

## **Fight Like a Nerdy Girl: The Dear Pandemic Playbook for Combating Health Misinformation**

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## INTRODUCTION

Raging alongside the COVID-19 pandemic, a parallel “infodemic” – an overwhelming swirl of information, both good and bad – has seriously compromised pandemic response.<sup>1</sup> Medical falsehood is not a new problem; in the words of medical sociologist Nikolas Christakis, “everywhere you see the spread of germs, for the last few thousand years, you see right behind it the spread of lies.”<sup>2</sup> But its ability to scale thanks to modern digital platforms represents a new and greatly intensified threat. Indeed, the impact of harmful information during the pandemic has been so profound that premier scientific leaders including the Director-General of the World Health Organization and the U.S. Surgeon General have issued urgent calls for the health sector workforce to proactively fight back.<sup>3,4</sup> Like many other scientists, our all-woman team of “Nerdy Girls” took seriously this call. In March 2020 we launched a public education campaign on social media to do our part to fight the infodemic. Over eighteen months and more than two thousand Facebook posts later, we’ve refined a set of core communication principles and named them with the mnemonic LET’S LEARN. We anticipate that these principles will feel intuitively familiar to health promotion professionals. Formalizing them into a framework provides shared language with which we can support each other as we navigate the new professional frontier of infodemic management.

## BACKGROUND

*What is Dear Pandemic and who are Those Nerdy Girls?*

We started Dear Pandemic in early March 2020 because we were asked to. At that early moment in the pandemic, colleagues, friends, and relatives were sending questions by the hundreds to our inboxes. They devoured our individual emails and Facebook posts and encouraged us to fill the information void for a broader audience. At that point in time, we saw few sources of timely, trustworthy, comprehensive information available to help people navigate the pandemic overwhelm – especially on Facebook, our primary platform. After a friend called us “Those Nerdy Girls,” we embraced the identity and launched Dear Pandemic – a play on the “Dear Abby” advice columns.

Our organic following grew, and in July 2020 we formally launched a non-profit designed specifically to help people cope with health information overwhelm. Our team now includes scientists with expertise ranging from immunology to epidemiology to mental health. We’ve disseminated over 2,000 evidence-based posts about staying safe and staying sane during the defining global health crisis of a century. Dear Pandemic has garnered over 170,000 followers across social media and stewarded a website frequented by clinicians, journalists, and other professionals seeking well-curated answers to common COVID-19 questions. Our website was selected for the Library of Congress’ (planned) digital pandemic archive. The Nerdy Girls have done hundreds of media appearances, presented everywhere from middle school classrooms to the halls of Congress, and donated hundreds of hours advising community organizations.

Through prototyping and iterating on Dear Pandemic’s educational content, we’ve grown our way towards a set of communication principles that now anchor our efforts.

## LET’S LEARN

*L – Listening and empathy come first.*

In the Dear Pandemic community, learning is a two-way street. Our readers are among our best teachers. We have created a system for soliciting questions via a simple form on the Dear Pandemic website and use its contents to generate post topic sentences. These topics use a question-and-answer format, providing an easy way to build rapport with our community. It has also disciplined us to center the information needs of readers in creating our content. Through dedicated listening to the website form entries and to comments left by readers across our social media platforms, we've learned that our community appreciates practical information delivered with a friendly and calming tone. They look to us to turn down the volume on the fear and anxiety often provoked by attention-grabbing headlines and political squabbling.

Cultivating a two-way dialogue, termed “social listening” in infodemiology research,<sup>5</sup> is also considered a best practice in the broader health communication and promotion literatures,<sup>6,7</sup> and is already familiar to and embodied by health promotion professionals. Methodological approaches can range from our simple Q&A format to the World Health Organization's highly sophisticated machine learning-driven social listening of large social media platforms.<sup>5</sup> Our methods provide proof-of-concept that even simple efforts to elicit community feedback can reap great benefits if done with intention.

A trio of nurse-scientist Nerdy Girls led the adoption of an empathy-first communication style. Trained in the art and science of developing therapeutic relationships, nurses are uniquely skilled at communicating health information in a respectful manner, prioritizing patient autonomy and a harm reduction approach.<sup>8</sup> Communicating with kindness is a Dear Pandemic core value. It does, however, present a trade-off with potential reach of our content. Behavioral science demonstrates what media and marketing professionals know instinctively: Content evoking extreme emotions, such as anger and outrage, drive higher levels of online engagement compared to less hyperbolic content.<sup>9</sup> While our readership has sought out a calmer platform (as mentioned earlier), this approach may limit the “viral” potential of our posts and ability to reach new audiences.

### *E – Engage partners*

Trust is the key currency in health communication.<sup>7</sup> Aligning with the broader literature,<sup>10</sup> we've found that finding the right messenger(s) is typically more important than crafting the perfect message in effectively serving a community's information needs. We appreciate that the Nerdy Girls aren't the appropriate messenger for many communities we care deeply about, and we actively seek to scale our impact partnering with other science communicators who speak to communities different than our own. To facilitate dialogue, we brought together a “Nerdy Neighborhood” of fellow science communicators who speak to online and geographic communities across North America, South America, and Europe. Like others seeking to push out credible health information on social media, all of us struggle to break out of social media echo chambers. Much of our bridge-building to other audiences, therefore, has necessarily taken place offline. Whenever possible, we try to match the right Nerdy Girl with the right topic and audience for these efforts. A few examples: Philadelphia-area team members have collaborated with the Philadelphia Department of Health; Wisconsin-based team members serve as regular radio and news sources across the state; the Editor-in-Chief of *Querida Pandemia*, our Spanish-language Facebook page, regularly serves as a resource for Telemundo; and the business school team member collaborates with a variety of employers and industry groups (e.g., U.S. Chamber of Commerce Foundation).

We've learned that our online and offline efforts are mutually reinforcing. Offline events spark interest in our online content, and vice-versa. Interestingly, our partner organization IMPACT4HC adopted a geography-first approach to fighting the infodemic, bringing together a coalition of Chicago-based health care providers, and have found that their place-based infodemic management efforts have yielded appreciable online spillovers.<sup>11</sup>

#### *T – Transparency is non-negotiable.*

The rapidly evolving crisis, advances in scientific understanding, and the mismatch between the speed of the news cycle and the speed of science requires us to continuously update and amend topics we have covered before. Early on, we shared a concern that ibuprofen may exacerbate COVID symptoms, a hypothesis that was subsequently overturned. Like many other science communicators, we got it wrong on masks initially, too. Often our readers catch typos and provide necessary notes of context. We update the posts accordingly to include their contributions, always noting when original posts have been changed. Although message consistency is considered a best practice in risk communication,<sup>12</sup> this ideal isn't always feasible in crisis contexts characterized by high levels of uncertainty. Unfortunately, shifting scientific guidance has been weaponized against public health leaders during the pandemic, requiring those of us on the information frontlines to tackle it head on. For example, we wrote updated posts correcting the ibuprofen confusion and have continuously stayed on the ever-evolving mask beat (To mask or not to mask? Cloth or medical? Double up? KN95 for the general public?).<sup>13</sup> While openly admitting uncertainty makes audiences uncomfortable – referred to as “ambiguity aversion” in behavioral science<sup>14</sup> – this frustration can be lessened somewhat via consistently normalizing it.<sup>15</sup> Moreover, in our experience, short-term ambiguity aversion is a small price to pay for a long-term increase in audience trust that comes from honestly communicating about unknowns.

#### *S – Source and vet data rigorously.*

We strive to be open and voracious learners. We peer review each others' posts and require that they be sufficiently well-referenced. Our readers often note that they appreciate the reference lists at the bottom of our posts, even if they don't make the time to go check out the technical citations themselves. As scientists and clinicians, we fell naturally into a reporting style that aligns with the core journalistic ethics of source verification, provision of sufficient context, avoidance of conflict-of-interest, and accountability.<sup>16</sup>






We also write a dedicated beat on “information hygiene,” which shares news and media literacy tools along with making explicit scientific habits of mind. Example posts include “How to Think Like a Scientist”; “‘Prebunking’ Offers Strong Immunity to Fake News”; and “How Can I Stand Up for Science on Social Media?”<sup>17</sup> Over time we've learned that blending content focused on scientific literacy with media literacy is a core requirement for our work.

#### *LEARN(ing) science guides content production.*

We Nerdy Girls hold sacred our educational mission. As educators, we are committed to grounding our content in the following set of learning science tactics.

Table 1. LEARN(ing) science tactics

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	TACTIC	DEAR PANDEMIC EXAMPLE
	<b>Look</b> Use images alongside text  Learning science concept: Combining images with text boosts understanding relative to using either mode alone. <sup>18</sup>	Prioritizing graphic design. We use our scarce financial resources to pay for a professional designer experienced in science communication.
	<b>Examples</b> Use worked examples  Learning science concept: Concrete examples facilitate learning better than abstract definitions. <sup>19</sup>	Providing a sample conversation in a post discussing evidence-based tips for combatting conspiracy theories.
	<b>Analogies</b> Use analogies  Learning science concept: Our brains learn new information best by comparing and contrasting with existing knowledge. <sup>20</sup>	Frequently referring to the popular “Swiss Cheese” analogy of non-pharmaceutical interventions. This analogy reinforces the core message that while no one mitigation layer is perfect on its own, a combination of layers creates solid protection.
	<b>Rule</b> Use the “Rule of three,” then Repeat  Learning science concepts: <ul style="list-style-type: none"> <li>• “Chunking” content into three categories honors working memory constraints<sup>21</sup></li> <li>• Spaced repetition of core content solidifies understanding<sup>20</sup></li> </ul>	Communicating basic principles in 3s. For example, our “Laws of Infodemiology,” include: <ol style="list-style-type: none"> <li>1. Demand extraordinary vetting for extraordinary claims;</li> <li>2. Proactively seek out competing views;</li> <li>3. Amplify good information and cut off the oxygen to the toxic stuff.</li> </ol> Repeating our SMARTS framework consistently and across varying contexts. S: Keep your space! M: Mask up! A: Airflow – keep it fresh! R: Restrict your social bubble! T: Time – keep it short! S: Shots – get vaccinated!
	<b>Narrative</b> Use stories  Learning science concept: Stories build connection and are psychologically privileged in memory. <sup>22</sup>	Sharing our personal stories as moms to build trust and relatability. We also celebrate and share stories of inspiring women scientists.

## CONCLUSION

Access to trustworthy, relatable, and well-curated health information is a fundamental determinant of health,<sup>23</sup> as is the ability to discern fact from falsehood. The success of the Dear Pandemic campaign demonstrates that the health promotion toolkit – synthesizing complicated science for lay audiences, translating evidence into actionable behaviors and policies, and communicating with empathy – is powerful for building effective and resilient health information networks.

What's next for the Nerdy Girls? We've recently launched a research lab contributing to the newly invigorated scientific discipline of infodemiology. Intentionally bringing together many disciplines to share perspectives – including data science, health communication, behavioral science, and epidemiology – infodemiology seeks to provide a robust evidence base supporting infodemic monitoring, detection, intervention, and evaluation.<sup>24</sup> Our hope is that by combining infodemic practice and research, we can be helpful to fellow health professionals working hard to amplify the impact of good health information and lessen the impact of the bad.

## References

1. Calleja N, AbdAllah A, Abad N, et al. A public health research agenda for managing infodemics: Methods and results of the first WHO Infodemiology conference." *JMIR Infodemiology*. 2021; Sep 15;1(1):e30979. doi: 10.2196/30979. eCollection Jan-Dec 2021.
2. Dr. Christakis' interview with NPR available at the website: The enduring impact of COVID-19. <https://www.npr.org/2020/10/26/927796954/the-enduring-impact-of-covid-19>. Updated October 29, 2020. Accessed October 27, 2021.
3. World Health Organization. Immunizing the public against misinformation. <https://www.who.int/news-room/feature-stories/detail/immunizing-the-public-against-misinformation>. Updated August 25, 2020. Accessed October 27, 2021.
4. U.S. Surgeon General's Office, Department of Health and Human Services. *Confronting health misinformation: The U.S. Surgeon General's advisory on building a healthy information environment*. Updated July 15, 2021. Accessed October 27, 2021. <https://www.hhs.gov/sites/default/files/surgeon-general-misinformation-advisory.pdf>.
5. Purnat T, Vacca P, Czerniak C, et al. Infodemic signal detection during the COVID-19 pandemic: Development of a methodology for identifying potential information voids in online conversations." *JMIR Infodemiology*. 2021; Jul 28;1(1):e30971. doi: 10.2196/30971. eCollection Jan-Dec 2021.
6. Frost H, Campbell P, Maxwell M, et al. Effectiveness of motivational interviewing on adult behaviour change in health and social care settings: A systematic review of reviews." *PLoS One*. 2018; Oct 18;13(10):e0204890. doi: 10.1371/journal.pone.0204890. eCollection 2018.
7. Centers for Disease Control, Department of Health and Human Services. *Crisis and emergency risk communication (CERC) manual: Community engagement. 2018 update*. Accessed October 27, 2021. [https://emergency.cdc.gov/cerc/ppt/CERC\\_CommunityEngagement.pdf](https://emergency.cdc.gov/cerc/ppt/CERC_CommunityEngagement.pdf).
8. Ritter A, Aronowitz S, Leininger L, et al. Dear Pandemic: Nurses as key partners in fighting the COVID-19 infodemic. *Public Health Nurs*. 2021 Jul;38(4):603-609. doi: 10.1111/phn.12903. Epub 2021 Apr 20.
9. A nice empirical example: Berger J, Milkman K. What makes online content viral? *Journal of Marketing Research*. 2012; 49(2): 192-205.
10. Wright S, Neimand A, Steinman M. Finding the right messenger for your message. *Stanford Social Innovation Review* website. [https://ssir.org/articles/entry/finding\\_the\\_right\\_messenger\\_for\\_your\\_message#](https://ssir.org/articles/entry/finding_the_right_messenger_for_your_message#). Published May 6, 2021. Accessed October 27, 2021.
11. Rotolo SM, Jain S, Dhaon S, et al. A coordinated strategy to develop and distribute infographics addressing COVID-19 vaccine hesitancy and misinformation. *J Am Pharm Assoc*. 2021; Aug 21;S1544-3191(21)00357-5. doi: 10.1016/j.japh.2021.08.016. Online ahead of print.
12. World Health Organization. *Communicating risk in public health emergencies: A WHO guideline for emergency risk communication (ERC) policy and practice*. Updated January 10, 2018. Accessed October 27, 2021. <https://www.who.int/publications/i/item/9789241550208>.
13. A complete list of our mask posts can be found at the Dear Pandemic website: <https://dearpandemic.org/category/masks/>
14. Han PKJ, Reeve BB, Moser RP, Klein WM. Aversion to ambiguity regarding medical tests and treatments: measurement, prevalence, and relationship to sociodemographic factors. *J Health Commun*. 2009; Sep;14(6):556-72. doi: 10.1080/10810730903089630.
15. Han PKJ, Scharnetzki E, Scherer AM, et al. Communicating scientific uncertainty about the COVID-19 pandemic: Online experimental study of an uncertainty-normalizing strategy. *J Med Internet Res*. Apr 22;23(4):e27832. doi: 10.2196/27832.

16. SPJ code of ethics. Society of Professional Journalists website. <https://www.spj.org/ethicscode.asp>. Updated September 6, 2014. Accessed October 27, 2021
17. A complete list of our “information hygiene” posts can be found at the Dear Pandemic website: <https://dearpandemic.org/category/uncertainty-and-misinformation/>.
18. A nice lay summary: Belham FS. How images and imagination can enhance learning. *The Learning Scientists* website. <https://www.learningscientists.org/blog/2018/3/28-1>. n.d. Accessed October 27, 2021.
19. Rawson KA, Thomas RC, Jacoby LL. The power of examples: Illustrative examples enhance conceptual learning of declarative concepts. *Educational Psychology Review*. 2015; 27: 483-504.
20. A terrific exposition of the power of analogy and the importance of chunking can be found in: Boser, U. *Learn Better*. New York, NY: Penguin Random House LLC; 2017.
21. Barkley EF, Major CH. *Interactive lecturing: A handbook for college faculty*. Hoboken, NJ: John Wiley & Sons, Inc.; 2018.
22. Mar RA, Li J, Nguyen ATP, Ta CP. Memory and comprehension of narrative versus expository texts: A meta-analysis. *Psychon Bull and Rev*. 2021; Jun 28(3):732-749. doi: 10.3758/s13423-020-01853-1. Epub 2021 Jan 6.
23. Nutbeam D, Lloyd JE. Understanding and responding to health literacy as a social determinant of health. *Annu Rev Public Health*. 2021. Apr 1;42:159-173. doi: 10.1146/annurev-publhealth-090419-102529. Epub 2021 Oct 9.
24. Eysenbach G. Infodemiology and infoveillance: Framework for an emerging set of public health informatics methods to analyze search, communication and publication behavior on the internet. *J Med Internet Res*. 2009. Mar 27;11(1):e11. doi: 10.2196/jmir.1157.