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How the Field of Infectious Diseases Can Leverage Digital Strategy and Social Media Use During a Pandemic

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Rapid information dissemination is critical in a world changing rapidly due to global threats. Ubiquitous internet access has created new methods of information dissemination that are rapid, far-reaching, and universally accessible. However, inaccuracies may accompany rapid information dissemination, and rigorous evaluation of primary data through various forms of peer review is crucial. In an era in which high-quality information can save lives, it is critical that infectious diseases specialists are well versed in digital strategy to effectively disseminate information to colleagues and the community and diminish voices spreading misinformation. In this study, we review how social media can be used for rapid dissemination of quality information, benefits and pitfalls of social media use, and general recommendations for developing a digital strategy as an infectious diseases specialist. We will describe how the Infectious Diseases Society of America has leveraged digital strategy and social media and how individuals can amplify these resources to disseminate information, provide clinical knowledge, community guidance, and build their own person brand. We conclude in providing guidance to infectious diseases specialists in aiming to build and preserve public trust, consider their audience and specific goals, and use social media to highlight the value of the field of infectious diseases.

Keywords. digital strategy; infectious diseases; information dissemination; social media.

At a time when dissemination of information happens in milliseconds and the spread of infectious diseases has touched every corner of the world, it is critical to evaluate the ways in which digital strategies are utilized to share and

consume information. Evidence-based guidance is critical, and inaccurate information can cause catastrophic loss of lives in vulnerable communities. The coronavirus disease 2019 (COVID-19) pandemic catalyzed the involvement of the infectious disease community in effective digital strategy as societies sought reliable, accurate information at a time when the lines between expert opinion and political ideology were being actively blurred. Concerted efforts must be made within the profession to streamline high-quality information and disseminate it strategically to reach a wide and diverse audience.

In 2018, the Infectious Diseases Society of America (IDSA) Board of Directors outlined and emphasized the society's strategic plan for the next several years [1]. The IDSA identified core

opportunities for improvement in marketing, communications, expanding membership touchpoints, and focusing on attracting diverse membership and leadership. One of the strategic priorities is to advance IDSA's role as a preeminent source of information and knowledge. The IDSA established the Digital Strategy Advisory Group (DSAG) in 2019 "To advise IDSA and its members regarding digital strategy, including the use of web, email, social media, mobile and other digital media and digital channels" [1]. In this study, the DSAG will discuss the background of digital strategy use in infectious diseases, provide an overview of the types of digital strategy used, describe the benefits and pitfalls of digital strategy, and make recommendations for how we can best leverage digital strategy in the field of infectious diseases.

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DIGITAL STRATEGY USE IN INFECTIOUS DISEASES

Social networking is a basic human instinct. Sharing experiences and skills allow humans to form small communities, but these interactions can be limited by physical distance, time zones, and social boundaries. Social media transcends these limitations, providing free access to information across a variety of platforms reaching different consumer demographics. Social media has become a major communication tool in the 21st century. Facebook, created in 2004, has 1.62 billion active daily users. Twitter, launched in 2006, has 330 million monthly active users with 145 million daily active users producing 500 million tweets daily [2]. As a result, a significant amount of information is now accessed largely through online platforms. In science, social media has had enormous benefits because it allows for the rapid dissemination of information and it increases public interaction with experts [3]. Digital strategy is a key means to connect people and disseminate information in medicine. A digital strategy identifies the individual/organization's specific goals, generates content directed to the target audience in line with these goals, and chooses platforms that aligns with the target audience and intended impact of the communication. In medicine, the target audience can include both healthcare professionals and/or the communities they serve. For example, a campaign designed to teach about the impact of COVID-19 spread in young people between ages of 18–29 could be best disseminated using platforms such as Instagram, Snapchat, TikTok, or YouTube, which are the social media platforms most utilized by that age range [4].

In parallel, digital media has exacerbated information overload and widespread dissemination of unvetted, low-quality information propagating misinformation and highlighting the need for consistent and reliable primary information sources to empower and protect consumers of medical

information. Pandemics are accompanied by “infodemics,” or outbreaks of misinformation. The rapid generation of partial information amidst an urgency to develop emerging treatment paradigms allows for scientific inaccuracies and misleading opinions [5]. Some examples include false claims around the origin of severe acute respiratory syndrome coronavirus 2 and the role of hydroxychloroquine in the treatment of COVID-19 [6]. Therefore, professional organizations and healthcare professionals, in the interests of their members/colleagues and society, “must” engage with digital and social media to mitigate misinformation and meet the growing need for timely, well curated, reliable sources of medical knowledge. Doing this successfully requires an intentional, thoughtful approach. An individual or organization's digital strategy ideally should be multifaceted for maximum impact. The strategy must consider the mission or goal, the audience targeted, and be nimble to evaluate and revise according to the response. Table 1 summarizes main categories of dissemination of information through digital strategy and examples of effective use of those platforms. The authors have provided a limited list of examples of digital media that is not intended to be comprehensive or an endorsement by the IDSA or the authors. These include blogs, lay press Op Ed articles, social media, video communication, podcasts, websites and resources centers, preprints, visual abstracts and infographics, guidelines, and apps. The authors strove to balance representation of gender, geographic, age, and perspective in these listings.

The IDSA Social media content (Tweets, Facebook posts, LinkedIn posts, etc) represents IDSA as an organization, but the organization itself is a community of more than 12 000 physicians, scientists, and public health experts who specialize in infectious disease. The mission of IDSA is to improve the health of individuals, communities, and society by promoting excellence in patient care, education,

research, public health, and prevention relating to infectious diseases. The digital content is meant to represent and amplify that mission. Tweets are written by the IDSA digital and communications staff in collaboration with different internal departments. The IDSA also retweets messages from its members and other organizations. The organization has broad and diverse membership, so not every member will agree with every message or statement that is put out. The IDSA aims to present a balanced view, rooted in science, and the organization is committed to listening to the views and opinions of all its members.

In this critical time of a pandemic, IDSA has built further infrastructure to research, write, and publish information about COVID-19. Our COVID-19 Real Time Learning Network content is researched and created by our medical editors, and it goes through multiple rounds of editing by internal staff before being published. Our podcasts, media briefings, and Saturday Clinician Calls feature IDSA members and other COVID-19 subject matter experts. The IDSA COVID-19 guidelines are created by expert medical guidelines panels and supported by medical writers, medical editors, and IDSA staff.

BENEFITS OF SOCIAL MEDIA USE TO SUPPORT A DIGITAL STRATEGY

The IDSA strategic plan had included rapid guideline development and revision, enhanced member engagement, and development of new dissemination/communication strategies to highlight the value of our specialty. The COVID-19 pandemic jumpstarted these plans. Figure 1 summarizes IDSA's multifaceted digital strategy response, with rapid website updates to incorporate a new public facing COVID-19 resource, expedited development and dissemination of clinical guidelines, and web-based video conferencing technology to host expert discussions and question and answer sessions for clinicians, the public, journalists, and policymakers.

Table 1. Types of Platforms Used in Digital Strategies for Dissemination of Information in Infectious Diseases

Platform	Strengths and Pitfalls	Examples
Blogs	Specialty writing, generally limited audience More expeditious publication than peer-reviewed articles, with more relaxed writing style May need additional social media dissemination to reach wider audience	Dr. Bobbi Pritt: Creepy Dreadful Wonderful Parasites https://parasitewonders.blogspot.com/ Dr. Paul Sax: HIV and ID Observations https://blogs.jwatch.org/hiv-id-observations/ Dr. Boghuma Titanji: The ID Doc http://theiddoc.net/ IDStewardship: Promoting Clinical Pharmacy & Antimicrobial Stewardship (multiple contributors): https://www.idstewardship.com/ Microcosm: the blog of the Diagnostic Bacteriology Laboratory at the Singapore General Hospital https://10minus6cosm.tumblr.com Controversies in Hospital Infection Prevention (multiple contributors) https://haiconroversies.blogspot.com/ Science Speaks: Global ID News: https://sciencespeaksblog.org/
Op Ed's in lay press	Wider audience including non-healthcare professionals, but harder to get these pieces accepted	Dr. Peter Hotez (eg, , NYT Jan 2020: https://www.nytimes.com/2020/01/09/opinion/vaccine-hesitancy.html) Dr. Matifadza Hlatshwayo Davis (eg, , Newsweek September 2020: https://www.newsweek.com/rushing-covid-19-vaccine-risks-leaving-behind-people-most-risk-opinion-1530761)
Social Media	Twitter: Microblogging platform with photo/video capabilities; Can unite multiple groups over a single topic using carefully curated hashtag Instagram: photo sharing platform Facebook: photos/videos + long-form blogging	@IDJClub https://twitter.com/IDJClub @ASP_Chat https://twitter.com/asp_chat @UNMC_ID https://twitter.com/UNMC_ID @SHEAEpi https://twitter.com/SHEA_Epi @SIDPharm https://twitter.com/SIDPharm @HIVMA https://twitter.com/HIVMA @PIDS https://twitter.com/PIDSociety @MSG_ERC https://twitter.com/MSG_ERC @IPACCanada https://twitter.com/IPACCanada ASM https://www.instagram.com/ASMMicrobiology/ WHO https://www.instagram.com/who/?hl=en IDSA https://www.instagram.com/idsafoundation/ Soc Bras de Infectologia ^a https://www.instagram.com/sbinfecto/?hl=en Sociedad de Enfermedades Infecciosas de Panamá. ^a https://www.instagram.com/infectologiapanama/?hl=es-la IDSA: https://www.facebook.com/IDSociety/
Video communication	Each week the one-hour teleconference focuses on timely issues of relevance to clinicians and features case presentations by experts in the field, synthesis of new data, and an opportunity to engage with colleagues during Q&A and discussion.	CDC/IDSA COVID-19 Clinician Calls and Media Briefings: https://www.idsociety.org/multimedia/ SHEA Weekly Town Halls https://emergency.cdc.gov/coca/calls/index.asp
Podcasts	Time intensive; must have ongoing content, with engaging hosts/guests	This Podcast Will Kill You (hosted by epidemiologists Drs. Erin Welsh and Erin Allmann Updyke) https://thispodcastwillkillyou.com/ IDSA COVID-19 podcast https://www.idsociety.org/multimedia/ Breakpoints the SIDP Podcast https://www.sidp.org/Podcasts
Websites/Resource Center	Comprehensive resources for linking information to guideline, publications	IDSA COVID-19 Real-Time Learning Network: https://www.idsociety.org/covid-19-real-time-learning-network/ SIDP COVID-19 Resources: https://www.sidp.org/covid19 Sinai Health System – University Health Network Antimicrobial Stewardship Program https://www.antimicrobialstewardship.com/
Preprint publications	Pre-publication peer review, early dissemination of research	MedRxiv https://www.medrxiv.org/ BioRxiv https://www.biorxiv.org
Visual abstracts and Infographics	Digestible research dissemination	Emory University Weekly COVID-19 Literature Round-Up https://scholarblogs.emory.edu/covid19roundup/visual-abstracts/
Guidelines	Issued by expert panels for organization that streamline processes or approaches to clinical management.	https://www.idsociety.org/practice-guideline/covid-19-guideline-infection-prevention/ https://www.idsociety.org/practice-guideline/covid-19-guideline-diagnostics/
Apps	Quick access to guidelines and focused information	Sanford Guide Johns Hopkins Guide IDSA Practice Guidelines

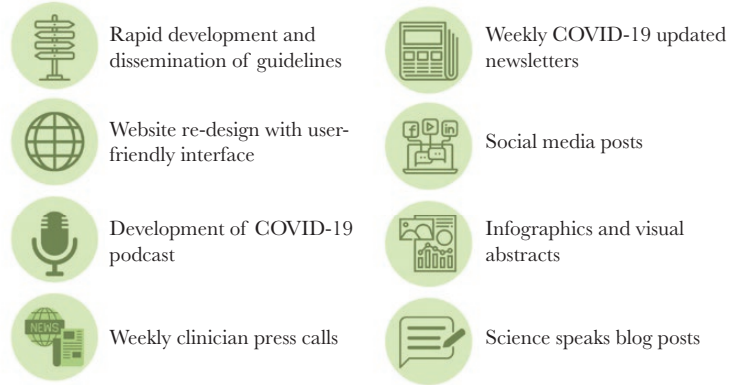
^aIn Spanish.

A major benefit of digital and social media in infectious diseases is dissemination of information for patient care,

medical education, and innovations in research, including clinical trial recruitment and published research findings [7].

Social media has been used as an educational tool for (1) antimicrobial stewardship for medical and pharmacist trainees

IDSA COVID-19 DIGITAL STRATEGY RESPONSE



IDSA COVID-19 DIGITAL STRATEGY INVESTMENT



Figure 1. IDSA COVID-19 Digital Strategy Response and Investment. The top panel shows 8 types of strategy used by Infectious Diseases Society of America (IDSA) to rapidly disseminate information during coronavirus disease 2019 (COVID-19). They include the following: rapid development and dissemination of guidelines for use by clinicians navigating the rapidly evolving paradigms of diagnosis, treatment, and infection prevention, redesign of the organization website with a more user-friendly interface, development of a COVID-19 twice-weekly podcast, weekly clinician press calls, weekly COVID-19 update newsletters, social media posts, infographics and visual abstracts, and Science Speaks blog posts. The bottom panel presents the facets of investment required to use this response including increased time commitment, increased person-power with recruitment of new members, and increased financial resources. These resources can largely be viewed at the COVID-19 Real-Time Learning Network (<https://www.idsociety.org/covid-19-real-time-learning-network/>).

[7–10] and (2) expanding public awareness of antimicrobial resistance among the general global community. Findings of scientific conferences are posted and summarized in real time to a broad online audience, potentially leading to faster implementation of science and further mentorship, networking, and innovative collaboration through digital engagement [11, 12].

For researchers and authors, crowdsourcing and digital dissemination can lead to greater impact [13–17]. Since early 2020, biomedical literature on COVID-19 has matured rapidly, with an unprecedented number of scholarly articles [18]. Scientists and clinicians are inundated with new publications; journal editors have been overwhelmed by submissions, and there is a desperate need to balance scientific rigor with rapid dissemination of results [19]. The preprint platforms BioRxiv and MedRxiv have noted an unparalleled number of preprints, creating challenges in parsing

data [18]. Digital and social media can help to address this. For example, a team of immunologists at the Icahn School of Medicine at Mount Sinai in New York created a concerted effort to critically review preprints to improve the rigor of literature evaluation for consumption by the scientific community [20]. Another example of real-time, postpublication peer review comes from the description of Dr. Elisabeth Bik [21] regarding the rapid publication of Gautret [22] et al describing the role of hydroxychloroquine in the treatment of COVID-19. Another commonly cited benefit of social media includes flattening of healthcare hierarchies, fostering collaborations between institutions and among individuals of all stages of training, which is particularly relevant in a year when in-person meetings have been curtailed [23, 24]. This is especially true for trainees and young faculty who may be parents of young children who face time, financial, and other barriers to traditional networking

opportunities. Online journal clubs, led by authors and field experts (eg, @IDJClub, @ASP_Chat), exemplify this; their organization around central hashtags and published articles and open access allows for robust discussion and postpublication peer-review of critical studies in the field among multiple participants.

PITFALLS OF USING SOCIAL MEDIA FOR DIGITAL STRATEGY

Despite its many advantages, the use of digital platforms in medicine poses distinct challenges. The rapid dissemination of information that is not carefully reviewed or amplification of unverified sources can lead to misinformation. Furthermore, scientists may face online harassment when engaging with social media [25]. To be a source of trusted information, they may reveal their identity, credentials, and workplace information. This may allow critics to more easily target clinical experts with opposing views while maintaining anonymity. In

addition, with shifting data availability, ID specialists with evolving views in response to emerging data during the pandemic may subsequently be criticized on social media for changing opinions. In a hypothetical example, a healthcare professional using social media to advocate for social distancing in areas with high rates of COVID-19 transmission might elicit backlash if that same individual had previously cast doubt on wearing masks in the early days of the COVID-19 pandemic. Disseminating thoughtful commentary to the general public requires that infectious diseases (ID) specialists acknowledge uncertainties inherent to our incomplete and evolving understanding of infections and be transparent that expert opinion-based recommendations may change with new data.

The “infodemic” itself proves problematic for experts despite the benefit of rapid information dissemination. Although peer-review remains a cornerstone of academic publication, digital media does not require the same type of rigor. As a result, content that is shared by self-proclaimed subject matter experts may not undergo appropriate vetting before dissemination, potentially contributing to the circulation of misinformation. It is unfortunate that this type of misinformation is an increasing concern given the ability of digital media to widely disseminate information at a rapid pace [26]. Moreover, although rapidly evolving knowledge during a pandemic may be expected by healthcare professionals to shift guidelines in response to new data, this may engender doubt and mistrust on the part of the general public. The combination of

misinformation and massive information overload (“fire-hose” effect) disseminated via social media and ubiquitous preprint servers during COVID-19 emphasize the need to curate a trusted network of colleagues and sources on digital media and to temper the mental fatigue associated with combatting misinformation [27, 28].

RECOMMENDATIONS FOR USE OF DIGITAL STRATEGY TO ADVANCE THE FIELD OF INFECTIOUS DISEASES

Now, more than ever, ID specialists must reach patients and communities where they are. The ID specialists using social media should include, as part of their digital strategy, a mission to (1) build and preserve public trust in the profession, (2) curate content to engage a defined audience with aligned mission, and (3) highlight the value of the field of infectious diseases, as described in Table 2, which includes examples of effective communication. Building and preserving the public trust does not mean that professional and personal identities must be siloed across accounts. One of the strengths of social media is that sharing content intentionally can humanize professionals and engender familiarity and trust among followers when done judiciously. The ID specialists should avoid spreading misinformation by independently verifying the accuracy of all statements shared.

Often those who are new to social media may engage more passively by observing posting without posting their own content. This practice, known as “lurking,” can be useful for a social media neophyte in learning the initial value of

social media, learning online etiquette, and best practices for creating and communicating content specific to a given social media platform. Once an individual is ready to engage in posting and curating social media content professionally, individuals should ask (1) “who am I trying to reach?” and (2) “what am I trying to convince them to believe or do?” These questions will focus strategic efforts on content that adds value. Once a target audience is identified (eg, other ID specialists, medical trainees, the general public), focus on interacting with and attracting followers from those communities. Similarly, individuals should curate the content being shared to inform and influence followers towards the specified goals originally outlined. Content curation means ensuring the content shared or interacted with (eg, “likes,” “retweets,” or comments) aligns with the mission of an individual’s digital presence, and that the balance between content that informs, persuades, and delights is appropriate for the targeted audience. For example, if the goal is to influence ID fellowship program directors to reconsider admissions criteria, a Twitter Feed that is mostly heated arguments with antivaccination campaigners and photos of dogs is not aligned with the specific audience or goals. Table 2 summarizes effective and ineffective ways to engage with social media as they align with the 3 main goals for social media use: build and preserve public trust in the profession, curate content to engage a defined audience with aligned mission, and highlight the value of the field of infectious diseases. Many of these recommendations are applicable to both

Table 2. Recommendations for Effective Communication to Advance the Field of Infectious Diseases

Recommendations	Examples
Build and preserve public trust in the profession	- Posting links to articles that demonstrate important accomplishments of public health officials
Curate content to engage a defined audience with aligned mission	- Amplifying messages by field experts on the role of mitigation of coronavirus disease 2019 (COVID-19) infection risk - Posting articles and guidelines that instruct the public in best practices in infection prevention
Highlight the value of the field of infectious diseases	- Posting an article demonstrating the impact of Infectious Diseases physicians in improving patient outcomes - Commenting on an article that describes the need for and actions taken to improve antimicrobial stewardship

individuals and organization, and the ultimate direction depends on the mission of said individual and/or organization.

As social media becomes more part of scientific and medical communications, more data will be needed to understand how metrics track with outcomes. Some have reported on how social media engagement can be leverages for scholarship in assessing academic accomplishments [17, 29]. Many websites and social media platforms measure traffic and engagement, and this information can be used to quantify effective and ineffective approaches.

CONCLUSIONS

ID specialists who use social media are encouraged to include bolstering support for the specialty as a primary goal. The ability to recruit and retain future generations of ID experts is dependent on successfully arguing for compensation appropriate for the value ID specialists bring to patients' care. From multidrug-resistant nosocomial pathogens to emerging pathogens and global pandemics, ID expertise is essential for our communities' survival and wellbeing. From individual to organizational digital strategy and social media engagement, ensuring that other health professionals and the general public recognize the importance of this work will help ensure that our specialty is fairly recompensed and can attract future talent.

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