

Rapid Development and Deployment of an International Omaha System Evidence-Based Guideline to Support the COVID-19 Response

Karen A. Monsen, PhD, RN, FAMIA, FAAN
University of Minnesota School of Nursing, Minneapolis.

Unprecedented challenges face the healthcare system as individuals, communities, and nations around the world respond to COVID-19.¹⁻⁴ Informatics solutions support global pandemic response.⁵⁻⁷ This article follows the development of a COVID-19 response guideline from inception on March 9, 2020, to deployment over a period of less than a week, using the Omaha System,⁸ a multidisciplinary healthcare terminology.

The Omaha System Community of Practice (OSCOPE), a grass-roots organization loosely connected through social networking platforms such as Facebook, Linked-IN, Twitter, and e-mail discussion list communications among professional societies, mobilized to address the need for a guideline.^{8,9} The OSCOP holds webinars four times per year to share innovations in practice, research, and education and updates to the expanding portfolio of evidence-based, encoded guidelines available at omahasystemguidelines.org.^{9,10} Participants from practice, academia, and industry in several countries share resources to build healthcare quality, maximizing the use of the Omaha System, their mutual language/terminology, as a communication and evaluation model. Facing the threat posed by COVID-19, members of the OSCOP announced on Monday, March 9, 2020, a webinar “to facilitate a conversation around best practices for using the Omaha System to support COVID-19 disease prevention and control activities and documentation at the individual, family, and community levels. Evidence-based guidelines will be shared that will enable local and state public health agencies to disseminate best practices in software and to generate consistent data regarding COVID-19 pandemic preparedness and responses. Your participation is critical to ensure the guidelines reflect your perspective.” Approximately 130 public health experts and others registered for the webinar. All registrants were promised the recording of the webinar if unable to attend in person.

On Wednesday, March 11, 2020, the World Health Organization (WHO) characterized COVID-19 as a pandemic, and on Thursday, March 12, 2020, 56 participants from China, the Netherlands, New Zealand, Singapore, Turkey, and numerous states in the United States attended

the Omaha System COVID-19 webinar. In advance of the webinar, the OSCOP leadership and interested stakeholders compiled evidence-based interventions for public health, long-term care, healthcare, community, policy makers, and self-care, in a combined, coordinated resource to support COVID-19 response efforts. See Table 1 for the public health interventions directed to the Omaha System Problem “Communicable/Infectious Condition.” We based the comprehensive international perspective on WHO, US Centers for Disease Control and Prevention (CDC), and Minnesota Department of Health (MDH) references, with additional validated resources from other sources, all of which are organized by intervention within the COVID-19 guideline.^{2,3}

During the webinar (<https://tinyurl.com/OmahaSystemCOVID19>), the participants critiqued and expanded the guideline and reached consensus on the content and structure, ensuring that evidence-based guidance from WHO, CDC, or MDH supported each intervention. We cross-referenced and added clinical terminology codes for all interventions. One day after WHO's COVID-19 pandemic announcement, the OSCOP published the evidence-based guideline online at Omaha System Guidelines¹⁰ to support the international COVID-19 Response as a clinical decision support reference and documentation tool. Following our standard guidelines dissemination process, the COVID-19 guideline was dual encoded with SNOMED Clinical Terms (CT) and Omaha System codes for ease of incorporation within any electronic health record.¹¹⁻¹³ We documented meta-data detailing our process and contributors and posted it online together with the webinar recording and the guideline itself.

Electronic health records and other platforms rapidly implemented the guidelines. We standardized the guideline with SNOMED CT and Omaha System coding, which enabled industry partners to immediately implement it within products without changes in hard coding. Notably, other applications in the same organization had a significant lag time for hard coding changes. On March 13, 2020, and continuing into the present, we invited participation from all stakeholders in updating the guideline weekly based on emerging evidence and guidance from the WHO and the CDC.

Table 1. Public Health COVID-19 Response Guideline Interventions for the Communicable/Infectious Condition Problem

Category	Target	Care Description
Teaching, Guidance, and Counseling	Behavior modification	Cover cough with tissue, avoid touching face
Teaching, Guidance, and Counseling	Continuity of care	Identify and protect vulnerable people (existing health concerns or older adults)
Teaching, Guidance, and Counseling	Infection precautions	Disseminate messages to the public, address misinformation
Teaching, Guidance, and Counseling	Infection precautions	Modify, postpone, or cancel events
Teaching, Guidance, and Counseling	Infection precautions	Personal readiness
Teaching, Guidance, and Counseling	Personal hygiene	Wash hands regularly and thoroughly with soap and water or 70% alcohol-based hand sanitizer
Teaching, Guidance, and Counseling	Sickness/injury care	Employer response
Teaching, Guidance, and Counseling	Sickness/injury care	Manage patients with COVID-19 in the community
Teaching, Guidance, and Counseling	Sickness/injury care	Train healthcare workers
Teaching, Guidance, and Counseling	Signs/symptoms-physical	Fever, cough, and shortness of breath (sore throat)
Teaching, Guidance, and Counseling	Stress management	Promote healthy functioning activities
Teaching, Guidance, and Counseling	Supplies	Prepare for 14-day quarantine
Teaching, Guidance, and Counseling	Support system	Build formal and informal neighborhood/community support systems
Treatments and Procedures	Behavior modification	Cover cough, avoid touching face
Treatments and Procedures	Dietary management	Provide essential services
Treatments and Procedures	Home	Provide essential services (shelter)
Treatments and Procedures	Infection precautions	Stay home when sick
Treatments and Procedures	Medication coordination/ordering	Provide essential services
Treatments and Procedures	Other community resources	Provide essential services (clothing, face masks, etc)
Treatments and Procedures	Personal hygiene	Wash hands regularly and thoroughly with soap and water or 70% alcohol-based hand sanitizer
Treatments and Procedures	Supplies	Prepare for 2-week quarantine
Case Management	Communication	Coordinate clear, accurate, and timely messaging
Case Management	Infection precautions	Encourage virtual transactions, eg, telehealth and telebusiness
Case Management	Medical/dental care	What to do if you are sick; when to seek medical care
Surveillance	Behavior modification	Cover cough, avoid touching face
Surveillance	Coping skills	Needs of persons isolated and quarantined
Surveillance	Dietary management	Identify need for essential services
Surveillance	Infection precautions	Identify contacts of sick people
Surveillance	Laboratory findings	Monitor the number of positive cases and percentage of positive findings
Surveillance	Medication coordination/ordering	Identify need for essential services
Surveillance	Personal hygiene	Wash hands regularly and thoroughly with soap and water or 70% alcohol-based hand sanitizer

Key factors contributing to the success of the 2020 COVID-19 Response Guideline initiative were the urgency of the problem, the existing international network of Omaha System users, and use of crowdsourcing techniques with virtual meeting methods. We made this resource available within communities for prevention and mitigation activities through radio broadcasts and other electronic media, for self-care prevention and mitigation activities, as well as for documentation of healthcare practice and use in research.¹⁴ As with previous Omaha System guideline development initiatives, the outstanding collaboration of informaticians and

community partners made possible rapid guideline development, deployment extending guidelines into real-time practice, and further collaboration.¹¹⁻¹³

Acknowledgment

The author would like to acknowledge Debra Eardley, DNP, RN, APHN-BC, Kristin Erickson, MSN, APHN-BC, RN, R. Clarence Jones, MEd, BA, Crystal Maertens, Kari Miller, DNP, RN, PHN, Emily Robb, RN, PHN, SANE, Norah Savard, BSN, Robin R. Austin, PhD, DNP, DC, RN-BC, and Karen S. Martin, RN, MSN, FAAN.

References

1. Gates B. Responding to Covid-19—a once-in-a-century pandemic? [published online ahead of print February 28, 2020]. *New England Journal of Medicine*.
2. World Health Organization (WHO). WHO Covid-19. <https://www.who.int/docs/default-source/coronaviruse/who-china-joint-mission-on-covid-19-final-report.pdf>. Accessed March 30, 2020.
3. Centers for Disease Control and Prevention. CDC COVID 19 guidance. <https://www.cdc.gov/coronavirus/2019-ncov/index.html>. Accessed March 30, 2020.
4. Wu JT, Leung K, Leung G. Correspondence SARS-CoV-2 infection among travelers returning from Wuhan, China. *New England Journal of Medicine*. 2020;6: 1–3.
5. Gates B. Innovation for pandemics. *New England Journal of Medicine*. 2018;378(22): 2057–2060.
6. Office of National Coordinator. COVID-19 response: tools and resources for the health IT community. <https://www.healthit.gov/coronavirus>. Accessed March 30, 2020.
7. Wu JT, Leung K, Leung GM. Nowcasting and forecasting the potential domestic and international spread of the 2019-nCoV outbreak originating in Wuhan, China: a modelling study. *Lancet*. 2020;395(10225): 689–697. doi:10.1016/S0140-6736(20)30260-9.
8. Martin K. *The Omaha System: A Key to Practice. Documentation and Information Management*. 2nd ed. Omaha, NE: Health Connections Press; 2005.
9. Omaha System Community of Practice. Omaha System Community of Practice. <http://omahasystemmn.org/>. Accessed March 30, 2020.
10. Monsen KA et al. COVID-19 response Omaha System Guidelines. <https://sites.google.com/view/omahasystemguidelines/covid-19-response?authuser=0>. Accessed March 30, 2020.
11. Slipka AF, Monsen KA. Toward improving quality of end-of-life care: encoding clinical guidelines and standing orders using the Omaha system. *Worldviews on Evidence-Based Nursing*. 2018;15(1): 26–37. doi:10.1111/wvn.12248.
12. Monsen KA, Neely C, Oftedahl G, Kerr MJ, Pietruszewski P, Farri O. Feasibility of encoding the Institute for Clinical Systems Improvement Depression Guideline using the Omaha system. *Journal of Biomedical Informatics*. 2012;45: 719–725. doi:10.1016/j.jbi.2012.06.004.
13. Austin RR, Monsen KA, Schulz C. An informatics approach to interprofessional management of low back pain: a feasibility study using the Omaha System. *Journal of Innovation in Health Informatics*. 2017;24(3): 268. doi:10.14236/jhi.v24i3.929.
14. Anderson RM, Heesterbeek H, Klinkenberg D, Hollingsworth TD. How will country-based mitigation measures influence the course of the COVID-19 epidemic? *Lancet*. 2020;395(10228): 931–934. doi:10.1016/S0140-6736(20)30567-5.