



# DIGITAL LISTENING FOR VACCINES CONFIDENCE

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FEB 2018    NATIONAL HPV VACCINATION ROUNDTABLE MEETING

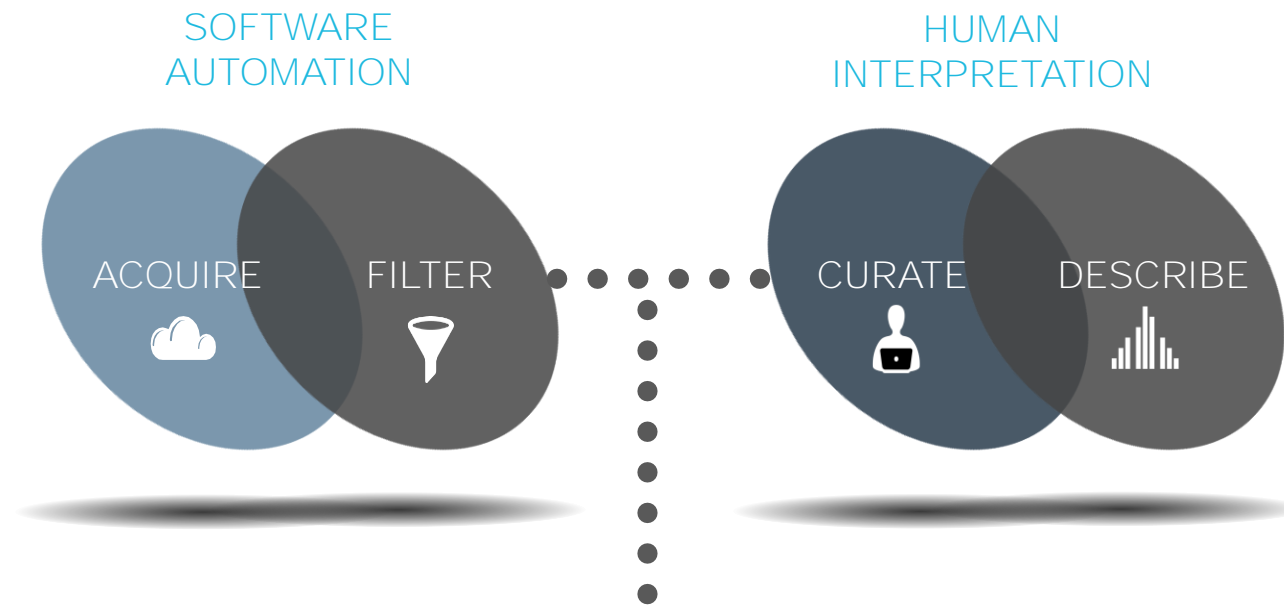
# DISCLOSURES

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- Booz Allen provides digital listening & insights services to commercial and government clients, including Merck on the topic of the HPV vaccine.
- The project and publication presented here was funded by Sanofi Pasteur, and conducted by Epidemico, ProMED-Mail, and Sanofi Pasteur.
- Epidemico has since been acquired by Booz Allen Hamilton.

# Our digital listening methodology includes both automated and human elements

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Improve data tools for efficiency

Natural language processing (NLP) and machine learning tools can assist in reducing human burden.

# Tool developed to understand vaccine sentiment in digital media, in real time

## RESEARCH ARTICLE

HEALTH AFFAIRS > VOL. 35, NO. 2: VACCINES

## Publicly Available Online Tool Facilitates Real-Time Monitoring Of Vaccine Conversations And Sentiments

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5. Angus Thomson is senior director of vaccination policy and advocacy at Sanofi Pasteur, in Lyon, France.
6. John S. Brownstein is cofounder of and a senior executive adviser at Epidemico and chief innovation officer at Boston Children's Hospital, in Massachusetts.

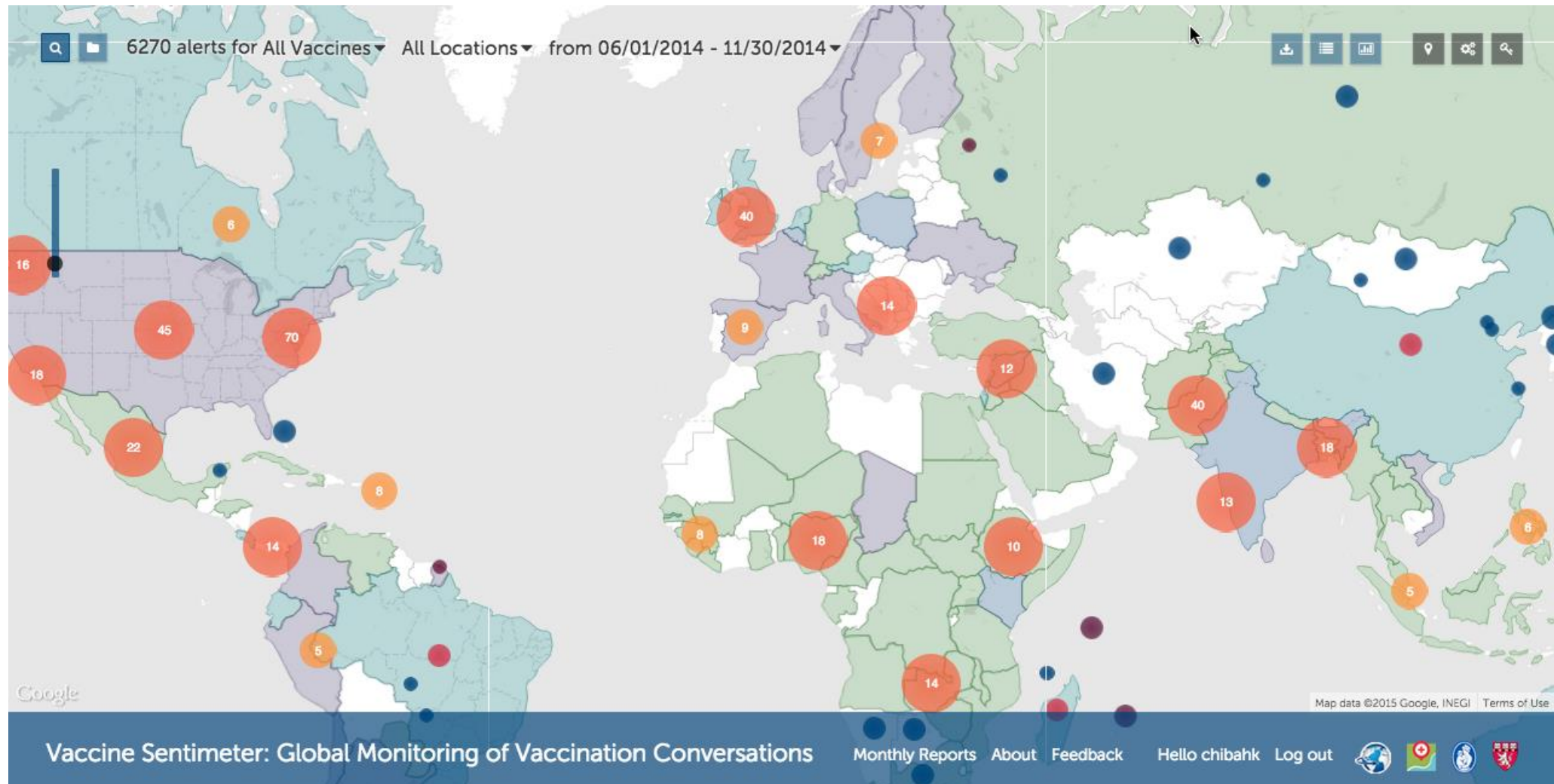
PUBLISHED: FEBRUARY 2016 [No Access](#)

<https://doi.org/10.1377/hlthaff.2015.1092>

## ABSTRACT

Real-time monitoring of mainstream and social media can inform public health practitioners and policy makers about vaccine sentiment and hesitancy. We describe a publicly available platform for monitoring vaccination-related content, called the Vaccine Sentimeter. With automated data collection from 100,000 mainstream media sources and Twitter, natural-language processing for automated filtering, and manual curation to ensure accuracy, the Vaccine Sentimeter offers a global real-time view of vaccination conversations online. To assess the system's utility, we followed two events: polio vaccination in Pakistan after a news story about a Central Intelligence Agency vaccination ruse and subsequent attacks on health care workers, and a controversial episode in a television program about adverse events following human papillomavirus vaccination. For both events, increased online activity was detected and characterized. For the first event, Twitter response to the attacks on health care workers decreased drastically after the first attack, in contrast to mainstream media coverage. For the second event, the mainstream and social media response was largely positive about the HPV vaccine, but antivaccine conversations persisted longer than the provaccine reaction. Using the Vaccine Sentimeter could enable public health professionals to detect increased online activity or sudden shifts in sentiment that could affect vaccination uptake.

# Interactive dashboard for real-time monitoring of vaccination conversations



## Wide range of topics and vaccines being discussed online

Date	Summary	Vaccine	Category	Sentiment	Location
2014-11-10	Mass sterilization: Kenyan Doctors Find Anti-fertility Agent in UN ...	Tetanus/NOS	Beliefs - Conspiracy theory, Beliefs - Religious, Fertility, Programmatic Error/Issue/Conflict	Negative	Kenya
2014-11-19	Zoster Vaccination in Patients with Rheumatoid Arthritis: Time to Change the ... - HCPLive	Shingles	Research, Recommendation by HCW	Positive	United States
2014-11-20	Yemen concludes children's vaccination campaign - Al-Shorfa	Measles/NOS, Rubella/NOS, Polio/NOS	Mass Campaign, Strategy - Delivery	Positive	Yemen
2014-11-14	Yellow Fever Vaccine - Only One Dose Required for Immunity - AllAfrica.com	Yellow Fever	Recommendation - Policy, Vaccine Effectiveness	Positive	Cameroon
2014-11-24	WSU students asked to have mumps vaccination - KXLY Spokane	MMR	Recommendation by HCW	Positive	Washington State, United States

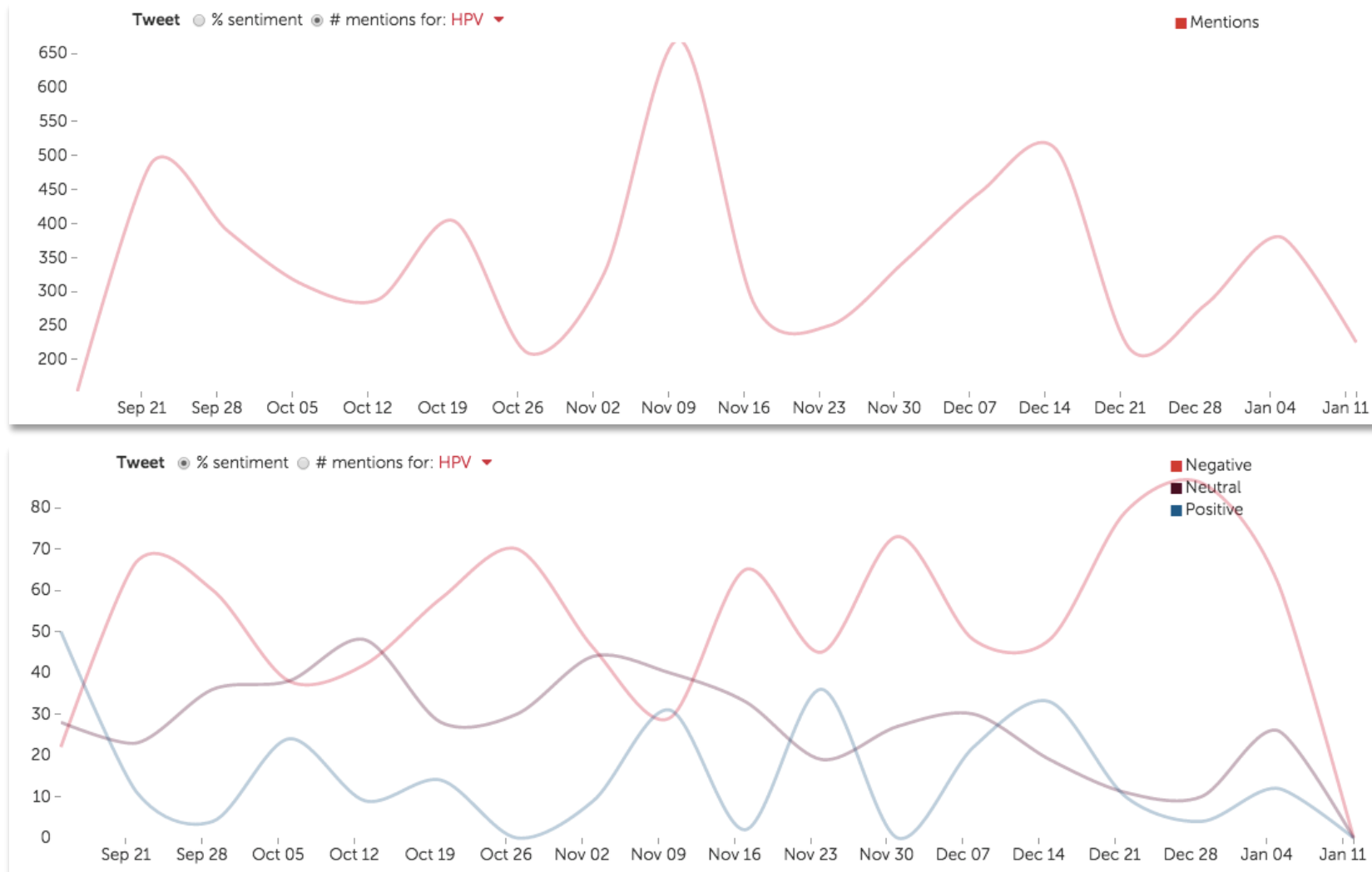
## Example: identify proactive stakeholder engagement on Meningococcal vaccines



# Example: identify proactive stakeholder engagement on Meningococcal vaccines



## Example: high volume of social media discussions surrounding the HPV vaccine



## Case Study: Impact of Katie Couric segment on digital media coverage

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December 4, 2013 episode of Katie, the US television personality Katie Couric's show on the ABC network, titled “HPV vaccine controversy”

Vaccine Sentimeter data from November 2013 to Jan 2014

160 relevant mainstream media reports and 1,534 tweets

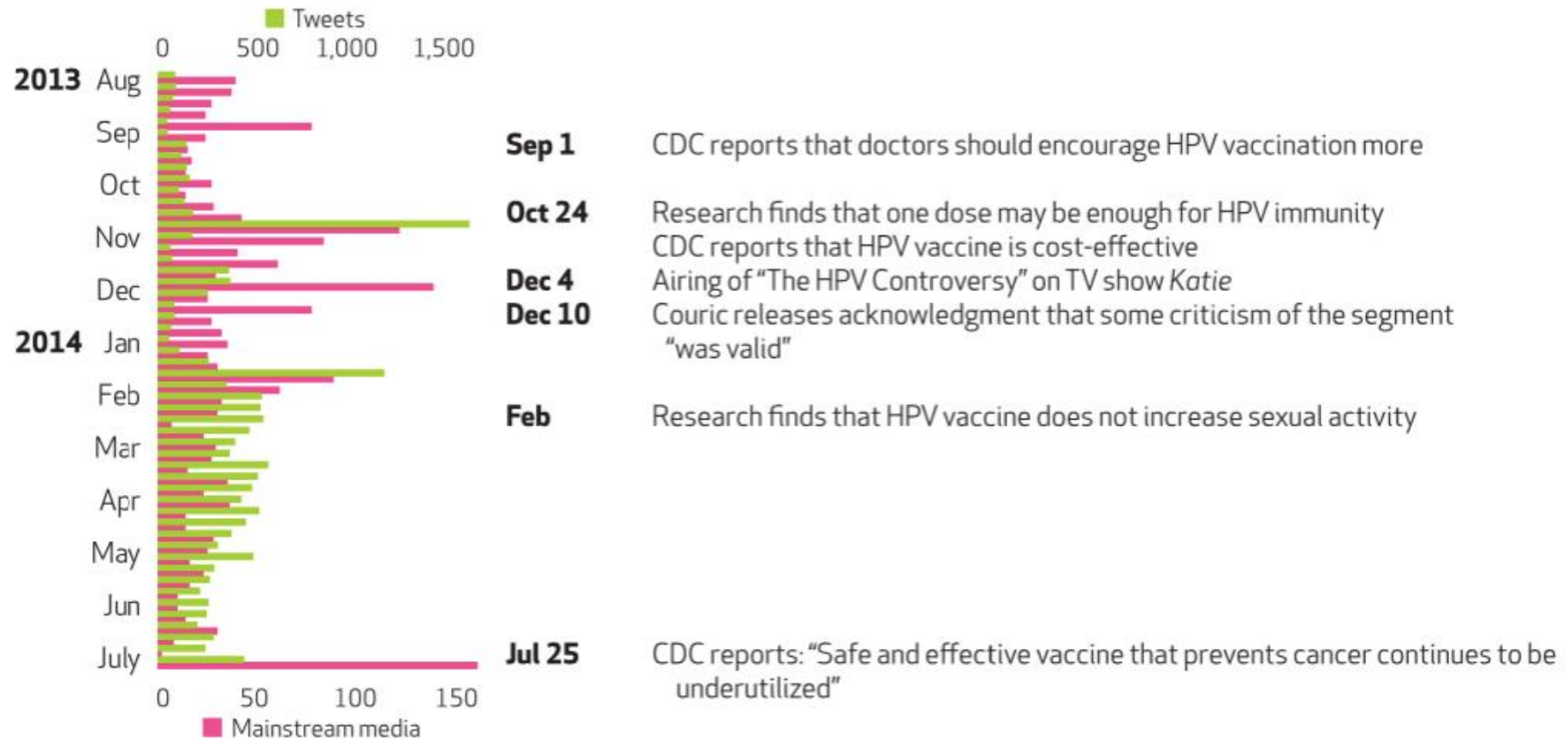


Bahk et al. Health Affairs. Feb 2016

## Notable content mentioning HPV vaccine, including Couric event

### EXHIBIT 2

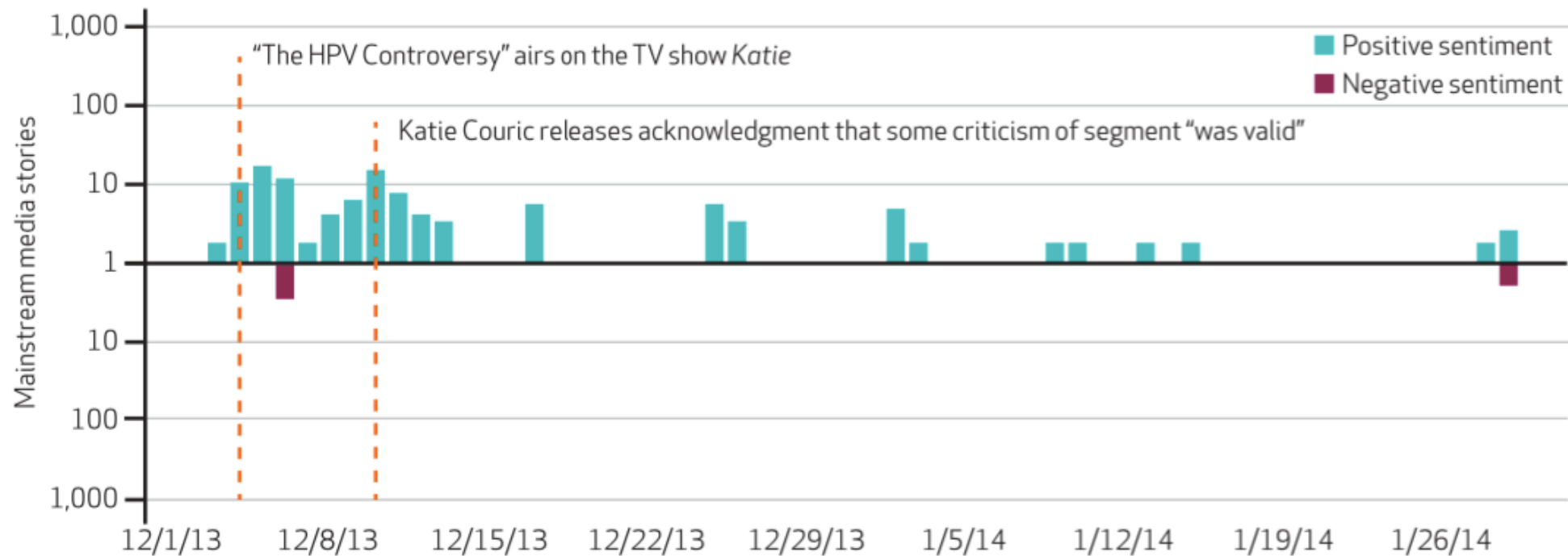
#### Mainstream Articles And Tweets About Human Papillomavirus (HPV) Vaccine Per Week, August 2013–July 2014



## Predominant media coverage following the segment was in support of the vaccine

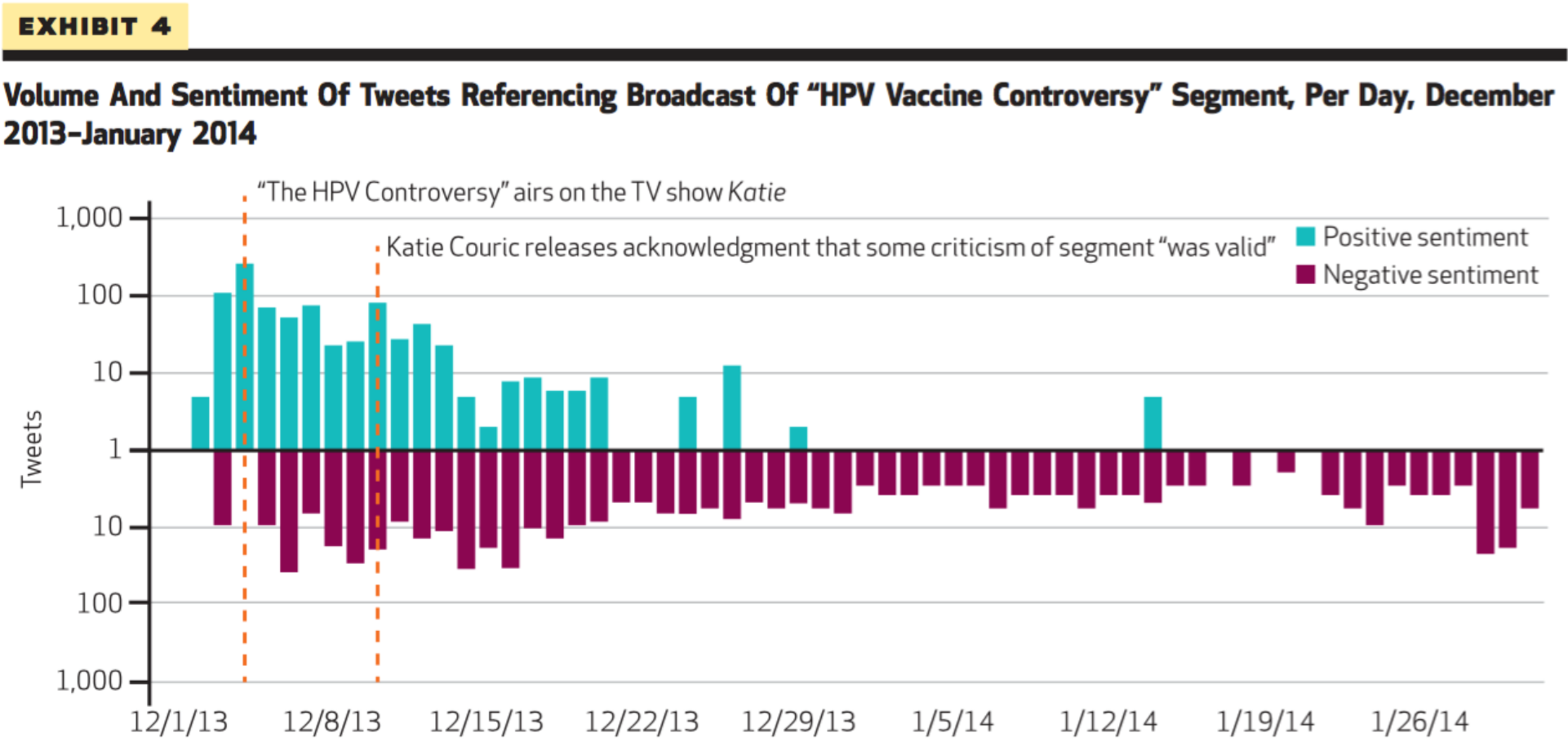
### EXHIBIT 3

**Volume And Sentiment Of Mainstream Media Activity Referencing Broadcast Of “HPV Vaccine Controversy” Segment, Per Day, December 2013–January 2014**



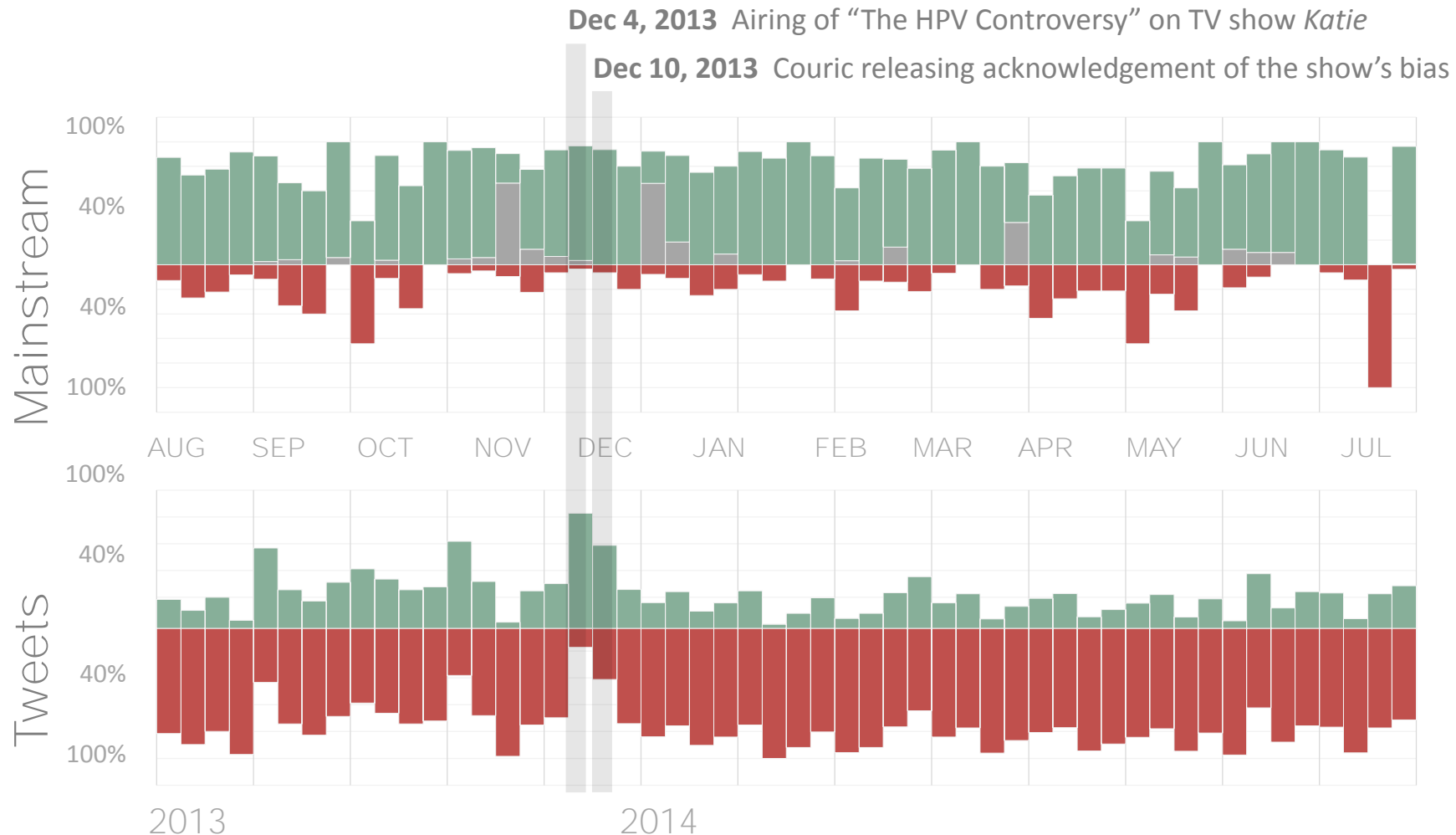
**SOURCE** Vaccine Sentimeter (Note 4 in text). **NOTE** The y axis uses a log scale.

In social media, negative sentiment towards the vaccine was triggered and sustained



**SOURCE** Vaccine Sentimeter (Note 4 in text). **NOTE** The y axis uses a log scale.

# Did this event create change in the overall landscape of HPV vaccine conversation?



## Value of digital listening for vaccine confidence

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- In a timely manner,
  - Anticipate, understand, and respond to the public's questions and concerns
  - Inform strategic communication tailored by vaccine and geography
  - Encourage engagement between public health organizations and journalists, bloggers, or other influencers
  - Measure efficacy of campaigns
- Unique stream of data compared to surveys and traditional channels

## Digital listening for vaccine confidence

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### Successes

- Additional data sources
- Looking beyond sentiment into drivers of sentiment
- Understanding influencers and networks
- Informing action based on insights

### Challenges

- Sustained operation for continuous monitoring
- Balance between automation vs manual efforts
- Connecting digital media to offline behavior

# QUESTIONS?

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