

CENTERS FOR DISEASE CONTROL

# FINAL ANALYSIS

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We chose our stakeholder to be the Centers for Disease Control. The CDC is the nation's health protection agency with a mission to save lives and protect people from health threats. This government organization is a huge proponent for vaccines in the nation, so we knew they would be at the center of talk surrounding vaccines.

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## Research Overview



Throughout this project, we gathered data from October-April (unless otherwise noted). Initially, we focused on Autism and Vaccines but as Zika gained traction in late January, we had to switch our focus to analyze the main conversation focus



To gather our data, we used a Crimson Hexagon Twitter Monitor, a Crimson Buzz Monitor and a Quintly Monitor. Between the three, we were able to analyze both owned and earned data to further our insights surrounding vaccines



Our data was pulled from both Twitter and Facebook. Twitter provided much more information for what we were searching for. 92% of our buzz monitor data came from Twitter, as opposed to the 8% drawn from Facebook

# Suggested Goals

and challenges for the CDC we aim to address

## Goals



Identify key users in the U.S. conversation about vaccines and develop strategy for communicating and partnering with influential voices supporting vaccination on each social media platform.



Asses which content type leads to the most engagement on each social media platform.



Identify changes in sentiments toward vaccinations over a 3 month period.



Identify where vaccines are discussed the least and raise volume of conversation in that geographic area over the next three months.

## Challenges



sentiment has taken  
taken a turn for the  
worse since Jan.  
2015



response rate to  
citizens is very low



CDC is not the only  
influential voice  
about health that the  
public listens to



the CDC is a government  
run organization, this  
limits their actions and  
causes the public to  
automatically question  
their motives

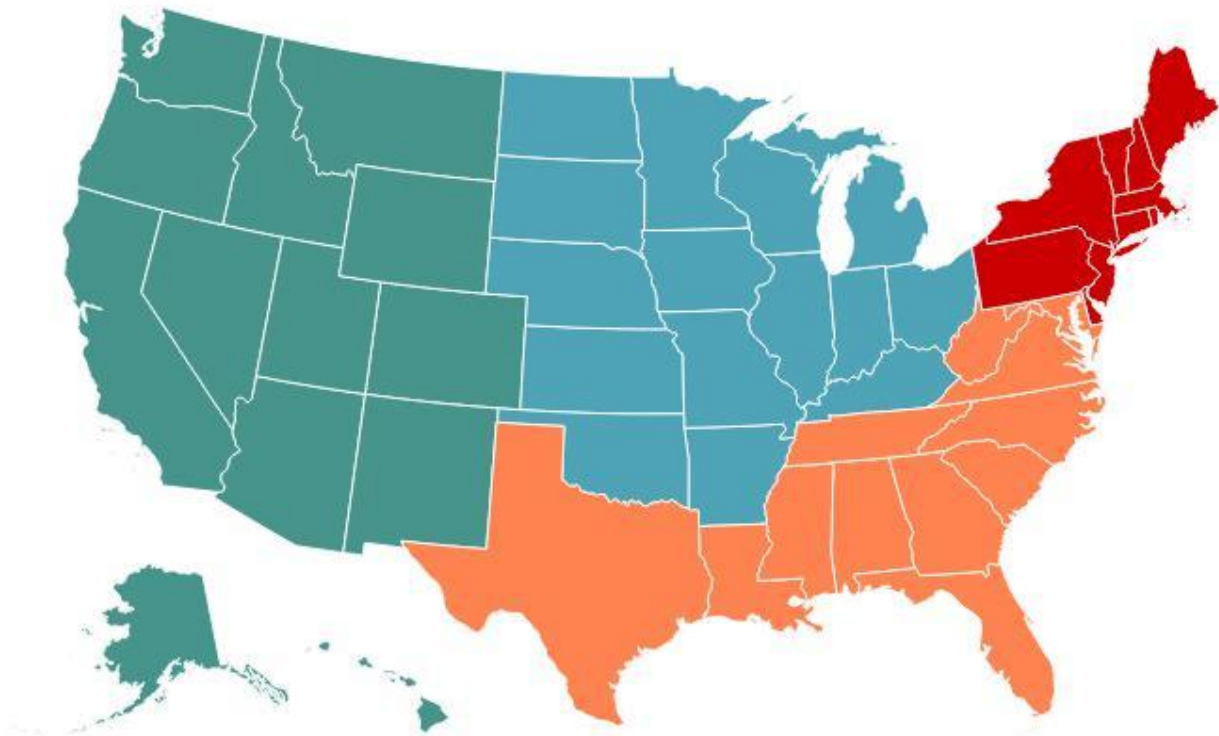


# Owned Insights

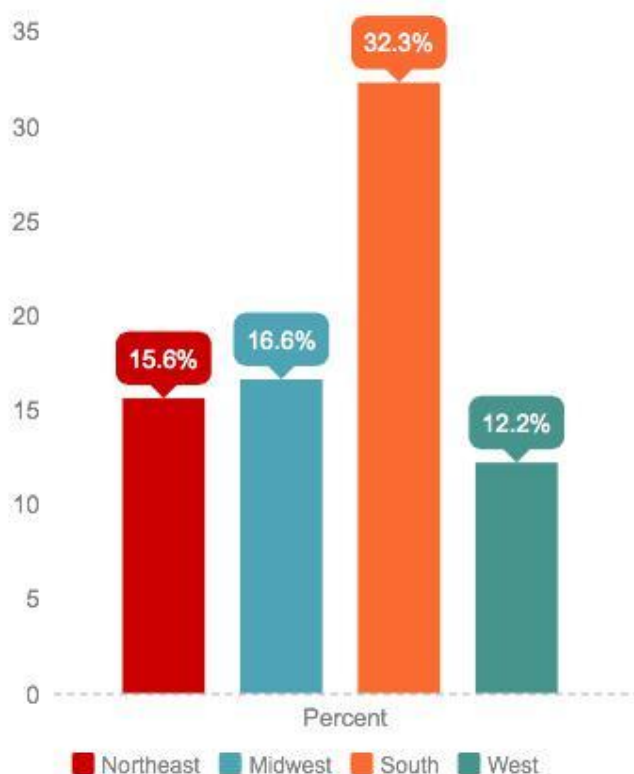
## Key Actionable Insights

- 1 Twitter users in the southern region of the United States are more likely to mention the CDC, this is most likely because the CDC is located in Atlanta, Georgia.
- 2 Out of all the tweets the CDC posts, tweets engaging with other health or news organizations are the most abundant, while informative tweets are the second most abundant. Users are much more likely to engage with informative posts.
- 3 When looking at post type on Facebook, the CDC posts photos more often than statuses, links, or videos. The CDC has the highest interaction rate with statuses, with links and photos following.
- 4 The CDC tweets very little on weekends, however Sunday is by far the highest day for interaction, double any other day of the week.
- 5 Zika was mentioned about 90 times more than "vaccine" or "flu". Engagement with CDC posts about Zika was also much higher than the other two keywords.
- 6 Sentiment regarding the CDC has become more negative since Zika became newsworthy in January.
- 7 The CDC almost rarely to any tweets on Twitter. This is probably the reason for the negative sentiment and distrust of users.

## Audience Insight - Location

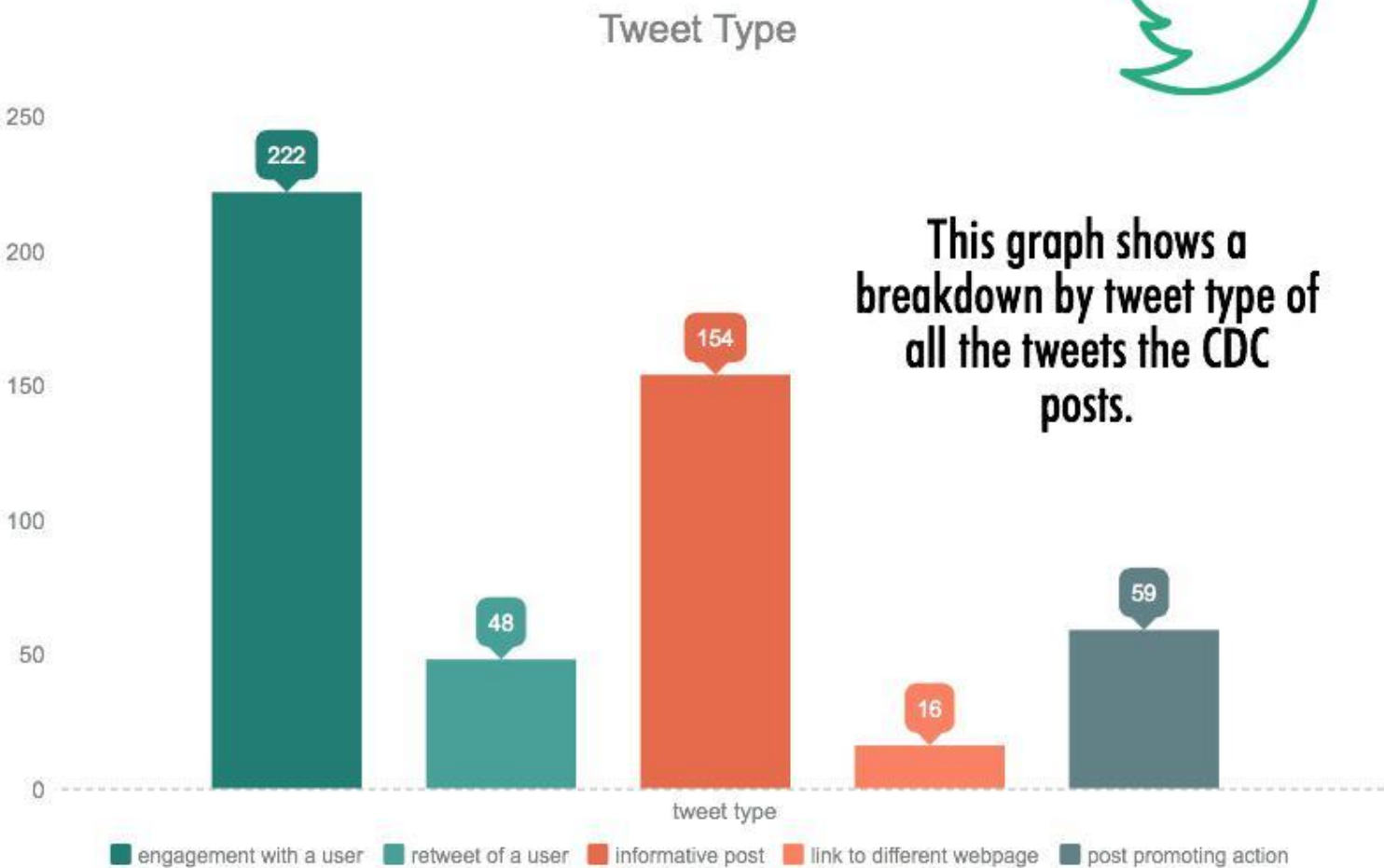


% of Posts Per Region

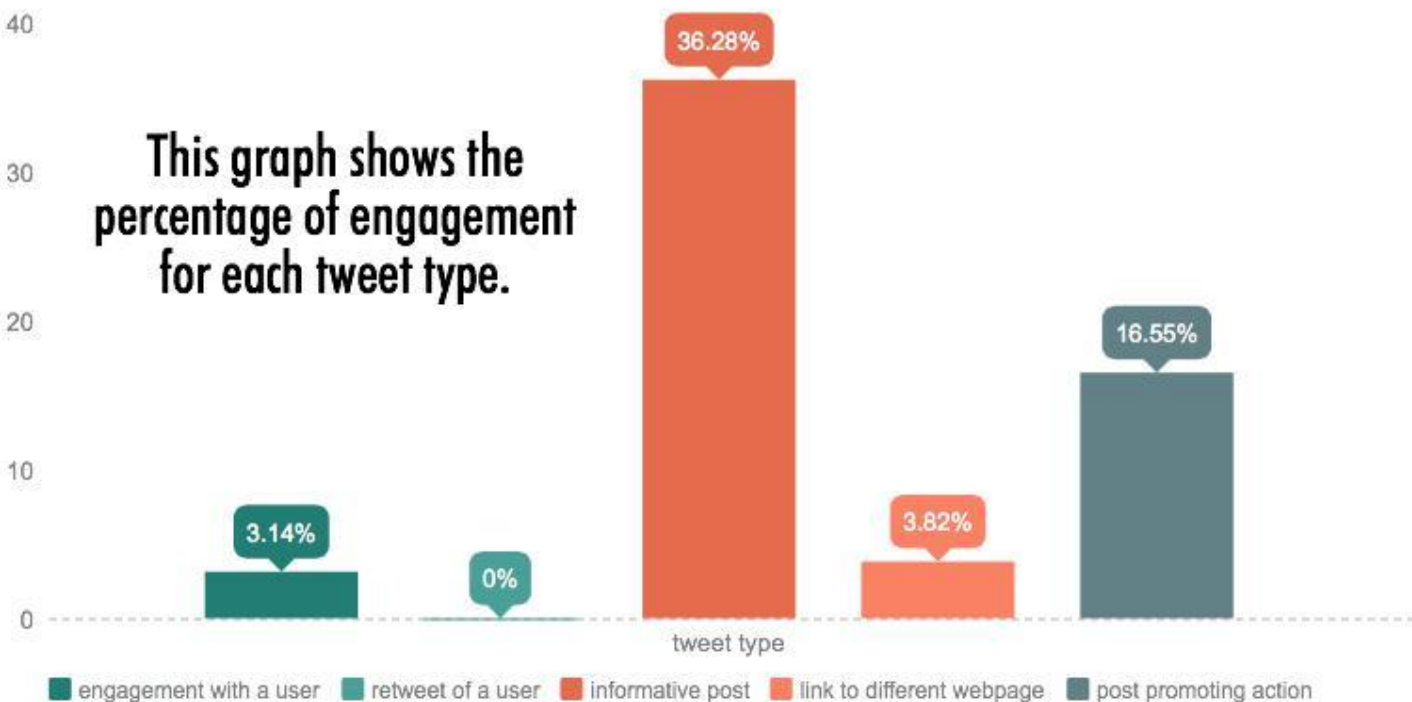


The post list shows that Twitter users in the Southern region are 32.3% more likely to post about the CDC than users in the West, Midwest and Northeast, making them the most engaged users

Content Insight - Tweet Type

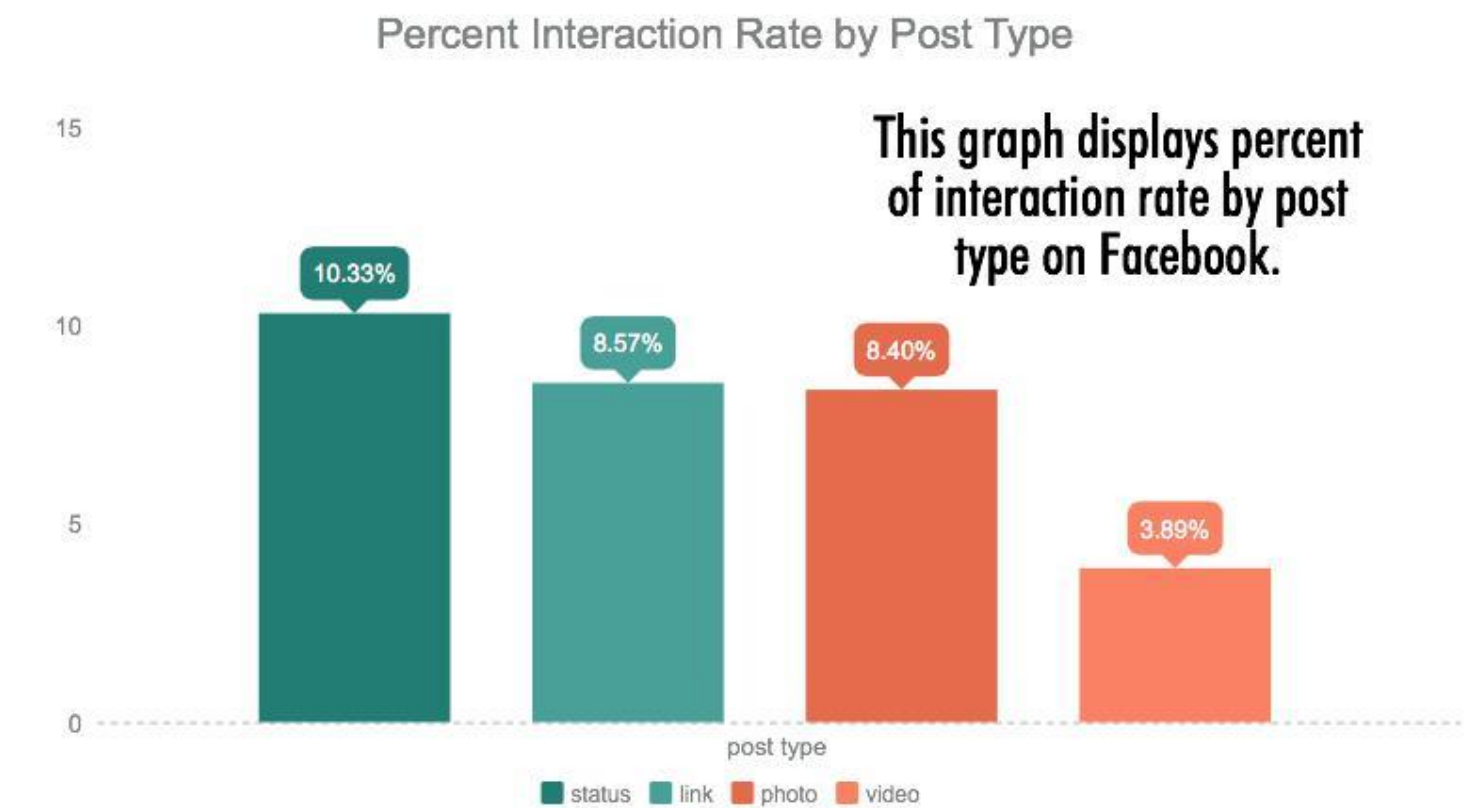
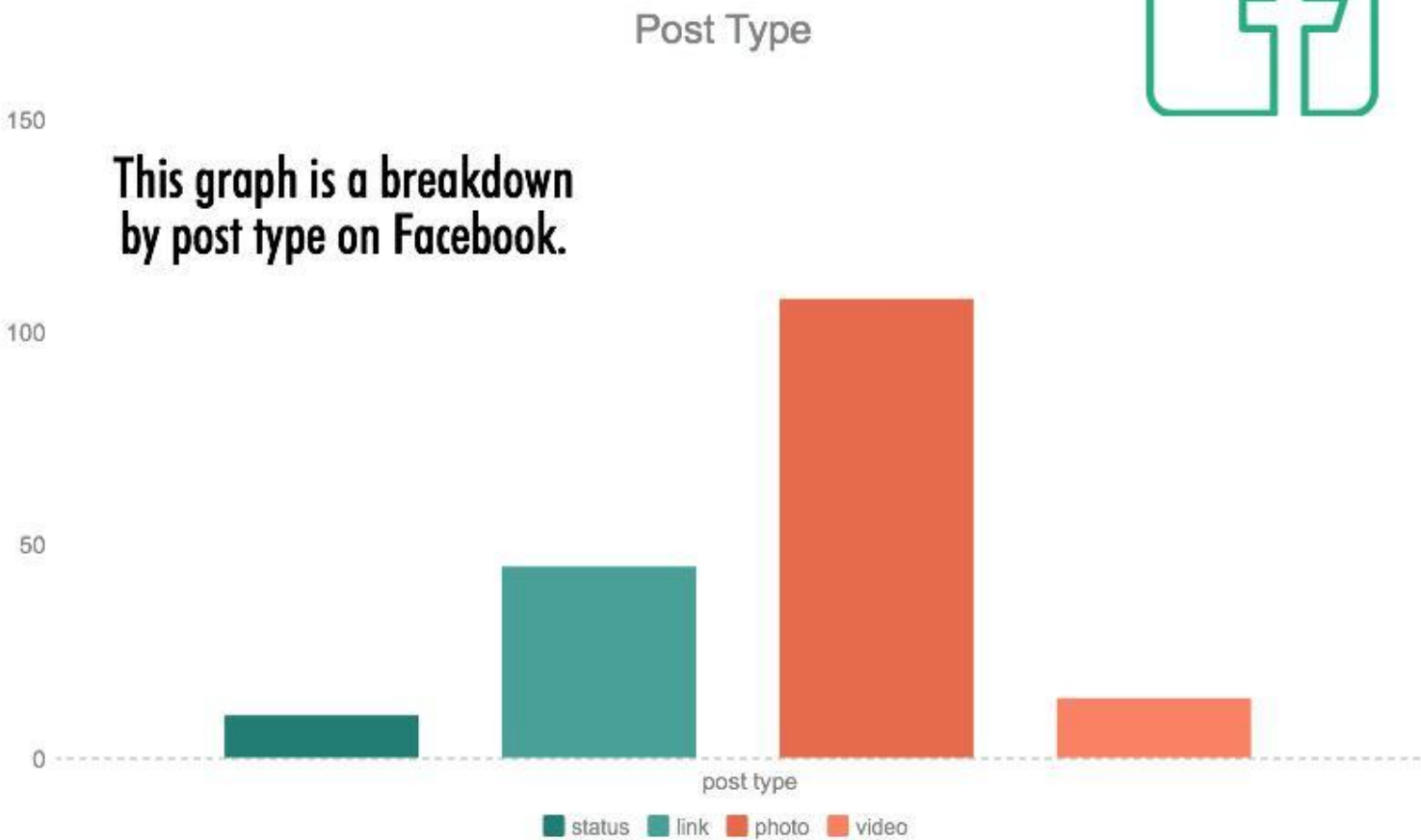


Percent Total Engagement by Content Type



Although the CDC posts tweets engaging with users (mentioning other health organizations or other CDC twitter profiles), they have the most engagement with purely informative tweets.

Content Insight - Post Type

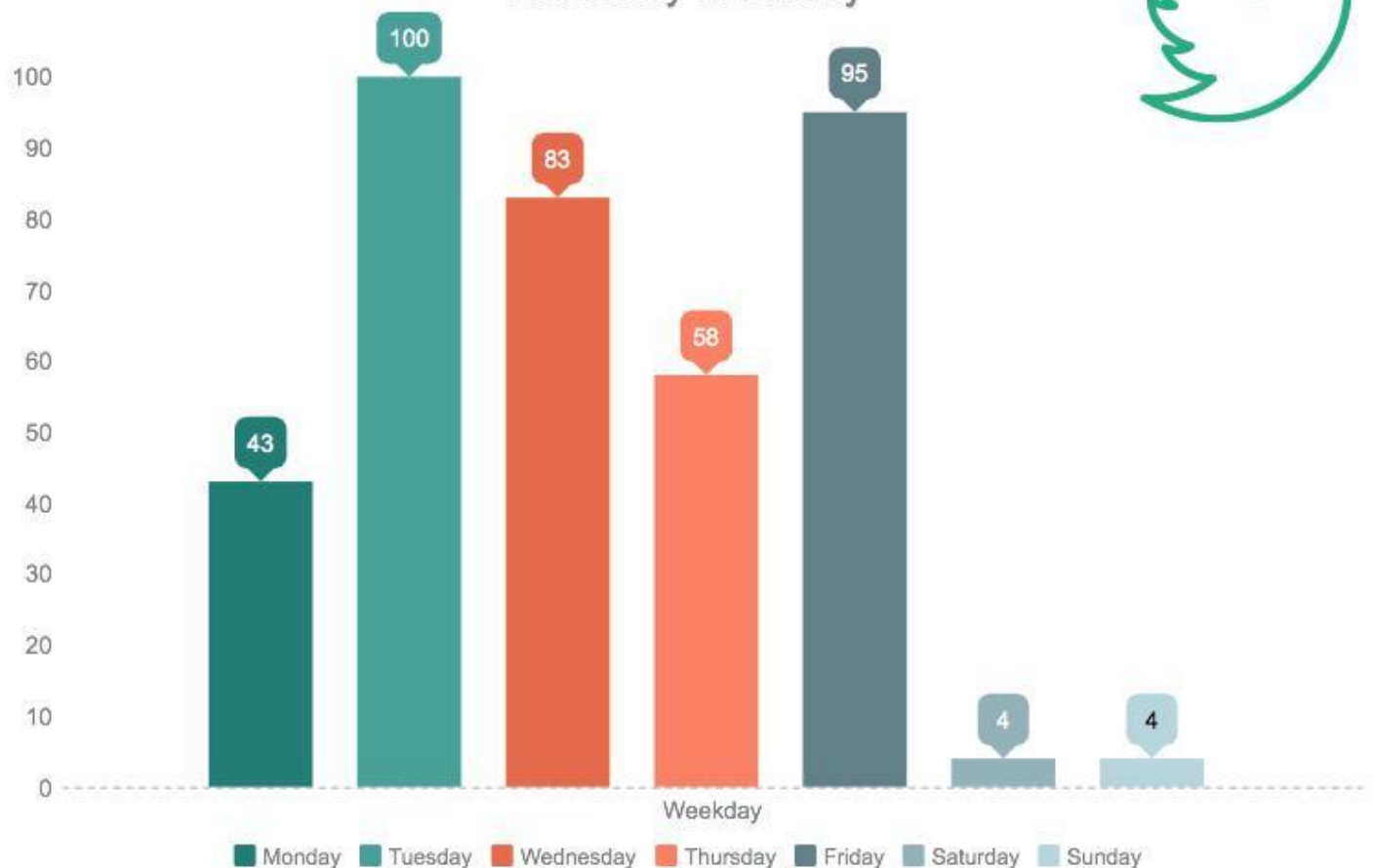


The CDC posts photos on Facebook more often than any other type, however statuses are interacted with more. 6

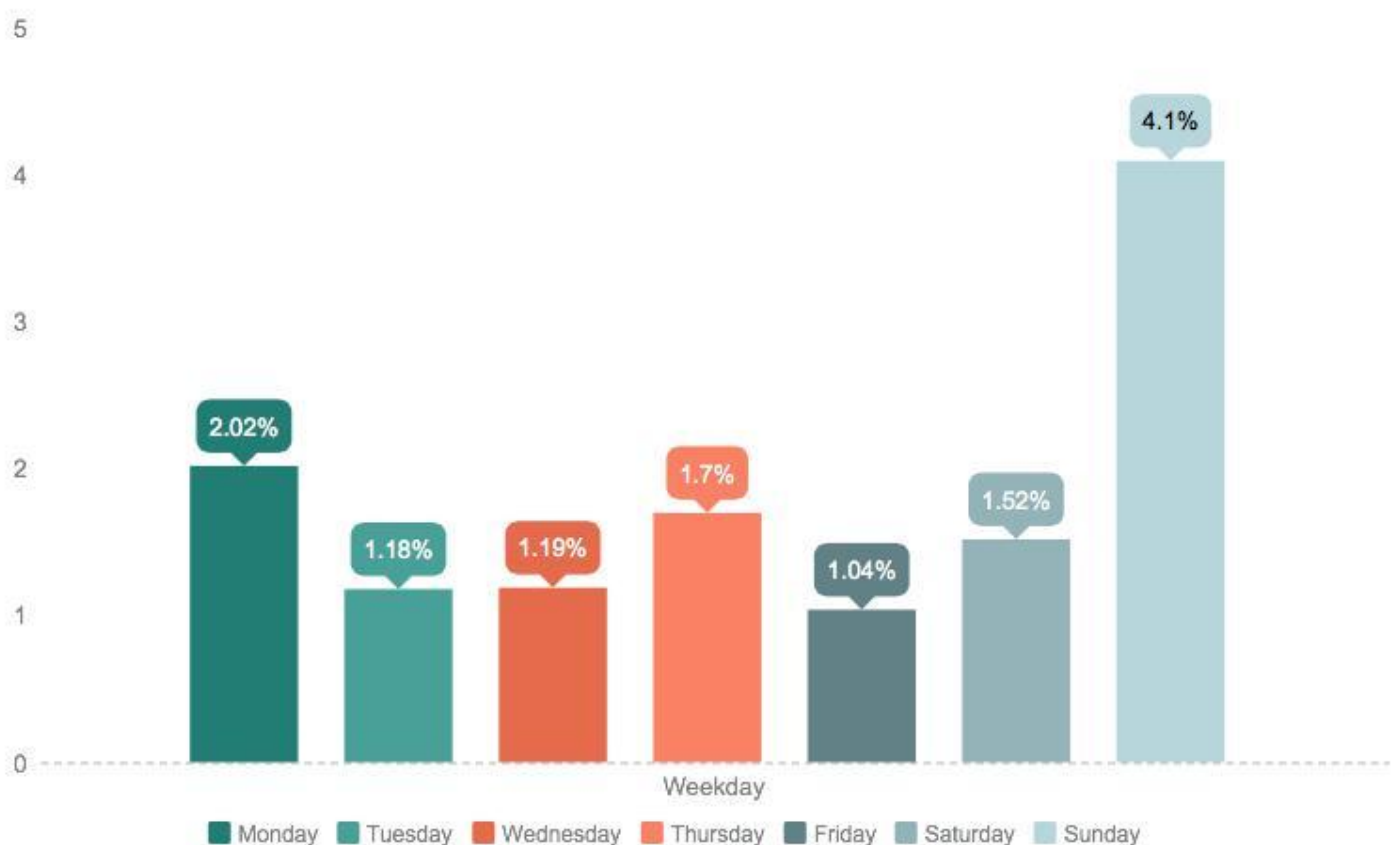


## Descriptive Insight - Tweets by Weekday

Tweets by Weekday



## Percent Interaction by Weekday

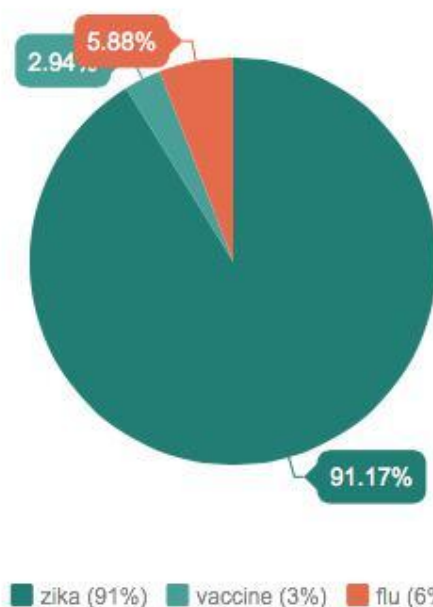


The CDC posts sparingly on weekends, however interaction on Sundays is double that any other day of the week. <sup>7</sup>

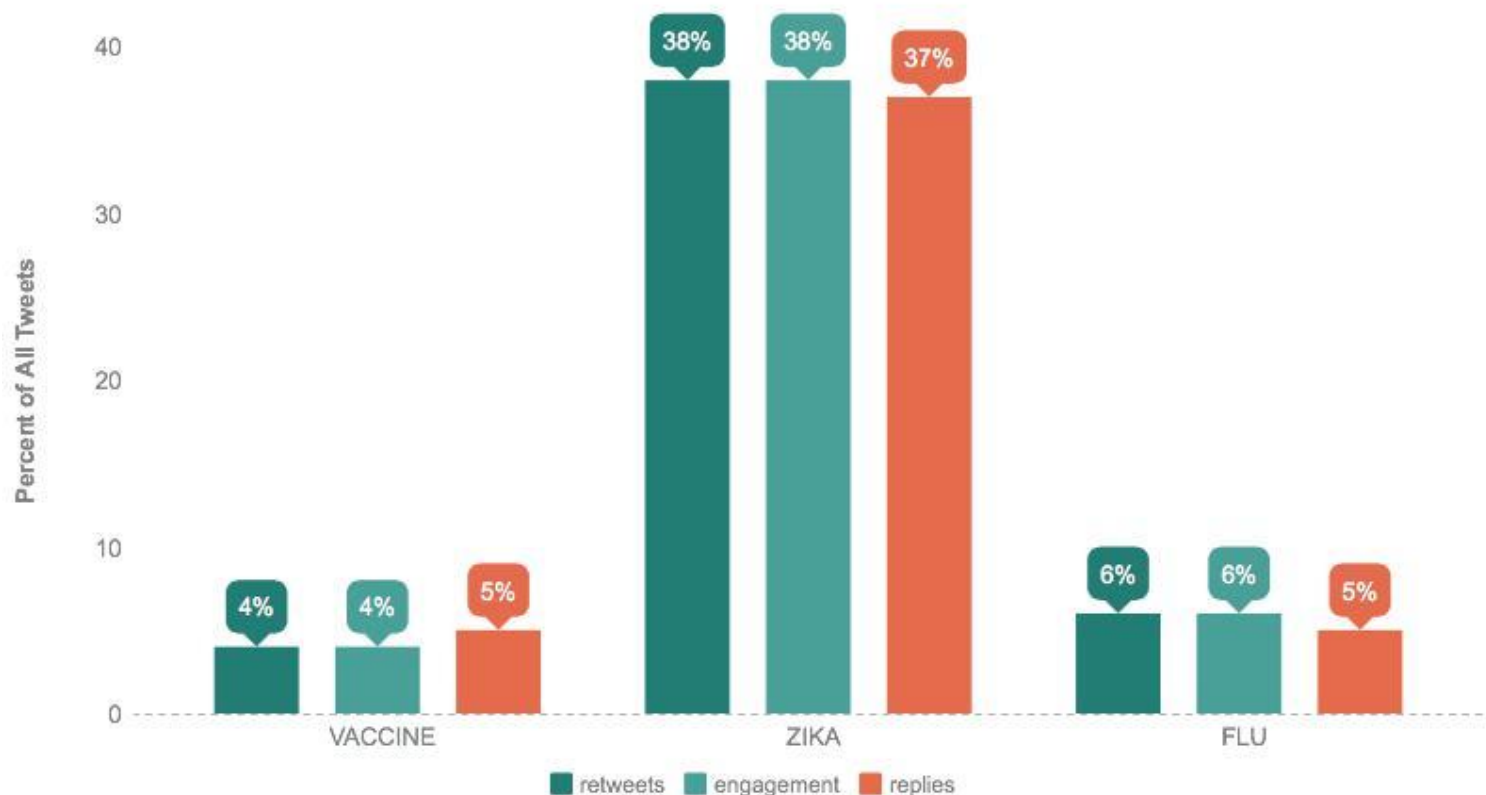
## Content Insight - Keywords

### ZIKA - VACCINE - FLU

Keywords Mentioned



Engagement Types by Keyword



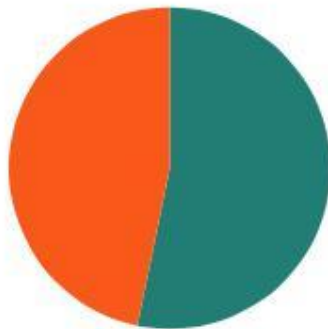
**Zika was mentioned 90 times more than "vaccine" and "flu" and interaction with CDC posts concerning Zika was also much higher.**



## Audience Insight - Sentiment

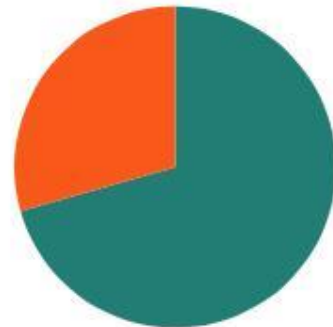
So obviously **Zika** is a big deal. Let's see how sentiment regarding the CDC has changed since Zika became newsworthy.

Before Zika



negative (53%) positive (47%)

After Zika



negative (71%) positive (29%)

Sentiment regarding the CDC has become more negative since Zika became newsworthy in late January.



**Michelle Meyer**  
@MichelleMeyer10



.@CDCgov Why aren't you telling whole story on #ZikaVirus It is a demyelinating disease which can paralyze kill adults affecting CNS #PJNET

1:03 PM - 5 Feb 2016



**Michael Grant Terry** ✓  
@LLMGTT

Follow

A lot of talk of Zika virus. I've had Dengue. Does it have to come to US to get a vaccine!? How many others have suffered @CDCgov

4:09 AM - 6 Feb 2016

8 61

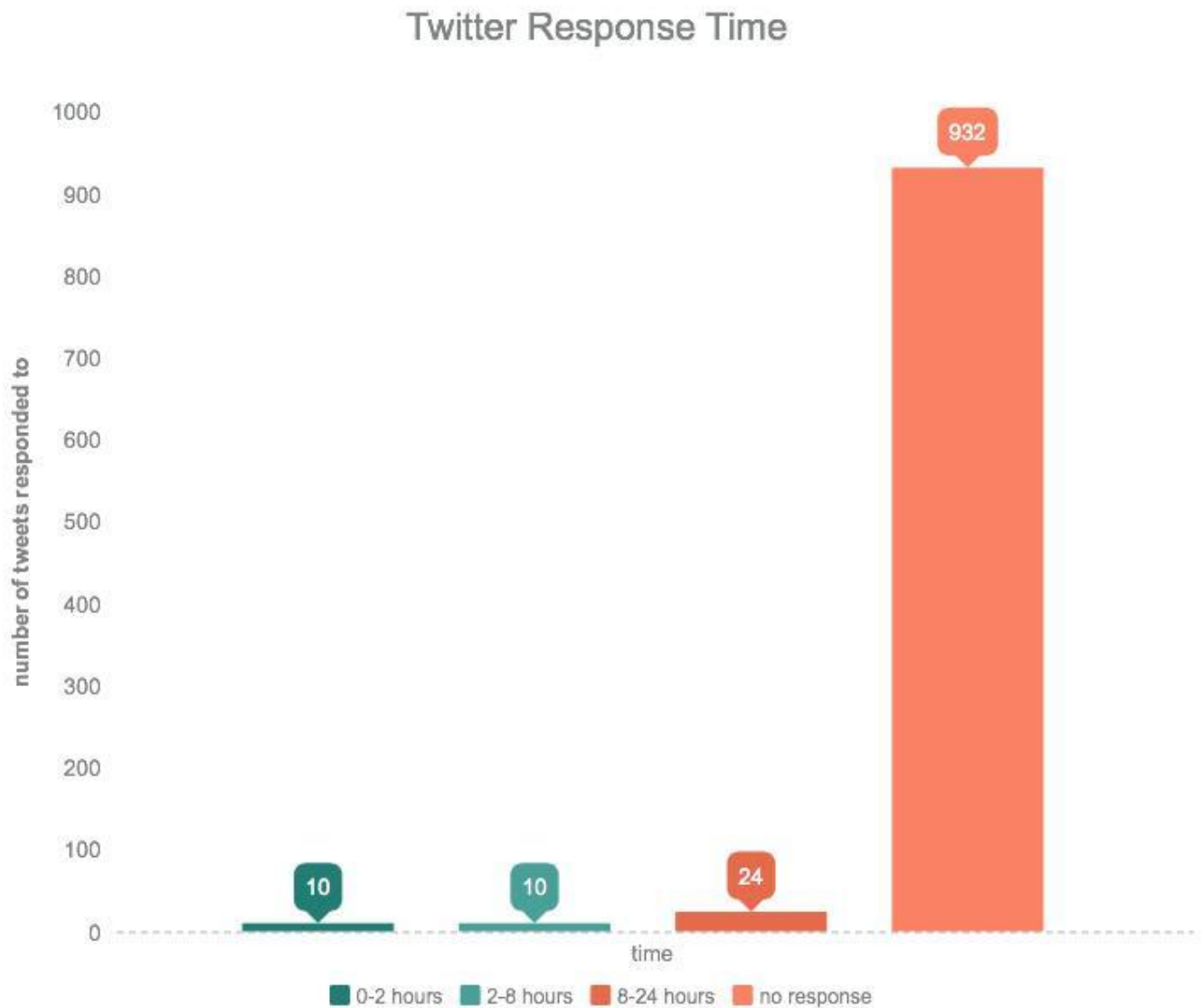


**Brandy**  
@GeorgiaGirl9

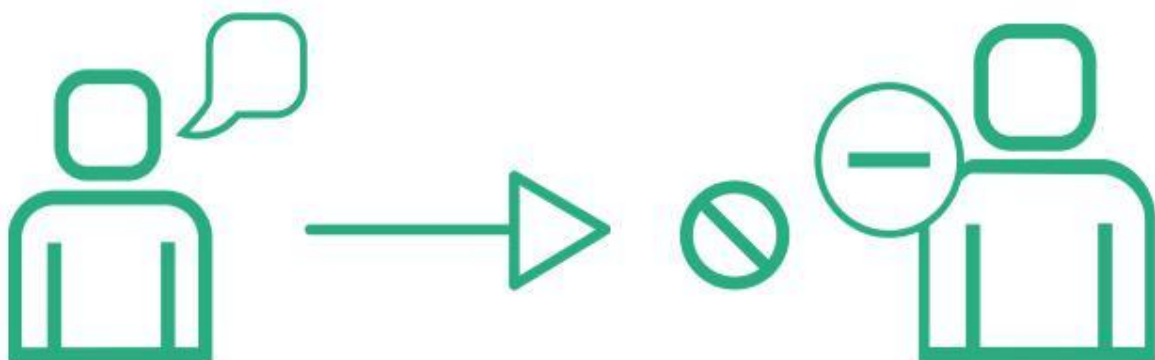
Follow

Very unhappy with @CDCgov reaction to #Zika Virus. What are women of child-bearing age to do? Stay inside forever? We need real solutions.

## Descriptive Insight - Twitter Response Time



**The CDC rarely responds to any tweets on Twitter. This is likely a contributing factor to the negative sentiment expressed by users.**



# Earned Insights

## Key Actionable Insights

1

There is more positive sentiment concerning vaccines when comparing posts about vaccines and Zika, but there are many more posts about Zika. If the CDC wants to generate more positive sentiment, they should include vaccine in their discussion.

2

Zika is leading the general conversation surrounding the CDC but also in the conversation mentioning the word vaccine/vaccine/vaccination.

3

Georgia, Texas, California, and New York are the most active across platforms. These states are also more extreme with their liberal or conservative political views so are likely more outspoken about issues including vaccines.

4

When looking at sentiment by region before and after Zika, we found that in the South West, and Northeast, positive sentiment dropped after Zika became newsworthy. Sentiment in the Midwest actually became more positive. Neutral sentiment shot up for every region, most likely because informative tweets concerning Zika were more prevalent.



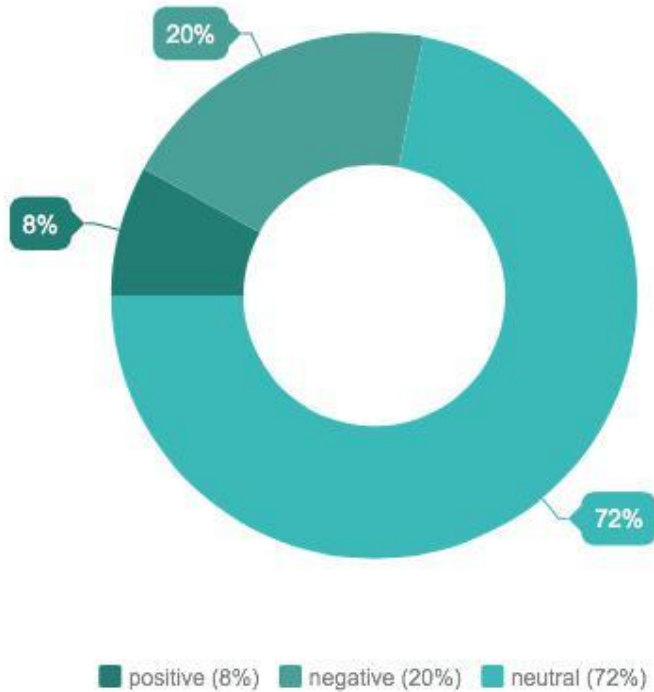
## Boolean Search

(vaccine OR vaccines OR vaccination OR vaccinations OR vaccinate OR ((vaccine OR vaccines OR vaccination OR vaccinations OR vaccinate) AND autism) OR ((vaccine OR vaccines OR vaccination OR vaccinations OR vaccinate) AND polio) OR CDC OR "center for disease control" OR "disease control center" OR "herd immunity" OR "pro vax" OR "anti vax" OR provax OR antivax OR pro-vax OR anti-vax OR vacine OR vaccination OR vacines OR vaccinations OR vaccinne OR vaccinnes OR vaccination OR vaccinnations OR vacinne OR vacinnes OR zika OR vacinnation OR vacinnations OR "voices for vaccines" OR voicesforvaccines OR momswhovax OR vaccineswork OR (flu AND (shot OR vaccine OR vaccination OR vax OR prevention OR prevent OR vaccines OR vaccinations)) OR (hepatitis AND (shot OR vaccine OR vaccination OR vax OR prevention OR prevent OR vaccines OR vaccinations)) OR (smallpox AND (shot OR vaccine OR vaccination OR vax OR prevention OR prevent OR vaccines OR vaccinations)) OR (MMR AND (shot OR vaccine OR vaccination OR vax OR prevention OR prevent OR vaccines OR vaccinations)) OR (influenza AND (shot OR vaccine OR vaccination OR vax OR prevention OR prevent OR vaccines OR vaccinations)) OR (HPV AND (shot OR vaccine OR vaccination OR vax OR prevention OR prevent OR vaccines OR vaccinations)) OR (zika AND (shot OR vaccine OR vaccination OR vax OR prevention OR prevent OR vaccines OR vaccinations)) OR antivaccination OR antivaxxer OR cdcwhistleblower) AND NOT ("The Vaccines" OR music OR band OR concert OR album OR song)

## Audience Insight - Sentiment

### Sentiment of Posts Mentioning Vaccine or Zika

#### Sentiment of Posts Mentioning Vaccine

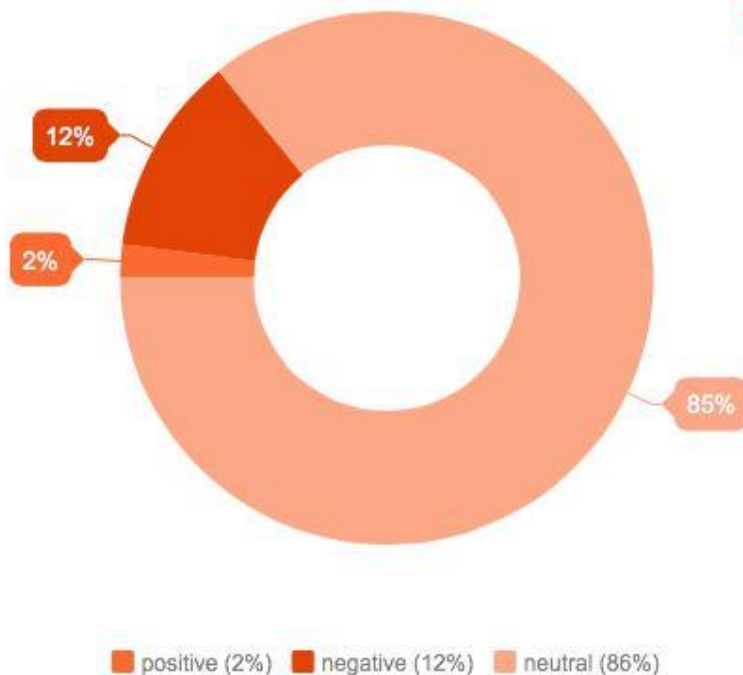


#### RAW NUMBERS

Vaccine (total posts: 334,050)

Positive: 20,043  
Negative: 63,470  
Neutral: 250,538

#### Sentiment of Posts Mentioning Zika



#### RAW NUMBERS

Zika (total posts: 1,821,780)

Positive: 36,436  
Negative: 218,614  
Neutral: 1,566,731

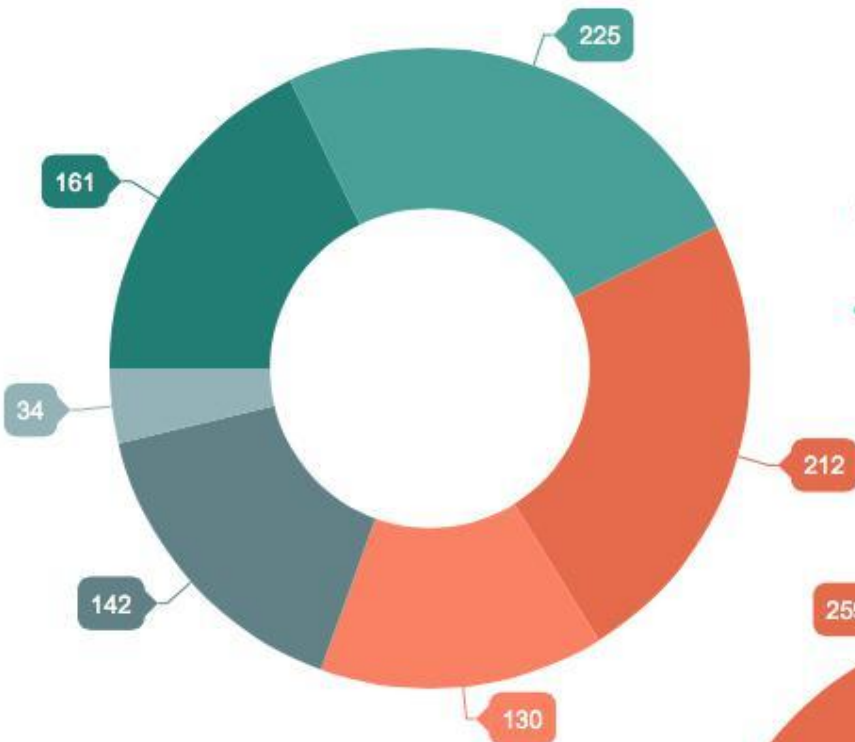
As seen in these charts, there is more positive sentiment regarding vaccine - BUT - there are significantly more posts concerning Zika. Zika is clearly dominating in sheer numbers, however, if the CDC wants to generate more positive sentiment, including vaccines in their discussions would be helpful! 3



# WHERE VACCINES WERE MENTIONED, WHICH VACCINES WERE MENTIONED THE MOST?

## Before Zika

Dengue (18%)   Flu (25%)   HPV (23%)   Ebola (14%)   Polio (16%)  
Meningitis (4%)

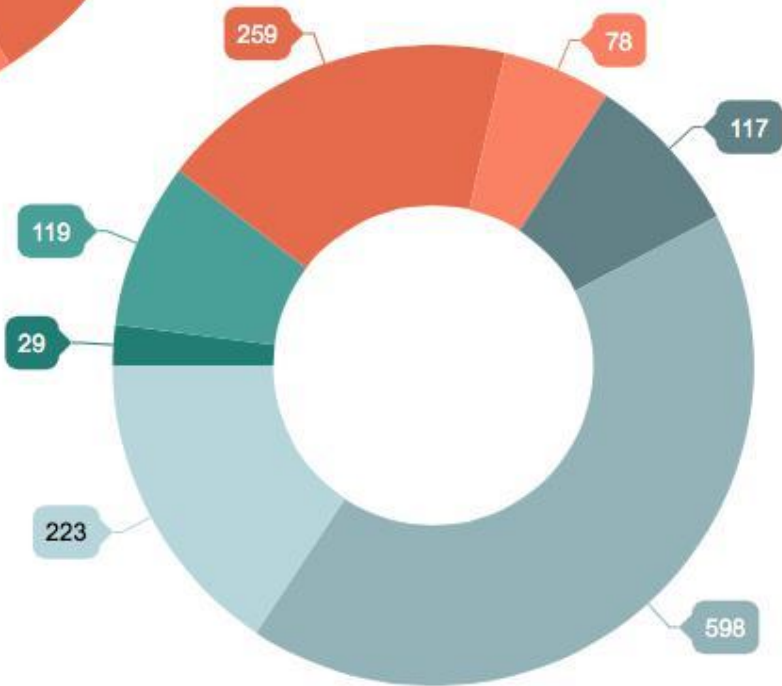


Zika went from being out of the conversation about specific vaccines to taking up almost 50% of the conversation about specific vaccines.



## After Zika

Dengue (2%)   Flu (8%)   HPV (18%)   Ebola (5%)   Polio (8%)   Zika (42%)  
Meningitis (16%)



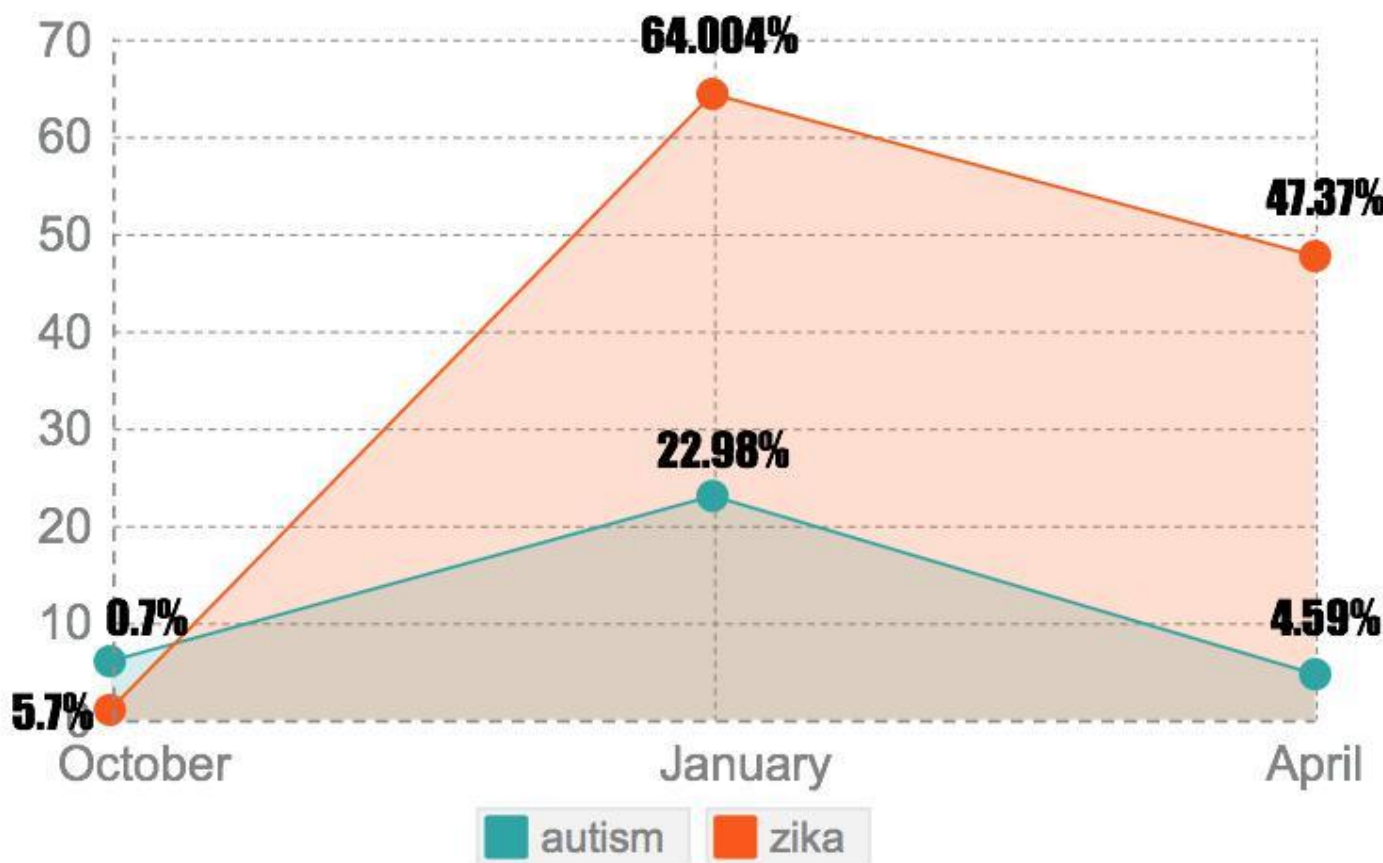
These charts illustrate further that Zika has taken over the conversation involving not only the CDC in general, but also vaccines in general.



Content Insight - Conversation Over Time

Autism and Vaccinations Conversation rate, measured here as the number of times a specific key word (autism or zika) was mentioned, was found to be higher over time with conversation mentioning Zika than with conversation mentioning autism.

Autism and Zika Conversation Over Time



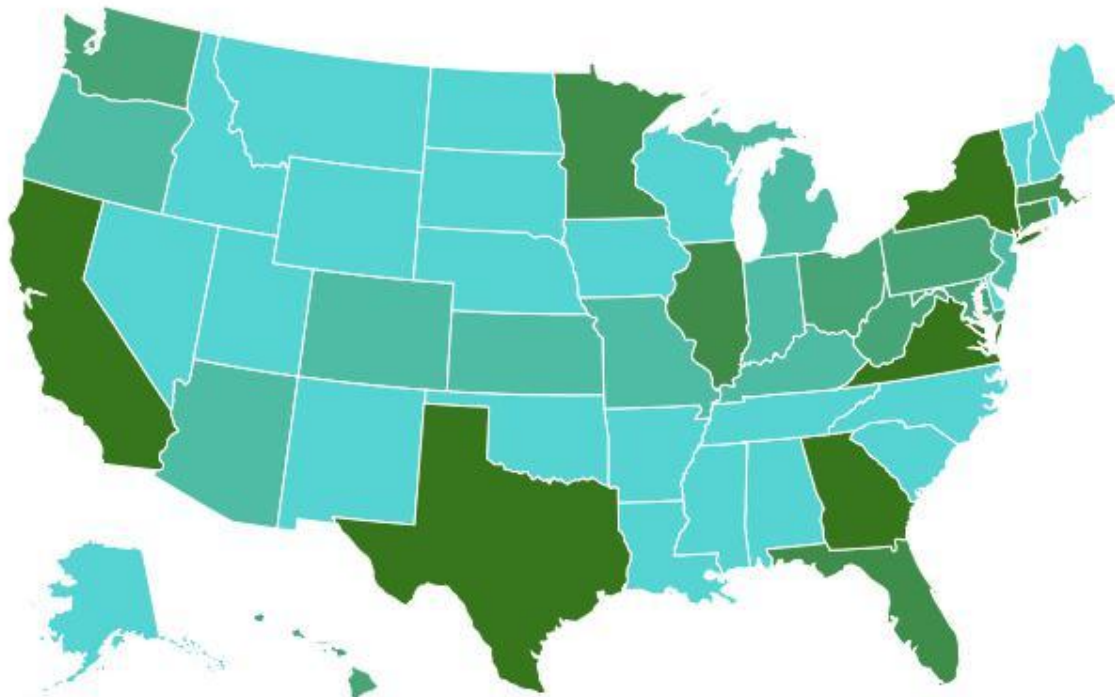
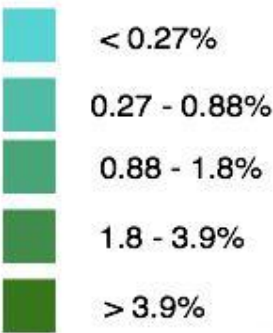
Week 1 - Oct 20-16

Week 2 - Jan 20-26

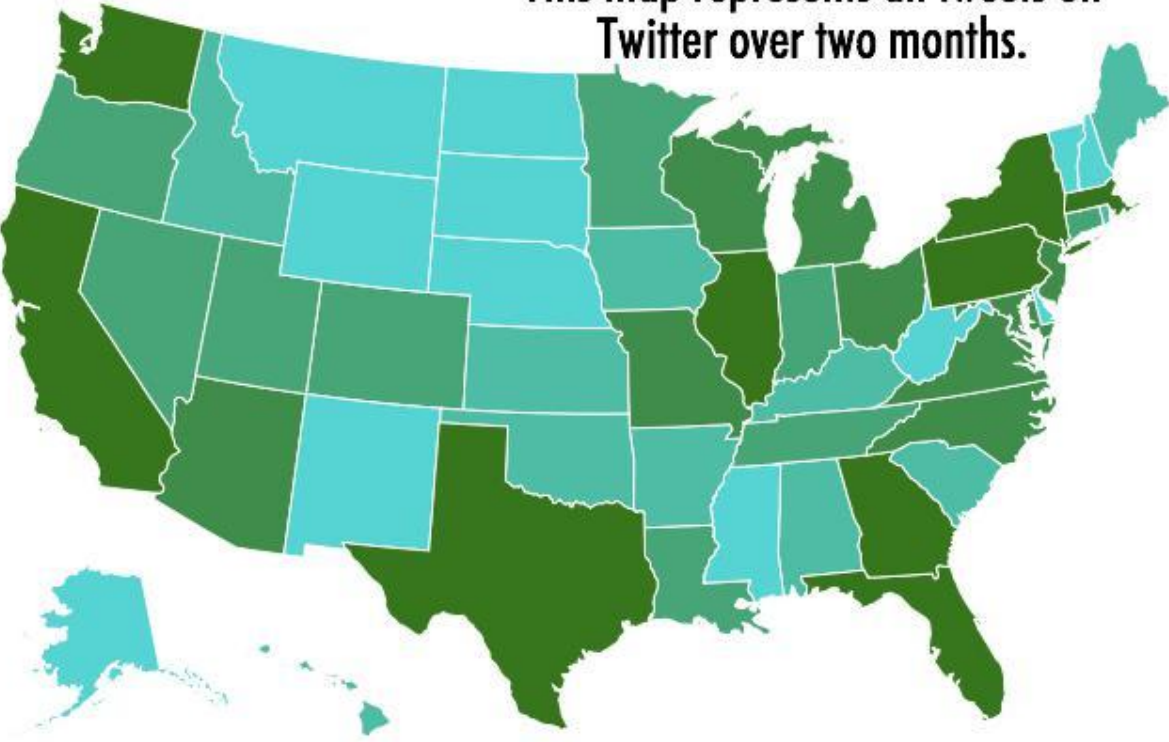
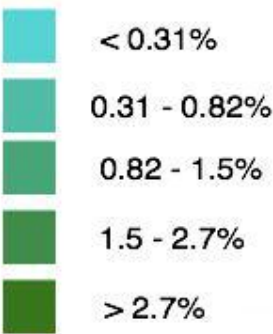
Week 3 - Apr 7-13

# Audience Insight - Volume of Posts By State

This map represents the the total volume of Facebook posts posted by users over two months.



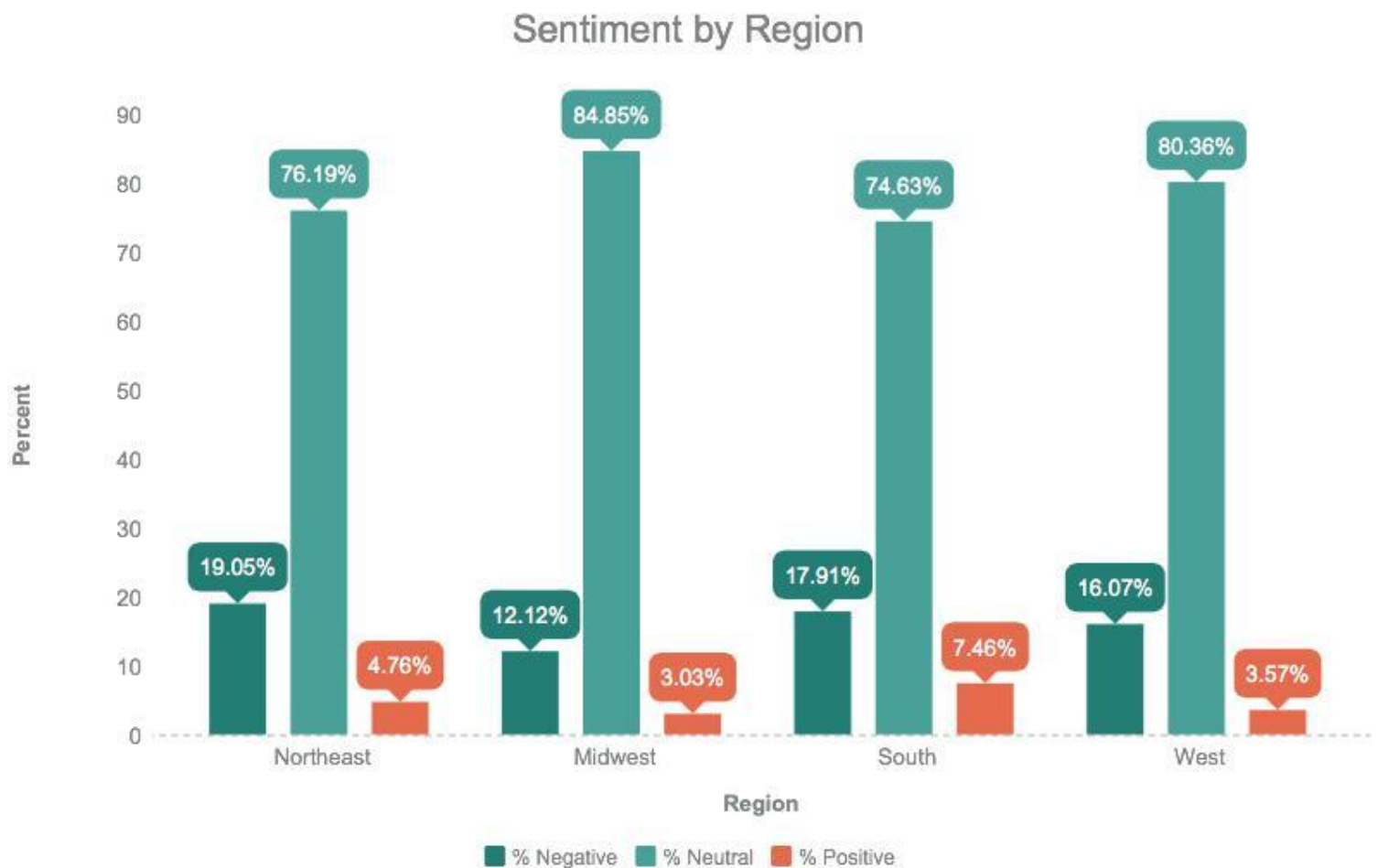
This map represents all tweets on Twitter over two months.



Georgia, California, Texas, and New York are the most active across platforms.

## Sentiment by Region Before Zika

these are tweets taken from a week before Zika became newsworthy

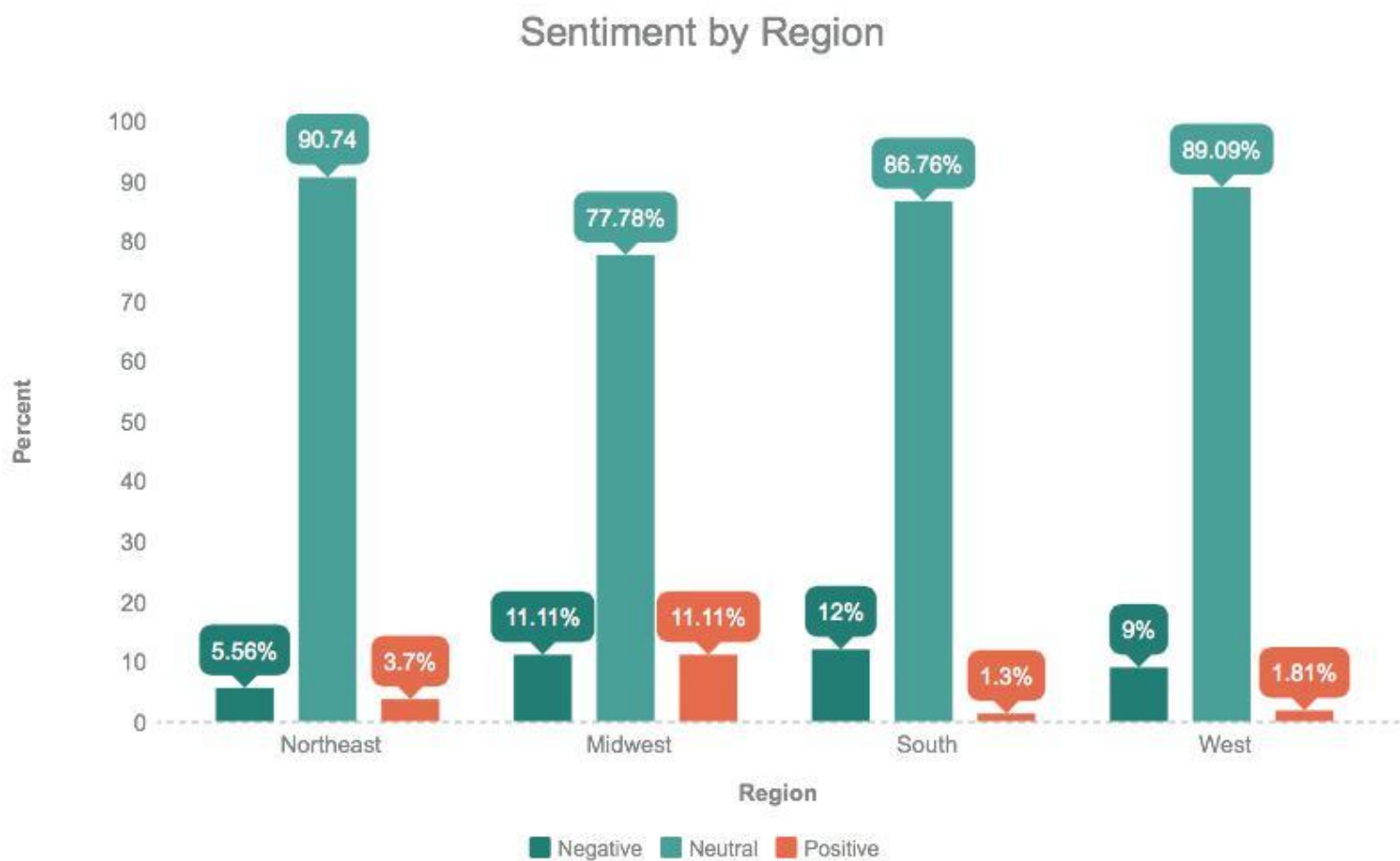


	Northeast	Midwest	South	West
Negative	8	4	12	9
Neutral	32	28	50	45
Positive	2	1	5	1



# Sentiment by Region After Zika

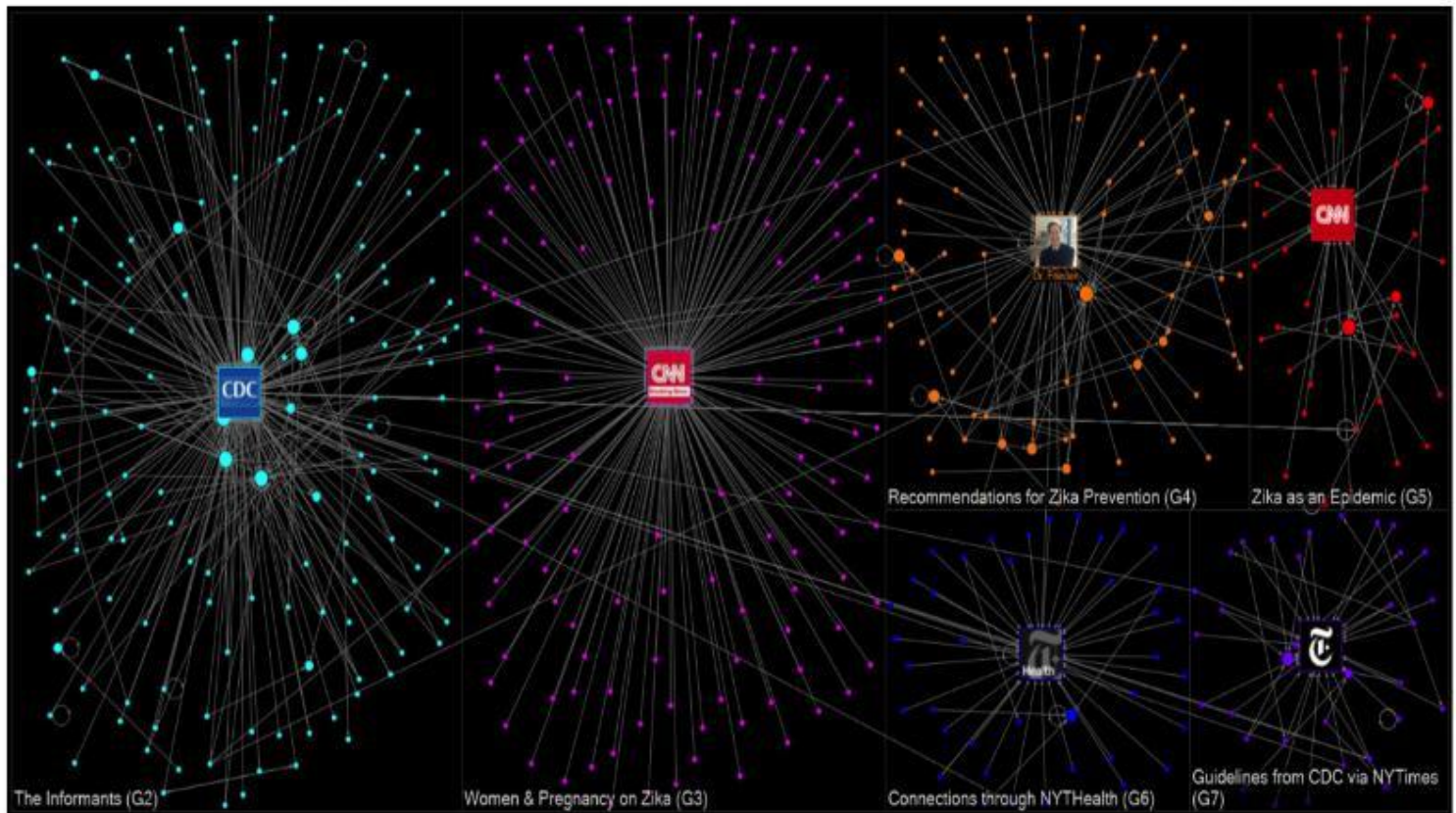
these are tweets taken from a week after Zika became newsworthy



	Northeast	Midwest	South	West
Negative	3	3	9	5
Neutral	49	21	65	49
Positive	54	3	1	1

In the South West, and Northeast, positive sentiment dropped after Zika became newsworthy. Sentiment in the Midwest actually became more positive. Neutral sentiment shot up for every region, most likely because informative tweets concerning Zika were more prevalent.

# Network Analysis



**Search terms: Zika, Virus, CDC**  
**Dates examined: 3/25/2016-3/31/2016**

This network is a good example of community clusters. Global news stories, such as Zika, generate coverage from various news outlets. We can see that sources such as CNN and New York Times have their own followings developing into these clusters shown in the image. They are of medium size and each center around a particular news story (e.g., women and pregnancy from CNN Breaking). Community clusters results in a large number of isolates present (43.59%), meaning they are tweeting about the topic, but not making connections with anyone else. The CDC would do well to engage with each of the different vertices in order to establish its prominence in the conversation.



## Network Insight - Top Community Clusters



**G2**

Centers for  
Disease Control

157 members

Hashtags: zika, cdc, global health, pheic, nurses, pregnancy, zikavirus, travel, springbreak, contraceptive

Keywords: zika, cdcgov, virus, rt, pregnancy, cdc, exposure, via, providers, amp

Top Tweeters: sema nticearth, welapmsinmanga, cdcstd, maliykaishealth, il9cd4bernie, women4bernie, rjber15, christymoto, shadetreader, sarunote

What is the level of connectedness?

Vertices: 157

Unique Edges: 227

Edges with Duplicates: 20

Total Edges: 247

Self loops: 9

Reciprocated Vertex Pair Ratio: 0.018

Reciprocated edge ratio: 0.035

Connected components: 1



**G3**

CNN Breaking News

148 members

Hashtags: zika, japan

Keywords: zika, rt, cnnbrk, women, virus, wait, before, trying, pregnant, cdc

Top Tweeters: cp24, doctorcara, racpong, janmanimoi, newsgirl123456, seagypsy40, amykichko, sclentertainmen, mcaldwellauthor, psychoanalyst3

What is the level of connectedness?

Vertices: 148

Unique Edges: 146

Edges with Duplicates: 2

Total Edges: 148

Self loops: 0

Reciprocated Vertex Pair Ratio: 0.000

Reciprocated edge ratio: 0.000

Connected components: 1



**G4**

Dr. Frieden, Director  
of the CDC

79 members

Hashtags: zika, health

Keywords: zika, rt, virus, cdc, drfriedencdc, guidance, transmission, new, issued, prevent

Top Tweeters: lehigh389, time, johnnysoftware, hiv\_insight, lgbtjournal, sbter79, slvrfrnx, gwendolbowling, cucatweet, whitehouse

What is the level of connectedness?

Vertices: 79

Unique Edges: 101

Edges with Duplicates: 7

Total Edges: 108

Self loops: 4

Reciprocated Vertex Pair Ratio: 0.010

Reciprocated edge ratio: 0.020

Connected components: 1



# Proposed Next Steps

1

In order to engage with more of the United States and not just the South, the CDC should direct its efforts toward making connections with key influencers in the West to create a national spread of its information.

2

Increase the amount of tweets posted on Sundays, as the interaction rate is double the normal rate. Perhaps investing in automated tweeting software would be beneficial--the tweets could be written on a Friday and then tweeted on the following Sunday in order to maintain constant communication with the public.

3

Zika is overwhelming the CDC and the public's discussion on Twitter. Although the CDC can only release information that it has approved, it should seek to mitigate the negative sentiment that accompanies the talk of Zika. Keeping the public as up-to-date as possible and being the first to release news will help build trust and increase positive sentiment.

4

Even without an actual vaccine, Zika has risen to dominate more than 50% of the conversations where the "vaccine" is present. The CDC should use the trust built through response to engage with these people regarding all kinds of vaccines, not just Zika.

5

Target the South, West, and Northwest with more reassuring posts about issues specific to those regions.

6

Responding to a small number of users, even if it is simply responding by providing a link to the CDC website, will likely help to raise positive sentiment towards the CDC.