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

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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, #getyourflushot. 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

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

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 | | | | Year 2 | | | |
| | September 2018 to March 2019 | | | | 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 | Number of comments | | | |
	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	

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 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[a]: 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[a]: 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[a]: Any comment that indicated the person has already received their flu shot ('I already got mine')	4.8% (68)	6.0% (170)
Positive Intention[a]: 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[b]: 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[b]: 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[b]: 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)

[a]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.
[b]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 opposers 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 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.

Conflict of interest statement

None declared.

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