

Supplement material to the article “Exploring Public Health Agencies’ Communication on Social Media in the Early Stages of the Covid-19 Pandemic: An International Perspective”

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Codebook: National public health agencies' communication about COVID-19 on social media in the Netherlands, South Korea, Poland, and the U.S.

General coding instructions

The aim of this content analysis is to categorize tweets published by national public health agencies on several dimensions (see the table below). The coding material and coding form are combined in one document (see the excel file). The first columns include date, text of the tweet, tweet's URL, retweet count, reply count, total engagement, and potential impressions. The text is coded by assigning codes to the variables listed in the following columns. If needed (e.g., when in doubt about the content of the tweet, especially when it is a retweet or a link is included in a tweet), coders are allowed and encouraged to click on the tweet's URL to see the full tweet. Tweets that have been deleted by the organization and cannot be found on tweeter anymore should be coded anyway (based on the text available in the spreadsheet). If a tweet contains a link, please click on it (it is likely a gif, image or video). You do not need to do that if the link is accompanied by "see more information" and clearly provides additional information. You do not need to code visuals, but if the visual includes text that is relevant, please take it into account when coding.

Each tweet should be coded as 0 (the category is absent) or 1 (the category is present). Therefore, each tweet can score 1 (can be categorized) under several categories. For the tweet to be coded it first needs to be deemed relevant. If the tweet is not relevant (does not deal with the COVID-19 pandemic caused by the SARS-CoV-2 virus), it needs not to be analysed any further. In other words, only relevant tweets should be analysed (relevance = 1).

Category	Subcategory	Definition + examples
Relevance	Deals with the pandemic	The message deals with issues related to the pandemic. It should explicitly refer to the pandemic, COVID-19 disease, the SARS-CoV-2 virus, lockdown, measures (if clear that they refer to the pandemic) or other consequences of the pandemic, e.g., economic impact or it uses pandemic vocabulary: #stayhome, front-line workers, essential workers. If # present, a tweet is automatically relevant (e.g., #COVID-19). If information provided is not enough to be sure if the tweet talks about the current pandemic, but it may be talking about a similar issue, then the tweet is not relevant (e.g., <i>Visiting in a hospital where all precautions being taken to minimize exposure from visitors. I asked if it would be ok to wear a mask to protect myself. Hospital staff feel if there's a need to wear mask one should not visit?</i>).

Sentiment/Tone	Positive	The message expresses overall positive sentiment, e.g., <i>Together against Corona</i>
	Neutral	The message expresses overall neutral sentiment, e.g., <i>Destinations with apparent community spread of #COVID19 include locations around the globe.</i> If in doubt (e.g., a tweet is both positive and negative and you are not sure what the general sentiment is), code a tweet as neutral.
	Negative	The message expresses overall negative sentiment, e.g., <i>COVID-19 leads to death and suffering. A challenging situation that restricts people's daily lives.</i>
Informational (“What is happening, why, and what are officials doing in response to it?”)	Numerical information, statistics	The message focuses on presenting numerical information related to the pandemic, e.g., <i>New in @CDCMMWR: 8 out of 10 deaths associated with #COVID19 occurred in older adults.</i>
	Basic info: symptoms, treatment, recovery, transmission, virus	The message discusses information about the virus (e.g., how it is built), how it is transmitted, what the symptoms are, how the treatment and recovery look like, the role of the vaccine, available treatments and therapeutics, who is susceptible, etc. It can be well-known information. Does not have to be medical/academic. Treatment is defined specifically as what the doctors and hospitals can do and does not include family members caring for sick ones. e.g., <i>Asymptomatic and pre-symptomatic nursing home residents with COVID-19 had high viral loads, raising concern about pre-symptomatic or asymptomatic spread of the virus among residents of skilled nursing facilities.</i> Or <i>@makfehrr @CDCFlu Currently there is no evidence to support spread of 2019-nCoV from goods imported from China; no such cases have been detected.</i>
	Measures, rules & regulations introduced by the government and other public institutions (including schools, offices, etc.).	Information about the efforts and measures undertaken by the government and other governmental agencies such as the health department and schools is discussed, including the introduction of rules, regulations, travel regulations, e.g., <i>Be prepared if your child's school or childcare facility is temporarily dismissed due to a #COVID19 outbreak in your community. Learn about the emergency operations plan at your child's school or childcare facility.</i> Note that travel advice or guidance for institutions, e.g., <i>we do not recommend travelling to the EU due to high infection rates</i> Or <i>here are the guidelines for correctional facilities</i> , should be included under preventive behaviours .

		Everything that is a recommendation (not a regulation) should be coded as preventive behaviours.
	Information about financial support introduced due to the pandemic.	Information about stimulus packages, financial support for organizations, businesses, etc. should be coded here, e.g., <i>The government is working on a recovery package to bring economy back once the pandemic is over.</i>
	Misinformation correction	The message explicitly refers to and corrects information that was widely spread but was deemed not true (does not have to use “disinformation” or misinformation” or “correction”), e.g., <i>@makfehrr @CDCFlu Currently there is no evidence to support spread of 2019-nCoV from goods imported from China; no such cases have been detected.</i> Code also more general messages like <i>“Know the facts about #COVID19. Don’t share rumors & unintentionally spread misinformation. Federal, state & local governments are posting current and accurate information. For help in distinguishing rumor from fact, see @FEMA Coronavirus Rumor Control”</i>
	Research	The tweet discusses academic findings and research. It can talk about research into the virus, its transmission, or possible treatments, e.g., <i>Research from the University of Chicago found that masks limit the number of particles in the air.</i>
Cues to action (specific stimuli that allows and triggers individuals to take action against a health condition or to adopt appropriate health behaviour)	Testing information	Information about available testing, types of testing, where one can get tested, who should test and when, etc., e.g., <i>We recommend that everyone who comes back from Italy gets tested upon return, preferably within 24 hours.</i>
	Preventive behaviours - virus (“What specific actions should I and those I care about take (or not take) for self-protection?”)	Information on preventive behaviours recommended, such as masks, social distancing, stay home when feeling sick, get tested when feeling sick, stay home if exposed, etc. The tweet offers specific directions that can motivate or enable individuals to take action, e.g., <i>Reduce spread of #COVID19. When in public, use a cloth face covering that ✓Reaches above nose & below chin, completely covering mouth & nostrils ✓Fits snugly against sides of your face</i>
	Preventive behaviours - other	This category also includes other behavioural tips that can help people survive the pandemic. The tips may focus more on mental health, creating healthy working

		environment, etc., e.g., <i>RT @HHSGov Working from home while #SocialDistancing? Physical activity breaks are a great way to stay focused! Try doing yoga, push-ups, or squats between tasks. Or While staying home to prevent #COVID19, do that thing around the house you have been putting off! Repair, paint, or clean, and then share your before and after pics online. Also, animal care during the pandemic.</i>
	Where to find information	The tweet directs readers to additional materials, such as websites, webinars, etc. The inclusion of a link only (without any 'read more', or 'see here') IS NOT sufficient to code 1 in this category., e.g., <i>Your friends will have plenty of time to "like" and retweet. https://t.co/OD99fLmeyc Or Make sure to explain the simple things they can do, like washing their hands often. Learn more here: https://t.co/fTXLiaLk18. https://t.co/mNHGrOvteD</i>
Social support	Empathy, gratitude, effort, reassurance, togetherness, doing your part, doing it for others	The message thanks citizens or a certain group of citizens for their effort in combating the pandemic, encourages them to keep working, and stresses out that "we are all in it together" , how everyone should care for others, do your part , everything that aims to emotionally support, etc., e.g., <i>A @UPMC microbiology laboratory recently received this package of samples with a special note. Thanks to all laboratory professionals for their important role in maintaining our nation's health Or Everyone can help prevent spread of #COVID19. Or RT @Surgeon_General Doing your part to #StayHome during the #COVID19 pandemic</i>
Credibility	Trust building	The message stresses that the public health agency or the government know what they are doing, that the healthcare system is prepared, etc., e.g., by stressing the information senders' expertise, e.g., <i>RT @IDSAInfo NEW PODCAST 🎧#Coronavirus: What's Happening Now Leading health experts, Dr. Daniel Lucey, FIDSA (@gumedcenter), Dr. Matthew Zahn (@OCHHealth), Dr. Tim Uyeki & Dr. Satish Pillai (@CDCGov) share what you need to know about #2019nCoV Or expressing confidence, e.g., RT @CDCDirector .@CDCgov will continue our aggressive public health response strategy to #2019nCoV, working to protect the health and safety of the American public. Or stating that they are preparing for what is going to happen kind of suggesting they will know what to do. These are explicit statements of expertise. Adding other actors</i>

		(e.g., @Surgen_General) is not enough to code the tweet as trust building/credible. These mentions should be ignored.
	Current knowledge is limited	The message admits that the current knowledge is limited, that mistakes have been made, that next steps are not clear, etc., e.g., <i>We did not know that the virus is airborne</i> . Implicit acknowledgment such as: it seems like it does something, it looks like, we expect it to, we believe it travels... and so on should be coded here, but if it is explicit, please make a comment that it is a firm statement that we know nothing.
	Rationale is provided, e.g., why certain behaviours should be undertaken	Rationale for the discussed measures, steps taken, etc. are discussed and the “why” is provided, e.g., <i>Living with older family members or others at higher risk of severe illness from #COVID19? Help protect your household by only leaving your house when absolutely necessary. Or Social distancing can help slow the spread of #COVID19 in affected communities. This means avoiding crowded places and maintaining distance from others.</i>

Comments – please note any interesting observations, abnormalities, anything that attracted your attention.