

PA Vaccine Conversations on Twitter

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

Vaccine Hesitancy Project Update based on October 28, 2022 – November 3, 2022

The CMU centers for:

Informed DEMocracy And Social cyber-security

Computational Analysis of Social and Organizational Systems



Carnegie Mellon University



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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 October 28 – November 3

- ❑ Masks, Mandates, Race are trending this week, also Military, Ivermectin, Heart related side effects are trending this week over the last;
- ❑ Trending stories: [nejm.org/doi/full/10.1056/NEJMoa2209367](https://doi.org/10.1056/NEJMoa2209367) Evaluation of mRNA-1273 Vaccine in Children 6 Months to 5 Years of Age; vaccines.gov Find a COVID-19 vaccine near you; reuters.com/business/healthcare-pharmaceuticals/italy-end-ban-health-workers-not-vaccinated-against-covid-2022-10-28 Italy to end ban on health workers not vaccinated against Covid; theatlantic.com/ideas/archive/2022/10/covid-response-forgiveness/671879 LET'S DECLARE A PANDEMIC AMNESTY;
- ❑ Popular anti-vax tweets: Any person who said the vaccine stopped transmission should be fined \$900 million for misinformation just like Alex Jones; Physical therapist 18 months after the “safe and effective” vax. <https://t.co/d1UbyNukZi>; Getting fired because Twitter changed ownership is not half as bad as getting fired because Twitter helped the Government push a vaccine mandate that didn't stop ANYONE from getting Covid; Hey—sorry you lost your job b/c of the vax that doesn't work and your grandmother died alone and you couldn't have a funeral and your brother's business was needlessly destroyed and your kids have weird heart problems—but let's just admit we were all wrong and call a truce, eh?

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Popular anti-vax stories October 28 – November 3

Anti-vax, disinformation, and vaccine hesitancy stories sorted by the number or shares:

- ❑ dailysceptic.org/2022/10/27/mrna-vaccines-injure-the-heart-of-all-vaccine-recipients-and-cause-myocarditis-in-up-to-1-in-27-study-finds mRNA Vaccines Injure the Heart of ALL Vaccine Recipients and Cause Myocarditis in Up to 1 in 27, Study Finds
- ❑ thegatewaypundit.com/2022/10/breaking-marxist-medical-boards-strip-top-dr-peter-mcculloughs-medical-credentials-speaking-truth-covid-vaccine BREAKING: Marxist Medical Boards Strip Top Dr. Peter McCullough's Medical Credentials for Speaking the Truth About COVID Vaccine;
- ❑ rumble.com/v1q6sjz-natalie-winters.html Natalie Winters: Group Partnered With Pfizer And CDC Caught Pushing The COVID-19 Vaccine On Children Without Disclosing Side Effects;
- ❑ t.me/NOTOVACCINATION SAY NO TO VACCINATION;
- ❑ childrenshealthdefense.org/defender/covid-vaccines-seizures COVID Vaccines and First-Time Seizures: Is There a Link?

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Countering disinformation October 28 – November 3

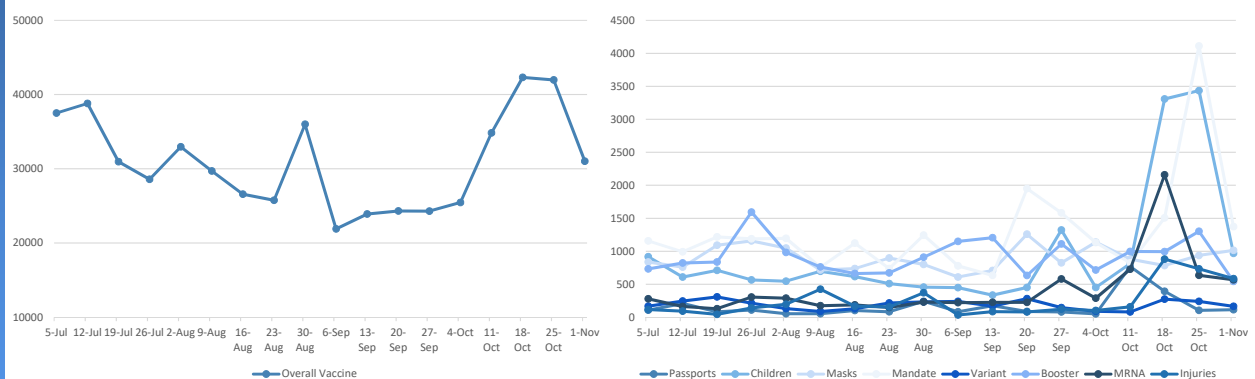
Articles and fact-checking stories debunking disinformation for the last week:

- ❑ Disputed scientific paper shared in false posts about Covid jabs and the human immune system <https://factcheck.afp.com/doc.afp.com.32M69DU>;
- ❑ Fact check: States determine vaccine requirements for public schools, not the CDC <https://www.usatoday.com/story/news/factcheck/2022/10/31/fact-check-states-determine-vaccine-requirements-public-schools-not-cdc/10587509002/>;
- ❑ Fact check: COVID-19 vaccine recipients are still human; vaccine doesn't affect DNA <https://www.usatoday.com/story/news/politics/2022/10/31/fact-check-covid-19-vaccine-does-not-change-dna-vaccinated-still-human/10612878002/>;
- ❑ Fact Check: COVID-Vaccinated Young Adults Are NOT 92% More Likely To Die Than Unvaccinated Young Adults In England <https://leadstories.com/hoax-alert/2022/10/fact-check-covid-vaccinated-young-adults-are-not-more-likely-to-die-than-unvaccinated-young-adults-in-england.html>;
- ❑ Posts recycle baseless claim about Gates' vaccination status <https://apnews.com/article/fact-check-bill-gates-children-vaccine-886368946553>;
- ❑ Fact Checking Tucker Carlson's Claims About Vaccines and School Attendance <https://thedispatch.com/article/fact-checking-tucker-carlsons-claims-about-vaccines-and-school-attendance/>;
- ❑ Fact Check: Do Booster Shots Increase a Person's Likelihood of Getting COVID? <https://thedispatch.com/article/fact-check-do-booster-shots-increase-a-persons-likelihood-of-getting-covid/>

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Trends (tweets per week in PA) October 28 – November 3



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High Level View by City October 28 – November 3

Conversation	Total PA	Philadelphia		Pittsburgh		Erie		Allentown/Bethlehem		Other	
	Tweets	Tweets	%	Tweets	%	Tweets	%	Tweets	%	Tweets	%
Overall Vaccine	26947	13321	49.4%	8337	30.9%	247	0.9%	3786	14.0%	1256	4.7%
Vaccine Passports	114	68	0.5%	20	0.2%			24	0.6%	2	0.2%
FDA Approval	25	11	0.1%	7	0.1%			7	0.2%		
Boosters	416	226	1.7%	99	1.2%	4	1.6%	55	1.5%	32	2.5%
Employees	110	55	0.4%	36	0.4%	1	0.4%	14	0.4%	4	0.3%
"Experimental"	121	52	0.4%	37	0.4%	3	1.2%	22	0.6%	7	0.6%
Children	696	336	2.5%	179	2.1%	6	2.4%	146	3.9%	29	2.3%
Myocarditis	336	159	1.2%	76	0.9%	3	1.2%	78	2.1%	20	1.6%
Heart	639	338	2.5%	141	1.7%	7	2.8%	124	3.3%	29	2.3%
Masks	999	487	3.7%	256	3.1%	7	2.8%	148	3.9%	101	8.0%
Thrombosis/VITT	15	7	0.1%	3	0.0%			5	0.1%		
Mandates	1372	718	5.4%	343	4.1%	25	10.1%	246	6.5%	40	3.2%
Natural Immunity	42	30	0.2%	7	0.1%			4	0.1%	1	0.1%
Efficacy	180	75	0.6%	63	0.8%	1	0.4%	36	1.0%	5	0.4%
Omicron	79	39	0.3%	24	0.3%	1	0.4%	10	0.3%	5	0.4%
Delta Variant	41	12	0.1%	11	0.1%			3	0.1%	15	1.2%
Race	674	383	2.9%	203	2.4%	4	1.6%	62	1.6%	22	1.8%
Ivermectin	112	53	0.4%	42	0.5%			14	0.4%	3	0.2%
Military	178	87	0.7%	31	0.4%	7	2.8%	46	1.2%	7	0.6%
Breakthrough	17	6	0.0%	6	0.1%	1	0.4%	3	0.1%	1	0.1%

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Conversation topics trending this week over last:

- Military
- Ivermectin
- Heart related side effects



High Level View by County October 28 – November 3

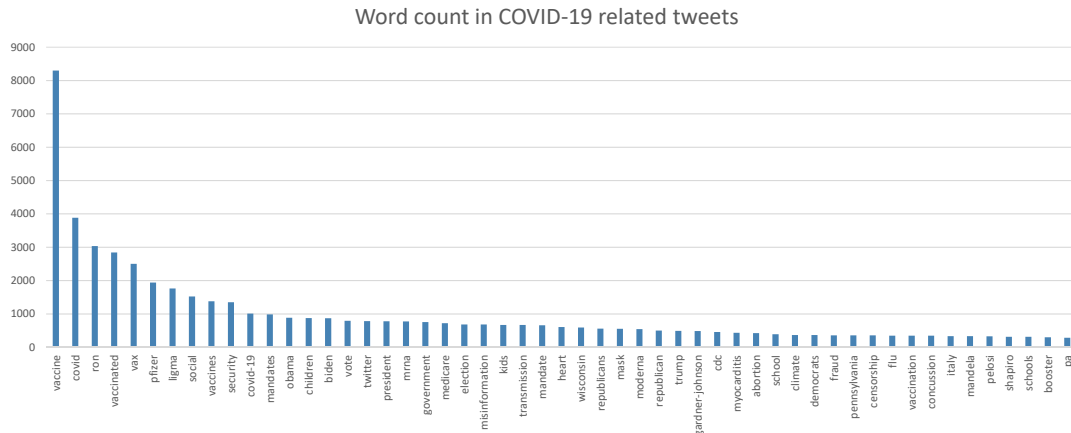
County	Allegheny	Beaver	Butler	Cambria	Fayette	Indiana	Somerset	Westmoreland
Overall Vaccine	8549	15	20	26	16	2	12	36
Vaccine Passports	20							
FDA	7							
Boosters	102	1	3					2
Employees	36							
"Experimental"	38		1				1	1
Children	183						5	1
Myocarditis	77		2	1	1			
Heart	144		2	1				2
Masks	274			1	3		3	4
Thrombosis/VITT	3							
Mandates	346	1			1		1	2
Natural Immunity	7							
Efficacy	63							1
Omicron	25							
Delta Variant	15		1					
Race	205							
Ivermectin	42							
Military	31	1			1			
Breakthrough	6							

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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 October 28 – November 3



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Top Hashtags by County October 28 – November 3

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	Cambria	Beaver + Butler
covid19 (48)	covid19 (1)	covid (1)
diedsuddenly (39)	diedsuddenly (1)	testbooster (1)
vaccine (34)		
herewego (33)		
pfizer (26)		

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Top Hashtags by City October 28 – November 3

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
covidvaccine (36)	covid19 (7)	vaccineinjured (58)	covid19 (48)	covidvaccine (3)	covid19 (29)	omicron (14)
pfizer (29)	fauci (5)	vaccinelonghaulers (58)	diedsuddenly (39)	covid19 (2)	pfizer (17)	covid19 (11)
mandates (26)	antivaxxers (4)	covid (30)	vaccine (34)	vaccineinjured (1)	diedsuddenly (16)	diedsuddenly (7)
diedsuddenly (24)	misinformation (4)	eagles (26)	herewego (33)	vaccinelonghaulers (1)	vaccine (15)	antivaxxers (2)
vaccineswork (22)	stoptheshot (4)	antivaxxers (16)	pfizer (26)	sideeffects (1)	covidvaccine (14)	defeatthemandates (2)

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Top URLs by County October 28 – November 3

Allegheny	West Moreland
nejm.org/doi/full/10.1056/NEJMoa2209367 Evaluation of mRNA-1273 Vaccine in Children 6 Months to 5 Years of Age (51)	childrenshealthdefense.org/defender/covid-vaccines-seizures COVID Vaccines and First-Time Seizures: Is There a Link? (1)
vaccines.gov Find a COVID-19 vaccine near you (43)	
thegatewaypundit.com/2022/10/breaking-marxist-medical-boards-strip-top-dr-peter-mcculloughs-medical-credentials-speaking-truth-covid-vaccine BREAKING: Marxist Medical Boards Strip Top Dr. Peter McCullough's Medical Credentials for Speaking the Truth About COVID Vaccine (22)	
dailysceptic.org/2022/10/27/mrna-vaccines-injure-the-heart-of-all-vaccine-recipients-and-cause-myocarditis-in-up-to-1-in-27-study-finds mRNA Vaccines Injure the Heart of ALL Vaccine Recipients and Cause Myocarditis in Up to 1 in 27, Study Finds (19)	
reuters.com/business/healthcare-pharmaceuticals/italy-end-ban-health-workers-not-vaccinated-against-covid-2022-10-28 Italy to end ban on health workers not vaccinated against Covid (15)	

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Top URLs by City October 28 – November 3

Philadelphia	Chester	Norristown	Pittsburgh	Erie	Allentown/Bethlehem	Other
vaccines.gov Find a COVID-19 vaccine near you (45)	dailysceptic.org/2022/10/27/mrna-vaccines-injure-the-heart-of-all-vaccine-recipients-and-cause-myocarditis-in-up-to-1-in-27-study-finds mRNA Vaccines Injure the Heart of ALL Vaccine Recipients and Cause Myocarditis in Up to 1 in 27, Study Finds (35)	justice.gov/opa/pr/two-florida-medical-study-coordinators-plead-guilty-connection-scheme-falsify-clinical-trial Two Florida Medical Study Coordinators Plead Guilty in Connection with Scheme to Falsify Clinical Trial Data (32)	neim.org/doi/full/10.1056/NEJMoa2209367 Evaluation of mRNA-1273 Vaccine in Children 6 Months to 5 Years of Age (51)	dailysceptic.org/2022/10/27/mrna-vaccines-injure-the-heart-of-all-vaccine-recipients-and-cause-myocarditis-in-up-to-1-in-27-study-finds mRNA Vaccines Injure the Heart of ALL Vaccine Recipients and Cause Myocarditis in Up to 1 in 27, Study Finds (2)	dailysceptic.org/2022/10/27/mrna-vaccines-injure-the-heart-of-all-vaccine-recipients-and-cause-myocarditis-in-up-to-1-in-27-study-finds mRNA Vaccines Injure the Heart of ALL Vaccine Recipients and Cause Myocarditis in Up to 1 in 27, Study Finds (41)	dailysceptic.org/2022/10/27/mrna-vaccines-injure-the-heart-of-all-vaccine-recipients-and-cause-myocarditis-in-up-to-1-in-27-study-finds mRNA Vaccines Injure the Heart of ALL Vaccine Recipients and Cause Myocarditis in Up to 1 in 27, Study Finds (9)
rutgers.com/business/healthcare-pharmaceuticals/italy-end-ban-health-workers-not-vaccinated-against-covid-2022-10-28 Italy to end ban on health workers not vaccinated against Covid (33)	twitter.com/songpingang/status/1550746676075192320 This is what life has become in China since Wuhan initial Covid outbreak A green QR code is needed to access public transportation, stores or to go to work. (32)	neim.org/doi/full/10.1056/NEJMoa2209367 Evaluation of mRNA-1273 Vaccine in Children 6 Months to 5 Years of Age (12)	vaccines.gov Find a COVID-19 vaccine near you (43)	www3.erie.gov/covid/vax-calendar/day/20221029 Clinic Schedule and Registration (2)	vaccines.gov Find a COVID-19 vaccine near you (20)	vaccines.gov Find a COVID-19 vaccine near you (5)
neim.org/doi/full/10.1056/NEJMoa2209367 Evaluation of mRNA-1273 Vaccine in Children 6 Months to 5 Years of Age (23)	rumble.com/v1q6siz-natalie-winters.html Natalie Winters Group Partnered With Pfizer And CDC Caught Pushing The COVID-19 Vaccine On Children Without Disclosing Side Effects (10)	dailysceptic.org/2022/10/27/mrna-vaccines-injure-the-heart-of-all-vaccine-recipients-and-cause-myocarditis-in-up-to-1-in-27-study-finds mRNA Vaccines Injure the Heart of ALL Vaccine Recipients and Cause Myocarditis in Up to 1 in 27, Study Finds (10)	thegatewaypundit.com/2022/10/breaking-marxist-medical-boards-strip-top-dr-peter-mcculloughs-medical-credentials-speaking-truth-covid-vaccine BREAKING: Marxist Medical Boards Strip Top Dr. Peter McCullough's Medical Credentials for Speaking the Truth About COVID Vaccine (22)	alexherenson.substack.com/p/pfizer-board-member-scott-gottlieb-secretly-pressed-twitter-to-censor-me-days-before-twitter-suspended-my-account-last-year Pfizer board member Scott Gottlieb secretly pressed Twitter to censor me days before Twitter suspended my account last year (1)	jamajournal.wordpress.com/2021/11/01/why-those-getting-the-covid-vaccine-should-be-locked-down-and-wear-a-mask Why those getting the Covid vaccine should be locked down and wear a mask (17)	evanhsospital.com/virus-coronavirus-update (4)
theatlantic.com/ideas/archive/2022/10/covid-response-fairness/671079 LET'S DECLARE A PANDEMIC AMNESTY (22)	auiwardgit.substack.com/p/thele-me-partners-moderna-and-rishi Theleme Partners, Moderna and Rishi Sunak (6)	t.me/NOTOVACCINATION SAY NO TO VACCINATION (10)	dailysceptic.org/2022/10/27/mrna-vaccines-injure-the-heart-of-all-vaccine-recipients-and-cause-myocarditis-in-up-to-1-in-27-study-finds mRNA Vaccines Injure the Heart of ALL Vaccine Recipients and Cause Myocarditis in Up to 1 in 27, Study Finds (19)	bioprocessionline.com/doc/assessing-quality-of-mrna-vaccines-key-considerations-000 Assessing Quality Of mRNA Vaccines: Key Consideration (1)	neim.org/doi/full/10.1056/NEJMoa2209367 Evaluation of mRNA-1273 Vaccine in Children 6 Months to 5 Years of Age (17)	spectrumbcalnews.com/nys/center-for-politics/2022/10/27/lawmaker-ready-to-revive-push-to-mandate-covid-vaccine-in-schools New York lawmakers ready to revive push to mandate COVID-19 vaccine in schools (3)
thegatewaypundit.com/2022/10/breaking-marxist-medical-boards-strip-top-dr-peter-mcculloughs-medical-credentials-speaking-truth-covid-vaccine BREAKING: Marxist Medical Boards Strip Top Dr. Peter McCullough's Medical Credentials for Speaking the Truth About COVID Vaccine (21)	aap.org/en/patient-care/immunizations/vaccination-recommendations-by-the-aap Vaccination Recommendations by the AAP (4)	vaccines.gov Find a COVID-19 vaccine near you (9)	retuters.com/business/healthcare-pharmaceuticals/italy-end-ban-health-workers-not-vaccinated-against-covid-2022-10-28 Italy to end ban on health workers not vaccinated against Covid (15)	childrenshealthdefense.org/defender/systemic-reactions-covid-vaccines-sold-as-feature Systemic Reactions to COVID Vaccines Now Being Sold to Public as a 'Feature' (1)	theatlantic.com/ideas/archive/2022/10/covid-response-fairness/671079 LET'S DECLARE A PANDEMIC AMNESTY (14)	thegatewaypundit.com/2022/10/breaking-marxist-medical-boards-strip-top-dr-peter-mcculloughs-medical-credentials-speaking-truth-covid-vaccine BREAKING: Marxist Medical Boards Strip Top Dr. Peter McCullough's Medical Credentials for Speaking the Truth About COVID Vaccine (3)

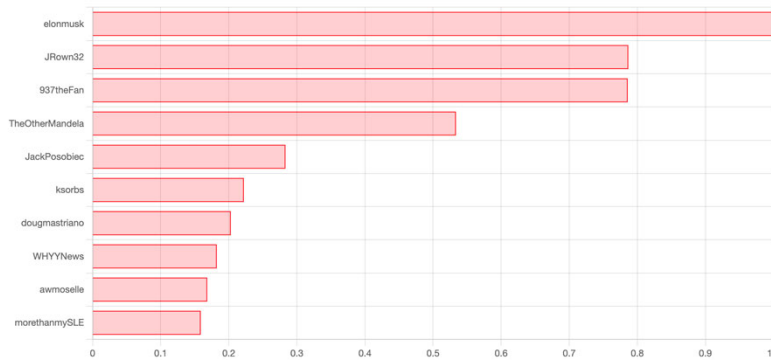
12/6/2022

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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.



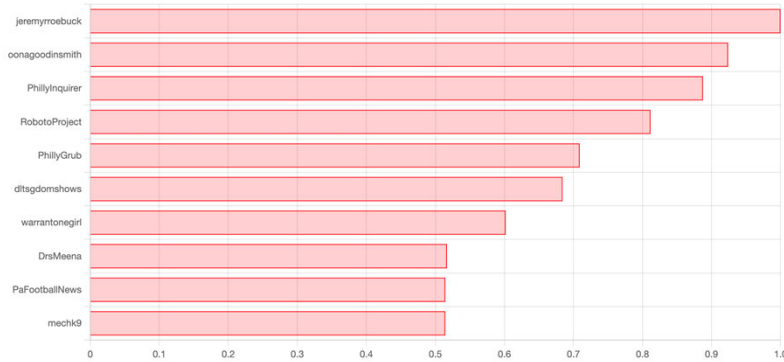
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14



Analysis of Tweeters - Super Friends

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

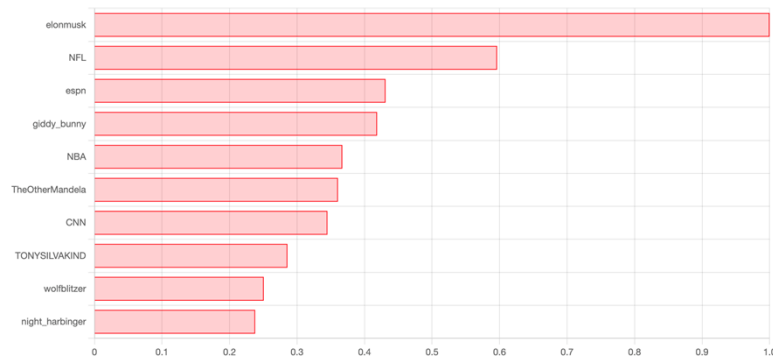


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Analysis of Tweeters - Other Influencers

❑ 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.



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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
elonmusk	389
TheOtherMandela	233
JoshShapiroPA	230
CDCgov	215
dougmastriano	215
bennyjohnson	196
pfizer	196
BarackObama	179
NFL	163
RonJohnsonWI	141
937theFan	123
TexasTribune	121
propublica	119

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Trending Tweets October 28 – November 3

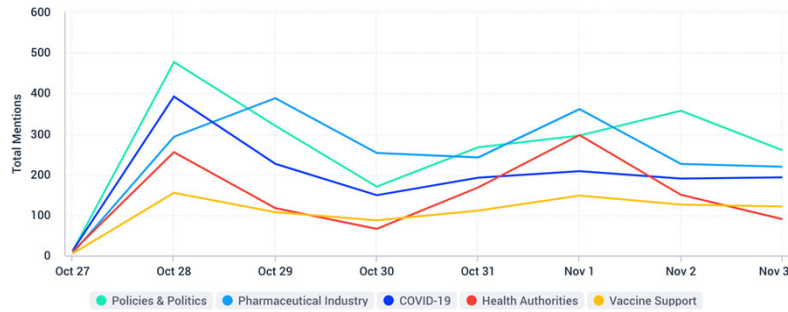
Tweets that are the most forwarded, either by retweet, reply, or quote:

- ❑ Any person who said the vaccine stopped transmission should be fined \$900 million for misinformation just like Alex Jones;
- ❑ Physical therapist 18 months after the “safe and effective” vax. <https://t.co/d1UbyNukZi>;
- ❑ Getting fired because Twitter changed ownership is not half as bad as getting fired because Twitter helped the Government push a vaccine mandate that didn't stop ANYONE from getting Covid;
- ❑ Hey—sorry you lost your job b/c of the vax that doesn't work and your grandmother died alone and you couldn't have a funeral and your brother's business was needlessly destroyed and your kids have weird heart problems—but let's just admit we were all wrong and call a truce, eh?
- ❑ Josh Shapiro: Anti-fracking Gangs run cities Homicide run wild Fentanyl covered streets Child vaccine mandates Gender transition surgery Abortion to point of birth Refuses to debate Media: 'moderate';
- ❑ “No one can force me to quarantine, get a vaccine, wear a mask or register my gun but you need to consult your political leaders before having a baby” is peak Republican;
- ❑ This applies to Vax Shapiro running in PA too It doesn't have to be this way, Pennsylvania Vote to protect our children. Vote for @DougMastriano <https://t.co/21OPLJYPdi>
- ❑ Censorship test: There was election fraud, men can't have babies, there is no climate emergency, covid vax has dangerous side effects, and we didn't land on the moon;
- ❑ BOMBHELL REPORT: Leaked Documents reveal DHS plans to INCREASE CENSORSHIP ON MULTIPLE TOPICS including racial justice, The Afghanistan withdrawal, the origin of COVID, vaccine effectiveness, and much more.;
- ❑ JUST IN - Safety panel of the European drug regulator now recommends adding “heavy menstrual bleeding” as a side effect of Pfizer and Moderna's mRNA injections.
- ❑ Pfizer's original vaccine trial which contained 1200 participants with evidence of prior infection, showed no benefit from their shots for those who had evidence of prior infection. @CDCgov lied, said study showed it was 92% efficacious for those w/ evidence of prior infection. <https://t.co/cu6STvvg2f>;
- ❑ The #COVID vaccine mandate for our military has to go.

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General PA Conversation October 28 – November 3

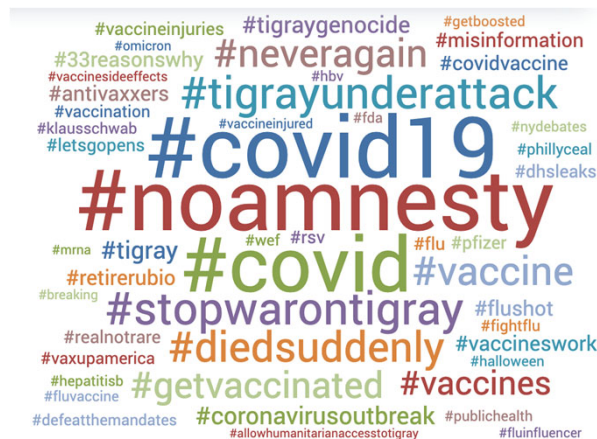


Source: VCTR Project Dashboard

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PA Hashtag Cloud October 28 – November 3

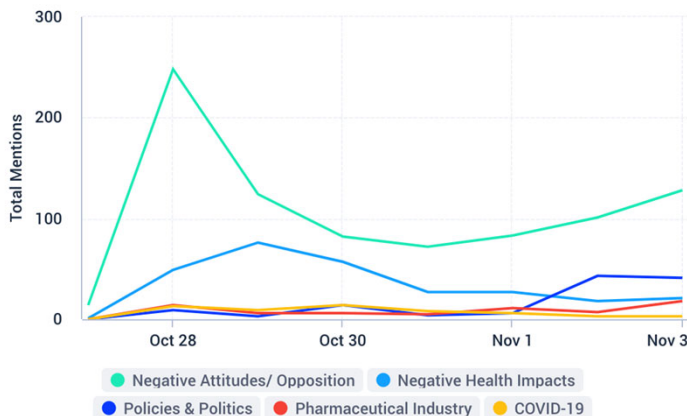


Source: VCTR Project Dashboard

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Negative Attitudes October 28 – November 3



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Source: VCTR Project Dashboard



Negative Hashtag Cloud October 28 – November 3



12/6/2022

Source: VCTR Project Dashboard



Trending Posts on Facebook October 28 – November 3

Sean Parnell • Oct 31, 2022 at 3:13 PM

Not only no but hell no. These COVID authoritarians destroyed businesses and lives. They forced your loved ones to die alone. There needs to be accountability for that, not amnesty.

148 46 33

Allegheny County Health... • Oct 28, 2022 at 3:27 PM

Unfortunately, due to unforeseen issues with the COVID-19 dataset at the state, we will be unable to release our weekly report. We plan to issue two weeks' worth of data next week. According to the Centers for Disease Control and Prevention (CDC), the COVID-19 community level in Allegheny County is "low."

17 9 0

Allegheny County Health... • Nov 2, 2022 at 10:14 AM

Probably, the most asked question we have received over the past month is, "Can I get my flu and COVID-19 booster shot at the same time?" The answer is a resounding "YES." Getting your flu and...

21 6 0

Congressman Guy Resc... • Oct 31, 2022 at 1:11 PM

Senate & ProPublica reports concluded COVID likely came from the Wuhan Institute of Virology in China. Fauci used U.S. tax dollars to fund bat coronavirus experiments there. Republicans will hold him accountable for funding a CCP lab & covering up COVID's origins.

74 54 10

KDKA-TV | CBS Pittsburgh • Oct 29, 2022 at 7:00 PM

According to the CDC, about 23 million people ages five and older have gotten the updated COVID-19 booster.

65 33 3

Source: CrowdTangle Dashboard

Trending Posts on Instagram October 28 – November 3

Rep. Jim Jordan @Jim_Jordan • 10h

They closed your church.

They closed your schools.

They took your job.

They made you wear a mask that didn't work.

They made you cancel family gatherings and funerals.

And now they just want you to forget about it.

NOPE.

blessed_america • Nov 1, 2022 at 1:04 AM

#neverforget #maskmandates #lockdowns #vaxmandates #covid...
See more

20 3

A pandemic problem meets long-term reality

For some Pittsburgh teachers, reasons for burnout predate the COVID-19 pandemic.

publicsource • Oct 31, 2022 at 7:09 PM

What's causing teacher burnout? Is it the pandemic, or long-time low morale factors, including low pay and a lack of decision-making power? Teacher morale has dropped significantly since the pandemic. At Pittsburgh Public Schools, a pandemic problem is meeting long-term realities. Teachers who spoke with PublicSource described structural challenges they have faced leading to burnout, from segregation to low pay and classroom funding, and say causes for burnout predate March 2020. Click the link in our bio to read what some Pittsburgh instructors had to say.

See less

15 0

Measures for countering health disinformation

- ❑ Anti-vaccine narratives are still pervasive on social media, while there are not that many counter-narratives about the positive effects of vaccines;
- ❑ There is a need for a reframing of social media as a medically and socially valuable resource and platform because of its high impact on society;
- ❑ Healthcare organizations need to implement social media strategies to create and expand conversations countering disinformation on social media;
- ❑ It would be helpful for health communicators to cooperate with local influencers who could spread pro-vaccination messages. Another strategy could be to motivate health practitioners to use social media as a channel for communication with the public;
- ❑ "Strategies focused on meaningfully and safely engaging HCPs on social media, promoting interconnectivity across the medical and public health communities on COVID-19 vaccine truths, and sustaining these messaging efforts across vaccine implementation stages will be our best hope of preventing any more missed doses and promoting "misinformation immunity" for all." (Hernandez et al. 2021. "The COVID-19 vaccine social media infodemic: healthcare providers' missed dose in addressing misinformation and vaccine hesitancy.")

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Measures for countering health disinformation

- ❑ As a trusted source of information on vaccines, family physicians play a crucial role in driving vaccine acceptance;
- ❑ Sharing stories, building trust with patients, addressing pain associated with vaccination, presenting vaccination as the default approach early on, focusing on the benefits of protection, and being honest about side effects could also help to promote pro-vaccination attitudes (Shen & Dubey 2019. "Addressing vaccine hesitancy: Clinical guidance for primary care physicians working with parents");
- ❑ It is helpful to provide more information for the patients about the possible disinformation strategies they may deal with, such as manipulating emotions to promote misinformation and conspiracy theories to sow confusion and create division. Inoculation strategy may help to prepare the community by presenting counterarguments to misinformation and raising awareness of negative emotional appeals spread by anti-vaccine campaigns;
- ❑ Framing vaccination as a concrete, actionable strategy to reduce COVID-19 risk may help to address negative emotions, increase self-efficacy and ensure the feelings of control over reducing COVID-19 risk.

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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)
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