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Perspective

Social media for field epidemiologists (#SoMe4epi): How to use Twitter during the #COVID19 pandemic[☆]

Charlotte C. Hammer^{a,b,*}, T. Sonia Boender^{b,c,d}, Daniel Rh Thomas^{b,e}

^a Finnish Institute for Health and Welfare, Department of Health Security, Mannerheimintie 166, 00400 Helsinki, Finland

^b European Programme for Intervention Epidemiology Training (EPIET), European Centre for Disease Prevention and Control, (ECDC), Stockholm, Sweden

^c Robert Koch Institute, Department for Infectious Disease Epidemiology, Seestrasse 10, 13353 Berlin, Germany

^d Postgraduate Training for Applied Epidemiology (PAE), Robert Koch Institute, Berlin, Germany

^e Public Health Wales, Communicable Disease Surveillance Centre, Cardiff, United Kingdom

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ABSTRACT

The COVID-19 pandemic has fundamentally changed the way that public health professionals work and communicate. Over a very short time span, remote working arrangements have become the norm, and meetings have shifted online. Physical distancing measures have accelerated a trend toward digital communication and social exchange. At the same time, the work of epidemiologists has been held under a magnifying glass by journalists, governments and the general public, in a way not previously seen. With social media becoming an integral part of our society over the last decade, Twitter is now a key communication tool and platform for social networking among epidemiologists (#EpiTwitter). In this article, we reflect on the use of Twitter by field epidemiologists and public health microbiologists for rapid professional exchange, public communication of science and professional development during the pandemic and the associated risks. For those field epidemiologists new to social media, we discuss how Twitter can be used in a variety of ways, both at their home institutions and during field deployment. These include information dissemination, science communication and public health advocacy, professional development, networking and experience exchange.

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Introduction

The COVID-19 pandemic is the first pandemic to take place in the social media age. While the pandemics of SARS in 2003 and Highly Pathogenic Avian Influenza H1N1 in 2009 (Chew and Eysenbach, 2010) made headlines around the world, they ran their course in a world very different from the one that is now seemingly collectively experiencing the COVID-19 pandemic, including the corresponding infodemic, in real-time (Cinelli et al., 2020). Social and digital media in their current form were unknown during these two pandemics, and information was consumed predominantly through traditional media outlets of print, television and radio.

[☆] In line with the topic of this article, we use hashtags (#) and Twitter accounts (@) throughout the text where available and appropriate. We invite readers to check out these hashtags and accounts, which we have found to be some of the most informative and engaging in the field.

* Corresponding author at: Finnish Institute for Health and Welfare, Department of Health Security, Mannerheimintie 166, 00400 Helsinki, Finland.

E-mail address: charlotte.hammer@thl.fi; @cc_martell (C.C. Hammer).

@SoniaBoender (T. S. Boender) @DanielRhysThom1 (D.R. Thomas)

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Social media is now an integral part of our society. Facebook was launched in 2004 with Twitter, WhatsApp and Instagram following in 2006, 2009 and 2010, respectively. In the last quarter of 2020, Twitter alone had 192 million daily active users (Statista, 2021). Despite social media already being well integrated into society during the Ebola Virus Disease epidemic in West Africa in 2014 and playing a role during the Zika pandemic in 2016 (Dredze et al., 2016; Kadri and Trapp-Petty 2016; Chan et al., 2018), the global reach of the COVID-19 pandemic coupled with the steep increase in social media use in the last few years, has made it an altogether different experience (Merchant and Lurie, 2020; Merchant et al., 2021; Tsao et al. 2021).

In a very short time span, COVID-19 has fundamentally changed the way that field epidemiologists work, with remote working arrangements becoming common and meetings having been shifted online. Physical distancing measures have pushed this balance to even more digital communication and social exchange. Social media is being used not only by journalists, governments and the general public but also by those directly responding to the pandemic. Public health professionals are now using social media to survey public attitudes, manage the infodemic, assess mental

health, detect or predict COVID-19 cases, analyse government responses to the pandemic, and evaluate the quality of health information in prevention education videos (Tsao et al., 2021).

Twitter for public health professionals

From this context, we reflect on the use of Twitter by professionals working on the COVID-19 response (#SoMe4epi) and introduce the field of social media to those not currently using it in their public health practice. We have focused on Twitter for this perspective. While many field epidemiologists use a variety of social media platforms, Twitter has become an important news outlet and a platform for communication and professional development activities, ranging from knowledge acquisition and peer-learning to applying and reflecting on skills in science communication. Digital platforms such as Slack and WhatsApp are used daily by responders to the COVID-19 pandemic; however, their use is often limited to information exchange and networking in semi-closed established groups. Therefore, these platforms can be regarded more as part of the digital work infrastructure and less in their function as social media. However, the World Health Organization has launched WhatsApp¹ and Facebook messaging services in 7 different languages to directly inform the general public. National governments in, for example, the UK and Germany have launched similar services through chatbots on WhatsApp and Telegram. Facebook and Instagram, on the other hand, in our experience, are used primarily in a personal capacity or for pushing public messaging by the main public health institutions. However, the overlap between users and messaging, and cross-platform communication, is one of the key strengths of social media, as an extension of traditional media such as radio, newspapers and television.

Twitter can be used in various ways by field epidemiologists, both at their home institutions and during field deployment, including information dissemination, science communication, professional development, networking and experience exchange. These varied ways to use Twitter are in no way mutually exclusive and often the reason for using social media, even for a single tweet (i.e., a micro-blog posted on Twitter), covers more than one of these usages. In most cases, any professional interaction on Twitter by field epidemiologists during this pandemic covers all of these aspects, which is one of the unique values of engaging on Twitter as a scientist. However, not all public health Twitter use is, or should be, through active engagement. In fact, in our experience, many public health professionals start by following and reading other users' tweets, actively engaging only at a later stage (or never).

Science communication (#SciComm) and advocacy

Twitter allows for science communication between peers and with the general public and journalists by either amplifying official information or providing original content. Conversely, social media has also opened avenues for coproducing information between scientists and citizen scientists who represent and share scientific content, such as surveillance data, for a general public audience. Communication between scientists serves transparently strengthens official information provided by the organisation at which the individual is based and/or that of a national or international authority, such as the World Health Organization (@WHO) or the European Centre for Disease Control and Prevention (@ECDC_EU). Information can be shared by retweeting content from the organisation and their key staff, such as the Executive Director

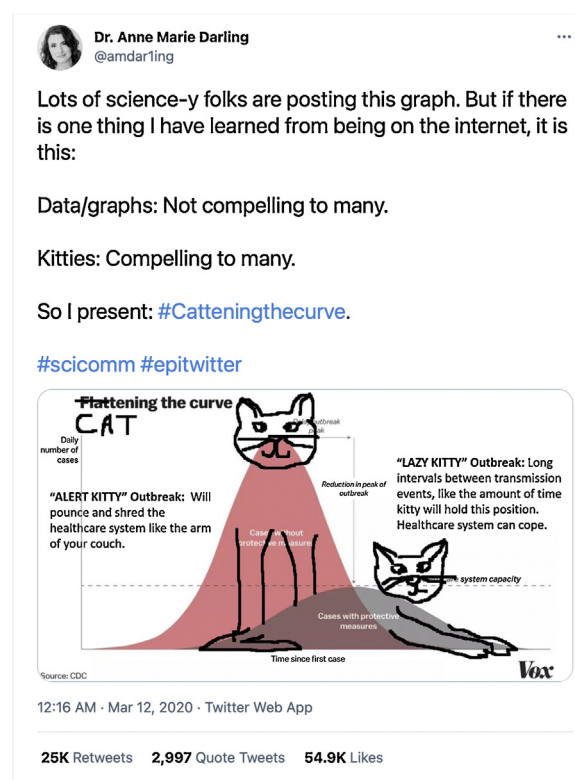


Figure 1. Tweet by Dr Anne Marie Darlin (@amdar1ing) (Darlin AM [amdar1ing]. (2020). "Lots of science-y folks are posting this graph. But if there is one thing I have learned from being on the internet, it is this: Data/graphs: Not compelling to many. Kitties: Compelling to many. So I present: #Catteningthecurve. #scicomm #epitwitter." Retrieved 24.02.2021, from <https://twitter.com/amdar1ing/status/1237880129575157760>) on the #CatteningTheCurve message for science communication (#SciComm) and the #EpiTwitter community. Screenshot made on 2 May 2021.

of the World Health Organization's Health Emergencies Programme Mike Ryan (@DrMikeRyan) or the COVID-19 Technical Lead Marie van Kerkhove (@mvankerkhove). Furthermore, press conferences by, for example, public health institutes are often live streamed on a plethora of social media platforms, allowing for swift communication and direct engagement. One striking example of this is the press conference on the European Medicines Agency's investigation of the AstraZeneca COVID-19 vaccine and thromboembolic events (European Commission [EU_Commission], 2021).

Beyond this, field epidemiologists using Twitter also directly share information and hands-on experience as individual experts without specifically amplifying official information for any organisation or accepted authority. As ambassadors of their profession, communicating key epidemiological concepts that are the talk of the day is a valuable way to communicate science for community engagement. One example is the "#CatteningTheCurve" graph (Figure 1) posted by the epidemiologist Dr Darling (@amdar1ing), who found the perfect cat metaphor for the 'flatten the curve' message (Darlin [amdar1ing], 2020). Another example, the "Swiss cheese model" adapted for COVID-19 by Dr Macay (@MackayIM) (Figure 2A) that builds on the original "Swiss cheese model" of accident prevention (Reason et al., 1990; Mackay [MackayIM], 2020), has been an excellent explainer of how multiple non-perfect non-pharmaceutical interventions can be very effective when applied as a package. Because of social media, the visualization has been quickly translated by the online community to many different languages. Moreover, it has been adopted by official organisations; the Irish Department of Health

¹ URL: <https://www.whatsapp.com/coronavirus/who/?lang=en>

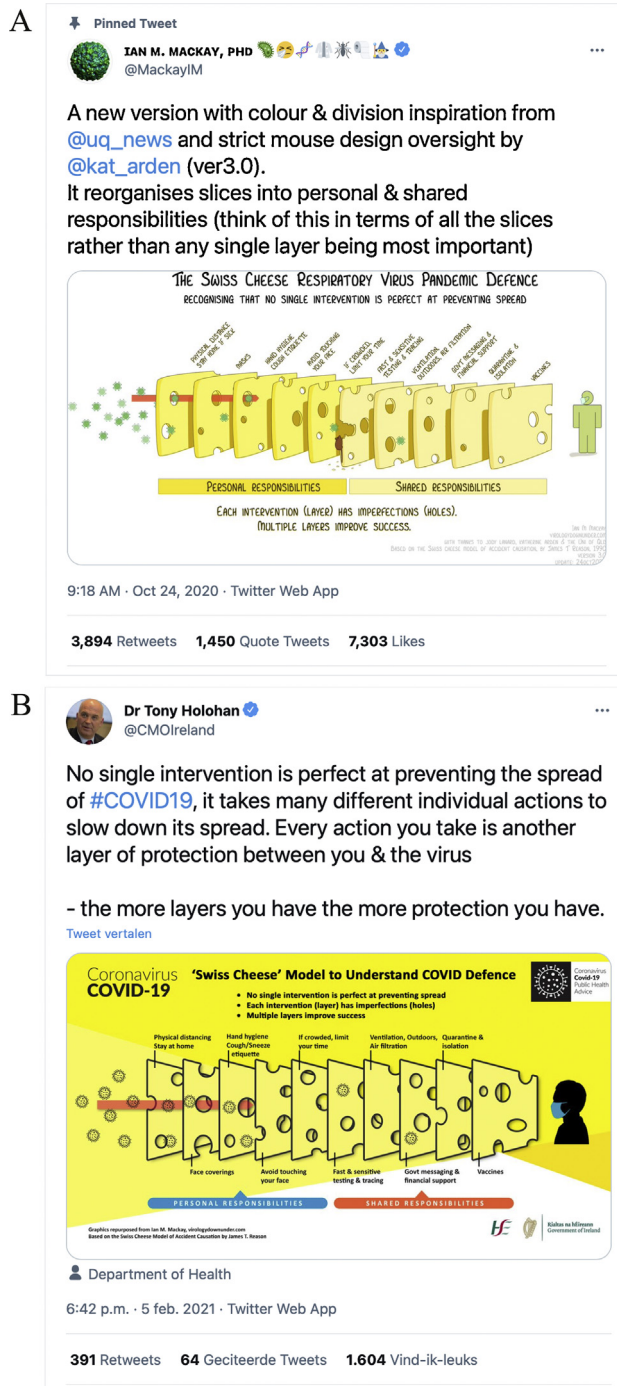


Figure 2. (A) Tweet by Dr. Ian M. Macay (@MackayIM) (Mackay I [MackayIM]. (2020). "A new version with colour & division inspiration from @uq_news and strict mouse design oversight by @kat_arden (ver3.0). It reorganises slices into personal & shared responsibilities (think of this in terms of all the slices rather than any single layer being most important) [Tweet]." Retrieved 24.02.2021, from <https://twitter.com/MackayIM/status/1319901144836026368> <<https://nam03.safelinks.protection.outlook.com/?url=https%3A%2F%2Ftwitter.com%2FMackayIM%2Fstatus%2F1319901144836026368&data=04%7C01%7CZ.french%40elsevier.com%7C022fd5c7bf64fadabf508d930b2e11f%7C9274ee3f94254109a27f9fb15c10675d%7C0%7C0%7C637594367119713335%7CUnknown%7CTWFPbGZsb3d8eyJWl-joiMC4wLjAwMDAiLCJQIjoiV2luMzliLCJBTiI6Iik1haWwLjCjXVCi6Mn0%3D%7C1000&sd=0xZySiCeiMnFGGnAcTj%2FGEVz3W%2FTRZWNBIBIDojND8%3D&reserved=0>>) on the Swiss Cheese respiratory Virus Pandemic Defense. The model is based on the cumulative effect act/accident causation model by James Reason (Reason et al., 1990). Screenshot made on 2 May 2021. (B) Tweet by Dr Tony Holohan (@CMOIreland) (Holohan T [CMOIreland]. (2021). "No single intervention is perfect at preventing the spread of #COVID19, it takes many different individual actions to slow down its spread. Every action you take is

even used the image in its official communication material (Figure 2B) (Holohan [CMOIreland], 2021).

Journalists search for news content and experts through Twitter. Having an online presence increases your 'findability' and the reach of your work and findings. Sharing your work and experience on Twitter helps journalists find you, your work and your expert view on current issues. Twitter is very good for news article peer-review and can help quickly clarify false information or misinterpretation of science in mainstream media, which has not been uncommon during the COVID-19 pandemic. Importantly, these communications can often lead to invitations for follow-up in traditional media, such as radio, newspaper or television.

Rapid 'in action' professional development and networking

Analogous to providing expert information to the general public, field epidemiologists also share the latest and developing evidence with each other and with other scientists and clinicians. This sharing covers both emerging evidence generated by the user, for example, findings from active research projects, and highlighting and discussing evidence and papers by other scientists and researchers. Using Twitter for professional development allows for the rapid acquisition of new and evolving knowledge through engagement with the synthesis and translation of knowledge into focused key messages. Additionally, Twitter is a powerful tool for linking new and ongoing research and researchers, facilitating rapid knowledge exchange as an extension of traditional peer review. The function of building "threads" (i.e., multiple linked Tweets) allows for more extensive explanations and content beyond what is possible in a single Tweet.

Another important function of Twitter in the context of the COVID-19 pandemic is networking and the exchange of experience. The community of epidemiologists on Twitter is found through the hashtag #EpiTwitter, as well as the specializations of, and hashtags for, government (#GovEpi) and field epidemiologists (#FETP #FieldEpi) (see Box 1). Twitter facilitates fluid collaborations with related disciplines such as data scientists (#DataScience) that have become increasingly important to epidemic and pandemic response in recent years. Science communication is tagged under #SciComm. The specific topic of social media for epidemiologists is tagged under #SoMe4epi. Other advantages of the online community include peer support, venting and a safe place to share expression of difficulties or "failures", such as unsuccessful experiments and rejected manuscripts or grant applications. The social support structure might be the function that is psychologically most valuable, generating the feeling of belonging to a global community.

The downside

The presence and engagement of more field epidemiologists on online platforms can counter misinformation and provide reliable information in a sphere characterised by a lack of curation. However, there is a risk of getting stuck in "filter bubbles" where only views in line with one's own are reinforced. This risk is enhanced by Twitter's inherent functions being geared towards accumulating likes and followers. Hence, accurately sharing information might not always be the (only) aim of interaction on such a platform.

another layer of protection between you & the virus - the more layers you have the more protection you have. [Tweet]. Retrieved 21.04.2021, from <https://twitter.com/CMOIreland/status/1357746538685038595?s=20> spreading the #SwissCheeseModel message with official communication material by the Irish Department of Health (@roinnslaite). Screenshot made on 2 May 2021.

Box 1. Suggestions for #hashtags to use and follow.

Communication	Epidemiology	Research	More specific, examples
#SciComm	#EpiTwitter	#AcademicTwitter	#WorldFieldEpidemiologyDay
#ScientistsWhoSelfie	#EpiBookClub	#AcademicChatter	#Outbreak
#ActualLivingScientist	#PublicHealth	#ECchat	#COVID—19
#DayInTheSciLife	#GlobalHealth	#PhDLife	#HIV
#UniqueScientists	#FETP #EPIET #EUPHEM	#PhDchat	#AMR
#STEM	#FieldEpi	Conference-specific, e.g.,	#pediatrics
#STEMdiversity	#Rstats	#ESCAIDE	#StayHome
#WomenInSTEM	#TidyTuesday	#COVIDUnknowns	
#SciArt	#DataScience	#IKEEP	
#infodemic	#StatsTwitter		
#InfodemicManager	#GovEpi		
	#SoMe4epi		

Furthermore, the risk of misunderstandings can be high, especially in the short and low threshold communication that Twitter demands. This coupled with the non-private nature of the platform means that what is normal disagreement which generally helps the scientific process, can become something perceived as an argument between scientists by non-scientists and can thus undermine public trust in science. Additionally, it is not always obvious who “the experts” are. With a topic that is highly polarizing and public like the pandemic, there is an inherent risk of the (interlinked) phenomena of epistemic trespassing (Adam, 2020), bandwagoning (Darwin, 2020) and, related to the latter, what has been aptly called “covidisation” (Adam, 2020; Bramstedt, 2020). Twitter provides an additional platform for these behaviours.

The infodemic

The COVID-19 pandemic is accompanied by an infodemic, an abundance of information—some accurate and some not—which makes it harder for people to find trustworthy information. Discussions about fake news have led to a new focus on critical thinking, fact-checking and media literacy as critical skills to verify the news piece in front of you (see “How To Spot Fake News”, Figure 3) (Kiely and Robertson, 2016). Social listening is essential to understand where infodemics originate and how and why they spread. Tracing information narratives, as well as “information voids”, can help effective communication. Digital tools, such as the recently launched EARS Platform (Early AI-supported Response with Social Listening) and research, such as the international study on digital crisis interaction among Gen Z and Millennials (WHO et al., 2021), can help guide decision-makers in developing communication strategies (WHO, 2021a, b, c). These strategies are particularly important as the polarization in our societies is intensified in online niche cultures.

Social media training

The unique advantages and functionalities, as well as the inherent negative effects of social media and platforms, are not always well known or understood by epidemiologists and public health microbiologists. These should be addressed in a balanced manner, underlining the need for social media training as an integral part of communication and media training of field epidemiologists. A recent survey (Parry et al., 2021) among the



Figure 3. Infographic to verify the news piece in front of you. CC-BY-4.0: The International Federation of Library Associations and Institutions (IFLA), based on FactCheck.org's 2016 article How to Spot Fake News (Kiely and Robertson, 2016). The infographic has been licensed under the CC-BY-4.0 license and is currently available in 46 languages here: <https://www.ifla.org/publications/node/11174>.

applied epidemiology workforce identified gaps in social and communication skills; only 11% of respondents received training in this area. More training for field epidemiologists is underway. With the workshop “Social Media for Public Health Professional” organised in 2019 by the European Programme for Intervention Epidemiology Training (EPIET) Alumni Network (@EAN_Board), training material on social media has been developed, including a case study on the challenges of using social media during an

Box 2. Suggestions for @Accounts to follow.

Institutes	Groups/Projects/Platforms	People
@WHO	@TEPHINET	@DrTedros
@WHOGOARN	@EANboard	@mvankerkhove
@WO_AFRO	@ISID_ORG	@DrMikeRyan
@WHO_Europe	@ESCAIDE	
@ECDC_EU	@medrxivpreprint	
@PHE_uk	@biorxivpreprint	
@rivm	@IJID	
@rki_de	@EID	
@MSF	@Eurosveillance	
@CDC	@PLOSmedicine	
@NIH	@ProMED_mail	
@EMA_News	@BMC_series	
@US_FDA	@RladiesGlobal	
	@RealScientists	

FETP fellows and graduates on Twitter:
<https://twitter.com/i/lists/1168077561404035072>

international epidemic (Medialdea Carrera, 2019). Furthermore, in the context of the COVID-19 pandemic, the WHO has created an online infodemic management course (OpenWHO, 2020) and a 4-week online training course (WHO, 2021a,b,c).

The (online) field

What would John Snow have tweeted back in 1854? Or Florence Nightingale, along with her Rose Chart, in 1858? The way that field epidemiologists communicate and maintain their network has changed drastically in the 25-year history of EPIET, let alone in the nearly 70 years since the first class of Centers for Disease Control's (CDC) Epidemic Intelligence Service officers started their work. The first cohort of EPIET has vivid memories of the then-novel use of email. Today, it is hard to imagine Field Epidemiology Training Program (FETP) fellows not using social media both personally and professionally. Never before was there a more pressing need for a virtual and online community for field epidemiologists but especially among the current FETP fellows, who normally benefit from learning together and from one another in person. Excellent resources on how to get started on Twitter are freely available online (Bik and Goldstein, 2013; Cheplygina et al., 2020; Quintana, 2020; Boender 2021), and we have provided a list of key hashtags and accounts to follow (Boxes 1 and 2).

In 2020 and 2021, many traditional networking events such as conferences, the FETP International Nights and training modules are suspended or moved online, taking away a large part of in-person networking and spontaneous exchange. Engaging on Twitter can make such online events more interactive and increase reach beyond the crowd that could have travelled. Additionally, Twitter enables collaboration and network building across programmes, either through official networks such as the Training Programs in Epidemiology and Public Health Interventions Network (@TEPHINET) and their engagement on social media or in a more informal way. On the first #WorldFieldEpidemiologyDay, 7 September 2021, we have the tools to come together and communicate about and advocate for field epidemiology – online!

Author contributions

DRhT initiated the manuscript and provided supervision. CCH and TSB wrote the manuscript with input from DRT.

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