

PA Vaccine Conversations and Misinformation on Twitter

Iuliia Alieva, Dawn Robertson, Dr. Kathleen M. Carley

Vaccine Hesitancy Project Update based on November 12 – November 18, 2021

The CMU centers for:

Informed DEMocracy And Social cyber-security

Computational Analysis of Social and Organizational Systems



Carnegie Mellon University



1/11/2022

1

1

PA Vaccine Conversations Project

- ☐ This report is an effort to summarize social media conversations around COVID-19 issues in Pennsylvania, with a focus 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.

1/11/2022

2



2

Report Overview November 12 – November 18

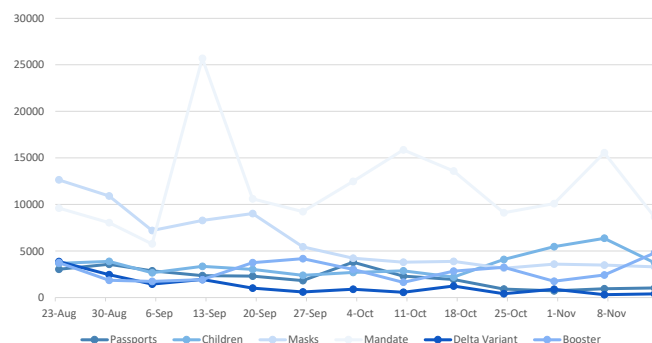
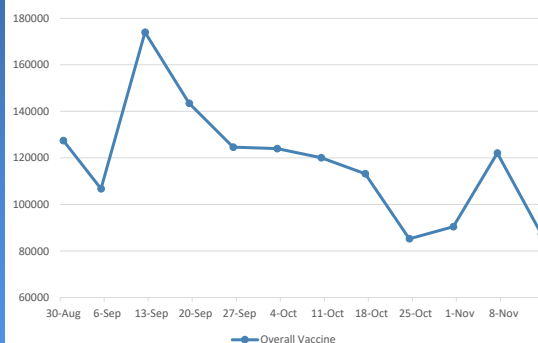
- ❑ This week's trending stories cover issues like vaccination for children, vaccination mandates, sports, and others;
- ❑ Trending disinformation publication: <https://www.conservativebeaver.com/2021/11/10/the-wife-of-pfizers-ceo-dies-from-complications-from-the-vaccine/> Wife of Pfizer's CEO dies after complications from the vaccine. AP conducted fact-checking on the story https://apnews.com/article/fact-checking-498221169953?utm_campaign=SocialFlow&utm_medium=APFactCheck&utm_source=Twitter
- ❑ Other trending stories: <https://www.telegraph.co.uk/news/2021/11/15/alzheimers-vaccine-step-closer-new-treatment-reverses-memory/> Alzheimer's vaccine step closer after new treatment reverses memory loss; <https://www.nbcnews.com/tech/tech-news/covid-vaccine-mandates-push-holdouts-get-shot-detox-rcna4859> Covid vaccine holdouts are caving to mandates — then scrambling to 'undo' their shots; <https://bit.ly/3kCuFU6> U.S. Sen. Ron Johnson is calling on Wisconsin lawmakers to take over elections and tell local officials to ignore the work of the bipartisan state Elections Commission; <https://www.cnn.com/2021/11/16/health/smallpox-vials-found/index.html> Vials labeled 'smallpox' found at vaccine research facility in Pennsylvania, CDC says
- ❑ Trending low-credibility disinformation stories: <https://www.conservativebeaver.com/2021/11/10/the-wife-of-pfizers-ceo-dies-from-complications-from-the-vaccine/> Wife of Pfizer's CEO dies after complications from the vaccine; <https://stevekirsch.substack.com/p/over-a-60x-increase-in-serious-adverse> Over a 60X increase in pro sports adverse events since the vaccines rolled out; <https://www.oann.com/mrna-vaccine-inventor-suggests-collusion-between-cnn-pfizer/> MRNA Vaccine Inventor Suggests Collusion Between CNN, Pfizer; https://www.nationalmemo.com/leigh-undadas-anti-vax?utm_campaign=RebelMouse&share_id=6783882&utm_medium=social&utm_source=twitter&utm_content=The+National+Memo Anti-Vax Protest Leader: Mandates Are 'Worse' Than Nazi Threat To Jews; <https://www.stopworldcontrol.com/veadon/> Former PFIZER vice-president Dr. Michael Yeadon warns humanity not to take the vaccine; <https://www.breitbart.com/europe/2021/11/16/italian-government-raids-homes-of-anti-vaccine-passport-activists/> Italian Government Raids Homes of Anti-Vaccine Passport Activists; <https://www.thegatewaypundit.com/2021/11/dr-fauci-admits-vaccines-not-work-advertised-vaccinated-great-danger-today/> Dr. Fauci Admits Vaccines Did Not Work as Advertised and that Vaccinated Are in Great Danger Today (VIDEO)
- ❑ Pro-vaccination video was widely spread during the week: <https://t.co/yREIEtqWh>

1/11/2022



3

Trends (tweets per week) November 12 – November 18



1/11/2022



4

High Level View by City November 12 – November 18

	Total PA	Philadelphia		Pittsburgh		Erie		Allentown/Bethlehem		Other	
Conversation	Tweets	Tweets	%	Tweets	%	Tweets	%	Tweets	%	Tweets	%
Overall Vaccine	74880	40251	53.8%	20106	26.9%	623	0.8%	11311	15.1%	2589	3.5%
Vaccine Passports	997	587	1.5%	212	1.1%	7	1.1%	178	1.6%	13	0.5%
FDA Approval	191	83	0.2%	40	0.2%	3	0.5%	57	0.5%	8	0.3%
Boosters	2925	1547	3.8%	657	3.3%	38	6.1%	467	4.1%	216	8.3%
Employees	776	402	1.0%	180	0.9%	10	1.6%	153	1.4%	31	1.2%
"Experimental"	315	181	0.4%	64	0.3%	5	0.8%	56	0.5%	9	0.3%
Children	2647	1574	3.9%	476	2.4%	38	6.1%	477	4.2%	82	3.2%
Myocarditis	533	244	0.6%	102	0.5%	6	1.0%	168	1.5%	13	0.5%
Heart	763	345	0.9%	182	0.9%	16	2.6%	200	1.8%	20	0.8%
Masks	3251	1776	4.4%	709	3.5%	30	4.8%	515	4.6%	221	8.5%
Thrombosis/VITT	61	37	0.1%	12	0.1%			11	0.1%	1	0.0%
Mandates	8574	4750	11.8%	1519	7.6%	101	16.2%	1896	16.8%	308	11.9%
Natural Immunity	661	393	1.0%	159	0.8%	4	0.6%	92	0.8%	13	0.5%
Efficacy	240	123	0.3%	51	0.3%	4	0.6%	55	0.5%	7	0.3%
Spike Proteins	101	47	0.1%	39	0.2%			12	0.1%	3	0.1%
Delta Variant	596	341	0.8%	111	0.6%	5	0.8%	101	0.9%	38	1.5%
Race	1687	1130	2.8%	340	1.7%	16	2.6%	156	1.4%	45	1.7%
Ivermectin	3467	659	1.6%	2669	13.3%	3	0.5%	121	1.1%	15	0.6%
Military	222	141	0.4%	36	0.2%	3	0.5%	35	0.3%	7	0.3%
Breakthrough	390	219	0.5%	76	0.4%	5	0.8%	83	0.7%	7	0.3%

1/11/2022

Trending conversations:

- Boosters
- Ivermectin



5

High Level View by County November 12 – November 18

County	Allegheny	Beaver	Butler	Cambria	Fayette	Indiana	Somerset	Westmoreland
Overall Vaccine	20549	24	70	16	30	9	4	74
Vaccine Passports	217		1					
FDA	40		1					1
Boosters	687			1	2	3	3	8
Employees	185		1	1	2			2
"Experimental"	67		1					
Children	488		2	1	2			2
Myocarditis	105							
Heart	183	1				1		
Masks	744	2	2	4		2		14
Thrombosis/VITT	12							
Mandates	1569	1	9	1	4			10
Natural Immunity	161							
Efficacy	51		1					
Spike Proteins	39		1					
Delta Variant	120		1					1
Race	345	1	2		1			1
Ivermectin	2674							
Military	38	1						
Breakthrough	77							1

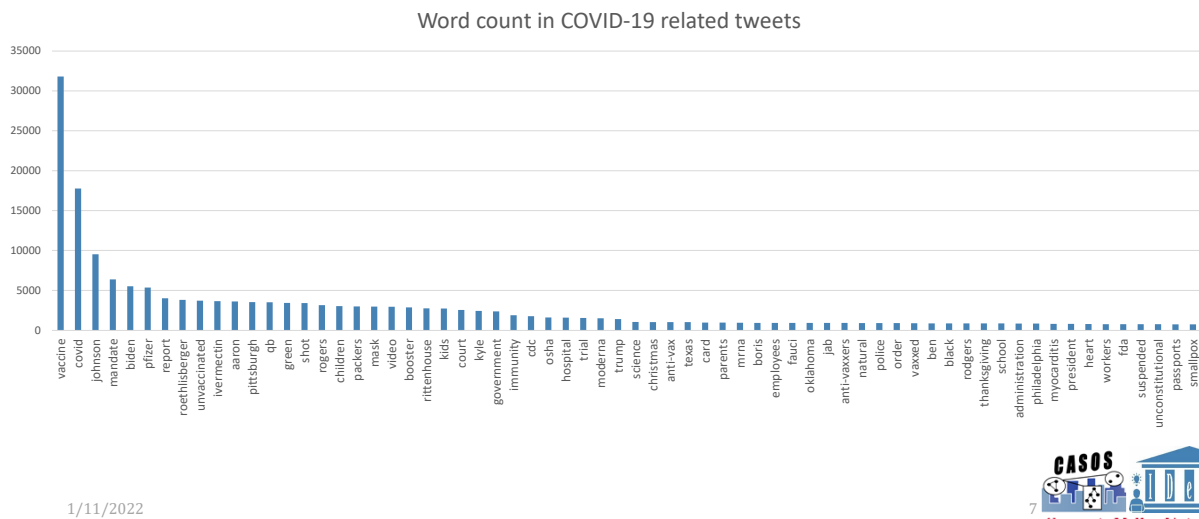
1/11/2022

- Tweets counted here if there is a county location attached
- Race: pulled by one of the vaccine keywords plus at least one other term in ("Black", "African American", "of color", "Latin", "Hispanic", "brown", "eugenic")



6

Top Words Used per Week November 12 – November 18



7

Top Hashtags by County November 12 – November 18

- ☐ We've checked hashtags in several counties such as Allegheny, Beaver, Butler, Cambria, Fayette, Indiana, Somerset, and West Moreland. After removing hashtags that were part of our search criteria, the top 5 hashtags for each county related to COVID19/vaccines are as follows*:

Allegheny	Beaver + Butler	Fayette	Somerset	West Moreland
covid19 (440)	covid19 (2)	covid19 (1)	covid19 (1)	covid19 (3)
steelers (213)	covid19vaccine (1)	probowlvote (1)	probowlvote (1)	nhl (2)
breaking (116)	oann (1)	vaccinate (1)	vaccinate (1)	penguins (2)
pedophiles (106)	vaccinate (1)			vaccinated (2)
vaccine (106)	vaccination (1)			covidvaccineforchildren (1)

1/11/2022

8

Top Hashtags by City November 12 – November 18

- ❑ After removing hashtags that were part of our search criteria, the top 5 hashtags for each region related to COVID19/vaccines are as follows:

Philadelphia	Chester	Norristown	Pittsburgh	Erie	Allentown/Bethlehem	Other
covid19 (789)	covid19 (133)	covid19 (225)	covid19 (433)	covid19 (11)	covid19 (325)	covid19 (80)
saturdaythoughts (233)	billgates (61)	vaccinate (40)	steelers (206)	browns (5)	vaccinate (63)	vaccine (35)
vaxupphilly (186)	vaccinate (34)	vaccine (35)	breaking (116)	vaccinemandate (5)	covidvaccine (44)	steelers (20)
vaccinate (149)	covidvaccine (21)	pennsylvania (22)	pedophiles (106)	breaking (4)	sciencewillwin (32)	covidvaccine (19)
covidvaccine (145)	probowlvote (20)	breaking (19)	vaccine (105)	pfizer (4)	pfizer (19)	breastcancer (10)

1/11/2022



9

Top URLs by County November 12 – November 18

Allegheny	Butler + Beaver	Cambria	Indiana	Fayette	West Moreland
https://www.conservativebeaver.com/2021/11/10/the-wife-of-pfizers-ceo-dies-from-complications-from-the-vaccine/ Wife of Pfizer's CEO dies after complications from the vaccine (173)	https://nyti.ms/3c5Ae9e The number of U.S. workers quitting their jobs in September was the highest on record (1)	https://vax4nyc.nyc.gov/patient/s/ vaccination scheduling (1)	https://www.bloomberg.com/opinion/articles/2021-11-12/moderna-to-uncle-sam-my-vaccine-not-yours Moderna to Uncle Sam: My Vaccine, Not Yours (1)	https://www.nbcnews.com/tech/tech-news/covid-vaccine-mandates-push-holdouts-get-shot-detox-rcna4859 Covid vaccine holdouts are caving to mandates — then scrambling to 'undo' their shots (2)	http://hill.cm/svd6sNu Gene Simmons rips anti-vaxxers: 'If you're willing to walk among us unvaccinated, you are an enemy' (1)
https://stevekirsch.substack.com/p/over-a-60x-increase-in-serious-adverse Over a 60X increase in pro sports adverse events since the vaccines rolled out (160)	http://apne.ws/1JFk5v7 Johnson & Johnson to split into 2, aim for faster growth (1)		https://www.nytimes.com/2021/11/12/business/media/coronavirus-misinformation-radio-podcasts.html?referringSource=articleShare On Podcasts and Radio, Misleading Covid-19 Talk Goes Unchecked(1)	https://www.jsonline.com/story/news/politics/elections/2021/11/10/ron-johnson-calls-gop-wisconsin-lawmakers-take-over-elections/6376079001/ U.S. Sen. Ron Johnson is calling on Wisconsin lawmakers to take over elections and tell local officials to ignore the work of the bipartisan state Elections Commission. (1)	https://nyti.ms/31XgXoo Covid News: D.C. Eases Indoor Mask Restrictions (1)
https://www.outkick.com/despite-nhls-99-vaccination-rate-ottawa-senators-games-postponed-due-to-covid/ DESPITE NHL'S 99% VACCINATION RATE, OTTAWA SENATORS GAMES POSTPONED DUE TO COVID (128)	https://www.oann.com/mrna-vaccine-inventor-suggests-collusion-between-cnn-pfizer/ MRNA Vaccine Inventor Suggests Collusion Between CNN, Pfizer (1)			https://www.nationalmemo.com/leigh-dundas-anti-vax?utm_campaign=RebelMouse&share_id=6783882&utm_medium=social&utm_source=twitter&utm_content=The+National+Memo Anti-Vax Protest Leader: Mandates Are 'Worse' Than Nazi Threat To Jews (1)	https://steelersnow.com/steelers-qb-ben-roethlisberger-said-hes-been-vaccinated/ Steelers QB Ben Roethlisberger Said He's Been Vaccinated against COVID-19 (1)
https://twitter.com/chuckcalles/status/1458920324427354112 BREAKING REPORT: 29-Year-Old Mountain Bike and National Title Winner Kyle Warner Diagnosed with Pericarditis, [CAREER ENDING INJURY] after Taking Pfizer Vaccine (99)	https://nyti.ms/2YLom9e Oklahoma's governor puts an opponent of vaccine mandates in charge of the National Guard (1)			https://www.nytimes.com/2021/11/12/briefing/when-will-covid-end.html How Does This End? (1)	https://www.foxnews.com/us/oklahoma-representative-bill-ban-vaccine-mandates Oklahoma representative files bill to ban vaccine mandates in state (1)
https://www.telegraph.co.uk/news/2021/11/15/alzheimers-vaccine-step-closer-new-treatment-reverses-memory/ Alzheimer's vaccine step closer after new treatment reverses memory loss (86)	http://apne.ws/9iuidVR Pfizer CEO's wife did not die or experience 'vaccine complications' (1)			https://www.washingtonpost.com/business/2021/11/12/biden-vaccine-mandate-court-ruling/ Federal appeals court halts Biden administration's vaccine requirement, delivering policy a major blow (1)	https://www.washingtonpost.com/business/2021/11/12/biden-vaccine-mandate-court-ruling/ Federal appeals court halts Biden administration's vaccine requirement, delivering policy a major blow (1)

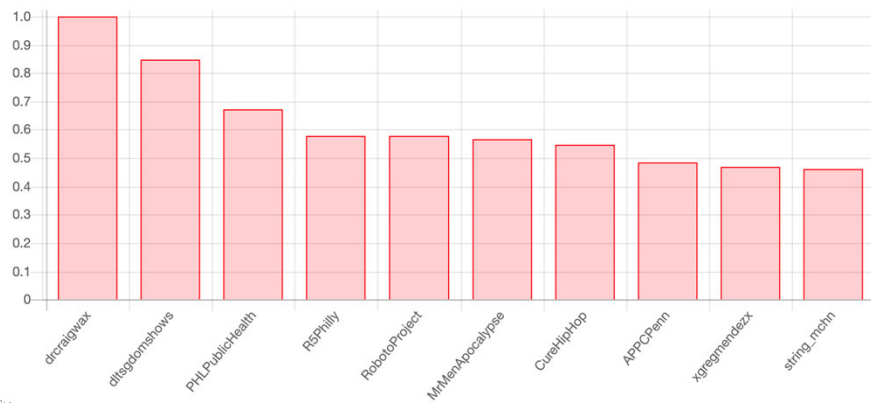
1/11/2022



10

Analysis of Tweeters - Super Friends

- Super Friends are users that exhibit frequent two-way communication, facilitating large or strong communication networks.



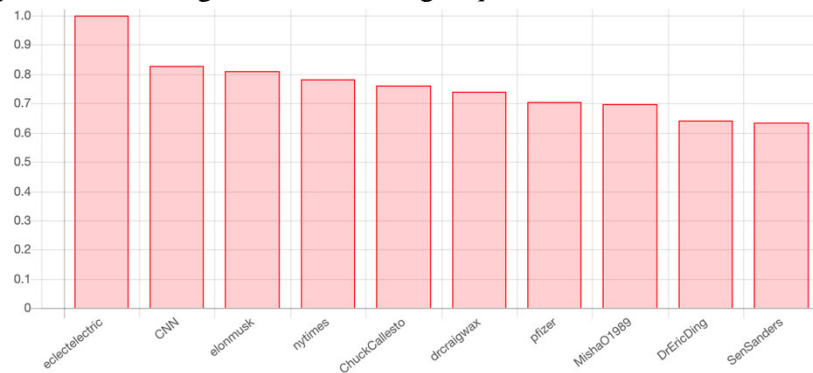
1/11/2022



13

Analysis of Tweeters - Other Influencers

- Other Influencers are users which have an active network presence, by tweeting often or mentioning users often, and operate in central parts of the conversation, such as by using important hashtags, or mentioning important users.



1/11/2022



14

Accounts Referenced by the Most Tweets

- ❑ This shows the tweeters that are most often referenced (e.g. mentioned) in PA tweets. Value is the number of tweets that reference the agent.

Agent Label	Value
pfizer	1446
ChildrensPhila	890
vaccinemakers	870
Angry Staffer	446
CariKelemen	430
JedediahBila	412
catturd2	367
ClayTravis	337
RepThomasMassie	314
POTUS	296

1/11/2022



15

Trending Tweets November 12 – November 18

Tweets that are the most forwarded, either by retweet, reply, or quote:

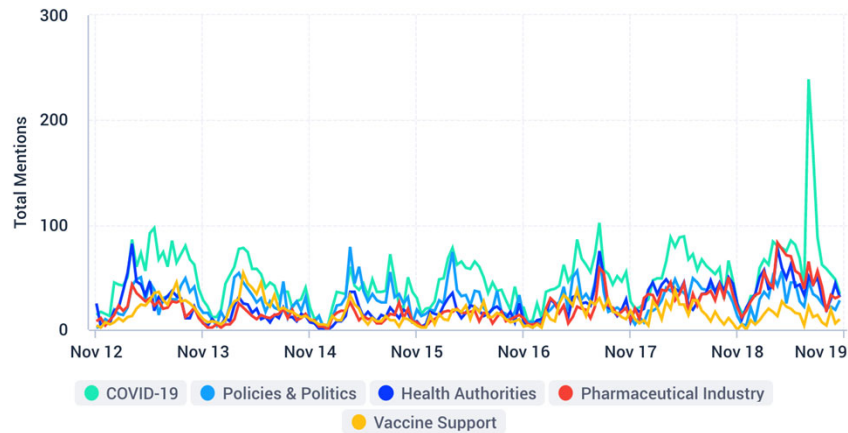
- ❑ BREAKING REPORT: Green Bay Packers QB Aaron Rogers Back Today After Taking Ivermectin, Pittsburgh QB Roethlisberger Vaccinated But Out with COVID...
- ❑ I am blown away by this COVID vaccine video, one of the coolest things I have seen in a long time <https://t.co/yREIETqtWh>
- ❑ 5) Captioned text of vaccine explainer. Again, beautiful video by @vaccinemakers of Children's Hospital of Philadelphia @ChildrensPhila. <https://t.co/CXMJQwbXKi>
- ❑ Who here has been vaccinated I want to follow you Retweet if you're vaccinated
- ❑ Heading read - Vax site. People wait in line to get a shot, while an injected person is carried away by ambulance! <https://t.co/o8rPLvkAdN>
- ❑ Then infantilization of Kyle Rittenhouse on this site is something. He's given the benefit & grace of youth that black boys in our criminal justice system are not. Imagine Demarcus Johnson traveling across state lines murdering 2. He would've been shot by police but you get it.
- ❑ Get onboard! <https://t.co/dZ7SabAkGI>
- ❑ I know a lot of people who regret getting the vaccine. Don't know anyone who regrets not getting it.
- ❑ Want to buy a house? It's more expensive. Want to build a house? More expensive. Want to rent an apartment? More expensive. Gas? More expensive. Groceries? More expensive. Thanksgiving turkey? More expensive. Christmas presents? More expensive.
- ❑ Even though I am fully vaccinated, I will still wear my mask and keep my distance, thank you. #SaturdayThoughts

1/11/2022



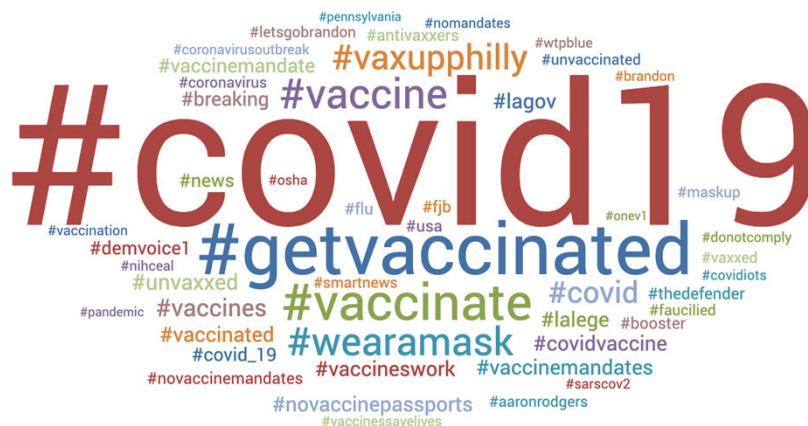
16

General PA Conversation November 12 – November 18



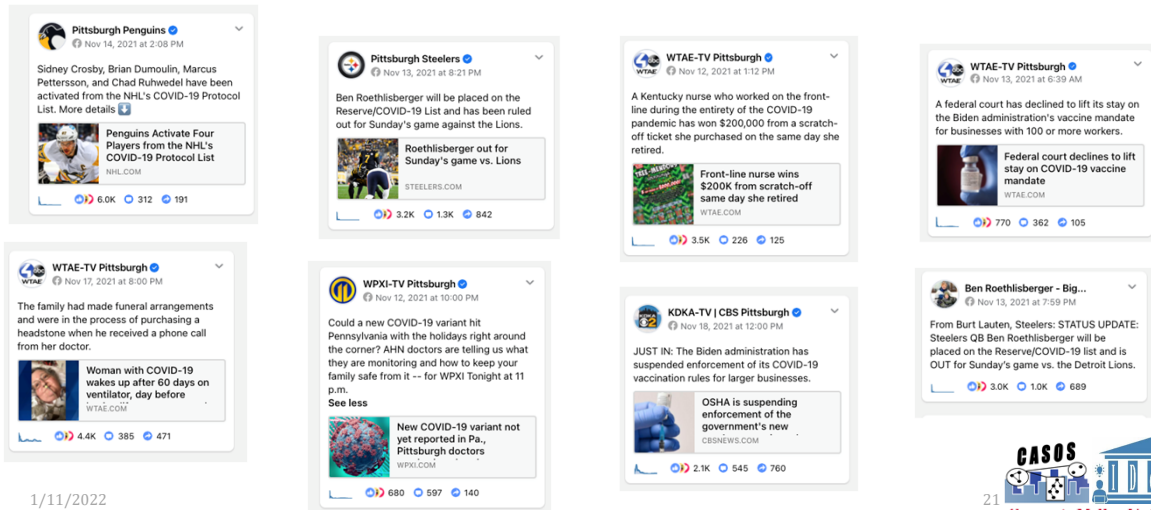
17

PA Hashtag Cloud November 12 – November 18



18

Trending Posts on Facebook November 12 – November 18

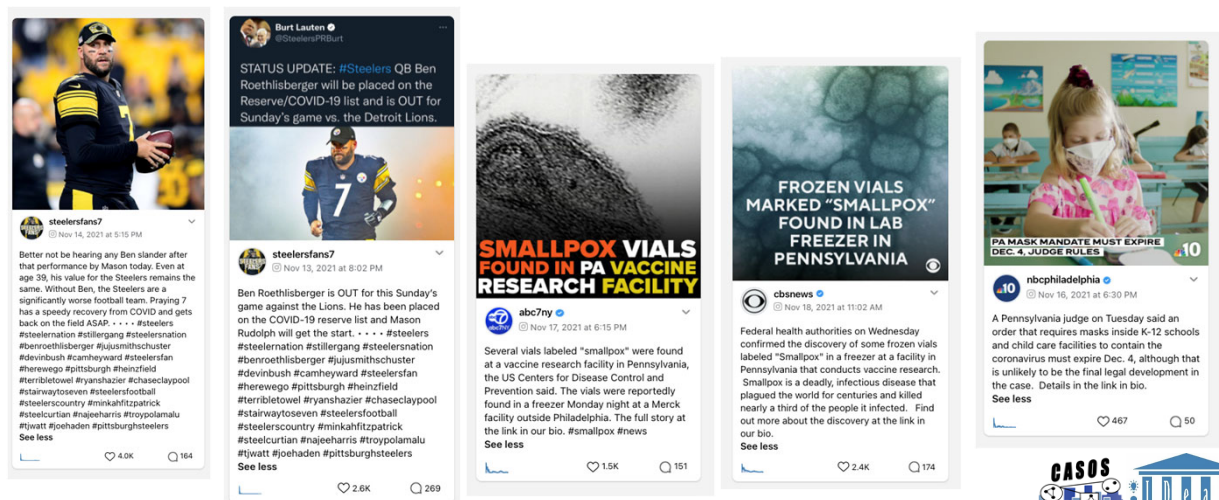


1/11/2022



21

Trending Posts on Instagram November 12 – November 18

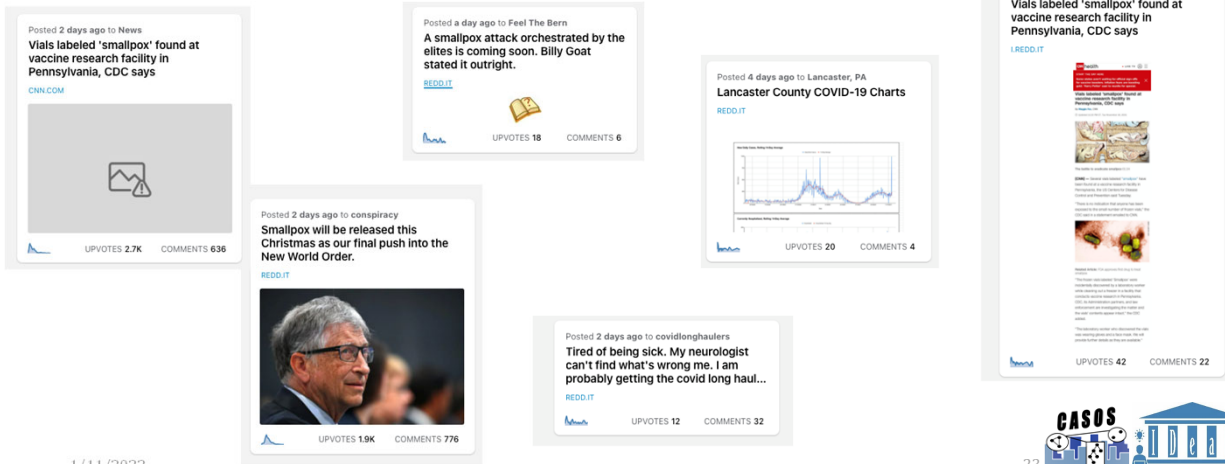


1/11/2022



22

Trending Posts on Reddit November 12 – November 18



23

For More Information

- ❑ Director 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/>
- ❑ CASOS website - <http://www.casos.cs.cmu.edu/>
- ❑ Social Cybersecurity Working Group - <http://social-cybersecurity.org>
- ❑ Facebook: [@IDEasCMU](https://www.facebook.com/IDEasCMU)
- ❑ Twitter: [@IDeaSCMU](https://twitter.com/IDeaSCMU)
- ❑ YouTube: [IDeaS Center](https://www.youtube.com/IDeaS-Center)
- ❑ Ask to be on our Email-Distro Lists

1/11/2022

Copyright © 2021 Kathleen M. Carley



24