Online spaces and the control of communicable diseases: implications for nursing practice

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Why you should read this article:
- To recognise the potential benefits of using online spaces in the control of communicable diseases
- To consider how to address challenges such as the spread of health misinformation online
- To learn about a framework and resources you could use in your practice to navigate online spaces effectively

Abstract
The digital revolution has significantly altered healthcare, including communicable disease control, with online spaces emerging as vital tools in preventing, identifying and controlling the spread of diseases. However, healthcare professionals, including nurses, need to find a balance between harnessing the benefits of mass communication and mitigating the potentially harmful effects of online misinformation. This article explores the benefits and challenges of using online spaces such as social media platforms in the control of communicable diseases and discusses the potential use of telehealth in reducing the risk of healthcare-associated infection and antimicrobial resistance. The author also describes a framework that nurses can use to explore potential roles and practice in the context of communicable disease control in online spaces.

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The digital revolution has transformed all aspects of human life, including healthcare. According to Internet World Stats (2023), a website that consolidates data on internet service usage globally, in 2022 around 68% of the world’s population and around 95% of the UK population were using the internet, while 82% of the UK population were Facebook subscribers.

Online spaces, in the form of social media platforms, forums, blogs, podcasts, applications and web-based information sources, have emerged as powerful tools in the control of communicable diseases such as influenza, coronaviruses and tuberculosis. For example, a review of the evidence on the use of social media for surveillance of communicable diseases indicated that it is an effective adjunct to traditional surveillance modalities (Pilipiec et al 2023). However, during the coronavirus disease 2019 (COVID-19) pandemic there was a proliferation of low-quality information sources providing unreliable healthcare information. This phenomenon was described by the World Health Organization (2024) as an ‘infodemic’, meaning ‘too much information including false or misleading information in digital and physical environments during a disease outbreak’.

False or misleading health-related information is often shared via social media platforms such as Facebook, X (formerly Twitter) and Reddit and may have negative effects on patient outcomes and on relationships between the public and healthcare professionals (Suarez-Lledo and Alvarez-Galvez 2021). It has been reported that clinical and scientific experts using online spaces have experienced harassment for expressing opinions that differ from those of members of the public, as well as criticism for changing advice or information in response to evolving data, thus undermining public trust (Marcelin et al 2021). Conversely, evidence suggests that effective engagement with people and data in online spaces can increase their awareness of
a communicable disease and its prevention, potentially resulting in people modifying their behaviour and a subsequent reduction in transmission (Sooknanan and Comissiong 2020).

As front-line healthcare professionals, nurses have a crucial role in preventing and managing communicable diseases and they need to adapt to the ever-changing landscape of digital health. This article discusses the role of online spaces in the control of communicable diseases and how this relates to nursing practice. It also considers the benefits and challenges of online spaces in the context of health information, prevention and promotion, and describes a framework that nurses can use to explore potential roles and practice in communicable disease control.

**Surveillance and early detection**
The risk of epidemics and pandemics is increasing due to the combined effects of globalisation, urbanisation and antimicrobial resistance (Bloom and Cadarette 2019). As such, efforts to identify and respond to outbreaks of communicable diseases in a timely manner are crucial to limit harm to patients and to society in general.

Traditionally, the surveillance of communicable disease has required the collection of microbiological samples followed by testing in a laboratory to identify trends in the data. However, with the availability of data on people's online information-seeking, it is now possible to track diseases by monitoring health-seeking behaviour in the form of search engine queries or social media posts and analysing the textual data.

A notable example of this was the Google Flu Trends project, which involved analysis of large numbers of Google search queries to track influenza-like illness (Ginsberg et al 2009). Ginsberg et al (2009) reported that they were able to estimate an influenza-like illness one to two weeks ahead of the US Centers for Disease Control and Prevention surveillance reports.

It is important to note that online data cannot be used to determine the causative agent responsible for disease, but such data can be used by healthcare professionals to instigate investigation of outbreaks of potentially novel pathogens, such as COVID-19, and to initiate proactive health protection measures. However, due to the limitations of this approach to disease surveillance, evidenced by its poor predictive reliability over subsequent years, Google Flu Trends was discontinued in 2015 (Ertem et al 2018). More recently, the use of rich sources of textual data in social media has been explored using natural language processing (Pilipiec et al 2023). Natural language processing uses complex text mining software and analysis processes to enable automated interpretation and manipulation of big data gathered from social media sites. Big data is a term for extremely large data sets that can be analysed by computers to reveal patterns, trends and associations, particularly in relation to human behaviour and interactions (Collier 2012). Pilipiec et al (2023) undertook a systematic review on the use of social media for surveillance of communicable diseases, identifying that X was the most frequently used source of user-generated health content and that data yielded from the site were useful for real-time automated prediction of communicable disease worldwide.

It is important for nurses to be aware of these novel approaches to surveillance and early detection of communicable diseases, as this may enable them to employ such digital technologies to enhance public health measures. Using real-time, user-generated health information to monitor and identify communicable diseases may enable nurses to respond more quickly and instigate intervention strategies. Nurses can also encourage patients to use online spaces such as X appropriately so that data analysed via natural language processing are more likely to yield accurate and reliable information that may be used to inform public health organisations.

**Health promotion and health education**
For nurses and patients, online spaces have become essential platforms for health promotion and health education, empowering individuals to make informed decisions about their health. By engaging with patients and the public in online spaces, nurses can potentially dispel misinformation, address people’s concerns and foster a culture of health literacy. This has been demonstrated in the context of human immunodeficiency virus (HIV), with a systematic review by Taggart et al (2015) finding that the use of different types of social media increased users’ knowledge of the condition and improved medicines adherence. However, the studies included in Taggart et al’s (2015) systematic review used varying outcome measures, so their conclusions should be considered with caution. Additionally, the authors of the studies reviewed did not attempt to determine if the information shared in the social media groups was of high quality. It was also notable that the ability to communicate anonymously was emphasised as an important feature of the online communities explored by many of the studies reviewed (Taggart et al 2015). Cao et al (2017) undertook a systematic review and meta-analysis of social media interventions to promote HIV testing, adherence and retention. They found that rates of HIV testing could be improved by providing social media interventions such as dissemination of information, interactive communities, testing services and health promotion materials. This type of proactive approach to health promotion could contribute to the reduction of communicable disease transmission.

**Complexities of online spaces as sources of health information**
The use of online spaces as sources of information on infectious disease, particularly social media platforms, is complex. Sooknanan and Comissiong (2020) discussed the importance of behaviour change in relation to disease transmission,
for example, observance of hand-washing or respiratory hygiene, but also emphasised the significant effect of exposure to information via social media on people’s behaviours. This is problematic when such information is unreliable. Gisondi et al (2022) identified how, during the COVID-19 pandemic, the algorithms used by social media companies created ‘echo chambers’ – that is, where people only encounter information that reflects or reinforces their own views – which acted as vectors for misinformation by spreading low-credibility sources of information.

In addition, the presence of online ‘bots’, or fake accounts, can be used by malign actors to perpetuate false information or misinformation. In a review of the literature on bots and misinformation spread on social media and the implications of this for COVID-19, Himelein-Wachowiak et al (2021) reported that 33% of top sharers of information from low-credibility sources were bots. However, the authors also noted that bots are used by benevolent actors to share credible information, for example by organisations disseminating recruiting materials to potential volunteers for social causes (Savage et al 2016). However, no evidence was reported of health professionals using bots for health promotion purposes.

It is unclear precisely what effect bot activity has on subsequent changes in human behaviour, partly due to the volume of such accounts and the challenges in verifying the information they share. However, it is notable that issues related to the control of communicable disease are common subjects of online misinformation campaigns. For example, a systematic review of health misinformation on social media found that vaccines was the most prevalent topic (Suarez-Lledo and Alvarez-Galvez 2021).

A further complexity is human emotion and behaviour. For example, Vosoughi et al’s (2018) study on the spread of true and false news online found that false news spreads more pervasively than the truth. Although the exact reasons for this are not fully understood, the researchers suggested that the ‘novelty’ of false information, and the strong emotional reactions such novelty often provokes, may be a causative factor (Vosoughi et al 2018).

Balancing benefits and harms

Gisondi et al (2022) offered the following recommendations for healthcare organisations when attempting to balance the potentially harmful effects of online misinformation against the benefits of mass communication:

- Engage with patients on social media.
- Commit to posting public health messaging online.
- Identify and implement evidence-based interventions to combat health misinformation.
- Provide expert advice to mass media outlets.
- Personalise outreach to patients and communities.
- Empower patients to seek reliable health information and make informed choices.

Some of these recommendations may be applicable to nursing practice. To assess the reliability of online health information, nurses and other healthcare professionals can use a simple approach such as the Currency, Reliability, Authority and Purpose (CRAP) test, developed by librarian Molly Beestrum (Box 1) (Kington et al 2021). Nurses could also introduce patients to such tools to empower them to identify reliable online information (Davis 2023).

Table 1 provides some examples of online spaces that nurses can use in communicable disease control, for example to find up-to-date information, network with other professionals, and engage with patients and the public. The list is not exhaustive and there are many other potentially useful online spaces for these purposes.

It is important to note that for long-term health conditions, for example HIV, online communities may develop independently of mainstream social media or information sources (Cao et al 2017). Additionally, different online spaces tend to have different functions; for example, YouTube or the UK Health Security Agency website may be used primarily for information sharing, while X and the Infection Prevention Society may be more conducive to engaging in dialogue and networking. It is also important to recognise that misinformation is most likely to be found on social media sites (Brennan et al 2020).

### Key points

- Online spaces – including social media platforms, forums, blogs, podcasts, applications and web-based information sources – have become useful tools in the control of communicable diseases.
- Nurses have a crucial role in preventing and managing communicable diseases, so they need to continually develop their technological competencies and adapt their practice to the rapidly changing digital landscape.
- By engaging with patients and the public in online spaces, nurses can potentially dispel misinformation, address people’s concerns and foster a culture of health literacy.

### Box 1. Currency, Reliability, Authority and Purpose test

The Currency, Reliability, Authority and Purpose (CRAP) test requires the person reviewing online information to consider four features:

- **Currency** – this involves assessing how contemporary the information is. In the context of communicable disease, doing so may require further research to determine if there is more up-to-date evidence on the topic.
- **Reliability** – this involves assessing the nature of the information, for example whether it is an opinion (less reliable) or findings from a research study (potentially more reliable).
- **Authority** – this involves considering if the author of the information is a known expert in communicable disease or a lay person describing a personal experience.
- **Purpose** – this involves assessing why the information exists; for example, whether it has been created by a public health service to improve health or by a pharmaceutical company to promote a product.

(Adapted from Kington et al 2020)
Healthcare-associated infection and antimicrobial resistance

The COVID-19 pandemic has had profound effects on healthcare and society in general. One notable example of the effect of the pandemic in healthcare is the increased use of telehealth in service delivery (Wosik et al 2020). The term telehealth broadly refers to care delivered and accessed at a distance through the use of equipment such as laptops, tablets, smartphones or wearable devices (Wosik et al 2020). While this rapid change in healthcare delivery was catalysed by the acute pressures created by the pandemic, there are implications for the long-term use of telehealth technology from a communicable disease perspective, in terms of reducing the risk of healthcare-associated infections (HCAIs) and antimicrobial resistance.

HCAIs are a known risk of inpatient healthcare interventions, such as medical or surgical treatment, and/or of being in contact with a healthcare setting (Haque et al 2018, NHS England 2024). In addition, the presence of antimicrobial-resistant organisms in inpatient settings presents a risk to patients and places a significant burden on healthcare systems globally (Haque et al 2018). Providing care in online spaces, such as virtual clinics, could reduce the risk of acquiring HCAIs or colonisation by antimicrobial-resistant organisms.

Ceradini et al (2017) conducted a study in an Italian paediatric cardiac hospital that used collaborative virtual meetings involving healthcare professionals, such as cardiologists, anaesthetists and surgeons, and infectious disease and microbiology specialists. They found that such meetings resulted in more prudent use of antibiotics and reduced the incidence of HCAIs in critical care settings, the numbers of multidrug-resistant organisms isolated from patients and spending on antibiotics. Ceradini et al (2017) also noted the educational benefits for healthcare professionals in terms of increasing their knowledge of antimicrobial stewardship. However, this was a small study undertaken in one site and the demography of the multidisciplinary teams was not detailed, so it is unclear if nurses were involved and, if they were, what their role entailed.

At the time of writing, there is no evidence that this type of collaborative virtual approach to managing risks associated with HCAIs and antimicrobial resistance is being used in the UK, and the role of nurses in telehealth in relation to managing communicable disease has yet to be fully developed. However, nurses could explore the potential benefits of using telehealth models in their practice areas in relation to the prevention of HCAIs and management of antimicrobial resistance.

Nursing practices in communicable disease control in online spaces

To optimise the use of online spaces in nursing practice, it is crucial that nurses focus on evidence-based interventions and dissemination of accurate, high-quality information. Nurses should also be aware of the potential risks associated with online misinformation and engage with patients and the public to promote health literacy and foster trust in professional opinion. By embracing the potential of online spaces and integrating them into nursing practice, nurses can contribute to improved patient health outcomes and participate in the global effort to control communicable diseases.

Nurses can use the Lens for Digital Nursing, developed by the author and colleagues (Wynn et al 2023), as a framework to explore potential nursing roles and practices in the context of communicable disease control in online spaces. The Lens for Digital Nursing framework provides three broad, mutually influencing concepts which were identified via the synthesis of eight nursing practice theories related to nurses’ use of digital technologies. The three concepts – knowing the person, technology as agent and technological competency – explain

<table>
<thead>
<tr>
<th>Table I. Examples of online spaces that nurses can use in communicable disease control</th>
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</thead>
<tbody>
<tr>
<td><strong>Website</strong></td>
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<tr>
<td>Social media sites such as:</td>
</tr>
<tr>
<td>- Facebook: en-gb.facebook.com</td>
</tr>
<tr>
<td>- YouTube: <a href="http://www.youtube.com">www.youtube.com</a></td>
</tr>
<tr>
<td>- X (formerly Twitter): twitter.com. Recommended X accounts include:</td>
</tr>
<tr>
<td>- Outbreak Science: @outbreaksci</td>
</tr>
<tr>
<td>- Infection Prevention Society: @IPS_Infection</td>
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<tr>
<td>- Centers for Disease Control and Prevention: @CDCgov</td>
</tr>
<tr>
<td>- Healthcare Infection Society: @HIS_infection</td>
</tr>
<tr>
<td>- European Centre for Disease Prevention and Control: @ECDC_Outbreaks</td>
</tr>
<tr>
<td>- MRC Centre for Global Infectious Disease Analysis: @MRC_Outbreak</td>
</tr>
<tr>
<td>- UK Health Security Agency: @UKHSA</td>
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<tr>
<td>- The Journal of Hospital Infection: @jhideditor</td>
</tr>
<tr>
<td>- World Health Organization: <a href="http://www.who.int">www.who.int</a></td>
</tr>
<tr>
<td>- National Institute for Health and Care Excellence: <a href="http://www.nice.org.uk">www.nice.org.uk</a></td>
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<tr>
<td>- Centers for Disease Control and Prevention (US): <a href="http://www.cdc.gov">www.cdc.gov</a></td>
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<tr>
<td>- European Centre for Disease Control and Prevention: <a href="http://www.ecdc.europa.eu/en">www.ecdc.europa.eu/en</a></td>
</tr>
<tr>
<td>- Infection Prevention Society: <a href="http://www.ips.uk.net">www.ips.uk.net</a></td>
</tr>
<tr>
<td>- Healthcare Infection Society: <a href="http://www.his.org.uk">www.his.org.uk</a></td>
</tr>
</tbody>
</table>
how and why nurses use digital technologies and what they use them for (Table 2) (Wynn et al 2023).

Table 3 shows the application of the Lens for Digital Nursing framework to nursing practice in the context of communicable disease, stratified by three levels of practice. The table details the knowledge, skills and professional regulation requirements that apply to nursing practice in this context.

**Table 2. Lens for Digital Nursing concepts**

<table>
<thead>
<tr>
<th>Concept</th>
<th>Description</th>
</tr>
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<tbody>
<tr>
<td>Knowing the person</td>
<td>This explains the main function of nurses’ use of digital technologies; that is, to develop an understanding of an individual’s needs which then guides clinical decision-making</td>
</tr>
<tr>
<td>Technology as agent</td>
<td>This relates to nurses’ recognition that the presence or absence of technology can influence clinical outcomes due to its design or functionality; this can be considered an important reason why nurses should engage with digital technologies. This concept also highlights the role of technology in extending the reach of healthcare in the absence of human staff, for example via artificial intelligence-driven robots or digital platforms such as appointment booking systems</td>
</tr>
<tr>
<td>Technological competency</td>
<td>This relates to nurses’ competence in engaging with technology to provide person-centred care, including recognition of its limitations and the ethical implications of using technology in clinical contexts</td>
</tr>
</tbody>
</table>

(Adapted from Wynn et al 2023)

**Conclusion**

The digital revolution has fundamentally altered the landscape of healthcare and communicable disease control, bringing opportunities and challenges. Online spaces offer a wealth of opportunities for early detection and surveillance of communicable diseases, health promotion and education for nurses and the public, thereby potentially reducing the risks of HCAIs and antimicrobial resistance. However, the use of online spaces as information sources can be complex, so it is important that healthcare professionals, including nurses, find a balance between harnessing the benefits of mass communication and mitigating the potentially harmful effects of online misinformation.

Nurses have a pivotal role in promoting the effective use of online spaces. They can apply the Digital Lens for Nursing (Wynn et al 2023) framework to understand the different aspects of their engagement with digital technologies and online spaces. This understanding can inform and enhance their practice, potentially contributing to improved patient care and control of communicable diseases. Nurses need to continually develop their technological competencies and adapt their practice to the rapidly changing digital landscape.

Further research is necessary to explore the effects and efficacy of online interventions by nurses for the purpose of communicable disease control.

**Table 3. Application of the Lens for Digital Nursing framework to nursing practice in the context of communicable disease**

<table>
<thead>
<tr>
<th>Level of practice</th>
<th>Concept – knowing the person</th>
<th>Concept – technology as agent</th>
<th>Concept – technological competency</th>
</tr>
</thead>
<tbody>
<tr>
<td>Population</td>
<td>Being aware of the use of natural language processing and social media data to recognise and understand trends in the spread of communicable diseases (Pilipiec 2023)</td>
<td>Recognising the influence of misinformation on patients and the public and its rapid dissemination in online spaces (Vosoughi et al 2018)</td>
<td>Curating accurate and useful information related to the control of communicable disease (Davis 2023)</td>
</tr>
<tr>
<td></td>
<td>Using online spaces to keep up to date with clinical evidence, for example following specialist organisations, journals or healthcare professionals on social media platforms (Davis 2023)</td>
<td>Recognising the effects of digital inequalities and how these may influence patients’ digital literacy and access to information and services (Blank and Reisdorf 2023)</td>
<td>Using online interprofessional collaboration to facilitate the sharing of knowledge, best practice and relevant resources</td>
</tr>
<tr>
<td>Community</td>
<td>Gaining an understanding of the local population’s health-related concerns by being active on social media using a professional account (Gisondi et al 2022)</td>
<td>Recognising how social media platforms influence disease control and behaviours in different communities (Sooknanan and Comissiong 2020)</td>
<td>Considering the principles of digital professionalism. The Nursing and Midwifery Council (NMC) (2018) The Code: Professional Standards of Practice and Behaviour for Nurses, Midwives and Nursing Associates states that nurses should not share their political, religious or moral beliefs in an inappropriate way and should respect people’s right to privacy and confidentiality. The NMC (2023) Guidance on Using Social Media Responsibly should be read in conjunction with the Code</td>
</tr>
<tr>
<td>Individual</td>
<td>Talking to patients to gain an understanding of their use of online spaces and how they access and use information from online sources (Gisondi et al 2022)</td>
<td>Developing competencies in the use of telehealth technology to minimise unnecessary in-person care, to reduce the risk of healthcare-associated infections and antimicrobial resistance (Ceradini et al 2017, Wosik et al 2020)</td>
<td></td>
</tr>
</tbody>
</table>
References


World Health Organization (2024) Infodemic. www.who.int/health-topics/infodemic#tab=tab_1 (Last accessed: 10 January 2024.)
