

# Supplemental Information

## How Information Flows from the World to China

### 1 Viral Tweets

The selection of the top 10 most retweeted tweets by week related to Covid-19 and China excluded tweets that were broad and lacking in specificity or only contained emotional appeals—e.g., “Covid-19 in China is terrible”—because such tweets could have many corresponding matches in Chinese social media but having corresponding match may or may not denote the flow of information. Specifically, we had the following rules for exclusion: 1) not related to China (Chinese government, Chinese people, or Chinese culture); 2) not related to Covid-19; 3) exact or near duplicate of another sampled tweet;<sup>A1</sup> 4) only contain emotional appeal; 5) does not focus on a specific event, action, issue, or expression an opinion about a specific event, action, or issue. Two members of the research team independently assessed tweets to determine whether they fulfilled these criteria, and achieved higher intercoder agreement.

Table A1: List of Viral Tweets

Index	Tweet content	Date	Retweets	Co-Occur
1	westerners are like wow the chinese govt is doing a bad job with coronavirus while their kids are coming back from school with measles because their government cant/wont be more convincing than some hippie mum with a wordpress site	1/24/20	22857	No
2	Those Wuhan people who gets infected with this disease literally said that even if they die, they want everyone to die together. They even pull doctors face mask & spit on them just so that the doctors would get infected too. Hope us Malaysian will be safe	1/24/20	39695	Yes
3	Wuhan China Corona Virus Update Disturbing Leaked Video shows People literally falling over as they succumb to Virus. 10 cities 33 million people have now been quarantined. 1 case found outside quarantine area This Morning. Retweet The Truth #china #Wuhan #Coronavirus	1/24/20	11672	No
4	this is allegedly a voice note from a nurse in Wuhan, China at the epicenter of where the coronavirus began. heartbreaking if its real.	1/25/20	19707	Yes
5	White people are really making anti-Chinese jokes because of this outbreak as if their ancestors didnt spread catastrophic diseases everywhere because they didnt know how to bathe	1/25/20	57928	No

<sup>A1</sup>If there were tweets across weeks or within a week discussing the same issue, we would keep the earliest occurring tweet and sample the tweet with the next highest number of retweets so that each week contained 10 unique tweets.

Index	Tweet content	Date	Retweets	Co-Occur
6	I live in #Wuhan. Today is the third day of the lockdown of the city. Here are some things I see or hear from other citizens these days. #Coronavirus The situation is far more severe than you might think, I think support from international organizations is in grave need.@WHO	1/25/20	20346	No
7	Liang Wudong, just become the first doctor to die from the new Coronavirus in #China A reminder that while everyone else is trying to avoid it, frontline medical staff are risking their lives to cure it + save others. #CoronavirusOutbreak	1/25/20	14175	Yes
8	Translation of the Wuhan Doctor video that's going viral. #CoronavirusOutbreak #coronavirus #coronavirusPH	1/25/20	15413	No
9	From my experience as a cabin crew, Wuhan passengers are the worst passenger i have ever encountered. They have no manners, stubborn, uncivilised and dirty. They even push me at the aisle and run my feet over with their luggage wheel	1/25/20	12582	No
10	A man from China is risking his life to spill the truth of the current situation of Wuhan, China in the middle of #CoronavirusOutbreak This man is seeking help from the world. Go watch before China take this video down	1/26/20	87394	No
11	If #coronavirus isnt such a big deal, then why are Italian authorities scanning every single passenger landing in the country? And why are we still allowing Flights originating from China to land in the US ? Something aint right.	1/28/20	36213	Yes
12	coronavirus has been racialised as a "chinese" illness and for this reason chinese people, regardless of their proximity to wuhan are being treated like carriers of the virus. similar to how ebola was subtly touted as an "african" illness.	1/29/20	75668	Yes
13	A man in China left 500 face masks at a police station - then jogged off before officers could thank him	1/29/20	22236	Yes
14	Coronavirus is declared global emergency by World Health Organization as outbreak continues to spread outside China	1/30/20	12429	Yes
15	RETWEET IF YOU WANT A CHINA-WIDE TRAVEL BAN NOW.	1/30/20	34507	Yes
16	Is it racist to suggest a ban on flights? NO. Is it racist to criticize Wuhan residents for traveling overseas? NO. Is it racist to look at every Chinese person and see disease? YES. Is it racist to refer to Chinese people as chinks, chekwa, etc.? YES	1/31/20	9566	No
17	the flu: *results in 500,000 hospitalizations and 30,000 deaths a year in the usa* americans: *don't even get the fucking flu shot consistently* coronavirus: *resulted in 0 deaths in any country outside of china* americans: *HYSTERICALLY USING IT AS AN EXCUSE TO BE ANTI-CHINESE*	1/31/20	31354	No
18	Instead of blaming them, lets pray for China especially those who risk their lives in helping those who are greatly affected by this crisis. Hate the virus, but don't hate the Chinese people. Remember they are still human and they're struggling too. #PrayforChina	1/31/20	30628	Yes
19	#Coronavirus On a train in Italy. A teenage Chinese boy boards the train. A woman comments loudly: There you go, we are all going to be infected. He replies in perfect Italian with a Roman inflection: Maam, in my whole life Ive seen China only on google maps. Applauses.	2/1/20	31973	No
20	Amdist the Corona Virus, please don't forget about the now 3 Million Muslims suffering in concentration camps in China. They are subject to accounts of torture, forced conversions, mass rape, forced sterilization, Organ harvesting...	2/2/20	8876	No
21	Turkey has sent medical aid to China and told the world Islam does not respond to evil with evil. #Coronavirus	2/3/20	20505	No
22	A Chinese nurse in a coronavirus-hit hospital in Henan province gives her sobbing daughter an air hug A tree is not the forest. The Mainland Chinese citizens need our sympathy and support. They are not the problem. Please be very mindful of the things we say. : Xinhua News	2/5/20	6424	No
23	rumor spread on whats*pp of a employee having coronavirus and this bakery thats known to have lines out the door is getting very little business. chinatown here in SF has decreased by 50% in foot traffic since the virus made headlines. no one in SF has been reported diagnosed.	2/5/20	8904	No
24	Proving he doesn't hold grudges, @realDonaldTrump just announced he's sending a delegation immediately to China consisting of Mitt Romney, Nancy Pelosi, Adam Schiff, and Jerry Nadler.	2/7/20	9028	No
25	The Chinese public have staged what amounts to an online revolt last night after the death of Dr. Li Wenliang. Government officials, biz figures & ordinary folks, have posted numerous messages expressing their grief and anger. It's sth I haven't seen in years	2/7/20	7380	Yes
26	Drone shots of Wuhan. Its literally a Ghost Town. #Wuhan #CoronaVirus	2/7/20	13862	Yes
27	We have coordinated with U.S. organizations to transport more humanitarian relief to people in Wuhan. Personal protective equipment and other medical supplies donated by these organizations can help save lives in #China and help protect people from the #coronavirus.	2/7/20	7608	Yes
28	the number of Chinese people in Britain with confirmed cases of coronavirus is still fewer than the number of Chinese people doing comedy so if you see a Chinese person on the tube and assume they are a comedian that would be statistically less racist	2/9/20	7943	No
29	Chen Qiushi, a citizen journalist who had been doing critical reporting from #Wuhan, the epicenter of the #coronavirus outbreak, went missing on Thursday evening, just as hundreds of thousands of people in #China began demanding freedom of speech online.	2/9/20	7626	No
30	Xiaozhan donated much needed medical supplies and ventilators directly to hospital in Wuhan He does this quietly without saying anything, if the hospital staff didnt post this we would never even know.	2/9/20	5456	No
31	Coronavirus: China is facing shortage of masks & gloves To help China, India has lifted ban on export of personal protection equipments. India has allowed the immediate export of at least two large consignments of protective clothing including masks to China. This is our India	2/10/20	7607	Yes
32	Sick: Border Patrol officers intercepted a passenger from China carrying 200 dead birds in his suitcase. He was trying to enter the country through Virginia with what could have been infected carcasses What was he planning? RT if we should ban all travel to and from China!	2/11/20	18596	No
33	These videos of China spraying disinfectant around #WuHan arent giving me the impression that they have the #coronavirus under control.	2/11/20	4548	Yes
34	Pakistan stands with the people & govt of China in their difficult & trying time and it will always stand by them. We will be extending every material & moral support to China just as China has always stood by us during all our times of trial and tribulation.	2/12/20	5192	Yes

Index	Tweet content	Date	Retweets	Matched
35	A Chinese girl killed two other customers, including a 12-years girl in a fight for a bottle of antiseptic little in a supermarket in China over #coronavirus pressure. Now she is under arrest.	2/12/20	4316	No
36	Many subway stations in China have implemented an AI fever screening system developed by Megvii, an #AI company founded by Tsinghua alumni. The system supports temperature screening from a distance of 3 meters, with a 0.3 degree Celsius margin of error.	2/12/20	4340	Yes
37	It's disgraceful that the Chinese community have faced increased racism and over 50% business losses since the coronavirus outbreak. I've come to Chinatown here in Manchester, a city that has been twinned with Wuhan for 33 years. We stand in solidarity with the Chinese community.	2/13/20	4457	No
38	Gross sial. 5 star hotels too! why China why	2/13/20	7646	No
39	the 7days built propaganda hospital in #wuhan shows its true color now. after all its Made in Chian by Chinese Gov #WuhanCoronavirus #coronavirus #CoVid2019	2/15/20	4097	No
40	BREAKING: People in Wuhan, China have been banned from leaving their homes	2/15/20	4196	Yes
41	EXCLUSIVE: China is tracking every movement of its Uighur minority to find reasons to detain them, a leaked document DW obtained from a whistleblower shows. People have been arrested for growing beards or having too many children: #KarakaxList	2/17/20	10928	No
42	Chinese fans of #BTS member #jhope donate funds originally meant to celebrate the stars birthday to charity amid #coronavirus epidemic #JHOPEDay @BTS_twt	2/17/20	3422	No
43	Japan's boy band #ARASHI # announced on #Weibo their concert scheduled to open in Beijing in April has to be canceled due to #COVID19. They sang a song in Chinese in the video to show their support to Chinas fight against #coronavirus @arashi5official	2/17/20	2862	Yes
44	BREAKING: Many leading Chinese scientists are starting to speak out and say #COVID-19 (#coronavirus) originated at a government bioweapons research facility in #Wuhan, rather than the widely-held belief that it emerged from the city's #Huanan seafood markets. #WuhanCoronavirus	2/18/20	3173	No
45	This is shocking stuff. Bloomberg News reportedly tries to silence & then ruin female journalist for speaking out about corrupt #China Communist Party. Will @MikeBloomberg be asked about this at Dem Debate?	2/18/20	2577	No
46	Due to coronavirus, Russia has banned all Chinese citizens from entering the country for tourism, work and for private purposes. Full ban.	2/18/20	3792	Yes
47	Facts: Mike Bloomberg said Chinas dictator, Xi Jinping, is not a dictator Joe Biden says that China is not a threat Bernie Sanders said China has done more to address extreme poverty than any country in history Why are Democrats so friendly to Americas greatest enemy?	2/19/20	5506	No
48	The United States condemns the move by China to expel three @WSJ journalists. Mature, responsible countries understand that free press reports facts and expresses opinions. China should not restrict #freespeech.	2/19/20	2540	Yes
49	Well, look at that. The Chinese Communist Partys propaganda rag finally admits what Ive said for a month: coronavirus didnt start in Wuhan food market. So where did it originate? Time for answers from CCP.	2/22/20	6590	Yes
50	Wow: Bernie Sanders just shamed the United States by saying that we have more people locked up than Communist China What hes not telling anyonehe isnt counting the at least 700,000 Uyghur Muslims locked away in Concentration Camps I guess that doesnt fit his narrative	2/23/20	6213	Yes
51	BREAKING: Three Chinese nationals were apprehended trying to cross our Southern border illegally Each had flu-like symptoms. Border patrol quickly quarantined them and assessed any threat of Coronavirus Our weak border is a health risk Close the borderBuild. The. Wall. RT!	2/26/20	28465	No
52	B.I has donated 100,000 masks to help those who are having trouble obtaining masks due to the Coronavirus The masks will be distributed in Korea, China, Thailand, Japan, Indonesia, Vietnam	2/26/20	15748	Yes
53	Ive seen Democrats be tougher on Trump for his coronavirus response than theyve been on China, whose communist government censored and hid the outbreak, leading to its unnecessary spread around the world.	2/27/20	6939	No
54	My friend Jimmy Lai, brave voice for free speech & basic rights in #HongKong, was arrested just hours ago by #Beijing puppet government. Transparent attempt to silence pro-democracy voices. While #coronavirus ravages China, repression is Beijings priority	2/28/20	5895	No
55	Airborne Nitrogen Dioxide Plumets Over China #NASA	2/28/20	10724	Yes
56	This is beyond shocking China shut down the lab that published the worlds first genome sequence of the #coronavirus last month, barring its scientists from finding ways to contain the outbreak Their only crime? Publishing the sequence before authorities	2/28/20	7535	No
57	Whats a reason the #coronavirus spread so quickly in China? Governmental incompetence plus the government downplaying the risk. Unfortunately, the @realDonaldTrump Administration has also shown incompetence and is actively trying to downplay the risk of coronavirus.	2/28/20	4881	No
58	Corona virus is like Pasta. The Chinese invented it, but the Italians spread it all over the world.	2/28/20	26049	Yes
59	Tzuyu donated 50 million won to Korea and 300k RMB to China to help prevent spreading of coronavirus. Shes donated quietly and used her own expenses to support both countries at the same time. She has the best heart of all and deserves the best. @JYPETWICE	2/29/20	5166	Yes
60	This blog is the opinion of one solitary American with a unique experience fighting for his childs life in a communist healthcare system (China). Boy, is it worth a read.	3/1/20	8531	No
61	Our antibiotics and penicillin are Made in China This is a national security issue The President is now considering activating the Defense Production Act to rectify the situation I say he should do it	3/2/20	5944	Yes
62	To fight the coronavirus China is undertaking its biggest experiment yet in rule by data: an app that automates quarantines. Alibaba software, using unexplained data, now decides whether millions can leave their home. It also shares data with the police. As it damages both the lungs and immune systems, and can cause irreversible lung damage even if the patient survives. @thespybrief	3/2/20	3397	Yes
63	Countries with largest numbers of #coronavirus diagnoses 1. China 2. South Korea 3. Italy 4. Iran 5. Japan 6. France 7. Germany 8. Spain 9. Singapore 10. USA y'all	3/3/20	5029	No
64	need to stop using photos of RANDOM ASS chinatown aunties and uncles for your #coronavirus headlines especially when it's about a SPECIFIC person becoming infected. THIS UNCLE WAS JUST MINDING HIS OWN DAMN BUSINESS BEING COURTEOUS WEARING A MASK. @thehill do the fck better.	3/3/20	4017	No

Index	Tweet content	Create date	#Retweets	Matched
65	Chinese doctors say autopsies of #coronavirus victims suggest that #COVID19 is like a combination of #SARS and #AIDS	3/5/20	19673	No
66	China has socialized medicine.	3/6/20	3786	Yes
67	US was late to develop test 4 #Coronavirus. Germany had a test a week after Chinese scientists released the genome info. World Health Org had one shortly after & gave it to 60 countries. US said no to it. In #NYC we have 2700+ ppl quarantine. Most may be infection free.	3/7/20	3677	No
68	THREAD 1/ Of all the articles I read this week on #COVID19, this @nytimes really caught my eye. It was an interview w/ Dr. Bruce Aylward, the lead on the @WHO team that visited China to examine their response. It surprised me for multiple reasons.	3/8/20	4393	Yes
69	Has anyone wondered why the #cornonavirus started in China?	3/8/20	5400	No
70	THREAD: Fri Jan 31, 2020, a few weeks before #Coronavirus has officially spread to other countries (which led to the bad stock market week Feb 24-Feb 28), the Trump Admin announced travel restrictions on China. Here is some of the reporting it generated. Take Politico of 2/4/20.	3/8/20	4091	No
71	yt people blaming chinese people for bringing the corona virus to the U.S. is the most hypocritical thing ive ever seen..did you colonizers forget when yall brought the flu, smallpox, and measles here? killing 90% of my indigenous ancestors because i sure didnt	3/9/20	24110	Yes
72	This is going to sound kinda mad, but this week, pls consider making your weekly takeout a Chinese takeaway. My family's businesses have all been impacted hugely by coronavirus panic	3/9/20	60146	No
73	reminder that there are actual businesses owned across america by chinese people that are hurting immensely because of the racism and xenophobia which come with pandemics, and specifically sinophobia following covid-19	3/12/20	41589	No
74	This is the medical team from Wuhan responsible for recovering 50K+ patients in just a few months. They're now risking their lives again to help out Italy. Rag on China all you want for the mishandlings early on but you can't deny that these people are true selfless heroes.	3/13/20	18684	Yes
75	SCOOP: Cuban doctors have discovered an antiviral for #COVID19 and are collaborating with China, Italy, and Venezuela. This is what happens when you invest in science and public health rather than spend \$800,000,000,000 a year blowing up children.	3/13/20	61117	No
76	Chinese medical workers who have been fighting the #coronavirus day and night in Wuhan celebrated the closing of the last temporary hospital in Wuhan. The reported #covid19 cases went from a surge in February of 15,000 in one day to only 15 this week.	3/13/20	82890	Yes
77	A photo of Chinese medical workers and law enforcement officers riding horses to remote places in the Altai Mountains for #coronavirus prevention efforts.	3/13/20	26304	Yes
78	Interesting that a Chinese person would help Americans when most of yall are fucking assholes	3/13/20	107181	No
79	If China loses this legal battle against Gilead to produce the Coronavirus Vaccine they should just disregard it and distribute it worldwide for free anyways, it's the moral choice, fuck the law. The world will see that Gilead are the real villains.	3/14/20	25579	No
80	Never forget who is responsible for the coronavirus pandemic: China. China: -Lied to the world about outbreak, they knew about it in NOVEMBER -Refused outside help to contain it -Failed to lock down borders to prevent it from escaping -Silenced whistleblowers who sounded alarm	3/15/20	35124	No
81	Cuba: We have an antiviral with demonstrably high success rates in treating patients with COVID-19 China: Our studies show this Cuban drug has incredibly high success rates US: If only WE could find a treatment, someone in the PRIVATE SECTOR needs to find a PATENTABLE treatment	3/16/20	60586	No
82	if you guys keep calling it the chinese virus then we get to call it the white mass shooting	3/16/20	105763	No
83	china went from having 15,000 new cases of coronavirus every day to just 15 a day within a month of wants to sit around being quarantined but the racist orange haystack in office and call it china virus while spring breakers are currently snorting eachs spit down in florida	3/17/20	22455	No
84	@realDonaldTrump You see this? Two children and two adults were stabbed at Sams in Midland, Texas, bc ppl associate Asians with the coronavirus. Calling it the Chinese virus encourages fear and racism. I will hold you personally responsible for every hate crime here on after.	3/17/20	27219	No
85	Imagine blaming china when americans are out here doing stupid shit like this	3/17/20	177575	No
86	Citizens of Wuhan can finally hear birds chirping after years, Venices water canals are clear and full of fish, and you can even see the Tatra mountains from Krakw because the smog has lifted. This isnt an apocalypse. Its an awakening.	3/18/20	53932	Yes
87	China followed protocol, quarantined, and has been deep cleaning the city since the epidemic started. Europeans and americans on the other hand have been partying and going to the beach with hundreds of other people. Shut the fuck up.	3/19/20	94720	No
88	"Yes, Im Asian. And yes, I have coronavirus. But I did not get it from China. I got it in America. In New York City. And despite what certain political leaders want to call it, I dont consider the place where it's from as important as the people who are sick and dying."	3/19/20	40855	Yes
89	China were building coro hospitals England are building mortuary	3/19/20	22063	Yes
90	The H1N1 swine flu pandemic that infected up to 1.4 billion people and killed up to 575,000 originated in factory farmed pigs in the United States. Yet nobody ever calls it the American Pig Flu. Lets stop calling the coronavirus the Chinese Virus. Were all in this together.	3/22/20	96013	Yes
91	I'm sitting home in Wuhan and eating free vegetables and fish govt sent me and you tell me it hurts my human rights???	3/23/20	36858	No
92	china are lifting their isolation on the 8th of april, it was enforced on the 23rd january, and people really believe were gonna be out in 3 weeks	3/25/20	31976	Yes
93	BREAKING: Another migrant caravan is heading to the US border While we suffer under the strain of the China Virus, we can't afford to let a single unchecked, unvetted, possibly unhealthy illegal alien enter the country RT if the southern border should be COMPLETELY CLOSED	3/26/20	19344	No
94	China is a fucking liar too. The refuse to accept new Covid19 suspected patients just to keep zero new patient record clean	3/26/20	18283	No

Index	Tweet content	Date	Retweets	Matched
95	Knowledge is power! We launched an online platform for doctors and nurses around the world to exchange ideas, lessons and know-how to fight the virus. We welcome all hospitals to join Chinese hospitals on this open platform One world, one fight!	3/26/20	18164	Yes
96	Spain bought 640,000 testing kits from China. They dont work	3/26/20	14940	Yes
97	Just two weeks ago the head of Emergency at Wuhan Central hospital went public, saying authorities had stopped her and her colleagues from warning the world. She has now disappeared, her whereabouts unknown. #60Mins	3/29/20	22637	No
98	#Wuhan residents estimate, based on calculations of cremations and urns now being returned to families, that between 42k-46k (!) died in city + surrounding areas in the 2.5 months of lockdown. Far more than official figure of 2535 deaths. #COVID19	3/29/20	21183	Yes
99	Chinese scientists have developed a new weapon to combat the #coronavirus. They say they have found a nanomaterial that can absorb and deactivate the virus with 96.5-99.9% efficiency.	3/29/20	14628	No
100	NETHERLANDS: Country's government recalls 600,000 masks from hospitals for being defective after being bought from China	3/29/20	13475	Yes
101	Chinese medics have just arrived in London to help us fight Covid-19. The media wont tell you for some reason.	3/30/20	54050	Yes
102	An Asian family in Texas was attacked due to the racist narrative that Chinese people are the ones spreading the Coronavirus.The perpetrator stabbed a 2 y.o and 6 y.o. LITERAL CHILDREN!! So excuse me if I dont find your racist Coronavirus jokes funny.	4/1/20	17024	Yes
103	BREAKING: China has concealed the extent of the coronavirus outbreak in its country, under-reporting both total cases and deaths, the U.S. intelligence community concluded in a classified report	4/1/20	28376	Yes
104	BREAKING: US Intelligence has officially confirmed what weve known all along China intentionally concealed the extent of the Coronavirus and under-reported the number of cases & deaths China lied, people died, and now its confirmed The CCP must pay RT!	4/1/20	15093	Yes
105	CHINA: City of Shenzhen becomes the first in the country to ban the eating of cats and dogs	4/2/20	16408	Yes
106	Official Chinese statistics put Wuhans coronavirus death toll at 2,563. Evidence coming out of the city suggests it was actually more than 40,000. Our latest:	4/3/20	14146	No
107	USA just discovered the man who manufactured and sold the #coronavirus to #China. Dr #CharlesLieber, head of the chemistry and biology department at #HarvardUniversity, USA. He was just arrested today according to American department sources.	4/4/20	13436	No
108	China promised to send top quality N-95 masks to Pakistan. When the consignment landed, Pakistanis found that China had sent masks made of underwear. Pakistani anchor says China ne Choona laga diya. #ChineseVirusCorona	4/4/20	12776	Yes
109	The U.S. had a program - PREDICT - that identified lethal viruses abroad to prevent their spread to the U.S. It had found 1,200 viruses (and 160 coronaviruses) in 10 years. It was actively working in China. Two months before the Wuhan outbreak, Trump shut the program down.	4/5/20	44807	No
110	Report: China says it will ship France a billion face masks – but only if they buy their 5G equipment from Huawei:	4/5/20	12743	Yes
111	Who are you working for? China?	4/6/20	13214	Yes
112	Today, China has flown in 300 ventilators, 33 million masks and 1 million gloves for the NHS. The media really needs to start reporting positive stories of international solidarity.	4/6/20	9976	Yes
113	Somewhere in #Wuhan, people moving body secretly as "zero new cases" has become a political task, and communities dare not break the "zero new cases" record , so they arrange to have the body moved at midnight. #CCPVirus #COVID2019 #Coronavirus #CoronavirusPandemic	4/7/20	31159	No
114	Japan just announced it would make the investment to relocate Japanese businesses OUT of China This is a smart, bold move by Japan RT if the United States should immediately do the same thing bring business back home!	4/9/20	17776	Yes
115	Great! First, I would like to speak with Dr. AI Fen. She worked at Wuhan Central Hospital and tried to sound the alarm on the virus. Could you un-disappear her so we could speak?	4/10/20	10487	Yes
116	Medical clothing sent from China has just arrived in France.	4/10/20	23576	No
117	China is a dictatorship that, for decades, enforced a one child per family policy under penalty of forced sterilization. But they can't close down the farmer's market from hell? #CoronaVirus #WetMarkets	4/11/20	41626	No
118	Sad that I have to make a distinction between the Chinese people and the Chinese Communist Party (CCP). The people of China have suffered greatly because of their government. Please be kind to your Asian-American friends. It is not easy for them these days. Lets be our best!	4/11/20	11506	No
119	Bill Maher on Chinese coronavirus: "So when someone says, 'what if people hear Chinese virus and blame China?' The answer is we should blame China. We can't afford the luxury anymore of non-judginess towards a country w/habits that kill millions of people"	4/11/20	10423	No
120	Blacks: don't call it the Chinese virus that's racist China:	4/12/20	28564	No
121	Dear @realDonaldTrump: Your myopic focus on foreign nationals in China is why you failed to stop the virus. You let in hundreds of thousands from Europe, and US travelers from China. And then you failed to test domestically until it was too late. An epic presidential disaster.	4/13/20	9625	No
122	This is a a very obvious point and has been obvious from the beginning but as the global picture fills in over time, there is *absolutely* no fricking way China only had 3300 fatalities from this virus.	4/14/20	12626	No
123	President Trump says U.S. is pulling funding to WHO because the group praised China's "transparency." Below is President Trump's tweet from January 24 praising China's transparency.	4/14/20	12838	Yes
124	So Bill Gates is unhappy that USA halted our funding for the WHO, after they parroted CCP propaganda & aided Chinas Wuhan cover-up. Well, quick math: USA funds \$400m/yr to WHO & Gates is worth \$103bn... he could personally fund the US share for 257 years!	4/15/20	11377	Yes

Index	Tweet content	Date	Retweets	Matched
125	China says the US should "fulfill its obligations" to the World Health Organization and restore funding I say China should fulfill ITS obligations and pay damages to the 22.5 million Americans who lost their job because of the virus China unleashed on the world RT if you agree!	4/16/20	9625	No
126	Bill Gates is seeing his utopian globalization project go up in smoke. We know China lied, Americans died, and a booming economy was fried. Time for real border enforcement and essential products MADE IN USA.	4/16/20	18215	No
127	Chinas embassy in Berlin wrote me an open letter because they werent too happy with our Corona coverage. I responded. Full version:	4/18/20	19135	Yes
128	President Trump has announced that he will end Obama era funding to the Wuhan lab accused of spreading the China virus. Why were we funding it in the first place?	4/18/20	8174	Yes
129	Germanys largest newspaper comes out swinging against China. This is a must watch for US journalists who seem intent on doing Chinas bidding. #BildTV @jreichelt	4/19/20	13238	Yes
130	The most economically, scientifically, and technologically advanced country on the planet is ranked 38th in tests per person. Donald Trump had to work hard to screw up such a massive advantage. His trust in China lost months, as did his belief COVID-19 would magically go away.	4/19/20	8102	No
131	Insanity: \$76,000 in US tax dollars went to a Chinese virology lab in Wuhan last year The money was specifically earmarked to study Coronavirus infections in bats This is sick. RT if not another DIME of US taxpayer money should go to funding the CCPs research	4/20/20	5460	Yes
132	So the Gates Foundation, WHO and Wuhan Institute of Virology have all been hacked and people are logging in via SSH and downloading everything, and I mean everything.	4/21/20	5096	Yes
133	In the past five weeks, the China Virus has caused: Deaths1.5/10,000 Americans New cases2/1,000 Americans Unemployment8/100 Americans 27 million jobs have been lost due to the China Virus This has gone on long enough. It's time to re-open America. RT if you agree!	4/23/20	3658	Yes
134	NEW: In deleted tweets, new HHS spokesman Michael Caputo said the coronavirus was because "millions of Chinese suck the blood out of rabid bats as an appetizer and eat the ass out of anteaters." He said Democrats had a "goal" of "massive deaths."	4/23/20	9152	Yes
135	China unleashed this deadly pandemic on the world and thats where Joe Biden should direct his anger. Only problem is Biden said a rising China is a positive development, his family made millions there and he opposed President Trumps China travel ban which saved American lives	4/23/20	4120	No
136	We strongly believe that #China didnt report the outbreak of the new #coronavirus in a timely fashion to the @WHO. Even after the CCP did notify the WHO of the coronavirus outbreak, China didnt share all of the information it had.	4/23/20	3977	Yes
137	Trump owes the Bank of China millions for helping him acquire one of his most valuable properties. The loan comes due in the middle of the next presidential term. Remember how much he echoed Chinese government propaganda about the virus being contained?	4/24/20	3943	Yes
138	BREAKING: US officials are investigating hundreds of cases of coronavirus brought in by Chinese tourists in January	4/24/20	3919	No
139	ATTENTION: A picture is emerging across 10 major-media investigative reports of the COVID-19 outbreak in the U.S. as a bribery scandal in which Trump looked the other way on intel about the virus in November in order to placate Chinese lenders and get political dirt on Joe Biden.	4/24/20	18410	No
140	Why did India buy Chinese rapid testing kits for #COVID19 when other countries have complained about its accuracy? In the words of a TV showman, the nation wants to know!	4/26/20	3868	No
141	#BREAKING: China's ambassador warns of potentially severe economic consequences if Australia doesn't back down from launching a coronavirus inquiry. Bring. It. On. You don't scare us.	4/27/20	3713	Yes
142	A new study from Wuhan finds the coronavirus can linger in the air in crowded spaces, as scientists struggle to determine exactly how it spreads	4/28/20	9761	Yes
143	BREAKING: The Trump Administration has suspended all US funding to the Wuhan Institute of Virology	4/28/20	9175	No
144	Meanwhile in China, they are treating Africans worse and blaming them because of the virus	4/28/20	13196	No
145	The same people who say Chinese Virus is hateful & racist are eerily silent about Bill De Blasio's insanely anti-Semitic message to the Jewish Community last night	4/29/20	5147	No
146	Dr. Fauci backed controversial Wuhan lab with millions of U.S. dollars for risky coronavirus research	4/29/20	6849	Yes
147	@realDonaldTrump says he has seen intelligence that gives him a high degree of confidence that the coronavirus originated from the Wuhan Institute of Virology - though he would not go into detail I cant say	4/30/20	3592	No
148	Our mission at the @StateDept is to protect Americans from threats around the world. As we seek information about the origins of #COVID19, we call on #China to be transparent and cooperative. When countries engage in disinformation it creates risk. We need reliable partners.	4/30/20	2757	No
149	Well, THERE'S a shocker. Spy Agencies Told White House Theres No Evidence to Prove Virus Began in Wuhan Lab, Says Report via @thedailybeast	4/30/20	2844	No
150	China: We discovered a new virus. America: So what? China: It's Dangerous America: It's only a Flu China: Wear a Mask America: Don't wear a Mask ...	4/30/20	23897	No

## 2 Classifier for Weibo Data

To train a classifier that could identify Covid-19-related sentiment, we first sampled 5,484 posts from the Weibo-COV dataset. We define a post related to Covid-19 if the post contains one topic about the SARS-CoV-2 virus, the resulting Covid-19 epidemic, as well as the emergence and impact of the outbreak. Three Mandarin-speaking research assistants annotated each post and we derived the final annotation result for each post by the majority vote. With this training data, we fine-tuned the pretrained Chinese BERT with the Whole Word Masking model (Chinese BERT-wwm-ext), which adapts whole word masking on Chinese text as an upgrade of BERT and more data sources for training to get better performance (Cui et al. 2020). After tuning for different hyper-parameters (e.g. learning rate, dropout rate), we selected hyper-parameters that maximizes F1 score. Our fine-tuned model reached 0.97 in accuracy and an F1 score of 0.99 in classifying whether a Weibo post is related to Covid-19. Among 8.3 million original posts from Weibo-COV dataset, we identify 6.7 million Covid-19-related posts.

## 3 Additional Methodological Details

### 3.1 Step 1: Time window validation

We used different window sizes, up to 10 days, to retrieve data with the same search engine pipeline. As shown in Figure A1, when the window size increases past 5, the majority of posts overlap with the posts retrieved by the  $\pm 5$  day time window, and the increased window size introduces additional noise in the  $K$  selected Weibo posts for human annotation.

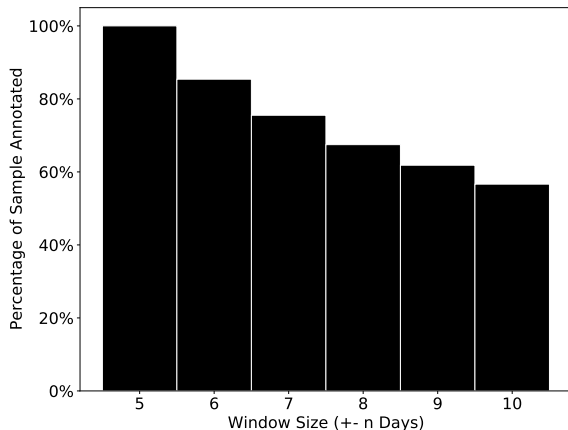


Figure A1: Overlapped posts with different window sizes

### 3.2 Step 1: Similarity calculation

Formally, let  $T_i = [t_1, \dots, t_m]$  be a translated source tweet that comprises a sequence of  $m$  Chinese word tokens and  $W = W_1, \dots, W_N$  be the pool of Weibo posts. Each  $W_j = [w_1, \dots, w_n]$  is a Chinese word sequence. To retrieve the top-10,000 candidate Weibo posts for a given tweet  $T_i$ , we measure similarity of  $T_i$  and  $W_j$  by Algorithm 1 for every post in  $W$  and obtain the top-10,000 candidate posts according to the scores.

---

**Algorithm 1:** Word2vec-based similarity for a tweet and a Weibo post

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**Input:** Translated source tweet  $T = [t_1, \dots, t_m]$ , Weibo post  $W = [w_1, \dots, w_n]$

**Output:** Similarity score

tweet\_vectors= $\langle \rangle$ ;

weibo\_vectors= $\langle \rangle$ ;

**for**  $k = 1$  **to**  $m$  **do**

$\mathbf{v}_{t_k} = \text{word2vec}(t_k)$

    tweet\_vectors.append( $\mathbf{v}_{t_k}$ );

**end**

**for**  $k = 1$  **to**  $n$  **do**

$\mathbf{v}_{w_k} = \text{word2vec}(w_k)$

    weibo\_vectors.append( $\mathbf{v}_{w_k}$ );

**end**

$\mathbf{v}_T = \text{mean\_vector}(\text{tweet\_vectors})$ ;

$\mathbf{v}_W = \text{mean\_vector}(\text{weibo\_vectors})$ ;

$\text{score} = \text{cosine\_similarity}(\mathbf{v}_T, \mathbf{v}_W)$ ;

**return**  $\text{score}$ ;

---

### 3.3 Step 2: Selection of $K$

An important analytical decision is to select a proper  $K$ , which is the number of Weibo posts human annotators should verify. If  $K$  is too small, there could be Weibo posts that co-occur with a tweet but are missed because the relevant posts were not included in  $K$  and thus humans have no opportunity to verify them. If  $K$  is too large, human annotators would have to review more Weibo posts for every tweet, increasing the cost of covering larger numbers of tweets for analysis. We select  $K$  based on our initial investigation of how  $K$  influences detection of co-occurring Weibo posts. Figure A2 shows how the total number of Weibo posts matched to tweets as a function of  $K$ . Figure A2 shows a rapid increase in the number of tweets with detected, co-occurring Weibo posts as  $K$  increases to 40. The rate of increase slows down afterwards, and is largely stable after  $K = 60$ . To err on the side of conservatism, and to maximize our chances of detecting co-occurring Weibo posts, we set  $K = 100$ .



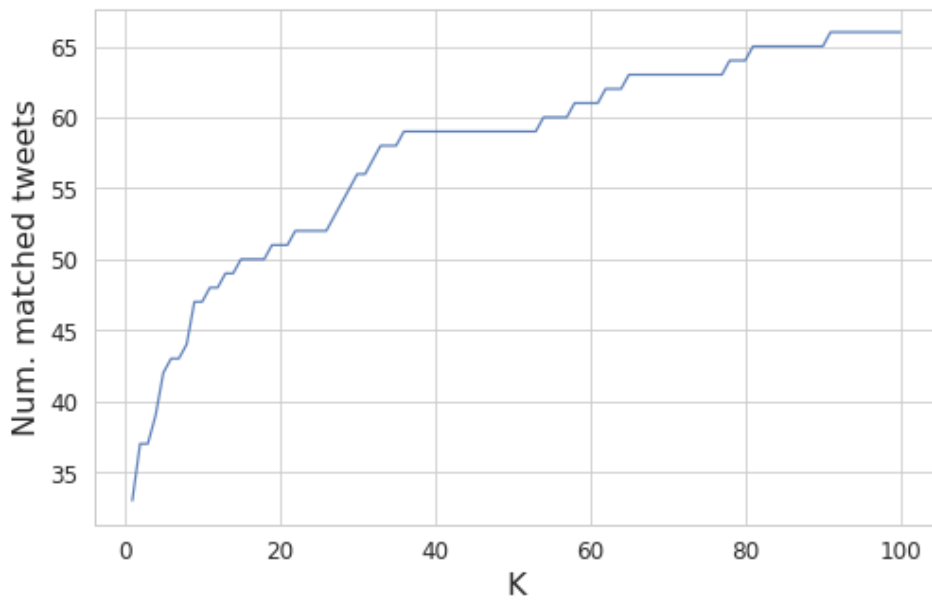


Figure A2: Number of matched tweets with varying  $K$

## 4 Robustness Check Using Pre-Censored Weibo Data

It may be the case that more viral tweets appeared on Weibo, but we do not find them because the corresponding Weibo posts were censored after they were posted. To assess the impact of this type of post-hoc censorship, we replicated all analyses, from classifier training to inflow investigation, on the Weiboscope Covid-19 dataset, a near real-time, pre-censored dataset collected by researchers in Hong Kong (Fu and Zhu 2020). The Weiboscope dataset ends on Feb 27, 2020, so we use our system to search for the 32 tweets in the Weiboscope dataset that were not found to have any Weibo matches in the WeiboCOV dataset.

We find two additional viral tweets with matching Weibo posts. One matched tweet represents information outflow from China. Two Weibo posts reported on the death of Liang Wudong, the first doctor to die in China from Covid-19, and this content found its way to Twitter and gained widespread attention. The other matched tweet represents information inflow. A Weibo public intellectual (verified as a celebrity account) copied reporting by Reuters on the relative lack of Covid-19 controls at French airports compared to other European airports where scanners were used to take the temperature of passengers arriving from China.

These results suggest that post-hoc censorship does not alter the pattern of information inflow we find using the WeiboCOV dataset. Even though the Weibo-COV dataset is collected in April 2020, it loses little data due to censorship, which corroborate results of prior research on censorship during the early months of Covid-19 in China (Fu and Zhu 2020, Lu, Pan and Xu 2021).

## References

- Cui, Yiming, Wanxiang Che, Ting Liu, Bing Qin, Shijin Wang and Guoping Hu. 2020. Revisiting Pre-Trained Models for Chinese Natural Language Processing. In *Proceedings of the 2020 Conference on Empirical Methods in Natural Language Processing: Findings*. Online: Association for Computational Linguistics pp. 657–668.  
**URL:** <https://www.aclweb.org/anthology/2020.findings-emnlp.58>
- Fu, King-wa and Yun'er Zhu. 2020. “Did the world overlook the media’ s early warning of COVID-19?” *Journal of Risk Research* 23(7-8):1047–1051.
- Lu, Yingdan, Jennifer Pan and Yiqing Xu. 2021. “Public Sentiment on Chinese Social Media during the Emergence of COVID19.” *Journal of Quantitative Description: Digital Media* 1.