kummeth C et al. Using social media influencers to increase knowledge and positive attitudes toward the flu vaccine. PLoS One 2020; 15:e0240828.
30. Serpel J, Green J. Parental decision-making in childhood vaccination. Vaccine 2006; 24:4041–6.
31. The Permanente Medical Group. Cold-And-Flu. Available at: https://mydoctor.kaiserpermanente.org/ncal/cold-and-flu/prevention/#/prevention. Accessed: 13 November 2020.
32. Centers for Disease Control and Prevention. Vaccine Effectiveness: How Well Do the Flu Vaccines Work? Available at: https://www.cdc.gov/flu/vaccines-work/vaccineeffect.htm. Accessed: 13 November 2020.
33. Centers for Disease Control and Prevention. What you need to know about influenza (flu) from CDC. Available at: https://www.cdc.gov/flu/index.htm. Accessed: 13 November 2020.
34. Coe AB, Gatewood SBS, Moczygemba LR, et al. The use of the health belief model to assess predictors of intent to receive the novel (2009) H1N1 influenza vaccine. Innov Pharm 2012; 3:1–11.
35. Kaiser Permanente. Flu Resources | Southern California. Available at: https://thrive.kaiserpermanente.org/care-near-you/southern-california/flu-resources/. Accessed: 13 November 2020.
36. Crabtree BF, Miller WL. Doing Qualitative Research. Thousand Oaks, CA: SAGE Publications, 1999, 127–145.
37. Quinn SC, Hilyard KM, Jamison AM et al. The influence of social norms on flu vaccination among African American and White adults. Health Educ Res 2017; 32:473–86.
38. Brewer NT, Chapman GB, Rothman AJ et al. Increasing vaccination: putting psychological science into action. Psychol Sci Public Interest J Am Psychol Soc 2017; 18:149–207.
39. Gold JAW. Race, ethnicity, and age trends in persons who died from COVID-19 — United States. MMWR Morb Mortal Wkly Rep 2020; 69:1517–21.
40. Coustas A, Kimber C, Maxwell K. COVID-19 and vaccine hesitancy: a challenge the United States must overcome. J Am Public Health Assoc 2021; 44:71–5.
41. Center for Public Interest Communications. Guide to COVID-19 vaccine communications – A practitioner’s guide to the principles of COVID-19 vaccine communications. Available at: https://covid19vaccinescommunicationprinciples.org/. Accessed: 15 January 2021.
42. Dutton AB. Area nurse takes Facebook hit from ‘anti-vaxxers’ | Idaho Statesman. Available at: https://www.idahostatesman.com/living/health-fitness/article23568109.html. Accessed: 13 November 2020.
43. Karlamangla S. Anti-vaccine activists have doctors ‘terrorized into silence’ with online harassment - Los Angeles Times. Available at: https://www.latimes.com/local/california/la-me-ln-vaccine-attacks-20190317-story.html. Accessed: 13 November 2020.