

**Key findings:** Misinformation re: graphene oxide in COVID-19 vaccines spreads at greater scale and depth than fact-checks. Networks are highly centralized. Fact-checking organizations are top influencers in the fact-check network; individuals are most influential in the misinformation network. Potential astroturfing in misinformation network.

## Background

- Vaccine misinformation (misinfo) was prevalent during the COVID-19 pandemic.
- Fact-checking is one intervention on misinfo. Little is known about how fact-checks spread on social media.
- This is a case study of the conspiracy theory that COVID-19 vaccines contain graphene oxide.

## Research Goals

- Perform social network analysis to compare the RT (retweet) network that formed around misinfo URLs to that of fact-check URLs:
  - Network structures? Popular URLs, key influencers?

## Sample & Packages

- Full RT network: 6,929 nodes, 7,082 edges
- Collected tweets posted June 1 - Nov 30, '21 with [academictwitterR](#)
- Analyzed and visualized with [igraph](#) and [statnet](#)

## Additional Findings

- Of the 69 URLs of interest, 90% of 21 fact check URLs and 31% of 48 misinfo URLs were RTed.
- Misinfo posted on Rumble from the Stew Peters Show is popular; popular misinfo includes [#hashtags](#), [ALL CAPS](#), and [embedded videos](#).
- On average, users in the fact-check network have [older accounts](#) and [higher tweet, following, and follower](#) counts than users in the misinfo network.

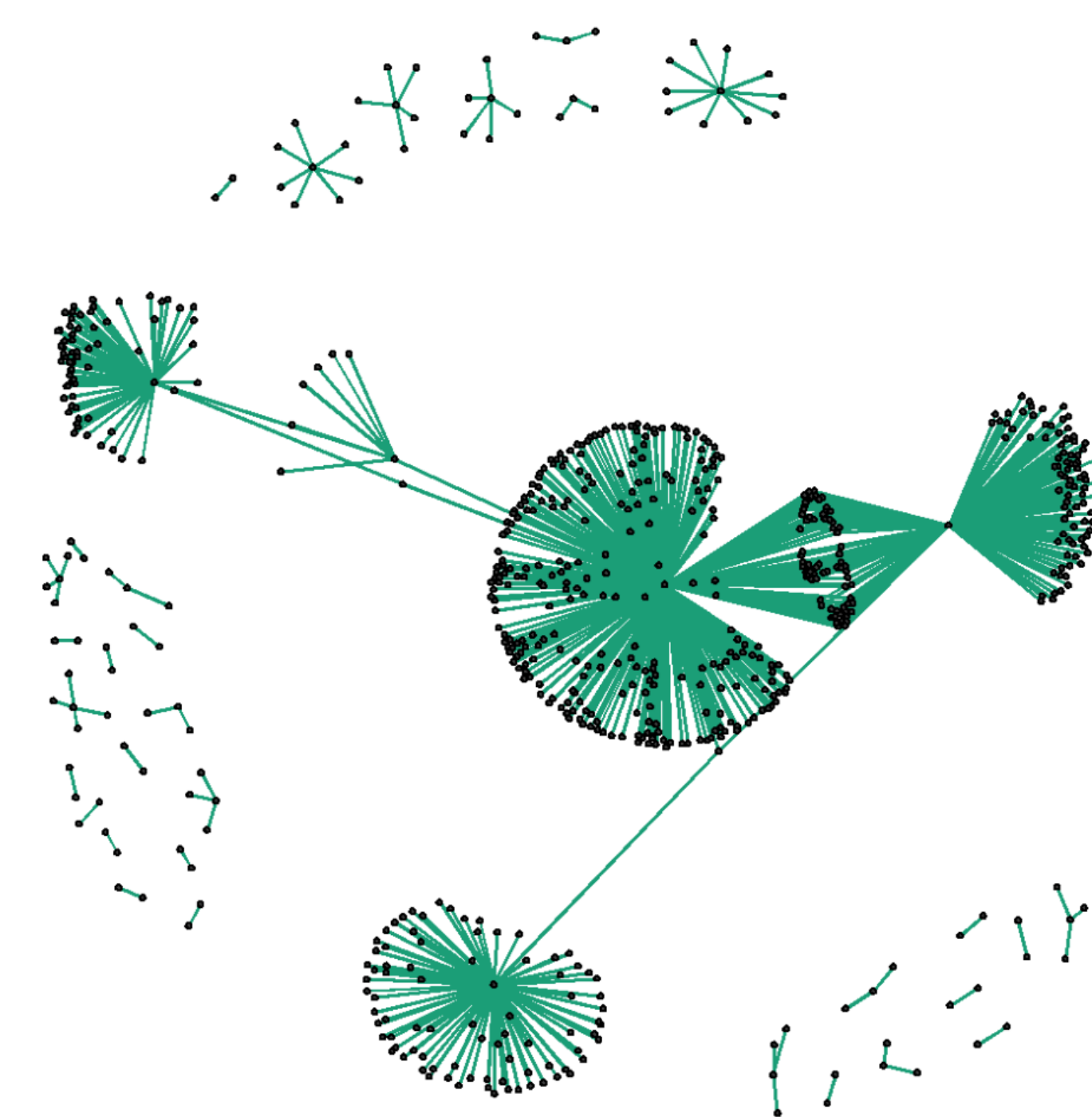
## More Information

[mcroston@wustl.edu](mailto:mcroston@wustl.edu)

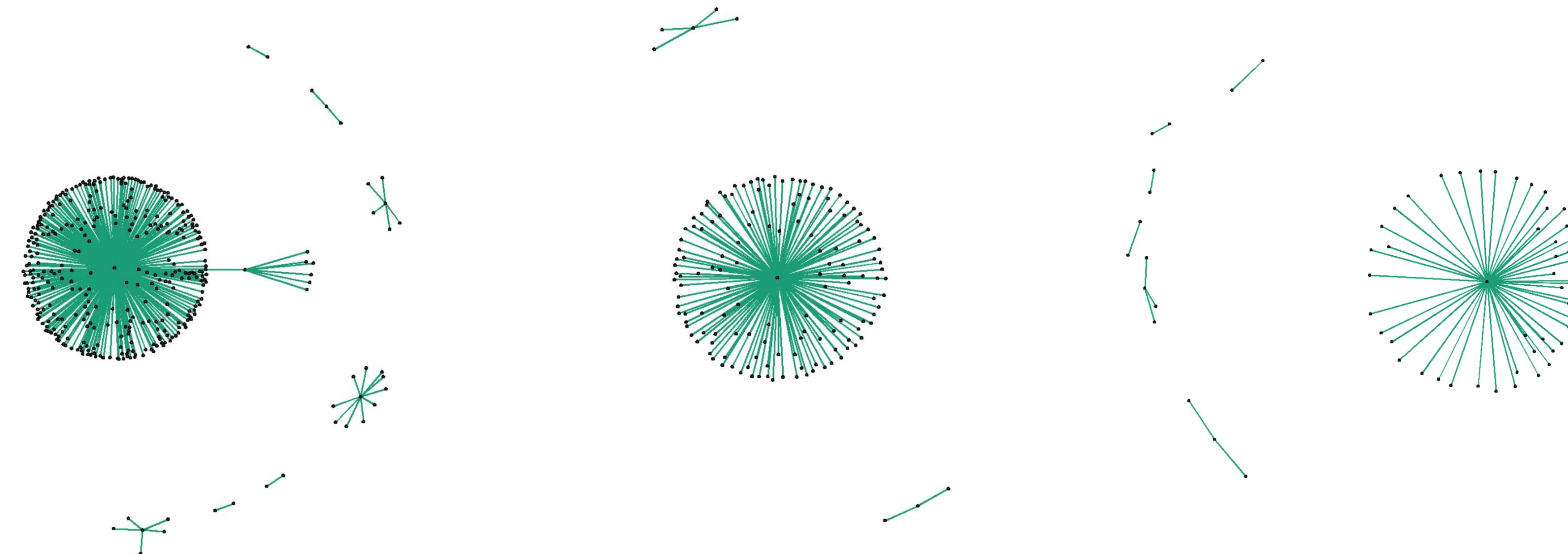
[https://github.com/mcroston/misinfo\\_covid19.git](https://github.com/mcroston/misinfo_covid19.git)


## Fact-check Network (693 nodes, 733 edges)

### Full Retweet Network Size: 693:




### 3 Most Popular URLs: Subnetworks & Top Tweets

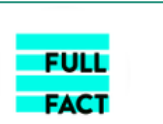


 PolitiFact  
@PolitiFact

There's no evidence of graphene oxide that's "toxic" to the body in Pfizer's COVID-19 vaccine.

 Lead Stories  
@LeadStoriesCom

Fact Check: COVID-19 Vaccines Do NOT Contain 99% Graphene Oxide To Conduct 'Mass Poisoning'

 Full Fact  
@FullFact

A post on social media says that the Covid-19 vaccines contain graphene oxide nanoparticles, amongst other false claims.

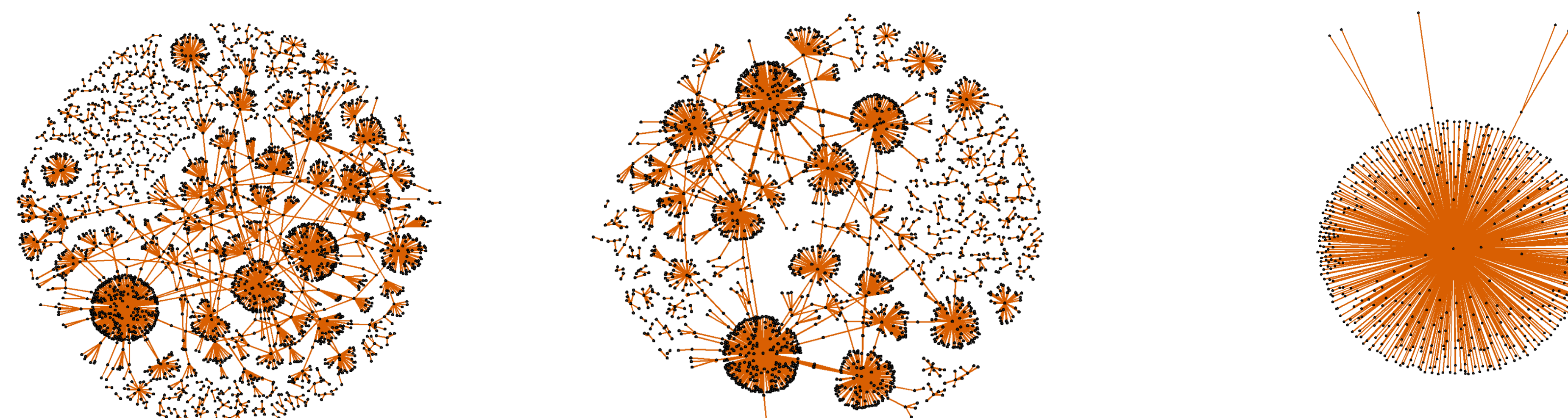
The Covid vaccines currently in use do not contain graphene oxide.

## Misinformation Network (6,241 nodes, 6,349 edges)

### Full Retweet Network Size: 6,241:



### 3 Most Popular URLs: Subnetworks & Top Tweets



BREAKING DISCOVERY! The ACTUAL CONTENTS Inside Pfizer Vials EXPOSED!

Source: [rumble.com/vjgmj9-breakin...](https://rumble.com/vjgmj9-breakin...)

This is interesting.

BREAKING DISCOVERY! The ACTUAL CONTENTS Inside Pfizer Vials EXPOSED!

BREAKING NEWS

Is 99% of ur 'vaccine' pure poison?

Dr. José Luis Sevillano claims up to 99% of 'vaccine' is GRAPHENE OXIDE

Its a toxin tht generates blood clotting & thrombi

Graphene hs bn detected in PCR swbs & face masks

[#VaccineRollOutSA](#) [#CyrilMustResign](#)  
[#PhoenixMassacre](#)



Table 1: Tweet Counts by Information Source (Total Tweets = 13,566)

Information Source	Tweet Count	Original Tweet Count	RT/Quote Tweet Count
<b>Fact Check</b>			
<a href="https://www.politifact.com/factchecks/2021/jul/08/facebook-posts/no-evidence-graphene-oxide-s-toxic-pfizer-covid-19/">https://www.politifact.com/factchecks/2021/jul/08/facebook-posts/no-evidence-graphene-oxide-s-toxic-pfizer-covid-19/</a>	456	83	373
<a href="https://leadstories.com/hoax-alert/2021/07/fact-check-covid-19-vaccines-do-not-contain-99-percent-graphene-oxide-to-conduct-a-mass-poisoning.html">https://leadstories.com/hoax-alert/2021/07/fact-check-covid-19-vaccines-do-not-contain-99-percent-graphene-oxide-to-conduct-a-mass-poisoning.html</a>	164	18	146
<a href="https://fullfact.org/health/graphene-oxide-covid-vaccines/">https://fullfact.org/health/graphene-oxide-covid-vaccines/</a>	107	50	57
<a href="https://www.reuters.com/article/factcheck-grapheneoxide-vaccine/fact-check-covid-19-vaccines-do-not-contain-graphene-oxide-idUSL1N2OZ14F">https://www.reuters.com/article/factcheck-grapheneoxide-vaccine/fact-check-covid-19-vaccines-do-not-contain-graphene-oxide-idUSL1N2OZ14F</a>	83	72	11
<a href="https://fullfact.org/online/graphene-oxide/">https://fullfact.org/online/graphene-oxide/</a>	81	49	32
<a href="https://apnews.com/article/fact-checking-430816913228">https://apnews.com/article/fact-checking-430816913228</a>	70	62	8
<a href="https://fullfact.org/health/graphene-oxide-vaccines-oct-2021/">https://fullfact.org/health/graphene-oxide-vaccines-oct-2021/</a>	38	11	27
<a href="https://factcheck.afp.com/http%253A%252F%252Fdoc.afp.com%252F9K397Y-1">https://factcheck.afp.com/http%253A%252F%252Fdoc.afp.com%252F9K397Y-1</a>	34	5	29
<a href="https://leadstories.com/hoax-alert/2021/08/fact-check-vaccines-do-not-contain-graphene-oxide-as-claimed-by-ex-pfizer-employee.html">https://leadstories.com/hoax-alert/2021/08/fact-check-vaccines-do-not-contain-graphene-oxide-as-claimed-by-ex-pfizer-employee.html</a>	29	9	20
<a href="https://factcheck.afp.com/http%253A%252F%252Fdoc.afp.com%252F9FE6UH-1">https://factcheck.afp.com/http%253A%252F%252Fdoc.afp.com%252F9FE6UH-1</a>	26	3	23
<a href="https://factcheck.afp.com/http%253A%252F%252Fdoc.afp.com%252F9QH4BL-1">https://factcheck.afp.com/http%253A%252F%252Fdoc.afp.com%252F9QH4BL-1</a>	16	2	14
<a href="https://factcheck.afp.com/http%253A%252F%252Fdoc.afp.com%252F9Q68UC-1">https://factcheck.afp.com/http%253A%252F%252Fdoc.afp.com%252F9Q68UC-1</a>	13	4	9
<a href="https://www.usatoday.com/story/news/factcheck/2021/10/29/fact-check-no-pfizer-patent-filed-involving-remote-contact-tracing/8548651002/">https://www.usatoday.com/story/news/factcheck/2021/10/29/fact-check-no-pfizer-patent-filed-involving-remote-contact-tracing/8548651002/</a>	8	8	NA
<a href="https://checkyourfact.com/2021/07/12/fact-check-pfizer-covid-vaccine-graphene-oxide/">https://checkyourfact.com/2021/07/12/fact-check-pfizer-covid-vaccine-graphene-oxide/</a>	7	5	2
<a href="https://leadstories.com/hoax-alert/2021/08/fact-check-video-does-not-show-what-vaccines-are-doing-inside-peoples-bodies.html">https://leadstories.com/hoax-alert/2021/08/fact-check-video-does-not-show-what-vaccines-are-doing-inside-peoples-bodies.html</a>	7	5	2
<a href="https://factcheck.afp.com/http%253A%252F%252Fdoc.afp.com%252F9FM82U-1">https://factcheck.afp.com/http%253A%252F%252Fdoc.afp.com%252F9FM82U-1</a>	6	6	NA
<a href="https://leadstories.com/hoax-alert/2021/09/fact-check-covid-19-vaccines-do-not-contain-sharp-metal-pieces-or-metal-structure.html">https://leadstories.com/hoax-alert/2021/09/fact-check-covid-19-vaccines-do-not-contain-sharp-metal-pieces-or-metal-structure.html</a>	6	3	3
<a href="https://leadstories.com/hoax-alert/2021/11/fact-check-video-does-not-show-graphene.html">https://leadstories.com/hoax-alert/2021/11/fact-check-video-does-not-show-graphene.html</a>	4	3	1
<a href="https://checkyourfact.com/2021/11/03/fact-check-pfizer-patent-tracking-vaccinated-microwave-graphene-covid/">https://checkyourfact.com/2021/11/03/fact-check-pfizer-patent-tracking-vaccinated-microwave-graphene-covid/</a>	2	1	1
<b>Misinformation</b>			
<a href="https://rumble.com/vkgdq7-deadly-shots-former-pfizer-employee-confirms-poison-in-covid-vaccine.html">https://rumble.com/vkgdq7-deadly-shots-former-pfizer-employee-confirms-poison-in-covid-vaccine.html</a>	6135	3244	2891
<a href="https://rumble.com/vjgmj9-breaking-discovery-the-actual-contents-inside-pfizer-vials-exposed.html">https://rumble.com/vjgmj9-breaking-discovery-the-actual-contents-inside-pfizer-vials-exposed.html</a>	4005	1893	2112
<a href="https://twitter.com/truthjacobs3/status/141555024631112704">https://twitter.com/truthjacobs3/status/141555024631112704</a>	566	1	565
<a href="https://rumble.com/vnslor-jab-scientist-discovers-hatching-eggs-parasites-birthed-after-injection.html">https://rumble.com/vnslor-jab-scientist-discovers-hatching-eggs-parasites-birthed-after-injection.html</a>	525	265	260
<a href="https://www.docdroid.net/TOBZJY/microscopia-de-vial-corminaty-dr-campra-firma-e-1-horizontal-pdf">https://www.docdroid.net/TOBZJY/microscopia-de-vial-corminaty-dr-campra-firma-e-1-horizontal-pdf</a>	508	20	488
<a href="https://www.redvoicemedia.com/2021/07/breaking-discovery-the-actual-contents-inside-pfizer-vials-exposed/">https://www.redvoicemedia.com/2021/07/breaking-discovery-the-actual-contents-inside-pfizer-vials-exposed/</a>	317	179	138
<a href="https://www.bitchute.com/video/ttFdOCiA188Y/">https://www.bitchute.com/video/ttFdOCiA188Y/</a>	88	29	59
<a href="https://rumble.com/vn482j-dr.-carrie-madej-first-u.s.-lab-examines-vaccine-vials-horrific-findings-re.html?fbclid=IwAR0efr8xcwx6WFUzsnYdLgaBg3u1Y2IRIIP6Y4oOhKSy9HzCGI-ZvcXN8">https://rumble.com/vn482j-dr.-carrie-madej-first-u.s.-lab-examines-vaccine-vials-horrific-findings-re.html?fbclid=IwAR0efr8xcwx6WFUzsnYdLgaBg3u1Y2IRIIP6Y4oOhKSy9HzCGI-ZvcXN8</a>	84	56	28
<a href="https://rumble.com/vn7hdn-carrie-madej-qui-examine-au-microscope-des-fioles-des-injections-covid.html">https://rumble.com/vn7hdn-carrie-madej-qui-examine-au-microscope-des-fioles-des-injections-covid.html</a>	52	39	13
<a href="https://www.henrymakow.com/2021/06/no-biological-content-in-pfizer.html">https://www.henrymakow.com/2021/06/no-biological-content-in-pfizer.html</a>	49	27	22
<a href="https://roguemale.org/2021/07/07/murder-by-injection-the-vile-vials/?fbclid=IwAR17MwbuL8YLrZ3M_YToUeQVeulEfHHGcjCq5VRd09tR4VV8x4q21t6CP4">https://roguemale.org/2021/07/07/murder-by-injection-the-vile-vials/?fbclid=IwAR17MwbuL8YLrZ3M_YToUeQVeulEfHHGcjCq5VRd09tR4VV8x4q21t6CP4</a>	42	23	19
<a href="https://truth11.com/2021/06/30/no-biological-content-in-pfizer-vaccine-spanish-researchers-put-the-pfizer-vaccine-under-an-electron-microscope-and-found-it-contains-99-graphene-oxide-and-hardly-anything-else/">https://truth11.com/2021/06/30/no-biological-content-in-pfizer-vaccine-spanish-researchers-put-the-pfizer-vaccine-under-an-electron-microscope-and-found-it-contains-99-graphene-oxide-and-hardly-anything-else/</a>	17	13	4
<a href="https://beforeitsnews.com/opinion-conservative/2021/07/breaking-discovery-the-actual-contents-inside-pfizer-vials-exposed-3587380.html">https://beforeitsnews.com/opinion-conservative/2021/07/breaking-discovery-the-actual-contents-inside-pfizer-vials-exposed-3587380.html</a>	10	9	1
<a href="https://www.facebook.com/permalink.php?story_fbid=2671862746454225&amp;id=100008915768126">https://www.facebook.com/permalink.php?story_fbid=2671862746454225&amp;id=100008915768126</a>	9	6	3
<a href="https://rumble.com/vmxenj-breaking-now-worldwide-call-to-stop-vaxx-now-doctors-scientists-reveal-find.html?fbclid=IwAR35kCPAA_US4f-7yPNCIRH1loyD31uYTAPwWMR4_vNF3UeEX2cb0mJuHCA">https://rumble.com/vmxenj-breaking-now-worldwide-call-to-stop-vaxx-now-doctors-scientists-reveal-find.html?fbclid=IwAR35kCPAA_US4f-7yPNCIRH1loyD31uYTAPwWMR4_vNF3UeEX2cb0mJuHCA</a>	2	1	1