PA Vaccine Conversations and Misinformation on Twitter

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Vaccine Hesitancy Project Update based on June 11-June 18, 2021

The CMU centers for:
Informed DEmocracy And Social cyber-security
Computational Analysis of Social and Organizational Systems
Trends (tweets per week)

- Vaccine Passport discussion jumped back up this week
- Myocarditis discussion also substantial jump from last week
- Magnet discussion continues to increase, while microchip fades
- Also fade out of FDA/booster discussion

6/23/2021
## High Level View June 10–June 16, 2021

<table>
<thead>
<tr>
<th>Conversation</th>
<th>Total PA</th>
<th>Philadelphia</th>
<th>Pittsburgh</th>
<th>Erie</th>
<th>Allentown/Bethlehem</th>
<th>Other</th>
</tr>
</thead>
<tbody>
<tr>
<td>Tweets</td>
<td>69,921</td>
<td>40,010</td>
<td>15,501</td>
<td>635</td>
<td>13,027</td>
<td>1,748</td>
</tr>
<tr>
<td>%</td>
<td>57%</td>
<td>62%</td>
<td>22%</td>
<td>1%</td>
<td>19%</td>
<td>1%</td>
</tr>
</tbody>
</table>

**Overall Vaccine**
- **Vaccine Passports**: 2,346 (88% Philadelphia, 6% Pittsburgh, 6% Erie, 57% Twitter, 22% Allentown/Bethlehem, 1% Other)
- **Not FDA approved**: 27 (64% Philadelphia, 37% Pittsburgh, 6% Erie, 11% Twitter, 11% Allentown/Bethlehem, 0% Other)
- **Boosters**: 23 (70% Philadelphia, 2% Pittsburgh, 4% Erie, 13% Twitter, 11% Allentown/Bethlehem, 0% Other)
- **Misinfo: Microchips**: 41 (61% Philadelphia, 27% Pittsburgh, 11% Erie, 0% Twitter, 12% Allentown/Bethlehem, 0% Other)
- **Misinfo: Magnets**: 945 (49% Philadelphia, 30% Pittsburgh, 13% Erie, 5% Twitter, 18% Allentown/Bethlehem, 1% Other)
- **Misinfo: Shedding**: 12 (50% Philadelphia, 17% Pittsburgh, 11% Erie, 0% Twitter, 12% Allentown/Bethlehem, 0% Other)
- **"Experimental"**: 331 (50% Philadelphia, 29% Pittsburgh, 13% Erie, 11% Twitter, 16% Allentown/Bethlehem, 0% Other)
- **Children**: 1,056 (60% Philadelphia, 23% Pittsburgh, 8% Erie, 15% Twitter, 12% Allentown/Bethlehem, 3% Other)
- **Myocarditis**: 354 (55% Philadelphia, 17% Pittsburgh, 2% Erie, 23% Twitter, 26% Allentown/Bethlehem, 5% Other)
- **Masks**: 842 (67% Philadelphia, 19% Pittsburgh, 11% Erie, 16% Twitter, 11% Allentown/Bethlehem, 2% Other)
- **Infertility**: 22 (82% Philadelphia, 9% Pittsburgh, 2% Erie, 0% Twitter, 9% Allentown/Bethlehem, 0% Other)
- **Mandates**: 2,048 (94% Philadelphia, 2% Pittsburgh, 2% Erie, 4% Twitter, 12% Allentown/Bethlehem, 5% Other)
- **Ingredients**: 19 (58% Philadelphia, 32% Pittsburgh, 6% Erie, 0% Twitter, 11% Allentown/Bethlehem, 0% Other)
- **"ExposéFacebook"**: 118 (42% Philadelphia, 31% Pittsburgh, 26% Erie, 0% Twitter, 30% Allentown/Bethlehem, 2% Other)
- **Natural Immunity**: 167 (59% Philadelphia, 24% Pittsburgh, 1% Erie, 1% Twitter, 16% Allentown/Bethlehem, 1% Other)
- **Efficacy**: 146 (51% Philadelphia, 16% Pittsburgh, 4% Erie, 3% Twitter, 30% Allentown/Bethlehem, 0% Other)
- **Spike Proteins**: 103 (51% Philadelphia, 23% Pittsburgh, 8% Erie, 8% Twitter, 17% Allentown/Bethlehem, 1% Other)

- Philadelphia in this and previous tables is a combination of Philadelphia, Norristown, and Chester
- Typically, a high majority of the tweets for this come from Philadelphia directly with less from Norristown and Chester
- This week though in the cases of Vaccine Passports and Mandates discussions the vast majority 81-85% of the tweets counted under Philadelphia came from Chester labeled users
- Looking at Hashtags and URLs going forward we are splitting up Chester/Philly/Norristown
Top Hashtags June 10-16 (only if shares > 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:

<table>
<thead>
<tr>
<th>Region</th>
<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 (1580)</td>
<td>SB618(1623)</td>
<td>COVID19 (419)</td>
<td>COVID19 (414)</td>
<td>COVID19 (23)</td>
<td>COVID19 (350)</td>
<td>CoronaClimateWarCalamity (28)</td>
<td></td>
</tr>
<tr>
<td>DeltaVariant(288)</td>
<td>COVID19(295)</td>
<td>SB618(193)</td>
<td>DeltaVariant(91)</td>
<td>DeltaVariant(10)</td>
<td>Covid (117)</td>
<td>COVID19 (14)</td>
<td></td>
</tr>
<tr>
<td>GetVaccinated(69)</td>
<td>Heart(22)</td>
<td>GetVaccinated(18)</td>
<td>COVIDThirdWave(27)</td>
<td>SarsCoV2(2)</td>
<td>GetVaccinated (24)</td>
<td>VaccinesWork(3)</td>
<td></td>
</tr>
</tbody>
</table>

6/23/2021
Hashtag Observations

- Top Hashtags in red indicate hashtags used in discussions more related to vaccine hesitancy:
  - SB618 – reference to PA bill up for discussion that would ban vaccine requirements by schools/municipalities and strip some powers from the PA health department
  - Heart – references to reported/rumored heart issues related to COVID vaccines
  - CoronaClimateWarCalamity – this is a weird one, looks like spam, usually associated with other languages, doomsday language/discussion
### Top URLs - June 10-16 (only if shares > 1)

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<tr>
<td><img src="https://cnn.it/3p0fzw" alt="Image" /> (255) (article about political divide in vaccination rates)</td>
<td><img src="https://www.ncbi.nlm.nih.gov/pmc/articles/PMC7827936/" alt="Image" /> (20) (academic paper on spike proteins)</td>
<td><img src="https://thefederalist.com/2021/06/11/youtube-bans-sen-ron-johnson-for-discussing-early-treatment-of-covid-19/#.YMNZxxxhWng.twitter" alt="Image" /> (19)</td>
<td><img src="https://wapo.st/3gnWNsk" alt="Image" /> (117) (report on lower death rates in areas with more vaccinated)</td>
<td><img src="http://vaccines.gov" alt="Image" /> (5)</td>
<td><img src="https://wapo.st/3gnWNsk" alt="Image" /> (5) (report on lower death rates in areas with more vaccinated)</td>
<td>More spam urls related to CoronaClimateWarCalamity hashtag (3)</td>
</tr>
</tbody>
</table>
URL Observations

- More top urls shared appear to be vaccine hesitant to anti-vaccine information than was the case with hashtags
- Similar top urls across different areas
Collection Keywords

- Pfizer
- Johnson
- Janssen
- Moderna
- Vaccine
- anti-vax
- Vaccineswork
- Vaccinehesitancy
- Antivax
- Vaccinepassport
- Vaccinated
- Vaccinate
- Covidvaccine
- Vax
- Vaxx
- vaxupphilly