

PA Vaccine Conversations on Twitter

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Vaccine Hesitancy Project Update based on March 25, 2022 – April 1, 2022

The CMU centers for:

Informed DEMocracy And Social cyber-security

Computational Analysis of Social and Organizational Systems



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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.
- ❑ Anti-Vax messaging includes vaccine hesitancy messages, opinions, questions, policy health and science related information, misinformation, disinformation, and conspiracy theories.

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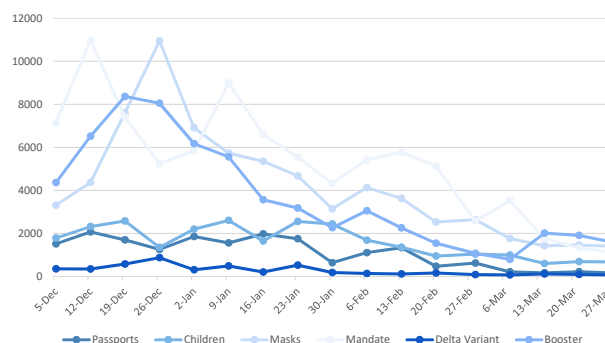
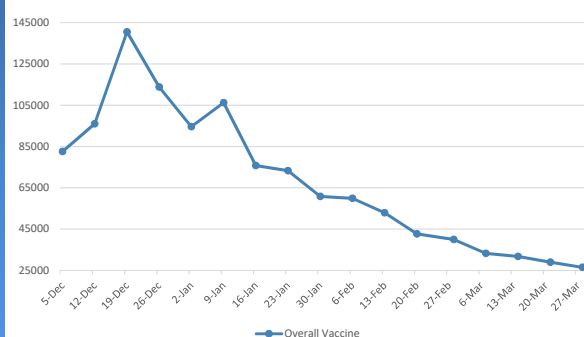
Report Overview March 25 – April 1

- ❑ This week's trending stories cover Boosters, Masks, Mandates, FDA, Military;
- ❑ Trending stories: [vox.com/22996799/supreme-court-biden-navy-seal-vaccine-austin-covid](https://www.vox.com/22996799/supreme-court-biden-navy-seal-vaccine-austin-covid) The Supreme Court rules that Joe Biden is commander-in-chief. Three justices dissent; [msn.com/en-us/health/medical/cornell-university-reports-indications-of-substantial-prevalence-of-covid-on-campus/ar-AAvt9CR](https://www.msn.com/en-us/health/medical/cornell-university-reports-indications-of-substantial-prevalence-of-covid-on-campus/ar-AAvt9CR) Cornell University reports indications of 'substantial prevalence' of COVID on campus; [nyti.ms/384ltVb](https://www.nytimes.com/2022/03/25/us/politics/biden-commander-in-chief.html) Federal health officials clear second Covid booster shots for those 50 and older, and some immunocompromised people;
- ❑ Anti-vax, disinformation, and vaccine hesitancy stories: [ipeds.com/article/S0022-3476\(22\)00282-7/fulltext](https://www.ipeds.com/article/S0022-3476(22)00282-7/fulltext) Persistent Cardiac MRI Findings in a Cohort of Adolescents with post COVID-19 mRNA vaccine myopericarditis; [dailyexpose.uk/2022/03/14/documents-published-confirming-moderna-created-covid](https://www.dailyexpose.uk/2022/03/14/documents-published-confirming-moderna-created-covid) Whilst you were distracted by the Battle for Ukraine, Documents were published confirming Moderna created the Covid-19 Virus; [it.ly/3D8QVny](https://www.it.ly/3D8QVny) Pfizer recalls 3 types of blood pressure medication over possible cancer risk; [peckford42.wordpress.com/2022/01/15/well-what-do-you-know-death-from-vaccine-ruled-suicide-insurance-did-not-pay-the-life-policy](https://www.peckford42.wordpress.com/2022/01/15/well-what-do-you-know-death-from-vaccine-ruled-suicide-insurance-did-not-pay-the-life-policy) WELL WHAT DO YOU KNOW! DEATH FROM VACCINE RULED SUICIDE – INSURANCE DID NOT PAY THE LIFE POLICY

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Trends (tweets per week) March 25 – April 1



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High Level View by City March 25 – April 1

	Total PA	Philadelphia		Pittsburgh		Erie		Allentown/Bethlehem		Other	
Conversation	Tweets	Tweets	%	Tweets	%	Tweets	%	Tweets	%	Tweets	%
Overall Vaccine	22521	11188	49.7%	7348	32.6%	196	0.9%	2767	12.3%	1022	4.5%
Vaccine Passports	161	79	0.7%	39	0.5%	2	1.0%	37	1.3%	4	0.4%
FDA Approval	133	62	0.6%	36	0.5%			28	1.0%	7	0.7%
Boosters	1096	554	5.0%	273	3.7%	11	5.6%	176	6.4%	82	8.0%
Employees	134	65	0.6%	33	0.4%	1	0.5%	27	1.0%	8	0.8%
"Experimental"	80	47	0.4%	21	0.3%	1	0.5%	8	0.3%	3	0.3%
Children	533	235	2.1%	147	2.0%	4	2.0%	121	4.4%	26	2.5%
Myocarditis	221	154	1.4%	40	0.5%			20	0.7%	7	0.7%
Heart	646	256	2.3%	284	3.9%	3	1.5%	82	3.0%	21	2.1%
Masks	1378	707	6.3%	366	5.0%	15	7.7%	163	5.9%	127	12.4%
Thrombosis/VITT	24	17	0.2%	5	0.1%			2	0.1%		
Mandates	985	560	5.0%	197	2.7%	15	7.7%	150	5.4%	63	6.2%
Natural Immunity	131	86	0.8%	25	0.3%			16	0.6%	4	0.4%
Efficacy	113	67	0.6%	24	0.3%	1	0.5%	18	0.7%	3	0.3%
Omicron	149	93	0.8%	28	0.4%	2	1.0%	20	0.7%	6	0.6%
Delta Variant	66	27	0.2%	10	0.1%	2	1.0%	3	0.1%	24	2.3%
Race	402	226	2.0%	123	1.7%	2	1.0%	37	1.3%	14	1.4%
Ivermectin	33	14	0.1%	9	0.1%	1	0.5%	9	0.3%		
Military	165	91	0.8%	28	0.4%	4	2.0%	35	1.3%	7	0.7%
Breakthrough	23	8	0.1%	7	0.1%			7	0.3%	1	0.1%

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- Conversation topics trending this week over last
 - FDA
 - Boosters
 - Military



High Level View by County March 25 – April 1

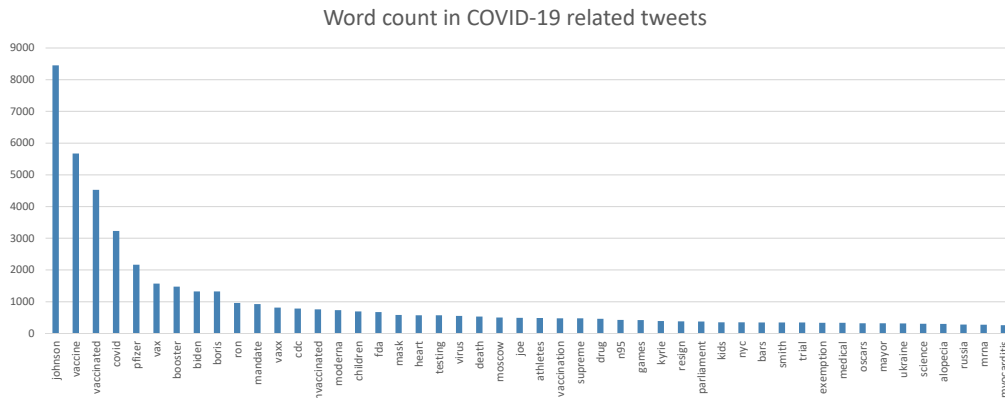
County	Allegheny	Beaver	Butler	Cambria	Fayette	Indiana	Somerset	Westmoreland
Overall Vaccine	7567	18	19	14	6	2		19
Vaccine Passports	39							
FDA	36			1				1
Boosters	291		2					
Employees	36							
"Experimental"	22							
Children	152	3						
Myocarditis	40	1						1
Heart	285	1	1					2
Masks	390	1	2	9				1
Thrombosis/VITT	5							
Mandates	213				1			
Natural Immunity	25							
Efficacy	24							
Omicron	31							
Delta Variant	12		3					
Race	124		1					
Ivermectin	9							
Military	30							
Breakthrough	7							

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- Race: pulled by one of the vaccine keywords plus at least one other term in ("Black", "African American", "of color", "Latin", "Hispanic", "brown", "eugenic")



Top Words Used per Week March 25 – April 1



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Top Hashtags by County March 25 – April 1

- ❑ 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	Indiana	West Moreland
covid19 (88)	covidvaccine (1)	talonsup (1)	cancer (1)
pfizer (75)	testbooster (1)		covid19 (1)
partygate (45)	us (1)		omniconvoy (1)
vaccine (36)			truckersgohome (1)
oscar (27)			cdnpoli (1)

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Top Hashtags by City March 25 – April 1

- ❑ 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 (127)	pfizer (15)	covid19 (35)	covid19 (85)	demvoice1 (10)	oscars (42)	covid19 (10)
pfizer (69)	covid19 (10)	partygate (23)	pfizer (75)	wtpblue (7)	covid19 (35)	pghttransit (8)
vaxupphilly (60)	oscars (9)	oscars (20)	partygate (45)	bluevoices (4)	pfizer (23)	pfizer (7)
oscars (48)	virus (5)	hypocrisy (15)	vaccine (35)	covidisnotover (1)	vaccine (17)	vaccine (7)
biotech (31)	covid (4)	liars (13)	oscars (26)	covidvaccine (1)	immunizeunder5s (9)	oscars (5)

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Top URLs by County March 25 – April 1

Allegheny	Butler + Beaver	Cambria	Fayette	West Moreland
vox.com/22996799/supreme-court-biden-navy-seal-vaccine-austin-covid The Supreme Court rules that Joe Biden is commander-in-chief. Three justices dissent. (51)	jpeds.com/article/S0022-3476(22)00282-7/fulltext Persistent Cardiac MRI Findings in a Cohort of Adolescents with post COVID-19 mRNA vaccine myopericarditis (2)	nytimes.com/2022/03/22/health/covid-boosters.html News: U.S. Health Officials Clear Second Booster for Those 50 and Older (1)	washingtonpost.com/health/2022/03/22/funding-fourth-vaccine-doses/ White House officials say U.S. has exhausted funds to buy potential fourth vaccine dose for all Americans (1)	pittsburgh.cbslocal.com/2022/03/29/fda-pfizer-moderna-covid-boosters-shot-authorizations/ FDA Authorizes Second Booster Of Pfizer, Moderna COVID-19 Vaccine For Adults 50 And Up (1)
twitter.com/ukiswithen/status/1507001664779264003 This morning: audio clip of Rishi Sunak saying Johnson has been leading on the global stage Later this morning: video showing nobody on the global stage wanting to talk to Boris Johnson (40)	reuters.com/3tulLbs Pfizer recalls some lots of blood pressure drug due to potential carcinogen (1)			vox.com/platform/amp/22996799/supreme-court-biden-navy-seal-vaccine-austin-covid The Supreme Court rules that Joe Biden is commander-in-chief. Three justices dissent. (1)
jpeds.com/article/S0022-3476(22)00282-7/fulltext Persistent Cardiac MRI Findings in a Cohort of Adolescents with post COVID-19 mRNA vaccine myopericarditis (37)	secure.actblue.com/donate/johnsonrussia Help Put These Billboards Up In Wisconsin (1)			
dailyexpose.uk/2022/03/14/documents-published-confirming-moderna-created-covid Whilst you were distracted by the Battle for Ukraine, Documents were published confirming Moderna created the Covid-19 Virus (24)				
bit.ly/3D8QVNY Pfizer recalls 3 types of blood pressure medication over possible cancer risk (22)				

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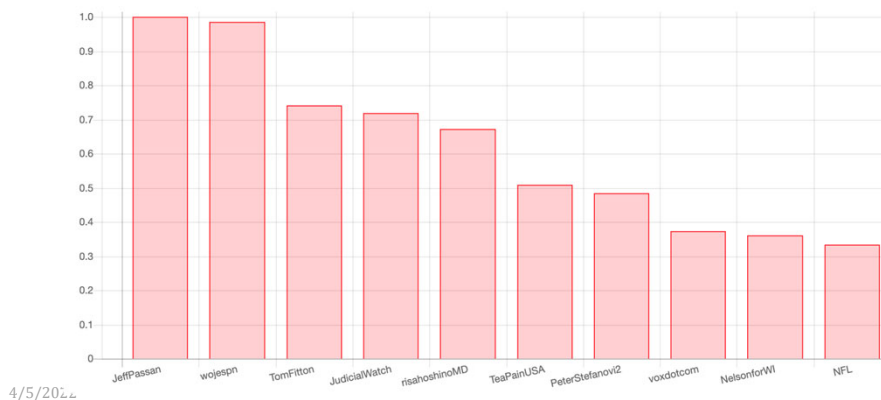
Top URLs by City March 25 – April 1

Philadelphia	Chester	Norristown	Pittsburgh	Erie	Allentown/ Bethlehem	Other
vox.com/22996799/supreme-court-biden-navy-seal-vaccine-austin-covid The Supreme Court rules that Joe Biden is commander-in-chief. Three justices dissent.(299)	ipeds.com/article/S0022-3476(22)00282-7/fulltext Persistent Cardiac MRI Findings in a Cohort of Adolescents with post COVID-19 mRNA vaccine myopericarditis (12)	vox.com/22996799/supreme-court-biden-navy-seal-vaccine-austin-covid The Supreme Court rules that Joe Biden is commander-in-chief. Three justices dissent (30)	vox.com/22996799/supreme-court-biden-navy-seal-vaccine-austin-covid The Supreme Court rules that Joe Biden is commander-in-chief. Three justices dissent. (47)	ox.com/22996799/supreme-court-biden-navy-seal-vaccine-austin-covid The Supreme Court rules that Joe Biden is commander-in-chief. Three justices dissent (6)	variety.com/2022/film/news/jim-carrey-slams-hollywood-will-smith-standing-ovation-slap-1235217924 Jim Carrey Slams 'Spineless' Oscars Audience for Will Smith Standing Ovation: 'I Was Sickened' (42)	ox.com/22996799/supreme-court-biden-navy-seal-vaccine-austin-covid The Supreme Court rules that Joe Biden is commander-in-chief. Three justices dissent (11)
msn.com/en-us/health/medical/cornell-university-reports-indications-of-substantial-prevalence-of-covid-on-campus/ar-AAV9CR Cornell University reports indications of 'substantial prevalence' of COVID on campus (107)	covid-datascience.com/post/uk-death-data-artifacts-stragglers-who-delay-vaccine-doses-a-select-group-with-higher-death-risk UK death data artifacts: "Stragglers" who delay vaccine doses a select group with higher death risk (8)	newstatesman.com/comment/2022/03/boris-johnson-cannot-keep-blaming-everyone-but-himself-for-britains-crisis Orbán's unfair election victory makes a travesty of EU values (29)	twitter.com/ukiswithew/status/1507001664779264003 This morning: audio clip of Rishi Sunak saying Johnson has been leading on the global stage Later this morning: video showing nobody on the global stage wanting to talk to Boris Johnson (40)	erie.gov/vax (3)	ox.com/22996799/supreme-court-biden-navy-seal-vaccine-austin-covid The Supreme Court rules that Joe Biden is commander-in-chief. Three justices dissent (20)	bit.ly/3uw2eLf Father arrested in 'street justice' killing of son's alleged murderer (7)
espn.com/nba/story/_/id/33631986/facing-potential-playoff-games-toronto-boston-celtics-philadelphia-76ers-decline-say-teams-fully-vaccinated Facing potential playoff games in Toronto, Boston Celtics and Philadelphia 76ers decline to say if teams are fully vaccinated (65)	variety.com/2022/film/news/jim-carrey-slams-hollywood-will-smith-standing-ovation-slap-1235217924 Jim Carrey Slams 'Spineless' Oscars Audience for Will Smith Standing Ovation: 'I Was Sickened' (8)	msn.com/en-us/health/medical/cornell-university-reports-indications-of-substantial-prevalence-of-covid-on-campus/ar-AAV9CR Cornell University reports indications of 'substantial prevalence' of COVID on campus (16)	ipeds.com/article/S0022-3476(22)00282-7/fulltext Persistent Cardiac MRI Findings in a Cohort of Adolescents with post COVID-19 mRNA vaccine myopericarditis (37)	2politicaljunkies.blogspot.com/2022/03/wendy-bell-is-still-lying-to-you-about.html Wendy Bell is STILL Lying To You About Medicine! (2)	ipeds.com/article/S0022-3476(22)00282-7/fulltext Persistent Cardiac MRI Findings in a Cohort of Adolescents with post COVID-19 mRNA vaccine myopericarditis (15)	ipeds.com/article/S0022-3476(22)00282-7/fulltext Persistent Cardiac MRI Findings in a Cohort of Adolescents with post COVID-19 mRNA vaccine myopericarditis (6)
abc.net.au/news/2022-03-30/vaccine-mandate-for-sa-teachers-and-transport-workers-dropped/100951400 Vaccine mandate for South Australian teachers and transport workers dropped as COVID-19 cases approach record (58)	vox.com/22996799/supreme-court-biden-navy-seal-vaccine-austin-covid The Supreme Court rules that Joe Biden is commander-in-chief. Three justices dissent (7)	peckford42.wordpress.com/2022/01/15/well-what-do-you-know-death-from-vaccine-ruled-suicide-insurance-did-not-pay-the-life-policy WELL WHAT DO YOU KNOW! DEATH FROM VACCINE RULED SUICIDE – INSURANCE DID NOT PAY THE LIFE POLICY.(13)	dailyexpose.uk/2022/03/14/document-s-published-confirming-moderna-created-covid Whilst you were distracted by the Battle for Ukraine, Documents were published confirming Moderna created the Covid-19 Virus (24)	apne.ws/cfz71qt US opens second COVID boosters to 50 and up, others at risk (2)	msn.com/en-us/health/medical/cornell-university-reports-indications-of-substantial-prevalence-of-covid-on-campus/ar-AAV9CR Cornell University reports indications of 'substantial prevalence' of COVID on campus (12)	nytimes.com/2022/03/28/us/politics/federal-health-officials-clear-second-covid-boosters-for-older-and-some-immunocompromised-people.html Federal health officials clear second Covid booster shots for those 50 and older, and some immunocompromised people. (6)
bbc.in/3Lix36 Twenty fines to be issued over No 10 lockdown parties (45)	vtdigger.org/2022/02/15/vermont-returns-to-old-covid-guidance-drop-masks-in-highly-vaccinated-schools Vermont returns to old Covid guidance. Drop mask mandates in highly vaccinated schools (7)	science.org/doi/10.1126/scitranslmed.abm2311 mRNA-1273 and BNT162b2 COVID-19 vaccines elicit antibodies with differences in Fc-mediated effector functions (10)	bit.ly/3D8QVny Pfizer recalls 3 types of blood pressure medication over possible cancer risk (22)	erienewsnow.com/story/46139651/myc-expanding-vaccine-exemption-to-city-based-entertainers-clearing-kyrie-irving-and-unvaccinated-yankees-and-mets-to-play-at-home NYC expanding vaccine exemption to city-based entertainers, clearing Kyrie Irving and unvaccinated Yankees and Mets to play at home (2)	cnn.com/travel/article/mask-mandate-travel-testing-rules-doctor-perspectives/index.html Airlines want to drop mask and Covid-19 test rules. What do doctors say about it? (9)	evanhospital.com/virus-COVID-19-Vaccine-Information (5)

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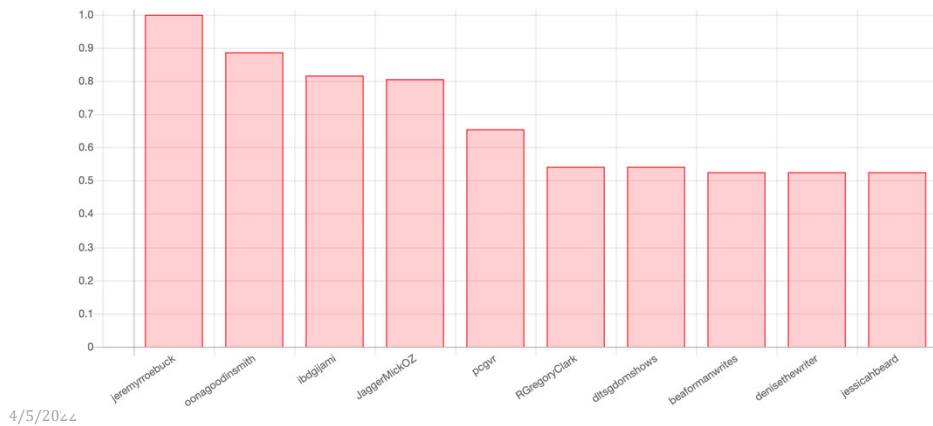
Analysis of Tweeters - Super Spreaders

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



Analysis of Tweeters - Super Friends

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



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.



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[+]	200
JacobEdwardInc	146
voxdotcom[+]	116
POTUS[+]	115
CNN[+][*]	104
NFL[+]	103
chandlermonica	102
catturd2	87
katystoll[+]	87
NYCMayor	85

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Trending Tweets March 25 – April 1

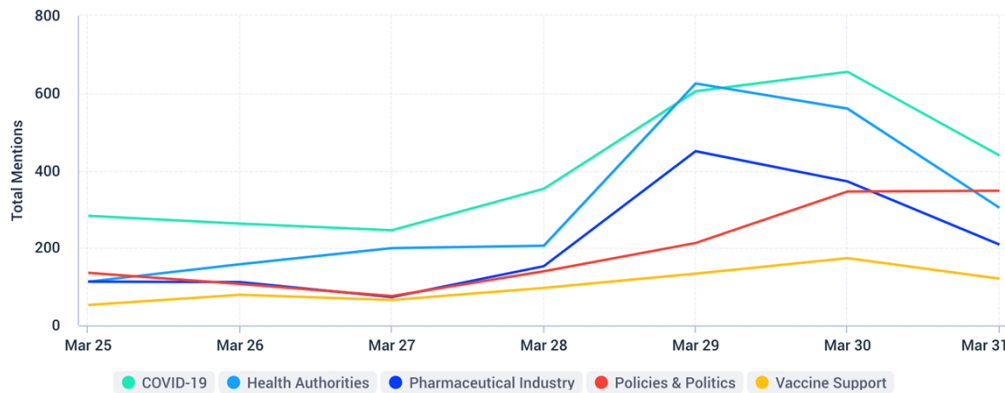
Tweets that are the most forwarded, either by retweet, reply, or quote:

- ❑ Ron Johnson must answer for why he was in Moscow on July 4th. Who agrees?
- ❑ Sometimes I walk home in my scrubs & N95 & stare at the bars full of unmasked people yelling, laughing, with spit flying, no vaxx statuses checked & no testing required. The utter contrast of my life with theirs seems so surreal. When will my time be to "live my life"?
- ❑ This is completely & utterly insane! Boris Johnson just denied knowing about 20 fixed penalty notices issued by the Met & says he can't say if laws were broken in Whitehall! So let's help him out LAWS WERE BROKEN HE MISLED PARLIAMENT HE MUST RESIGN <https://t.co/ZsuA8XUzey>
- ❑ South Korea, a country with an 85% COVID-19 vaccination rate, is having a record surge of new cases. The CDC is advising not to travel to the country. When the CDC is advising the vaccinated to refrain from traveling to a highly vaccinated country, you know something's wrong.
- ❑ Despite 92% of students being boosted (97% vaccinated), Cornell Univ. is seeing substantial, unexpected spread of Covid (BA.2) this week after dropping masking outside of classrooms. More than 500 symptomatic cases this week in a young, healthy population. <https://t.co/fGI79V8ecp>
- ❑ The Supreme Court rules that Joe Biden is commander-in-chief. Three justices dissent. <https://t.co/yGqdnt7WGS>
- ❑ Look. This isn't intended to come across as antivax in anyway. I am triple protected and would do it again. But, it has significantly affected my menstruation. It has significantly affected a lot of women's menstruation. There has been hardly anything written about this.
- ❑ 4th booster f**kers. Oh, and CVS gave us EIGHT free Covid tests for getting boosted! <https://t.co/fG6zHsayKz>
- ❑ The CDC is no longer releasing data comparing vaccinated vs unvaccinated deaths & hospitalizations. But don't worry. I'm sure it's just an oversight.
- ❑ @JacobEdwardInc The impact of the tyranny is real. I worked at a university in Pittsburgh & I refused to disclose my vax status. On 12/31/21, i was terminated for not answering that question. Wasn't easy walking away from my salary/job but my health, my freedom & my liberty is nonnegotiable.

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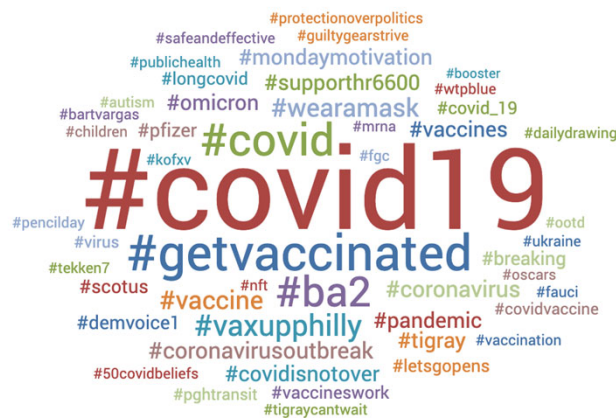
General PA Conversation March 25 – April 1



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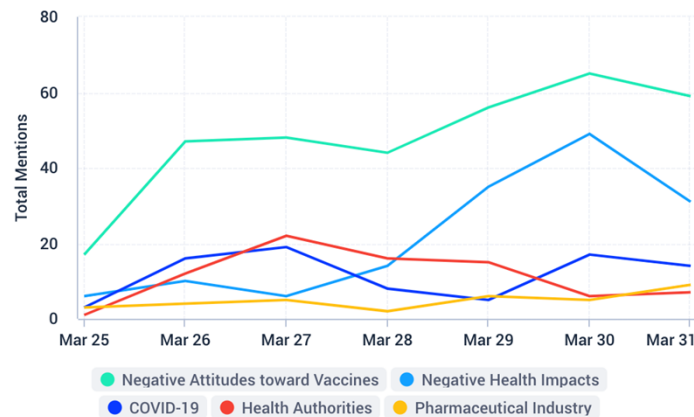
PA Hashtag Cloud March 25 – April 1



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Negative Attitudes March 25 – April 1



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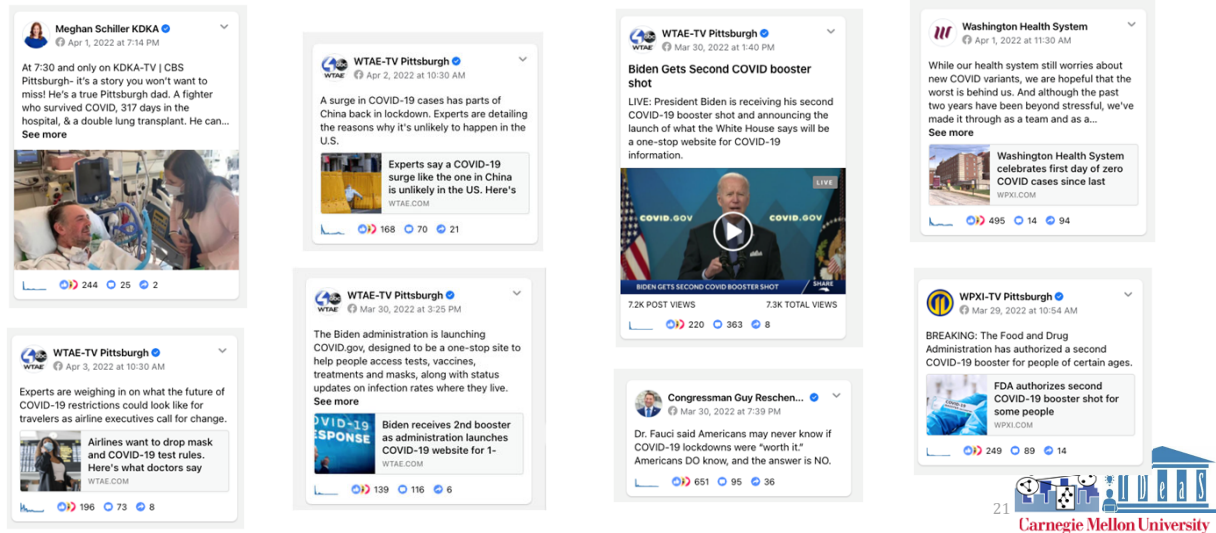
Negative Hashtag Cloud March 25 – April 1



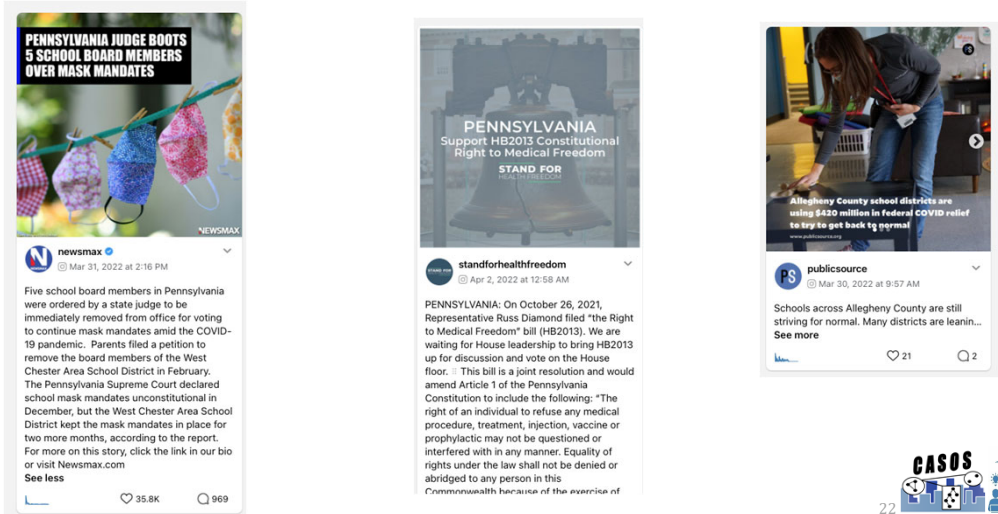
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Trending Posts on Facebook March 25 – April 1

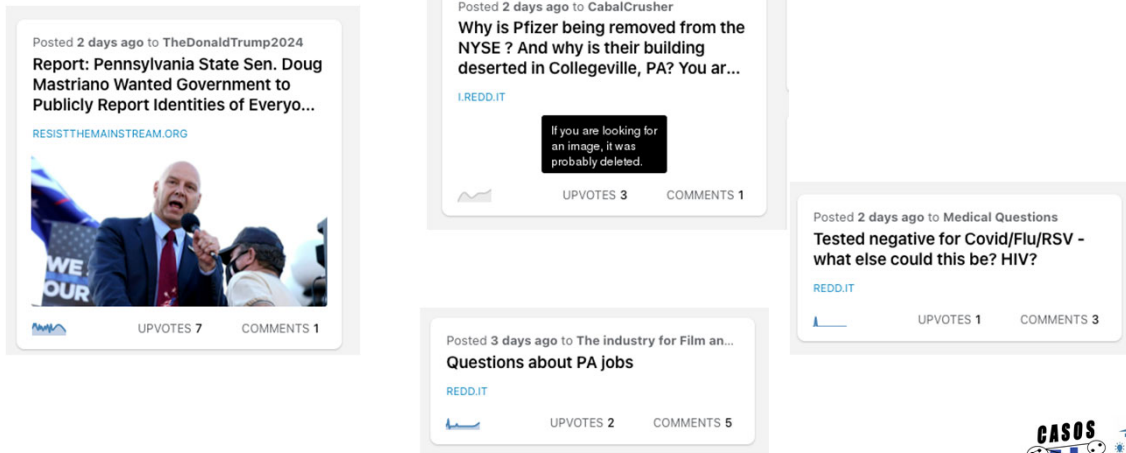


Trending Posts on Instagram March 25 – April 1



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Trending Posts on Reddit March 25 – April 1



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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

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