

PA Vaccine Conversations and Misinformation on Twitter

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Vaccine Hesitancy Project Update based on April 1 – April 21, 2021

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- ❑ This report is an effort to summarize social media conversations around COVID-19 issues in Pennsylvania, focusing on vaccination. It contains an analysis of the general topics about the current pandemic, such as COVID-19 regulations, mandates, masks, pro-and anti-vaccination campaigns, as well as other topics related to COVID-19 misinformation, disinformation, conspiracy theories, and vaccine hesitancy messages.
- ❑ The material contained in this report is a summary of social media content and does not represent a judgment or characterization of any individual.

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Process Description

- To get a broad sense of the Twitter conversation about vaccines and vaccine misinformation we have collected tweets based on a combination of keyword-based and location-based methods.
- Locations are assigned to tweets based on a mix of the following: Twitter's own location-based search operations, Twitter's annotations, and our own machine-learning based tool.
- We are focused on the 5 following locations:
 - 4 larger city areas: Philadelphia, Pittsburgh, Allentown/Bethlehem, Erie
 - 1 area comprised of as much of the rest of PA as is possible (rural areas plus other smaller urban areas) – this is not currently shown in these slides

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Types of Discussions

- It is helpful to be aware that Twitter conversations around vaccines and vaccine misinformation may contain a variety of types of discussions:
 - Pro-vaccine news and information
 - Honest questions/concerns about vaccines
 - Informative responses to questions
 - Misinformation and disinformation about vaccines
 - Informative responses to misinformation/fact-checking
 - Pro-vaccine satire/sarcasm/personal attacks against proponents of anti-vaccine views
 - Anti-vaccine satire/sarcasm/personal attacks against proponents of pro-vaccine views/government and medical professionals

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Vaccine Narrative Descriptions

- Overall Vaccine Conversation: tweets that mention any of a set of vaccine keywords
- Vaccine Passports: mix of discussions mentioning vaccine passports
 - Misinfo: "Mark of the Beast" – religiously-tinged conspiracy theory that vaccines and vaccine passports represent the mark of the Devil from an interpretation of Christian end times scripture
 - Mixed: Non-Religious Government control narratives – mix of questioning and outright conspiracy
 - Fake vaccine cards – discussions of creating fake IDs (both pro and anti-making the IDs)
- Vaccine Ingredients
 - Misinfo: Luciferase - religious-tinged conspiracy that the compound is of the Devil (Luciferase is a real compound related to bioluminescence), mix of misinformation and those scorning the misinformation
 - Misinfo: Microchips – conspiracy theory that microchips for population control are in the vaccines, Twitter conversation is mix of sharing conspiracy and sharing scorn for it
- Vaccine Side effects
 - Mixed: Menstrual ghost effects/shedding – questioning and/or passing of misinformation about vaccine's ability to "hop" from person to person affecting menstrual patterns
 - Mixed: Herpes – questioning and/or passing of misinformation that vaccines cause herpes
 - Misinfo: Celebrity deaths – discussions blaming the death of DMX and Prince Phillip on them getting COVID vaccines

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Vaccine Narrative Descriptions (cont.)

- Need for vaccine
 - Misinfo: "if you have already had the disease" then you don't need the vaccine – mix of questioning and misinformation
- Vaccine administration
 - Not FDA approved – discussion/misinformation about emergency use authorization
 - Boosters – news and discussion of whether boosters are just a cash grab
- Johnson and Johnson fallout – discussions of the pause in use of J&J vaccine in US, mix of questioning, news discussion, and misinformation related to vaccine safety/confounding all three vaccines in the US

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High Level View Apr 1 – Apr 21, 2021

Conversation	Total PA	Philadelphia		Pittsburgh		Erie		Allentown/Bethlehem	
	Tweets	Tweets	%	Tweets	%	Tweets	%	Tweets	%
Overall Vaccine Conversation	342,735	200,641	59%	84,825	25%	3,098	1%	54,171	16%
Vaccine Passports	5,546	2,946	53%	1,289	23%	60	1%	1,251	23%
Misinfo: "Mark of the Beast"	81	46	57%	22	27%	0	0%	13	16%
Misinfo: Non-Religious Gov Control	20	8	40%	8	40%	0	0%	4	20%
Fake Vaccine Cards	109	56	51%	26	24%	1	1%	26	24%
Misinfo: "Luciferase"	6	3	50%	1	17%	0	0%	2	33%
Misinfo: "Celebrity Deaths"	330	223	68%	59	18%	3	1%	45	14%
Not FDA approved	109	59	54%	30	28%	0	0%	20	18%
Boosters	171	92	54%	50	29%	0	0%	29	19%
Johnson and Johnson Fallout	3,665	2,339	64%	941	26%	32	1%	353	10%
Misinfo: Microchips	491	238	48%	141	29%	5	1%	107	22%
Misinfo: Menstrual Ghost effects	162	128	79%	15	9%	0	0%	19	12%
Misinfo: Shedding	27	21	78%	5	19%	0	0%	1	4%
COVID Vaccine gives Herpes	211	112	53%	53	25%	1	0%	45	21%
"Already infected don't need vaccine"	5	4	80%	1	20%	0	0%	0	0%



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Some Observations

- As is usual with Twitter, higher population areas typical also have higher amounts of Twitter discussion
- Most discussion is of a mixed nature about vaccine passports and J&J vaccine, both of which were related to government announcements during this period
- Discussions around easily identifiable misinformation were smaller, and were a mix of proponents of the misinfo and sarcasm/scorn directed at them. Of these, microchip-related discussion was the greatest.

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Ongoing work

- Adding data on Tweets from rural/other PA locations
- Separating out more clearly the pro-misinformation and anti-misinformation discussions and which narratives occur together in time
- Looking more closely at proponents of misinformation that are targeting officials/health agencies – so far, while we have seen this activity the amount of attention it has generated on Twitter has been minimal
- Adding in other media platforms

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For More Information

- Dr. Kathleen M. Carley - kathleen.carley@cs.cmu.edu
 - <http://www.casos.cs.cmu.edu/bios/carley/carley.html>
- IDeaS website - <https://www.cmu.edu/ideas-social-cybersecurity/>
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