

# PA Vaccine Conversations on Twitter

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

Vaccine Hesitancy Project Update based on December 3– December 9, 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 related to COVID-19 vaccination. This includes discussions related to COVID-19 regulations, mandates, masks, pro-and anti-vaccination campaigns, science messages, 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



Carnegie Mellon University

2

## Report Overview December 3 – December 9

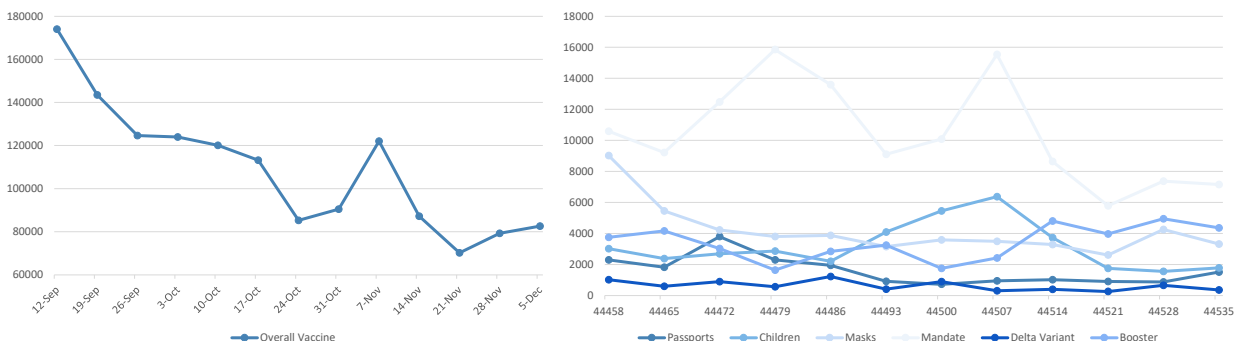
- ❑ This week's trending stories cover new COVID-19 variant omicron, vaccination mandates, boosters, and others;
- ❑ #omicron, #vaccinesideeffects, #pericarditis are among trending hashtags;
- ❑ Trending disinformation/vaccine hesitancy/antivax publications: <https://westernstandardonline.com/2021/12/no-more-moderna-doses-for-young-men-after-millions-already-given/> No more Moderna doses for young men, after millions already given; <https://enexpress.net/news/news/120-children-hospitalized-province-suspends-pfizer-vaccine-batch-4397748.html> 120 children hospitalized, province suspends Pfizer vaccine batch; <https://www.oann.com/who-warns-against-vaccine-mandates/> WHO Warns Against Vaccine Mandates; <https://pittsburgh.cbslocal.com/2021/12/04/woman-diagnosed-with-tinnitus-after-vaccine/> 'I'm Not Willing To Go Through This Again:' Woman Diagnosed With Tinnitus After COVID Vaccine; <http://divr.it/SDevgk> Cruz: 'No Pissant Politician ... Has The Right Or Legal Authority To Force You' To Get Vaccinated; <https://brownstone.org/articles/vaccine-mandates-unscientific-divisive-and-enormously-costly/> Vaccine Mandates: Unscientific, Divisive, and Enormously Costly; <http://tinyurl.com/y6nwd8jx> 'This Unlawful Mandate is Now Blocked in All 50 States': Biden's Vaccine Mandate Suffers Another Blow in Ruling for Montana; <https://www.thegatewaypundit.com/2021/12/court-orders-fda-comply-foia-release-information-pfizer-eua-first-batch-documents-shows-1200-vaccine-deaths-within-first-90-days/> Court Orders FDA To Comply With FOIA and Release Information On Pfizer Vaccine – First Batch of Documents Shows Over 1,200 Vaccine Deaths WITHIN FIRST 90 DAYS; <https://childrenshealthdefense.org/defender/vaers-cdc-adverse-events-deaths-5-year-old-died-pfizer-vaccine/> 5-Year-Old Died 4 Days After Pfizer Shot, CDC VAERS Data Show; <https://www.facebook.com/100024649025428/posts/1063537627811195/> Pennsylvania girl suffers stroke and brain hemorrhage 7 days after being vaccinated; <https://dailytelegraph.co.nz/covid-19/crisis-in-slovenia-whistleblower-nurse-says-politicians-receive-saline-instead-of-mrna-jab/> SLOVENIA? WHISTLEBLOWER NURSE SAYS POLITICIANS RECEIVE SALINE INSTEAD OF MRNA JAB; <https://twitter.com/AnonCitizenUK/status/1467525765474443264?s=20> Dr Ugur Sahin CEO of BioNTech and inventor of the BIO N TECH Pfizer jab refuses to take the jab for safety reasons WAKE UP!; <https://ussanews.com/vaccine-scandal-in-slovenia-bottles-have-code-s-for-placebo-vax-or-kill-shot/> Vaccine Scandal in Slovenia – Bottles have Code #'s for Placebo, Vax, or KILL SHOT; <https://www.breitbart.com/politics/2021/12/01/exclusive-tool-to-enforce-orwellian-rules-80-house-republicans-help-pass-bill-to-fund-federal-vaccination-database/> Exclusive — "Tool to Enforce Orwellian Rules": 80 House Republicans Help Pass Bill to Fund Federal Vaccination Database; <https://twitter.com/evelynrae/status/1466712921266814977> Paradise in Australia. (video about the Forced Internment Camp in Australia)
- ❑ Other trending stories: <https://www.npr.org/sections/health-shots/2021/12/05/1059828993/data-vaccine-misinformation-trump-counties-covid-death-rate> Pro-Trump counties now have far higher COVID death rates. Misinformation is to blame; <https://trib.al/twZ1qUH> Nets' Kyrie Irving might be swayed to take plant-based COVID vaccine in works; <https://pubmed.ncbi.nlm.nih.gov/34873910/> Mechanisms of SARS-CoV-2 Evolution Revealing Vaccine-Resistant Mutations in Europe and America; <https://www.theblaze.com/news/dana-white-covid-treatments-joe-rogan> Fully vaccinated Dana White contracts COVID-19, takes same treatment as Joe Rogan, 'feeling like a million bucks' in less than 24 hours

1/11/2022



3

## Trends (tweets per week) December 3– December 9



1/11/2022



4

## High Level View by City December 3 – December 9

	Total PA	Philadelphia		Pittsburgh		Erie		Allentown/Bethlehem		Other	
Conversation	Tweets	Tweets	%	Tweets	%	Tweets	%	Tweets	%	Tweets	%
Overall Vaccine	69787	36633	52.5%	18969	27.2%	660	0.9%	10686	15.3%	2839	4.1%
Vaccine Passports	1482	826	2.3%	331	1.7%	11	1.7%	268	2.5%	46	1.6%
FDA Approval	106	41	0.1%	29	0.2%	1	0.2%	28	0.3%	7	0.2%
Boosters	3703	2019	5.5%	835	4.4%	43	6.5%	560	5.2%	246	8.7%
Employees	858	487	1.3%	193	1.0%	9	1.4%	133	1.2%	36	1.3%
"Experimental"	219	110	0.3%	43	0.2%	3	0.5%	56	0.5%	7	0.2%
Children	1222	692	1.9%	259	1.4%	9	1.4%	220	2.1%	42	1.5%
Myocarditis	303	161	0.4%	75	0.4%	5	0.8%	57	0.5%	5	0.2%
Heart	1209	484	1.3%	488	2.6%	9	1.4%	198	1.9%	30	1.1%
Masks	3284	1703	4.6%	730	3.8%	52	7.9%	531	5.0%	268	9.4%
Thrombosis/VITT	160	59	0.2%	37	0.2%	1	0.2%	46	0.4%	17	0.6%
Mandates	7110	3573	9.8%	1501	7.9%	69	10.5%	1652	15.5%	315	11.1%
Natural Immunity	607	372	1.0%	133	0.7%	2	0.3%	94	0.9%	6	0.2%
Efficacy	182	97	0.3%	35	0.2%	1	0.2%	42	0.4%	7	0.2%
Omicron	3463	1999	5.5%	656	3.5%	29	4.4%	623	5.8%	156	5.5%
Delta Variant	352	197	0.5%	85	0.4%	3	0.5%	36	0.3%	31	1.1%
Race	1584	702	1.9%	604	3.2%	8	1.2%	196	1.8%	74	2.6%
Ivermectin	229	127	0.3%	74	0.4%	1	0.2%	21	0.2%	6	0.2%
Military	239	103	0.3%	86	0.5%	1	0.2%	39	0.4%	10	0.4%
Breakthrough	163	91	0.2%	38	0.2%	1	0.2%	23	0.2%	10	0.4%

1/11/2022

### Trending conversations:

- Passports
- Mandates



5

## High Level View by County December 3 – December 9

County	Allegheny	Beaver	Butler	Cambria	Fayette	Indiana	Somerset	Westmoreland
Overall Vaccine	19449	32	47	21	27	10	15	65
Vaccine Passports	338		2					
FDA	30							
Boosters	879			2	3	1	1	4
Employees	198				1			
"Experimental"	43							
Children	263	1	3		2			
Myocarditis	75							
Heart	490				1			
Masks	777	2	3	2	2	1	9	3
Thrombosis/VITT	44							
Mandates	1561	5	5		4			5
Natural Immunity	133							
Efficacy	36							1
Omicron	680			1	2		1	4
Delta Variant	94					1		1
Race	613	4	2		2			1
Ivermectin	76							
Military	87				1			1
Breakthrough	38							

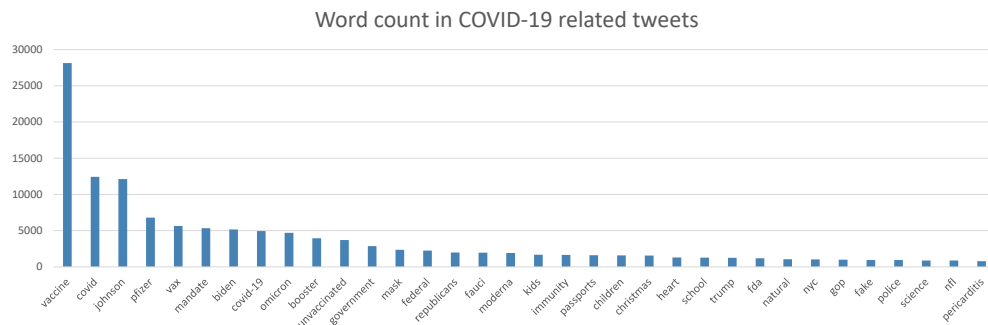
1/11/2022

- 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 December 3 – December 9



1/11/2022



7

## Top Hashtags by County December 3 – December 9

- ❑ 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	Cambria	Fayette	Indiana	West Moreland
covid19 (450)	herewego (4)	booster (1)	americanfreedom (1)	biden (1)	coronavirus (1)
vaccine (394)	covidvaccine (2)	covid (1)	covid19 (1)	covid19 (1)	covid19 (1)
pfizer (373)	steelersnation (2)	getvaccinatednow (1)	ethanschmidt (1)	vaccine (1)	foxnews (1)
vaccinesideeffects (295)	covid_19 (1)	maskup (1)			omicron (1)
pericarditis (274)	oann (1)	vaccinated (1)			vaccinated (1)

1/11/2022



8



## Top URLs by City December 3 – December 9

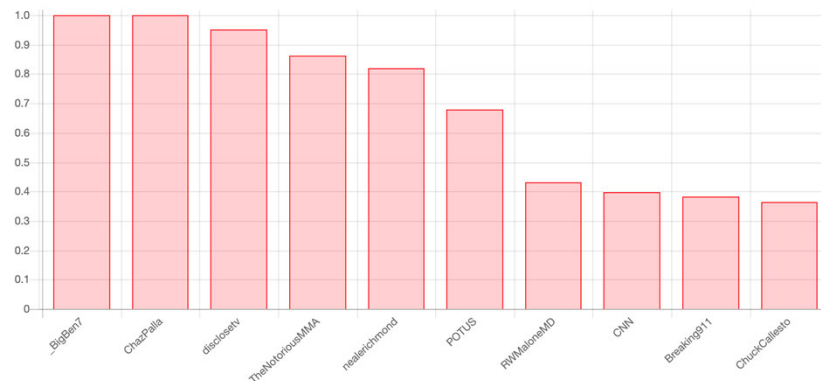
Philadelphia	Chester	Norristown	Pittsburgh	Erie	Allentown/ Bethlehem	Other
<a href="https://www.npr.org/sections/health-shots/2021/12/05/1059828993/data-vaccine-misinformation-trump-counties-covid-death-rate">https://www.npr.org/sections/health-shots/2021/12/05/1059828993/data-vaccine-misinformation-trump-counties-covid-death-rate</a> Pro-Trump counties now have far higher COVID death rates. Misinformation is to blame (103)	<a href="https://childrenshealthdefense.org/defender/yaers-cdc-adverse-events-deaths-5-year-old-died-pfizer-vaccine/">https://childrenshealthdefense.org/defender/yaers-cdc-adverse-events-deaths-5-year-old-died-pfizer-vaccine/</a> 5-Year-Old Died 4 Days After Pfizer Shot, CDC VAERS Data Show (42)	<a href="https://www.npr.org/sections/health-shots/2021/12/05/1059828993/data-vaccine-misinformation-trump-counties-covid-death-rate">https://www.npr.org/sections/health-shots/2021/12/05/1059828993/data-vaccine-misinformation-trump-counties-covid-death-rate</a> Pro-Trump counties now have far higher COVID death rates. Misinformation is to blame (31)	<a href="https://www.npr.org/sections/health-shots/2021/12/05/1059828993/data-vaccine-misinformation-trump-counties-covid-death-rate">https://www.npr.org/sections/health-shots/2021/12/05/1059828993/data-vaccine-misinformation-trump-counties-covid-death-rate</a> Pro-Trump counties now have far higher COVID death rates. Misinformation is to blame (107)	<a href="https://www.npr.org/sections/health-shots/2021/12/05/1059828993/data-vaccine-misinformation-trump-counties-covid-death-rate">https://www.npr.org/sections/health-shots/2021/12/05/1059828993/data-vaccine-misinformation-trump-counties-covid-death-rate</a> Pro-Trump counties now have far higher COVID death rates. Misinformation is to blame (4)	<a href="https://www.npr.org/sections/health-shots/2021/12/05/1059828993/data-vaccine-misinformation-trump-counties-covid-death-rate">https://www.npr.org/sections/health-shots/2021/12/05/1059828993/data-vaccine-misinformation-trump-counties-covid-death-rate</a> Pro-Trump counties now have far higher COVID death rates. Misinformation is to blame (72)	<a href="https://www.npr.org/sections/health-shots/2021/12/05/1059828993/data-vaccine-misinformation-trump-counties-covid-death-rate">https://www.npr.org/sections/health-shots/2021/12/05/1059828993/data-vaccine-misinformation-trump-counties-covid-death-rate</a> Pro-Trump counties now have far higher COVID death rates. Misinformation is to blame (28)
<a href="http://vaccines.gov">http://vaccines.gov</a> (72)	<a href="https://phmp.org/wp-content/uploads/2021/11/5_3_6-postmarketing-experience.pdf">https://phmp.org/wp-content/uploads/2021/11/5_3_6-postmarketing-experience.pdf</a> CUMULATIVE ANALYSIS OF POST-AUTHORIZATION ADVERSE EVENT REPORTS OF PF-07302048 (BNT162B2) RECEIVED THROUGH 28-FEB-2021 (28)	<a href="https://www.facebook.com/100024649025428/posts/1063537627811195/">https://www.facebook.com/100024649025428/posts/1063537627811195/</a> Pennsylvania girl suffers stroke and brain hemorrhage 7 days after being vaccinated (26)	<a href="http://dlvr.it/5Dd3ID">http://dlvr.it/5Dd3ID</a> Fully vaccinated Dana White contracts COVID-19, takes same treatment as Joe Rogan, 'feeling like a million bucks' in less than 24 hours (88)	<a href="https://dailytelegraph.co.nz/covid-19/crisis-in-slovenia-whistleblower-nurse-says-politicians-receive-saline-instead-of-mrna-jab/">https://dailytelegraph.co.nz/covid-19/crisis-in-slovenia-whistleblower-nurse-says-politicians-receive-saline-instead-of-mrna-jab/</a> CRISIS IN SLOVENIA? WHISTLEBLOWER NURSE SAYS POLITICIANS RECEIVE SALINE INSTEAD OF MRNA JAB (3)	<a href="https://e.vnexpress.net/news/news/120-children-hospitalized-province-suspends-pfizer-vaccine-batch-4397748.html">https://e.vnexpress.net/news/news/120-children-hospitalized-province-suspends-pfizer-vaccine-batch-4397748.html</a> 120 children hospitalized, province suspends Pfizer vaccine batch (44)	<a href="https://www.foxnews.com/politics/pelosi-government-funding-democrats-republicans-congress">https://www.foxnews.com/politics/pelosi-government-funding-democrats-republicans-congress</a> Pelosi says House won't pass funding bill blocking vaccine mandates: 'Not going to go for their anti-vaxing' (12)
<a href="http://tinyurl.com/y6nwd8ix">http://tinyurl.com/y6nwd8ix</a> 'This Unlawful Mandate is Now Blocked in All 50 States': Biden's Vaccine Mandate Suffers Another Blow in Ruling for Montana (60)	<a href="https://www.npr.org/sections/health-shots/2021/12/05/1059828993/data-vaccine-misinformation-trump-counties-covid-death-rate">https://www.npr.org/sections/health-shots/2021/12/05/1059828993/data-vaccine-misinformation-trump-counties-covid-death-rate</a> Pro-Trump counties now have far higher COVID death rates. Misinformation is to blame (15)	<a href="https://trib.al/twZ1qLH">https://trib.al/twZ1qLH</a> Nets' Kyrie Irving might be swayed to take plant-based COVID vaccine in works (18)	<a href="https://trib.al/twZ1qLH">https://trib.al/twZ1qLH</a> Nets' Kyrie Irving might be swayed to take plant-based COVID vaccine in works (46)	<a href="https://twitter.com/AnonCitizenUK/status/1467525765474432642">https://twitter.com/AnonCitizenUK/status/1467525765474432642</a> Dr Ugur Sahin CEO of BioNTech and inventor of the BIONTECH Pfizer jab refuses to take the job for safety reasons WAKE UPI (3)	<a href="https://pubmed.ncbi.nlm.nih.gov/34873910/">https://pubmed.ncbi.nlm.nih.gov/34873910/</a> Mechanisms of SARS-CoV-2 Evolution Revealing Vaccine-Resistant Mutations in Europe and America (28)	<a href="https://nyti.ms/3ldRMq">https://nyti.ms/3ldRMq</a> Covid News: Over 200 Million Americans Are Fully Vaccinated (6)
<a href="https://www.inquirer.com/opinion/america-a-public-good-student-debt-vaccine-refusal-20211205.html">https://www.inquirer.com/opinion/america-a-public-good-student-debt-vaccine-refusal-20211205.html</a> 3 words America forgot that explain gun insanity, vaccine denial, student debt, and more   Will Bunch (59)	<a href="https://www.npr.org/sections/health-shots/2021/12/05/1059828993/data-vaccine-misinformation-trump-counties-covid-death-rate?utm_campaign=storyshare&amp;utm_source=twitter.com&amp;utm_medium=social">https://www.npr.org/sections/health-shots/2021/12/05/1059828993/data-vaccine-misinformation-trump-counties-covid-death-rate?utm_campaign=storyshare&amp;utm_source=twitter.com&amp;utm_medium=social</a> Pro-Trump counties now have far higher COVID death rates. Misinformation is to blame (11)	<a href="http://vaccines.gov">http://vaccines.gov</a> (14)	<a href="https://westernstandardonline.com/2021/12/no-more-moderna-doses-for-young-men-after-millions-already-given/">https://westernstandardonline.com/2021/12/no-more-moderna-doses-for-young-men-after-millions-already-given/</a> No more Moderna doses for young men, after millions already given (46)	<a href="https://twitter.com/broadcasts/AYpk8ZayNPKu">https://twitter.com/broadcasts/AYpk8ZayNPKu</a> LIVE: BioNTech, Pfizer officials hold briefing on Omicron variant (3)	<a href="https://www.breitbart.com/politics/2021/12/01/exclusive-tool-to-enforce-orwellian-rules-80-house-republicans-help-pass-bill-to-fund-federal-vaccination-database/">https://www.breitbart.com/politics/2021/12/01/exclusive-tool-to-enforce-orwellian-rules-80-house-republicans-help-pass-bill-to-fund-federal-vaccination-database/</a> Exclusive — 'Tool to Enforce Orwellian Rules': 80 House Republicans Help Pass Bill to Fund Federal Vaccination Database (27)	<a href="https://brownstone.org/articles/vaccine-mandates-unscientific-divisive-and-enormously-costly/">https://brownstone.org/articles/vaccine-mandates-unscientific-divisive-and-enormously-costly/</a> Vaccine Mandates: Unscientific, Divisive, and Enormously Costly (5)
<a href="https://www.thegatewaypundit.com/2021/12/court-orders-fda-comply-foia-release-information-pfizer-eua-first-batch-documents-shows-1200-vaccine-deaths-within-first-90-days/">https://www.thegatewaypundit.com/2021/12/court-orders-fda-comply-foia-release-information-pfizer-eua-first-batch-documents-shows-1200-vaccine-deaths-within-first-90-days/</a> Court Orders FDA To Comply With FOIA and Release Information On Pfizer Vaccine – First Batch of Documents Shows Over 1,200 Vaccine Deaths WITHIN FIRST 90 DAYS (45)	<a href="https://www.wsj.com/articles/omicron-cases-at-norway-christmas-party-provide-clues-on-new-variants-spread-11638554033">https://www.wsj.com/articles/omicron-cases-at-norway-christmas-party-provide-clues-on-new-variants-spread-11638554033</a> Omicron Cases at Norway Christmas Party Provide Clues on New Variant's Spread (11)	<a href="http://aie.io/asecv5">http://aie.io/asecv5</a> Pfizer says COVID booster 'effective' against Omicron variant (11)	<a href="https://e.vnexpress.net/news/news/120-children-hospitalized-province-suspends-pfizer-vaccine-batch-4397748.html">https://e.vnexpress.net/news/news/120-children-hospitalized-province-suspends-pfizer-vaccine-batch-4397748.html</a> 120 children hospitalized, province suspends Pfizer vaccine batch (38)	<a href="https://ussanews.com/vaccine-scandal-in-slovenia-bottles-have-code-s-for-placebo-vax-or-kill-shot/">https://ussanews.com/vaccine-scandal-in-slovenia-bottles-have-code-s-for-placebo-vax-or-kill-shot/</a> Vaccine Scandal in Slovenia – Bottles have Code #'s for Placebo, Vax, or KILL SHOT (3)	<a href="https://twitter.com/evelynrae/status/1466712921266814977">https://twitter.com/evelynrae/status/1466712921266814977</a> Paradise in Australia. (video about the Forced Internment Camp in Australia) (24)	<a href="https://pubmed.ncbi.nlm.nih.gov/34873910/">https://pubmed.ncbi.nlm.nih.gov/34873910/</a> Mechanisms of SARS-CoV-2 Evolution Revealing Vaccine-Resistant Mutations in Europe and America (5)

Carnegie Mellon University

11

## Analysis of Tweepers - Super Spreaders

- ❑ Super Spreaders are users which generate content that is shared often, and hence spread information effectively.



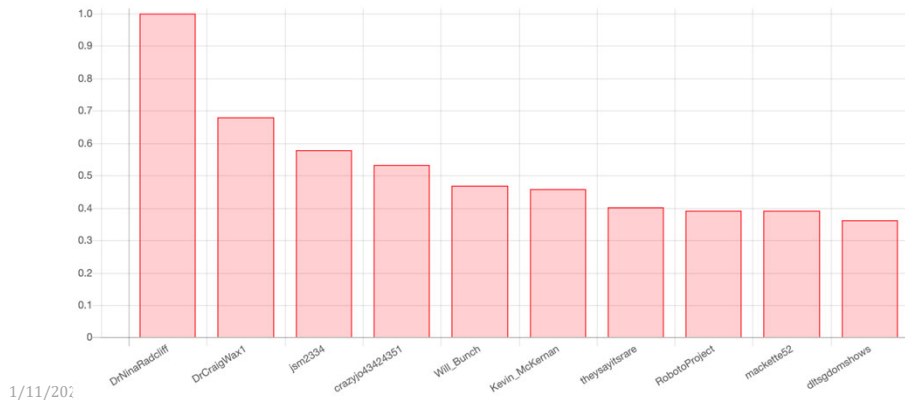
1/11/2022

12

12

## Analysis of Tweeters - Super Friends

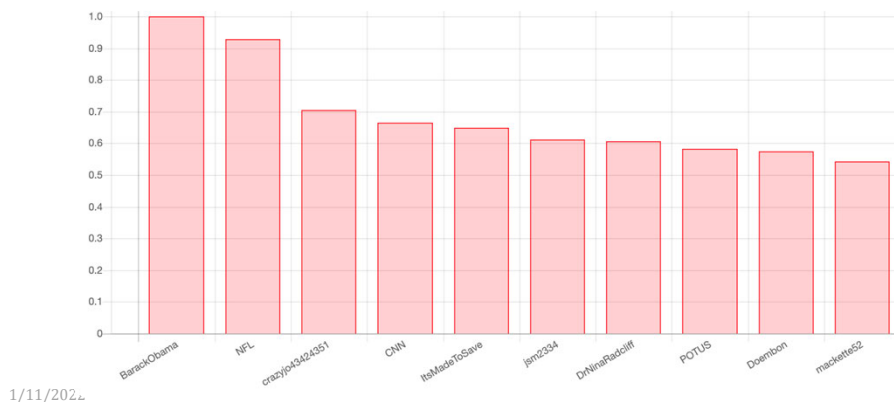
- Super Friends are users that exhibit frequent two-way communication, facilitating large or strong communication networks.



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.



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
<a href="#">POTUS</a>	538
<a href="#">pfizer</a>	476
<a href="#">CNN</a>	401
<a href="#">catturd2</a>	368
<a href="#">GOP</a>	347
<a href="#">RWMaloneMD</a>	272
<a href="#">smerconish</a>	272
<a href="#">disclosetv</a>	221
<a href="#">SenMikeLee</a>	215
<a href="#">FoxNews</a>	208

1/11/2022



15

## Trending Tweets December 3 – December 9

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

- ❑ Why do the vaccinated need to be protected from the unvaccinated?
- ❑ Discharged from hospital today with pericarditis medication and told to limit exercise for a couple of weeks. Chest pain not improving and I can feel my heart beat in my throat which is new whilst in bed. Not fun times. #pfizer #pericarditis #VaccineSideEffects #vaccine
- ❑ A school in LA gave students the vaccine without their parent's permission after they bribed the students with pizza and told them not to tell their parents: <https://t.co/NMNpL5w3FE>
- ❑ Boris Johnson hosted multiple parties when the country was in lockdown over Christmas. Yesterday he claimed that was within the rules. He is taking people for fools. It's one rule for the Conservatives and another for everyone else.
- ❑ The best protection against Omicron is simple: Get fully vaccinated. Get a booster shot.
- ❑ Republicans are planning to shut down the government because...wait for it...too many people are getting vaccinated.
- ❑ The Omicron variant is just another example of how COVID will be prolonged if rich nations and Big Pharma keep blocking vaccine distribution. <https://t.co/dPljn1EW71>
- ❑ German police detain an elderly woman who didn't have her vaxx passport. This scene looks irry. <https://t.co/FL7gr05DM6>
- ❑ Nets' Kyrie Irving might be swayed to take plant-based COVID vaccine in works <https://t.co/U8QyLGr5MZ>
- ❑ Ex Pfizer employee scientist Dr. Mike Yeadon says Midazolam was created as a depopulation tool. 1/2 <https://t.co/3Ta1HIFvAW>

1/11/2022



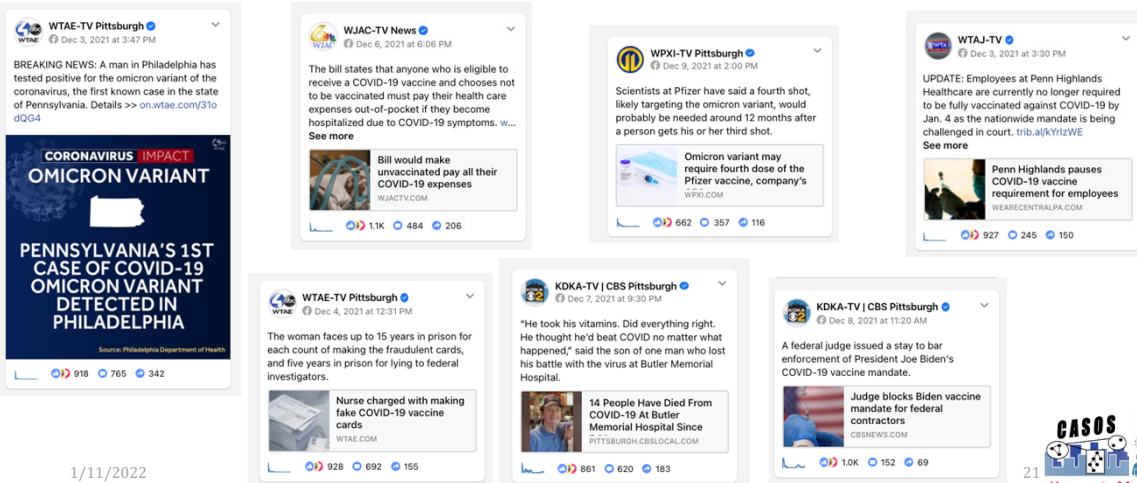
16





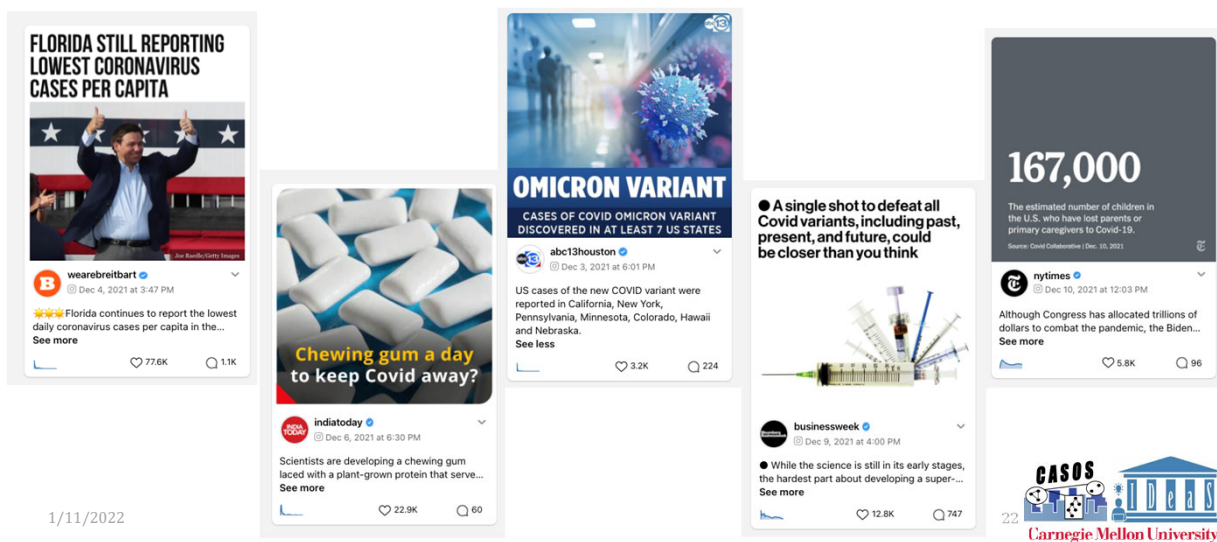


## Trending Posts on Facebook December 3 – December 9



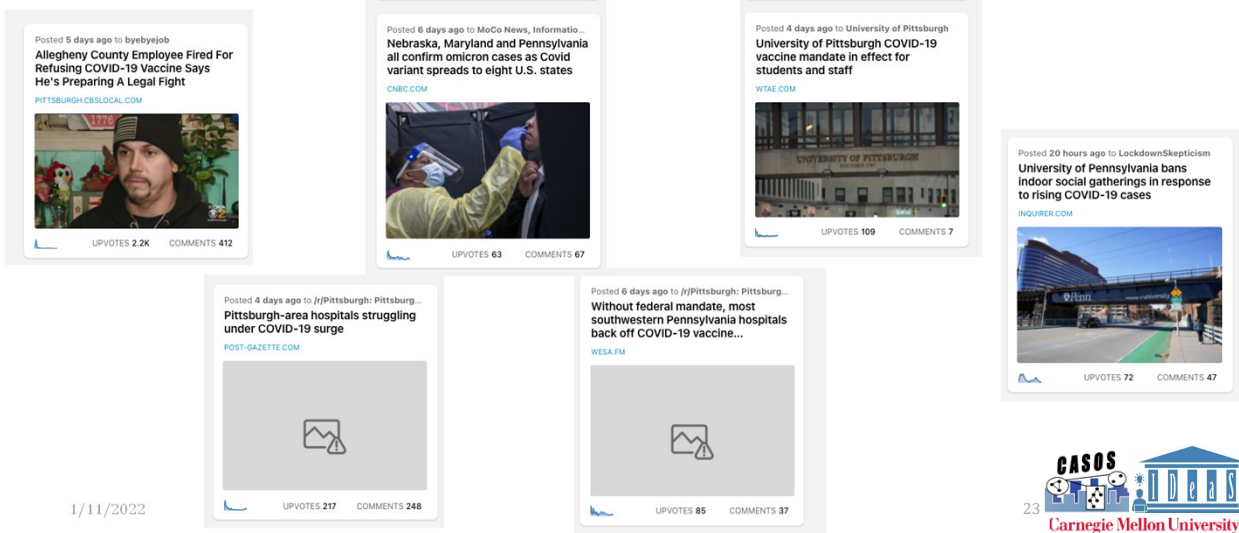
21

## Trending Posts on Instagram December 3 – December 9



22

## Trending Posts on Reddit December 3 – December 9



23

## For More Information

- ❑ Director Kathleen M. Carley - [kathleen.carley@cs.cmu.edu](mailto: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