

# Medical Misinformation is a Threat. The Solution Lives in Technology.

Winter 2020 / 2021



The spread of medical misinformation is not a new concept. However, with the rise of social media, forum-structured websites, and smartphones, the speed with which misinformation can spread threatens the integrity of our healthcare system. In order to combat misinformation, providers should supply factual, peer-reviewed information to the technological outlets consumed by their patients. In addition, strategic technology platform selection as well as intentional and responsible social media sharing by interested doctors have the potential to significantly curb misinformation in healthcare. The threat of misinformation to patients is considerable, and something has to change. Relatable technology solutions could be the answer.

# Medical Misinformation: How, What, and Why? A Brief Overview

In recent years, with the proliferation of social media, unmoderated forums, and consumers turning to the Internet for answers or second opinions, it has been easier than ever before for medical misinformation to spread.<sup>1</sup>

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1. Trethewey SP. Strategies to combat medical misinformation on social media. *Postgrad Med J.* 2020;96(1131):4-6.



## MISINFORMATION AND MISLEADING INFORMATION. DIFFERENT, BUT BOTH DANGEROUS.

**Misinformation:** false information that is spread, regardless of whether there is intent to mislead.<sup>2</sup>

**Misleading information:** false giving a wrong idea or impression; tending to confuse or mislead; deceptive.<sup>3</sup>

With the tumult of information bombarding people at every turn, it's easy to understand why misinformation or misleading facts are proliferated online by forums, social media, or uneducated sharers. The major difficulty is that many consumers of health information aren't able to tell the difference between what is fact or fiction.

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2. Dictionary.com. Misinformation.; 2018. Accessed October 28, 2020. <https://www.dictionary.com/browse/misinformation?s=t>

3. Collins Dictionary. Misleading definition and meaning. Accessed October 29, 2020. <https://www.collinsdictionary.com/us/dictionary/english/misleading>

# Myths Perpetuated by the Internet – and What the Science Says<sup>4</sup>

MYTH	PEER REVIEWED SCIENCE
Pregnant women can't drink any coffee.	In the first trimester, excessive caffeine intake has been associated with higher risk of miscarriage. But after the first trimester, caffeine in moderation is okay.
Pregnant women are "eating for two."	Pregnant women who begin pregnancy at a healthy weight need about 200 extra calories per day.
Pregnant women shouldn't pet cats.	The risk (of contracting toxoplasmosis) comes from ingesting or coming into contact with cat feces.
Pregnant women should not dye or color their hair.	There is no evidence that hair dye harms the fetus.
Various tricks help alleviate morning sickness.	There is no evidence. "Cures" are purely anecdotal.

4. Yan M, Jones B. Doctors debunk the 25 biggest pregnancy myths. Business Insider. Published online October 14, 2019. Accessed October 28, 2020. <https://www.businessinsider.com/ob-gyn-doctors-biggest-pregnancy-myths-debunked-2019-10>

# Patients Experience Medicine-Related Stress

In the twenty-first century, humans have unprecedented access to information: it's literally at our fingertips, thanks to smartphones. Globally, the average person consumed 82 hours of information per week in 2018 and with greater ease than ever before.<sup>5 6</sup>

People often share articles or sources from health professionals, or articles which include information from professionals, and use a personal anecdote to confirm something the professional was sharing as an opinion.

For example, Doctor A may be quoted in an article that diet can help with fertility. Person Z shares the article on social media along with the personal anecdote: "I tried this diet and I got pregnant — it works!" Personal anecdotes inspire confidence because social media tends to tap into a person's emotions. As another person reads this post, they assume truth and share the article (written using a single doctor's opinion), thus forming a chain of potential misleading information that grows with the number of shares.

With so much information — real, fake, and, sometimes, both — swirling around, how can the layperson keep track of what's true — and what's not?

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5. Clinton D. Defining the future of human information consumption. Loup Ventures. Published June 12, 2018. Accessed October 28, 2020. <https://loupventures.com/defining-the-future-of-human-information-consumption>

6. Haladjian HH. Informavores: Beings that Produce and Consume Information. Psychology Today. Published online March 28, 2019. Accessed October 28, 2020. <https://www.psychologytoday.com/blog/theory-consciousness/201903/informavores-beings-produce-and-consume-information>



## Science Sometimes Isn't Clear — And Neither Are Headlines

CLAIM	PEER REVIEWED SCIENCE	HEADLINE	WHY IT'S UNCLEAR
Stress causes infertility.	While it's clear that infertility causes stress, it is unclear if stress causes infertility. <sup>7</sup>	Can't Get Pregnant? How Stress May Be Causing Your Infertility <sup>8</sup>	More research is needed.

7. Rooney KL, Domar AD. The relationship between stress and infertility. *Dialogues Clin Neurosci*. 2018;20(1):41-47.

8. Johnson M. Can't Get Pregnant? How Stress May Be Causing Your Infertility. *US News*. Published August 27, 2010. Accessed October 28, 2020. <https://health.usnews.com/health-news/family-health/womens-health/articles/2010/08/27/cant-get-pregnant-how-stress-may-be-causing-your-infertility>

CLAIM	PEER REVIEWED SCIENCE	HEADLINE	WHY IT'S UNCLEAR
<p>Too much exercise can impede fertility.</p>	<ul style="list-style-type: none"> <li>• The data on exercise is varied, but exercise may have an effect on ovulation and fertility — positive or negative.<sup>9</sup></li> <li>• Physical activity is not significantly associated with the probability of implantation, a clinical pregnancy, or a live birth; greater amounts of sedentary time are marginally associated with a higher probability of a live birth.<sup>10</sup></li> <li>• Two studies find a beneficial effect of exercise on fertility.<sup>11 12</sup></li> <li>• Two studies find no effect of exercise on fertility.<sup>13 14</sup></li> <li>• One study finds a detrimental effect on fertility.<sup>15</sup></li> </ul>	<p>Yes, Exercise Can Hurt Your Fertility. Here's How to Exercise Safely.<sup>16</sup></p>	<p>There are too many variables to consider, such as age, weight, type of exercise, and other lifestyle factors, to currently make a general claim.</p>

9. Rossi BV, Abusief M, Missmer SA. Modifiable Risk Factors and Infertility: What are the Connections? *Am J Lifestyle Med.* 2014;10(4):220-231.

10. Gaskins AJ, Williams PL, Keller MG, et al. Maternal physical and sedentary activities in relation to reproductive outcomes following IVF. *Reprod Biomed Online.* 2016;33(4):513-521.

11. Evenson KR, Calhoun KC, Herring AH, Pritchard D, Wen F, Steiner AZ. Association of physical activity in the past year and immediately after in vitro fertilization on pregnancy. *Fertil Steril.* 2014;101(4):1047-1054.e5.

12. Palomba S, Falbo A, Valli B, et al. Physical activity before IVF and ICSI cycles in infertile obese women: an observational cohort study. *Reprod Biomed Online.* 2014;29(1):72-79.

13. Kucuk M, Doymaz F, Urman B. Effect of energy expenditure and physical activity on the outcomes of assisted reproduction treatment. *Reprod Biomed Online.* 2010;20(2):274-279.

14. Moran L, Tsagareli V, Norman R, Noakes M. Diet and IVF pilot study: short-term weight loss improves pregnancy rates in overweight/obese women undertaking IVF: Weight loss and IVF. *Aust N Z J Obstet Gynaecol.* 2011;51(5):455-459.

15. Morris SN, Missmer SA, Cramer DW, Powers RD, McShane PM, Hornstein MD. Effects of lifetime exercise on the outcome of in vitro fertilization. *Obstet Gynecol.* 2006;108(4):938-945.

16. Meisel L. Yes, exercise can hurt your fertility. Here's how to exercise safely. *Ava Women.* Published June 20, 2017. Accessed October 28, 2020.

<http://avawomen.com/avaworld/exercise-fertility/>

CLAIM	PEER REVIEWED SCIENCE	HEADLINE	WHY IT'S UNCLEAR
A certain diet will increase or improve fertility.	<ul style="list-style-type: none"> <li>• Greater adherence to a Mediterranean-type diet may enhance fertility.<sup>17</sup></li> <li>• There is little scientific evidence that any one particular food, diet, herb, or supplement will significantly improve fertility.<sup>18</sup></li> </ul>	The Fertility Diet: What to Eat When Trying to Get Pregnant <sup>19</sup>	There are too many variables to consider. What is the individual's current diet? Age? Weight? Lifestyle? General health?

Medical misinformation is particularly dangerous when factual information is misinterpreted, yielding misleading information that is later consumed by regular people looking for answers to their health questions on the Internet. This process very commonly occurs as media outlets or non-scientific reporters write headlines meant to describe the outcomes of scientific study. Instead, those headlines can become harmful clickbait and begin the spread of misinformation.

## Doctor Influencers Are in a Unique Position to Battle Misinformation

Doctor influencers are physicians who have developed an online presence, often using social media outlets, to connect with patients on a daily basis. When executed responsibly by a knowledgeable doctor influencer, social media engagement about medical information can be extremely positive. Since 72% of Americans used social media in 2019, it is clear that doctors should relay medical information in a digestible way that reaches patients where they are.<sup>20</sup>

17. Toledo E, Lopez-del Burgo C, Ruiz-Zambrana A, et al. Dietary patterns and difficulty conceiving: a nested case-control study. *Fertil Steril.* 2011;96(5):1149-1153.

18. Malacoff J. Can a “fertility diet” actually improve your chances of getting pregnant? *CCRM Fertility.* Published January 22, 2020. Accessed October 28, 2020. <https://www.ccrmivf.com/news-events/fertility-diet/>

19. Eagleson H. The fertility diet: What to eat when trying to get pregnant. *Parents.* Published June 10, 2013. Accessed October 28, 2020. <https://www.parents.com/getting-pregnant/fertility/what-to-eat-to-get-pregnant/>

20. Demographics of Social Media Users and Adoption in the United States. Published June 05, 2020. Accessed November 05, 2020. <https://www.pewresearch.org/internet/fact-sheet/social-media/>

However, there is a narrow line that doctors using social media to educate people about medical topics must toe. Due to the manner in which social media algorithms amplify posts that have received a lot of views, likes, or shares, a small misstep or confusing piece of medical information can suddenly become large scale misinformation.

## What Is Being Done to Fight Misinformation?

There are several ways to prevent the spread of misinformation. The Chief Executive of the American Medical Association wrote to the leading technology companies in 2019 calling for more action to “ensure that users have access to scientifically valid information” concerning vaccines, an area rife with medical misinformation.<sup>21</sup> Alongside major technology companies and social media platforms, it is essential that healthcare providers understand the power of an online presence to spread only verified medical information and fight the spread of medical misinformation.

But online presence isn't the only thing that doctors and health systems should focus on. The 81% of Americans that are owners of smartphones spend just 8% of their time browsing a mobile website. 92% of their time

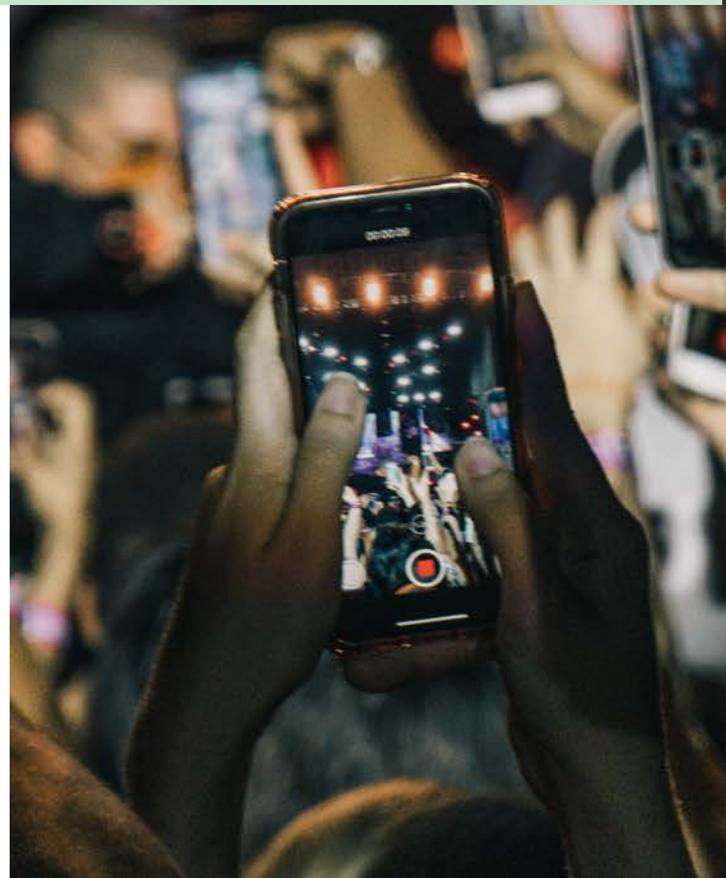
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*The alternative is very loud. If we're not there [on social], it might seem like we don't care. And we do. As a physician, if you want to reach people, you need to go where they are.*

**Dr. Natalie Crawford • Co-Founder & Reproductive Endocrinologist at Fora Fertility, Austin, TX**

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Madara JL. AMA urges tech giants to combat vaccine misinformation. AMA. Published March 13, 2019. Accessed October 28, 2020. <https://www.ama-assn.org/press-center/press-releases/ama-urges-tech-giants-combat-vaccine-misinformation>



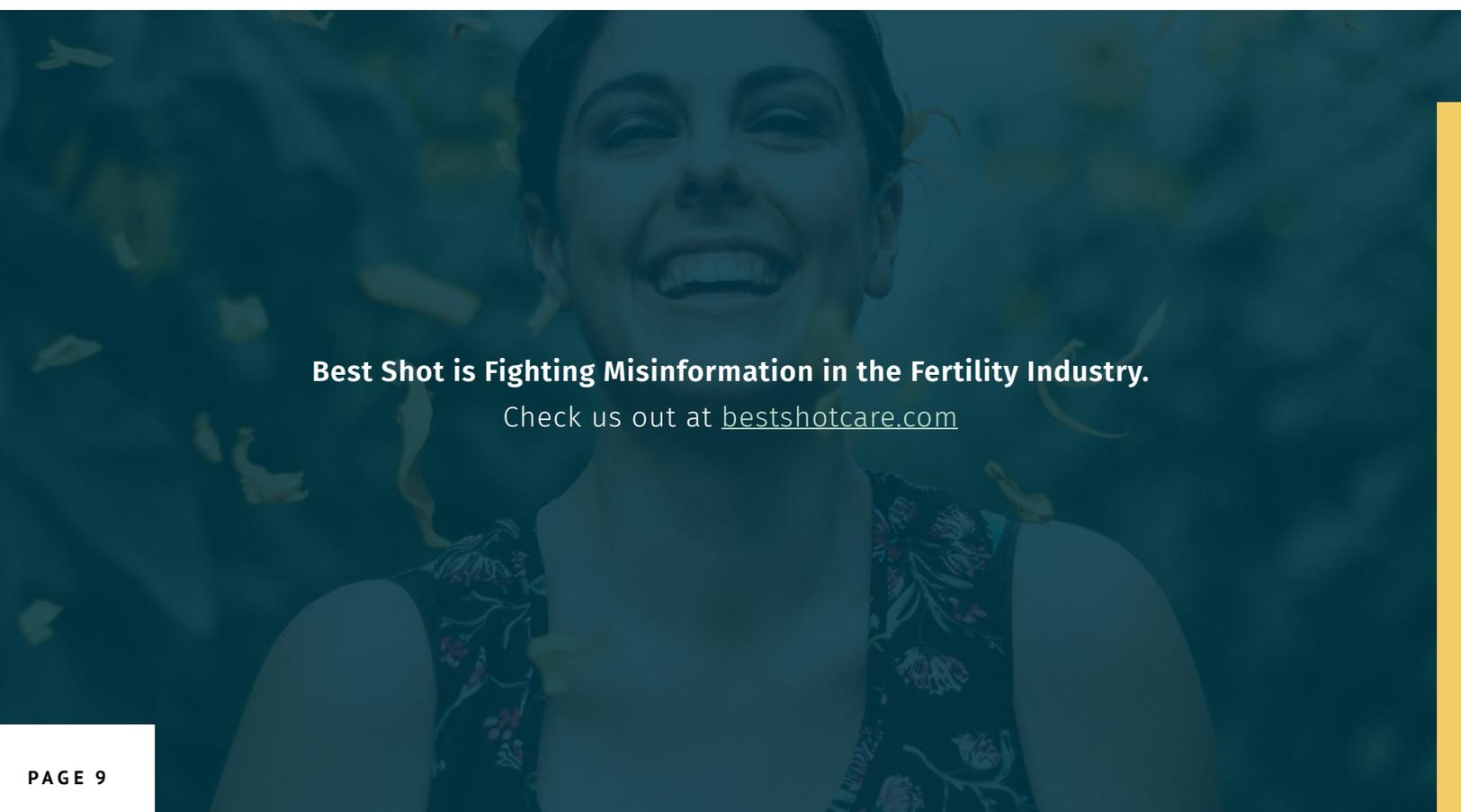
is spent using mobile apps.<sup>22 23</sup> Therefore, if healthcare providers want to reach their patients with peer-reviewed medical information, they should consider doing it by way of a mobile application.

Misinformation is a threat to the healthcare industry. However, providers and patients have the ability to combat this threat by embracing new – and more mobile, consumable – technologies in the healthcare space. With so many sources of information on the Internet, patients also need to develop a more discerning eye for reliable sources. Patients should look to the mobile apps their doctors provide them, fact-checked sites, and video interviews as reliable sources. Providers must do their part to sponsor, help build, and populate these technology platforms with accurate and up-to-date insights in order to reverse the spread of misinformation that has the potential to cause harm to their patients.

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22. Demographics of Mobile Device Ownership and Adoption in the United States. Published June 05, 2020. Accessed November 05, 2020. <https://www.pewresearch.org/internet/fact-sheet/mobile/>

23. Khalaf, B. U.S. Consumers Time-Spent on Mobile Crosses 5 Hours a Day. Published March 02, 2017. Accessed November 05, 2020. <https://www.flurry.com/blog/us-consumers-time-spent-on-mobile-crosses-5/>



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