



A Learning Session Behavioral Science and Digital Strategies to Accelerate HPV Vaccination Uptake: Evidence From Bangladesh

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Today's Agenda

Opening & Introduction to the Learning Collaboratives



Presentation by Dr. Sohail Agha: Impact and costeffectiveness of social media interventions on HPV vaccination in Bangladesh



Presentation by Dr. Doug Evans: Reflections on HPV and digital strategies



Open Q&A

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Tell us about yourself

In the chat, introduce yourself and where you're joining from!

Social Norms and Agency Learning Collaborative (LC) Network: Who We Are



A network of passionate individuals and organizations working together to influence and shape the field of social norms and agency



Comprised of 5 communities in Anglophone and Francophone West Africa, East Africa, South Asia, and the Global Learning Collaborative community for those not residing within these regions





Our mission is to strengthen research and practice on social norms, gender, and agency by building a network of practitioners, researchers, evaluators, and advocates who share knowledge, generate evidence, and develop resources to support SBC programming.

What We Do

DOCUMENT & SHARE EXPERIENCES





Learning Collaborative **ACTIVITIES**

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IMPROVE PRACTICE THROUGH PARTNERSHIPS



CO-CREATE RESOURCES AND PRODUCTS

Find out more about the LCs at our brand new website!



www.socialnormsandagencylcs.org

Today's Presenters





Sohail Agha

Doug Evans

Impact and Cost-effectiveness of a Behavioral Insights-Informed Social Media Campaign on HPV Vaccination in Bangladesh

Sohail Agha, PhD Behavioral Insights Lab May 6, 2025

Presented at the Social Norms and Agency Learning Collaborative Webinar

Project Objectives

Determine whether HPV vaccination rates can be increased through a behavioral-insights driven social media campaign

We tested the impact of 3 interventions implemented in 2024:

- 1. An at-scale social media campaign targeting the population within 1 Km of schools in Barisal, Chittagong and Sylhet divisions
- 2. A school promotion interventions conducted in Sylhet division
- 3. An at-scale population-wide social media campaign in Khulna, Rajshahi, and Rangpur divisions



HPV vaccination rates in the 6 divisions prior to National Vaccine Introduction in 2024



Baseline - Sep. 2024

BEHAVIORAL Insights 2023 formative research study

What drives caregivers' expectations that their child will be vaccinated?

HOPE



Caregivers who believed that the HPV vaccine offered girls a brighter future, had higher expectation that their child would get vaccinated.



INJUNCTIVE NORMS

Caregivers who perceived that friends and family supported HPV vaccination had higher expectations of their child getting vaccinated.

GIRL'S AGENCY



Caregivers who knew that their girl wanted the HPV vaccine had higher expectation that she would get vaccinated.

More information about the study can be found here: <u>https://binsightslab.com/hpv-bangladesh</u>

Fear of cancer risk was unrelated to vaccination expectations

% of caregivers who expected their child to get vaccinated, December 2023



CAMPAIGN EXECUTION

Social media messages focused on:

- The girl's future
- Social network approval
- The girl's agency



The HPV vaccine for girls aged 10-14 is coming to your community! Protect your daughter's future with just one dose.





ideSHi





DOCTORS ACROSS BANGLADESH SAY, "YES" TO THE HPV VACCINE



CAMPAIGN EXECUTION schools

An in-person program was implemented in schools and communities. Audiences: Girls, parents, teachers, local community leaders and local health care workers. Program included:

- Community focus groups
- School based events highlighting the agency of the girl in the vaccination journey with quizzes and discussions
- Counseling





HPV vaccination rates before and after the national introduction





Changes in the HPV vaccination rate in intervention and control areas

Baseline Follow-up

We compared caregiver characteristics between the control and intervention areas

- 1. Caregiver's age
- 2. Caregiver's education
- 3. Caregiver's gender
- 4. Caregiver's residence in urban or rural areas
- 5. Adolescent's age

Caregiver's education was higher in divisions where the population-wide social media intervention was implemented



The % of caregivers who were women was higher in divisions where the population-wide social media intervention was implemented



% of caregivers who were women

Urban residence was higher in locations where the school promotion intervention was implemented



We examined whether education, gender and urban residence were associated with HPV vaccination

Education and gender were associated with HPV vaccination, while residence was not



HPV vaccination rate by education, gender and residence

We estimated the Net Effects of each intervention, after controlling for socio-demographic characteristics

Net effects of the 3 interventions on HPV vaccination

Adjusted odds ratios from a logistic regression



Net effects

Percentage point change in vaccination rates (predicted probabilities)



Results:

- There were significant increases in HPV vaccination associated with all 3 interventions
- The targeted social media intervention was associated with a 9.5 percentage points increase in HPV vaccination
- The population-level social media intervention was associated with a 5.3 percentage point increase in HPV vaccination
- The school-promotion intervention was associated with a1.3 percentage point increase in vaccination

Conclusion:

Behavioral-insights informed social media campaigns implemented during national vaccine rollouts can result in substantial increases in HPV vaccination

Implications

- Ensure that national rollouts are supported by social media interventions that are based on behavioral insights.
- Campaigns should consider a positive messaging strategy focusing on the caregiver's aspirations, the adolescent's agency and social norms. Not rely only on lowering the risk of cancer.

Cost-effectiveness

Methodology for Cost-effectiveness

- A simplified proportional outcomes model was used
 - Static, one-time estimate
 - Unit of analysis: single vaccinated girl
- Cost inputs included:
 - Vaccine procurement and distribution costs
 - Cervical cancer treatment costs averted
 - Social media campaign delivery costs
 - Research costs
- Effectiveness inputs:
 - Vaccine effectiveness
 - Social media intervention effectiveness

Model Inputs and Outcomes – HPV Vaccine Promotion via Social Media

Parameter	Value
Cervical cancer incidence (per girl)	0.000106
Vaccine efficacy	97.5%
Vaccine cost (single dose)	\$4.60
Supply chain & delivery cost	\$0.92
Social media cost per girl vaccinated	<mark>\$0.66</mark>
Treatment cost per cerv. cancer case	\$477
Average survival post-diagnosis (yrs)	3.35
DALYs averted per vaccinated girl	0.152
Treatment cost averted per girl	\$0.17
Incremental cost per vaccinated girl	\$6.02
Cost per DALY averted (ICER)	\$39.57

Cost-effectiveness

US\$ 40 per DALY averted

Cost of social media campaigns and evaluation:



END

Digital Media for Behavior Change: State of the Science

The Social Norms and Agency Learning Collaborative Webinar

W. Douglas Evans, Ph.D. May 2025



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Overview

- Describe the growing field of digital media for social and behavior change with case studies
- Theory, Principles, Evidence
- Quick examples
- Conclusions and future research

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Branding behavior change

- Strategic communications for behavior change use branding strategies
- Brands represent values with which audiences identify
- Evans et al. (2015) showed *branded* strategic communication is more effective than unbranded in population health campaigns
- Digital media are powerful tools to build behavior change brands
- This approach has been especially successful in tobacco control (eg, the widely acclaimed *Truth* campaign)

Evans, W. D., Blitstein, J., Vallone, D., Post, S., & Nielsen, W. (2015). Systematic review of health branding: growth of a promising practice. *Translational behavioral medicine*, *5*(1), 24–36. https://doi.org/10.1007/s13142-014-0272-1

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Adelante Digital

- Integrated digital and community-based social marketing campaign
- Youth social influencers created branded content to promote Adelante
- Built positive identification with program for Hispanic youth in DC area

Evans WD, Andrade EL, Barrett N, Snider J, Cleary S, Edberg M. Outcomes of the Adelante community social marketing campaign for Latino youth. Health Educ Res. 2019 Oct 1;34(5):471-482. doi: 10.1093/her/cyz016.

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Defining digital media for behavior change

- Within the field of Digital Health Interventions (DHIs)
- Campaigns, interventions, and programs aimed at changing specific behavior(s) in a population using one or more digital platform(s) as the delivery channel, including research aimed at assessing the effectiveness of such programs
- But how effective is it and under what conditions?

Evans WD, Abroms LC, Broniatowski D, Napolitano M, Arnold J, Ichimiya M, Agha S. Digital Media for Behavior Change: Review of an Emerging Field of Study. Int J Environ Res Public Health. 2022 Jul 26;19(15):9129. doi: 10.3390/ijerph19159129.

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Principles and theoretical foundations

- The scale of digital media may create a sense of widespread support for, and adoption of, specific behaviors.
- Social support and social influence may result.
- Social media campaigns may promote a <u>social norm</u> for specific health behaviors like vaccination or nicotine use.
- Critically, such <u>social norms</u> can be reinforced by combining social influences via digital and community channels

Panek E, Mollen S, Cascio C. Editorial: Perceived social norms and how they relate to online media. Front Psychol. 2025 Feb 25;16:1568119. doi: 10.3389/fpsyg.2025.1568119.

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Example: Social media interventions systemic review

- PRISMA-based review of social media behavioral interventions in LMIC
- 1,832 studies, 107 passed title-abstract review, total of 34 were included in the final analysis
- 22 studies concluded intervention was effective; only 13 quantified social media engagement, and 8 used a theoretical model
- <u>21/22 effective interventions used both social</u> media and community-level components
- Small but growing evidence base



Seiler J, Libby TE, Jackson E, Lingappa JR, Evans WD. Social Media-Based Interventions for Health Behavior Change in Lowand Middle-Income Countries: Systematic Review. J Med Internet Res. 2022 Apr 14;24(4):e31889. doi: 10.2196/31889.

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Digital Media Behavioral Intervention Database



- Recently compiled a database to systematically monitor DHI publications
- The aims are to:
 - 1) Identify all published digital media behavior change interventions;
 - 2) Identify evidence in the field;
 - 3) Conduct meta-analyses;
 - 4) Example: Ichimiya, M., Gerard, R., Mills, S., Brodsky, A., Cantrell, J., & Evans, W. D. (2022). The Measurement of Dose and Response for Smoking Behavior Change Interventions in the Digital Age: Systematic Review. *Journal of Medical Internet Research*, 24(8), e38470. https://doi.org/10.2196/38470





Case Studies

Using Digital Media for Behavior Change

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Digital segmentation for research

- Social media remarketing maybe used to segment, direct campaign content to audiences, recruit participants into studies
- Intervention studies can use remarketing to direct content to study arms
- Create naturalistic online experiments
- Use cases in nicotine & vaccination
- Virtual Lab platform (<u>https://vlab.digital/</u>)



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Case Study 1: Vaping RCT Using Retargeting

- RCT to examine vaping/smoking outcomes (aim 1.2 of CA253013)
- Pre-test, 30 day, 60-day follow-ups, (n=1,823)
- Randomization to levels of exposure to 4 campaignthemed anti-vaping ads (0, 1x, 2x, 3x, 4x exposures) presented in random order
- Examine the effects of exposure levels on changes in outcomes pre/post over a 60 day period

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Aim 1.2 study design



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Anti-vaping brand



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RCT: Treatment Effects on Vape Use Intentions

 Reduced vape intentions at followup among current users v. control

 Increased antivape industry beliefs among current users v. control

 Dose-response effects of higher exposure on outcomes JOURNAL OF MEDICAL INTERNET RESEARCH

Original Paper

Effects of a Social Media Intervention on Vaping Intentions: Randomized Dose-Response Experiment

William Douglas Evans¹, PhD; Jeffrey Bingenheimer¹, PhD; Jennifer Cantrell³, PhD; Jennifer Kreslake³, PhD; Shreya Tulsiani³, MPH; Megumi Ichimiya¹, MPH; Alexander P D'Esterre¹, MPH; Raquel Gerard¹, MPH; Madeline Martin¹, MPH; Elizabeth C Hair³, PhD

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Abstract

https://www.imir.org/2024/1/e5074

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Background: e-Cigarette use, especially by young adults, is at unacceptably high levels and represents a public health risk factor. Digital media are increasingly being used to deliver antivaping campaigns, but little is known about their effectiveness or the dose-response effects of context delivery.

Objective: The objectives of this study were to evaluate (1) the effectiveness of a 60-day antivaping social media intervention in changing vaping use intentions and beliefs related to the stimulus content and (2) the doser-response effects of varying levels of exposure to the intervention on vaping outcomes, including anti-industry beliefs, vaping intentions, and other attitudes and beliefs related to vaping.

Methods: Participants were shalts aged 18 to 24 years in the United States. They were recruited into the study through Facebook (Meta Platforms), ourpleted a baseline survey, and them randomized to 16 the 5 conditions: to (control), 4, 8, 16, and 32 exposures over a 15-day period between each survey wave. Follow-up data were collected 30 and 60 days after randomization. We conducted stratified analyses of the full sample and in subsamples defined by the boseline vaping status (avec; former, and current). Stimulas was delivered through Facebook and Instagram in four 15-second social media videos focused on anti-industry beliefs about vaping. The main outcome measures reported in this study were self-reported ergosure to social media in Subsamples defined by the boseline vaping institutions. We estimated a series of multivariate linear regressions in Stata 17 (StataCorp). To capture the dose-response effect, we assigned each armad used this number as our focal independent variable. In each model, the predictor was the treatment arm to which each participant was assigned.

Results: The baseline sample consisted of 1491 participants, and the final analysis sample consisted of 57.28% (854/1491) of the participants retained at the 60-day follow-up. We compared the retained participants with those lost to follow-up and found no statistically significant differences across demographic variables. We found a significant effect of the social media treatment on vaping intentions (3=-0.138, 95% CI -0.266 to -0.010; P=04) and anti-industry beliefs (3=-0.122, 95% CI 0.008-0.237; P=04) targeted by the intervention content among current vapers but not among the full sample or other strata. We found no significant effects of self-reported exposure to the stimulus.

Conclusions: Social media interventions are a promising approach to preventing vaping among young adults. More research is needed on how to optimize the dosage of such interventions and the extent to which long-term exposure may affect vaping use over time.

Trial Registration: ClinicalTrials.gov NCT04867668; https://clinicaltrials.gov/study/NCT04867668

J Med Internet Res 2024 | vol. 26 | e50741 | p. 1 (page number not for citation purposes)

Evans et a



Evans WD, Bingenheimer J, Cantrell J, Kreslake J, Tulsiani S, Ichimiya M, D'Esterre A, Gerard R, Martin M, Hair EC. Effects of a social media intervention on vaping intentions: Randomized dose-response experiment. Journal of Medical Internet Research. 08/02/2024:50741. DOI: 10.2196/50741

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Case Study 2: Promoting COVID-19 Vaccine Uptake and Willingness in Nigeria

- Nationwide study in 2022 of social media campaign delivered in 6 Nigerian states compared to outcomes in 31 non-treatment states
- Data collected through FB & Instagram surveys
- BL (Dec 2021), FU1 (Mar 2022), FU2 (Sept-Oct 2022)
- Measures of vax status, hesitancy, social norms, demographics
- Used social influencer strategy to change vaccination social norms

Evans, W. D., Bingenheimer, J. B., Long, M., Ndiaye, K., Donati, D., Rao, N. M., Akaba, S., Nsofor, I., & Agha, S. (2023). Outcomes of a social media campaign to promote COVID-19 vaccination in Nigeria. *PloS one*, *18*(9), e0290757. https://doi.org/10.1371/journal.pone.0290757

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Theory of change

- Vaccine hesitancy 5 Cs (constraints, complacency, etc.)
- Social norms about vaccination they may change as more people vaccinate
- Supply (trusted source?) and demand balance
- Structural factors (ability to vaccinate)

Betsch C, Schmid P, Heinemeier D, Korn L, Holtmann C, Böhm R. Beyond confidence: Development of a measure assessing the 5C psychological antecedents of vaccination. PLoS One. 2018 Dec 7;13(12):e0208601. doi: 10.1371/journal.pone.0208601.

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Simple Model of Vaccine Uptake



Evans, W. D., & French, J. (2021). Demand Creation for COVID-19 Vaccination: Overcoming Vaccine Hesitancy through Social Marketing. *Vaccines*, 9(4), 319. https://doi.org/10.3390/vaccines9040319



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It is up to us! 100 Find a vaccination site here: http://www.vacsitefinder.nphcda.gov.ng

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 Many influencers, from micro to celebrities

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Vaccination outcomes



Levels:

*Statistically significant difference between treatment and control for first follow up crude rate (p < 0.045) and adjusted rate (p < 0.02)

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Social Norms Outcomes

Adjusted Odds Ratio with Vaccine Hesitancy and Pro-Vaccine Social Norms



* Statistically significant difference for Pro-Vaccine Social norms First Follow-up Prediction (p < 0.001) and Second Follow-up Prediction (p < 0.005)

** First follow-up n= 1155 and Second follow-up n=329

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Future Research and Challenges

- How do we integrate digital and community channels to optimize public health programs?
- Social media as an intervention channel:
 - Will it encourage anti-social behavior online?
 - Will people consume and respond to digital media for behavior change in an impactful way?
- Future research needs to:
 - Keep up with rapidly changing technology (eg, AI)
 - Do research findings translate to community impact?

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Thank you! Questions?

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- https://brightinstitute.gwu.edu/

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Open Q&A

In the Q&A box, share any questions you may have for the panelists.

Find out more about the LCs at our brand new website!



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Thank You