PA Vaccine Conversations on Twitter

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Vaccine Hesitancy Project Update based on December 17 – December 30, 2021

The CMU centers for:
Informed DEmocracy And Social cyber-security
Computational Analysis of Social and Organizational Systems

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.
Report Overview December 17– December 30

- This week’s trending stories cover Sports, Breakthrough infections, Boosters, Omicron, Masks;
- Trending stories: https://www.essence.com/news/sixth-grader-saves-choking-student-woman-housefire/ Sixth-Grader Saves Choking Classmate And Elderly Woman From House Fire In Same Day;
  https://trib.al/yIAetdS Harvard going remote again due to rise of Omicron variant;
- Anti-vax, disinformation, or vaccine hesitancy stories: https://alexberenson.substack.com/p/a-ny-times-editor-has-died-of-a-heart/comments NY Times editor has died of a heart attack at 49, one day after receiving a Moderna Covid "booster" shot;

Trends (tweets per week) December 17– December 30

1/11/2022

1/11/2022
High Level View by City December 17 – December 30

- Two weeks’ data included
- Trending conversations:
  - Breakthrough infections
  - Boosters
  - Omicron
  - Masks

<table>
<thead>
<tr>
<th>Conversation</th>
<th>Total PA Tweets</th>
<th>Philadelphia Tweets %</th>
<th>Pittsburgh Tweets %</th>
<th>Erie Tweets %</th>
<th>Allentown/Bethlehem Tweets %</th>
<th>Other Tweets %</th>
</tr>
</thead>
<tbody>
<tr>
<td>Overall Vaccine</td>
<td>202592</td>
<td>115171</td>
<td>52394</td>
<td>1890</td>
<td>24614</td>
<td>8528</td>
</tr>
<tr>
<td>Vaccine Passports</td>
<td>2767</td>
<td>1515</td>
<td>705</td>
<td>32</td>
<td>448</td>
<td>1.8%</td>
</tr>
<tr>
<td>FDA Approval</td>
<td>382</td>
<td>158</td>
<td>97</td>
<td>3</td>
<td>104</td>
<td>4.4%</td>
</tr>
<tr>
<td>Boosters</td>
<td>13298</td>
<td>7844</td>
<td>2892</td>
<td>124</td>
<td>1753</td>
<td>7.1%</td>
</tr>
<tr>
<td>Employees</td>
<td>1395</td>
<td>624</td>
<td>389</td>
<td>29</td>
<td>277</td>
<td>1.1%</td>
</tr>
<tr>
<td>&quot;Experimental&quot;</td>
<td>487</td>
<td>212</td>
<td>151</td>
<td>4</td>
<td>103</td>
<td>0.4%</td>
</tr>
<tr>
<td>Children</td>
<td>2452</td>
<td>1410</td>
<td>497</td>
<td>25</td>
<td>421</td>
<td>1.7%</td>
</tr>
<tr>
<td>Myocarditis</td>
<td>673</td>
<td>435</td>
<td>121</td>
<td>5</td>
<td>94</td>
<td>0.4%</td>
</tr>
<tr>
<td>Heart</td>
<td>1997</td>
<td>947</td>
<td>589</td>
<td>15</td>
<td>356</td>
<td>1.4%</td>
</tr>
<tr>
<td>Masks</td>
<td>13234</td>
<td>7627</td>
<td>2768</td>
<td>153</td>
<td>1742</td>
<td>7.1%</td>
</tr>
<tr>
<td>Thrombosis/VITT</td>
<td>145</td>
<td>76</td>
<td>31</td>
<td>3</td>
<td>30</td>
<td>0.1%</td>
</tr>
<tr>
<td>Mandates</td>
<td>11915</td>
<td>6339</td>
<td>2483</td>
<td>127</td>
<td>2378</td>
<td>9.7%</td>
</tr>
<tr>
<td>Natural Immunity</td>
<td>1766</td>
<td>955</td>
<td>466</td>
<td>9</td>
<td>240</td>
<td>1.0%</td>
</tr>
<tr>
<td>Efficacy</td>
<td>660</td>
<td>317</td>
<td>178</td>
<td>6</td>
<td>136</td>
<td>0.6%</td>
</tr>
<tr>
<td>Omicron</td>
<td>9027</td>
<td>5517</td>
<td>1764</td>
<td>80</td>
<td>1176</td>
<td>4.8%</td>
</tr>
<tr>
<td>Delta Variant</td>
<td>1313</td>
<td>770</td>
<td>272</td>
<td>2</td>
<td>173</td>
<td>0.7%</td>
</tr>
<tr>
<td>Race</td>
<td>29988</td>
<td>15616</td>
<td>1469</td>
<td>48</td>
<td>378</td>
<td>1.5%</td>
</tr>
<tr>
<td>Ivermectin</td>
<td>480</td>
<td>176</td>
<td>205</td>
<td>9</td>
<td>80</td>
<td>0.3%</td>
</tr>
<tr>
<td>Military</td>
<td>791</td>
<td>404</td>
<td>205</td>
<td>12</td>
<td>136</td>
<td>0.6%</td>
</tr>
<tr>
<td>Breakthrough</td>
<td>1524</td>
<td>898</td>
<td>323</td>
<td>23</td>
<td>217</td>
<td>0.9%</td>
</tr>
</tbody>
</table>

High Level View by County December 17 – December 30

- Two weeks’ data included
- 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 December 17 – December 30

Word count in COVID-19 related tweets

Top Hashtags by County December 17 – December 30

- 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*:

<table>
<thead>
<tr>
<th>County</th>
<th>Allegheny</th>
<th>Beaver + Butler</th>
<th>Cambria</th>
<th>Fayette</th>
<th>West Moreland</th>
</tr>
</thead>
<tbody>
<tr>
<td>covid19 (873)</td>
<td>covidvaccine (3)</td>
<td>steers (2)</td>
<td>covid19 (2)</td>
<td>steers (10)</td>
<td></td>
</tr>
<tr>
<td>steers (558)</td>
<td>omicron (3)</td>
<td>covid (1)</td>
<td>covid10s (2)</td>
<td>covid19 (3)</td>
<td></td>
</tr>
<tr>
<td>omicron (331)</td>
<td>pamaskmandate (3)</td>
<td>getvaccinated (1)</td>
<td>iammitchelbosch (2)</td>
<td>omicron (3)</td>
<td></td>
</tr>
<tr>
<td>herewego (248)</td>
<td>covid19 (2)</td>
<td>getvaccinatednow (1)</td>
<td>omicron (2)</td>
<td>getvaccinated (2)</td>
<td></td>
</tr>
<tr>
<td>holdheline (216)</td>
<td>steers (2)</td>
<td>healthcare (1)</td>
<td>antivax (1)</td>
<td>novaxpassports (2)</td>
<td></td>
</tr>
</tbody>
</table>
Top Hashtags by City December 17 – December 30

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

<table>
<thead>
<tr>
<th>Philadelphia</th>
<th>Chester</th>
<th>Norristown</th>
<th>Pittsburgh</th>
<th>Erie</th>
<th>Allentown/Bethlehem</th>
<th>Other</th>
</tr>
</thead>
<tbody>
<tr>
<td>covid19 (1748)</td>
<td>probowvote (194)</td>
<td>covid19 (238)</td>
<td>covid19 (858)</td>
<td>covid19 (40)</td>
<td>covid19 (347)</td>
<td>covid19 (177)</td>
</tr>
<tr>
<td>eagles (808)</td>
<td>covid19 (111)</td>
<td>omicron (119)</td>
<td>steelers (523)</td>
<td>vaccine (17)</td>
<td>omicron (195)</td>
<td>vaccine (143)</td>
</tr>
<tr>
<td>omicron (748)</td>
<td>demovoice (75)</td>
<td>eagles (53)</td>
<td>omicron (321)</td>
<td>browns (14)</td>
<td>vaccine (114)</td>
<td>eagles (79)</td>
</tr>
<tr>
<td>flyeaglesfly (671)</td>
<td>eagles (71)</td>
<td>vaccine (52)</td>
<td>herwegov (246)</td>
<td>demovoice (12)</td>
<td>eagles (94)</td>
<td>covid19 (77)</td>
</tr>
<tr>
<td>probowvote (443)</td>
<td>omicron (63)</td>
<td>covid (49)</td>
<td>holdtheline (216)</td>
<td>omicron (12)</td>
<td>flyeaglesfly (77)</td>
<td>omicron (75)</td>
</tr>
</tbody>
</table>

Top URLs by County December 17 – December 30

- Allegheny
  - http://vaccines.gov (227)
  - https://www.defense.gov/hub/articles/2021/12/05/us-army-creates-single-vaccine-effective-against-all-omicron-sub-variants/ (199)
  - http://vaccines.gov (227)

- Butler + Beaver
  - http://vaccines.gov (3)
  - https://www.defense.gov/hub/articles/2021/12/05/us-army-creates-single-vaccine-effective-against-all-omicron-sub-variants/ (199)
  - http://vaccines.gov (227)

- Cambria
  - https://www.defense.gov/hub/articles/2021/12/05/us-army-creates-single-vaccine-effective-against-all-omicron-sub-variants/ (199)
  - http://vaccines.gov (227)

- Indiana + Somerset
  - http://vaccines.gov (3)
  - https://www.defense.gov/hub/articles/2021/12/05/us-army-creates-single-vaccine-effective-against-all-omicron-sub-variants/ (199)
  - http://vaccines.gov (227)

- Fayette
  - https://www.defense.gov/hub/articles/2021/12/05/us-army-creates-single-vaccine-effective-against-all-omicron-sub-variants/ (199)
  - http://vaccines.gov (227)

- Westmoreland
  - https://www.espn.com/sportscard/story/2021/12/05/us-army-creates-single-vaccine-effective-against-all-omicron-sub-variants/ (199)
  - http://vaccines.gov (227)
Analysis of Tweeters - Super Spreaders

- Super Spreaders are users who 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.

<table>
<thead>
<tr>
<th>Agent Label</th>
<th>Value</th>
</tr>
</thead>
<tbody>
<tr>
<td>JoeBiden[+]</td>
<td>3,829</td>
</tr>
<tr>
<td>POTUS[+]</td>
<td>1,907</td>
</tr>
<tr>
<td>Timcast[+]</td>
<td>1,572</td>
</tr>
<tr>
<td>ClayTravis[+]</td>
<td>1,311</td>
</tr>
<tr>
<td>CNN[+][*]</td>
<td>1,025</td>
</tr>
<tr>
<td>wojsep[+]</td>
<td>995</td>
</tr>
<tr>
<td>catturd2</td>
<td>964</td>
</tr>
<tr>
<td>ramseybollin</td>
<td>788</td>
</tr>
<tr>
<td>CDCgov[+]</td>
<td>696</td>
</tr>
<tr>
<td>mtgreenc[+]</td>
<td>680</td>
</tr>
</tbody>
</table>

Trending Tweets December 17 – December 30

- Tweets that are the most forwarded, either by retweet, reply, or quote:
  - The NFL is 95% vaccinated, the NBA is 97% vaccinated, the NHL is nearly 100% vaccinated. All three leagues are still overwhelmed with covid cases & hitting new covid case highs. So how is @JoeBiden arguing vaccines will end covid? The pro sports leagues prove that’s 100% a lie.
  - Covid denialism includes vaccinated people not taking precautions
  - Multiple people arrested in NYC for trying to eat in Applebee’s without a vaccine pass https://t.co/CsKX7yauEC
  - vaccinated or not pls stop making hot chocolate with water
  - vaccinated or not please stop standing so close to me in line
  - Man was arrested in Brooklyn, NY after trying to order food at Panera Bread without a vaccine pass https://t.co/KMwbfPwHgH
  - 75 members in the US Congress own stock in Pfizer Moderna and Johnson and Johnson. Just think about that...
  - Kevin Durant just tested positive for covid. Pretty soon the only player the Nets are going to have eligible to play is Kyrie Irving, the guy who refused to get the covid vaccine and the media spent months telling all of us was a selfish, idiotic teammate.
  - Vaccinated or not, stop fucking broke niggas
  - They said the vaccine stopped transmission. Now they are lying and saying they didn’t. Video proof here https://t.co/Ds652bdH2Z
  - Donald Trump: "The Vaccine is one of the greatest achievements of mankind""All three vaccines (Pfizer, Moderna, J&J) are very good" The vaccines work - If you take the vaccine you are protected" People aren’t dying when they take the vaccine https://t.co/IUBq1sdMda
General PA Conversation December 17 – December 30

![Graph showing total mentions from December 17 to December 30. The x-axis represents the dates, and the y-axis represents the number of mentions ranging from 0 to 3k. The graph lines are color-coded for different topics: COVID-19, Health Authorities, Policies & Politics, Pharmaceutical Industry, and Vaccine Support.]

PA Hashtag Cloud December 17 – December 30

![Hashtag cloud displaying various hashtags related to COVID-19, such as #covid19, #omicron, #getvaccinated, and #vaccine. The hashtags are visually represented in a cloud format with varying sizes and positions.]
Negative Attitudes December 17 – December 30

Negative Hashtag Cloud December 17 – December 30
Trending Posts on Facebook December 17 – December 30

- The NFL has postponed the first games of 2021 due to COVID-19.
- President Biden is announcing major changes to his COVID-19 winter plan as omicron continues to spread.
- Breaking news: The CDC is advising Americans to avoid cruise travel, regardless of their vaccination status for COVID-19. 
- Omicron variants are spreading fast, according to health officials.

Trending Posts on Instagram December 17 – December 30

- Covid Symptoms for Omicron, the New Variant 
- Establishment media cast doubt on CDC's shortened five-day quarantine guidance
- Covid Network
- Coronavirus: U.S. cases and deaths by state
- Omicron and children: Pediatricians billing
- Establishment media cast doubt on CDC's shortened five-day quarantine guidance
Trending Posts on Reddit December 17 – December 30

For More Information

- **Director Kathleen M. Carley** - kathleen.carley@cs.cmu.edu
- [http://www.casos.cs.cmu.edu/bios/carley/carley.html](http://www.casos.cs.cmu.edu/bios/carley/carley.html)
- **IDeaS website** - [https://www.cmu.edu/ideas-social-cybersecurity/](https://www.cmu.edu/ideas-social-cybersecurity/)
- **CASOS website** - [http://www.casos.cs.cmu.edu/](http://www.casos.cs.cmu.edu/)
- **Social Cybersecurity Working Group** - [http://social-cybersecurity.org](http://social-cybersecurity.org)
- **Facebook**: @IDeasCMU
- **Twitter**: @IDeaSCMU
- **YouTube**: IDeaS Center
- **Ask to be on our Email-Distro Lists**

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