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.

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 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
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.

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.

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.

The CDC tweets very little on weekends, however Sunday is by far the highest day for interaction, double any other day of the week.

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.

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

The CDC almost rarely to any tweets on Twitter. This is probably the reason for the negative sentiment and distrust of users.
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.
This graph shows a breakdown by tweet type of all the tweets the CDC posts.

This graph shows the percentage of engagement for each tweet 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

This graph is a breakdown by post type on Facebook.

Percent Interaction Rate by Post Type

This graph displays percent of interaction rate by post type on Facebook.

The CDC posts photos on Facebook more often than any other type, however statuses are interacted with more.
The CDC posts sparingly on weekends, however interaction on Sundays is double that any other day of the week.
Zika was mentioned 90 times more than "vaccine" and "flu" and interaction with CDC posts concerning Zika was also much higher.
So obviously **Zika** is a big deal. Let's see how sentiment regarding the CDC has changed since Zika became newsworthy.

Before Zika

![Pie chart showing sentiment](image)

- negative (53%)  
- positive (47%)

After Zika

![Pie chart showing sentiment](image)

- negative (71%)  
- positive (29%)

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

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**Michael Grant Terry**  
@LLMGT

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

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**Brandy**  
@GeorgiaGirl9

Very unhappy with @CDCgov reaction to #Zika Virus. What are women of child-bearing age to do? Stay inside forever? We need real solutions.
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.
(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 vaccine OR vaccination OR vaccines OR vaccinations OR vaccinne OR vaccinnes OR vaccination OR vaccinnations OR vaccinne OR vaccinnes OR zika OR vaccination OR vaccinnations OR voices for vaccines OR voicesforvaccines OR momswovax 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)
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.
WHERE VACCINES WERE MENTIONED, WHICH VACCINES WERE MENTIONED THE MOST?

**Before Zika**

- Dengue (16%)
- Flu (26%)
- 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**

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

- Dengue (2%)
- Flu (6%)
- HPV (16%)
- Ebola (5%)
- Polio (8%)
- Zika (42%)
- Meningitis (16%)
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 total volume of Facebook posts posted by users over two months.

Georgia, California, Texas, and New York are the most active across platforms.
these are tweets taken from a week before Zika became newsworthy

<table>
<thead>
<tr>
<th>Region</th>
<th>Negative</th>
<th>Neutral</th>
<th>Positive</th>
</tr>
</thead>
<tbody>
<tr>
<td>Northeast</td>
<td>8</td>
<td>32</td>
<td>2</td>
</tr>
<tr>
<td>Midwest</td>
<td>4</td>
<td>28</td>
<td>1</td>
</tr>
<tr>
<td>South</td>
<td>12</td>
<td>50</td>
<td>5</td>
</tr>
<tr>
<td>West</td>
<td>9</td>
<td>45</td>
<td>1</td>
</tr>
</tbody>
</table>
these are tweets taken from a week after Zika became newsworthy

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.
Search terms: Zika, Virus, CDC

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

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, maliykaishath, 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

148 members
Hashtags: zika, japan
Keywords: zika, rt, cnbrk, women, virus, wait, before, trying, pregnant, cdc

Top Tweeters: cp24, doctorcara, racpong, janmanimoi, newsgirl123456, saagpsy40, amykikho, scletertainmen, 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

79 members
Hashtags: zika, health
Keywords: zika, rt, virus, cdc, dfriedencdc, guidance, transmission, new, issued, prevent

Top Tweeters: lehigh389, time, johnnysoftware, hiv, insight, lbgtjournal, sbter79, slvrtnx, 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

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.

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.

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.

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.

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

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.