

# NANDA-I, NOC, and NIC Linkages to SARS-Cov-2 (Covid-19): Part 1. Community Response

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**PURPOSE:** We developed linkages using interoperable standardized nursing terminologies, NANDA International (NANDA-I) nursing diagnoses, Nursing Interventions Classification (NIC), and Nursing Outcomes Classification (NOC), to present initial guidance for the development of care plans focused on COVID-19 for nurses practicing in community or public health roles.

**METHODS:** Seven nurse experts identified the linkages of NANDA-I, NOC and NIC for our work related to the COVID-19 pandemic. A model was developed to guide the project. The first step in creating linkages focused on the identification of nursing diagnoses. Then, for each nursing diagnosis, outcomes aligned with all components of the diagnosis were categorized and a list of nursing interventions was selected. The experts used their clinical judgment to make final decisions on the linkages selected in this study.

**FINDINGS:** Two community level nursing diagnoses were identified as key problems appropriate for a pandemic related to COVID-19: Deficient Community Health and Ineffective Community Coping. For the nursing diagnosis Deficient Community Health, eight nursing outcomes and 12 nursing interventions were selected. In comparison for the nursing diagnosis, Ineffective Community Coping, nine nursing outcomes and 18 nursing interventions were identified. A total of 40 concepts were identified for future development across the three classifications.

**CONCLUSIONS:** The nursing diagnoses, outcomes and interventions selected during this linkage process provide knowledge to support the community challenged with responding to the COVID-19 pandemic, provide the opportunity to quantify the impact of nursing care, and enhance nursing practice by promoting the use of three standardized terminologies.

**IMPLICATIONS FOR NURSING PRACTICE:** NANDA-I, NOC and NIC linkages identified in this manuscript provide resources to support clinical decisions and care plan development for nurses practicing in the community.

On December 31, 2019, China reported a cluster of pneumonia cases that were identified as a novel coronavirus (named COVID-19). After weeks of monitoring the outbreak in China and providing guidance to the international community, the World Health Organization (WHO, 2020a) declared COVID-19 a pandemic on March 11, 2020 and noted the certainty of coronavirus spread to all parts of the world. In the

subsequent days, the world efforts were implemented to stop the rapid spread of this virus, while simultaneously reacting to the virus that had already spread globally. Currently there is no medical treatment for the virus. Facing this pandemic, nurses are in the position to address a wide range of problems associated with COVID-19 and to make a major impact on the disease and its spread.

Nurses have been the frontline providers in different epidemics and pandemics throughout history, from the 1918 influenza pandemic (D'Antonio, 2019) to the emergence of the HIV/AIDS pandemic in the 1980s (Kuehnert, 1991), to the Ebola hemorrhagic fever epidemic that began in the 1995 (Hewlett & Hewlett, 2005), to the 2003 severe acute respiratory syndrome (SARS) pandemic (Tzeng, 2003), to name a few. In their role in these extenuating situations, nurses have continuously provided care to the injured or ill, assisted individuals and families to deal with physical and emotional problems, worked to improve health and well-being, and to help stabilize reconstruct communities.

By the end of April 2020, the COVID-19 pandemic has caused more than 200,000 deaths and over 3 million confirmed cases globally (WHO, 2020b). The United States has surpassed all other countries for the number of confirmed cases (WHO, 2020b). Nurses are needed again to be at the frontline of this pandemic, providing physiologic and psychosocial care at the individual and community levels. Given the novelty of the coronavirus, its rapid spread, and the potential for infected individuals to experience rapid deterioration and death, best practices for nursing care are needed but have not yet been widely formulated and disseminated. There are only a few published articles focused on the impact of COVID-19 on the care management of at-risk populations during the pandemic. For example, Ueda and colleagues (2020) highlighted the challenges of cancer treatment during a pandemic and stressed the importance of organizational structure, preparation, agility, and a shared vision for this unique time. In addition, nurses are being urged to return to clinical practice from retirement, redeployed to clinical units that are a new experience for them (De Avila & Chen, 2020) while caring for very challenging patients in an ever-changing environment.

Nurses and other frontline health workers need advice on best practices to guide their care decisions during the pandemic. Although the virus itself is novel, many of the nursing diagnoses, interventions, and outcomes associated with the illness are not unique and have been used in previous linkages of nursing diagnoses, outcomes, and interventions to other infections. Valid and reliable documentation of the nursing care provided is needed during the crisis, despite the high demands it imposes on nurses' time at the bedside. Importantly, documentation should be codified and interoperable to monitor progress, recovery, and potential deterioration of the patient's status, to review prior interventions, and to determine the effectiveness of nursing care retrospectively.

The purpose of this project is threefold. In part one of a two-part article, we present initial guidance for developing nursing care plans for COVID-19 for nurses practicing in community or public health roles, based on identifying linkages of three standardized nursing terminologies, NANDA international (NANDA-I) nursing diagnoses, Nursing Interventions Classification (NIC), and Nursing Outcomes Classification (NOC). Community and public health nurses play a critically important role by assessing the needs and

resources of the population related to the coronavirus, case tracking, and decreasing the spread of the disease through education at both the individual and community levels. In part two, we present linkages of nursing diagnoses, outcomes, and interventions to support the development of nursing care plans that can be adopted by nurses working with individuals and families in various settings based on a model we developed for this work. These linkages can guide clinical decision-making and care plan development by nurses at the front line as well as provide needed data to enable researchers to examine the impact of nursing care on both individuals and communities. Our third goal is to identify a list of additional nursing diagnoses, outcomes, and interventions for future development to address pandemic situations.

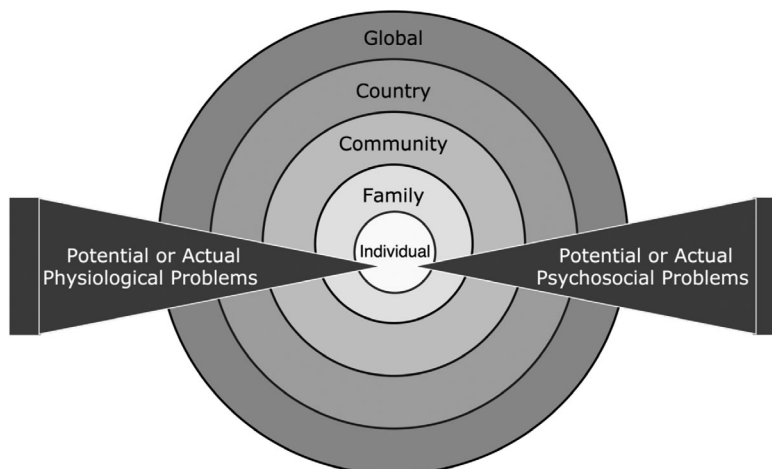
### Conceptual Model

Nursing care needed during the pandemic is multidimensional. Guided by a social ecological framework (Lounsbury & Mitchell, 2009), we propose the *nursing care in response to pandemics model* (Figure 1). Although social ecological models are used widely in health education and public health (Baral, Logie, Grosso, Wirtz, & Beyrer, 2013; Golden & Earp, 2012), we were unable to identify a conceptual model or framework that encompassed nursing care during a worldwide infectious pandemic. In this model, individuals are depicted in the center surrounded by four concentric layers that depict additional recipients of nursing care during pandemics: families, communities, countries, and the global world. Arrowheads cut across each layer of the model, as nurses target problem-focused and potential (at-risk) health problems that are both physiologic and psychosocial in nature in response to pandemics.

We believe this model is helpful to understanding the current pandemic because it highlights the fluidity of the spread of this virus across the concentric circles representing groups of individuals. In most cases when dealing with viral infections, healthcare workers are focused on treating individuals as they seek care in clinics or outpatient settings. In rare cases, individuals are admitted to hospitals for more intense nursing care than they can receive at home. They seek care from the larger community environment surrounding them and depend on family support during their illness. Individuals with multiple comorbid conditions may require more intensive treatment of a viral infection (Begley, 2020; Turner, 2020).

The case of the COVID-19 pandemic is, in contrast, focused on both individuals and communities adopting a set of actions to help slow the spread until a vaccine or drug to combat the virus becomes widely available. These actions are called mitigation strategies and should be implemented when there is evidence of community transmission (Center for Disease Control and Prevention, 2020). Individuals are encouraged to isolate at home and are not seen in care facilities unless their symptoms become severe. This means that the individual in the center of the model may be separated

**Figure 1. Nursing Care in Response to Pandemics Model**  
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from family members, or at least from the extended family, resulting in decreased social support and a potential lack of caregivers. Individuals are encouraged to not participate in large social or community activities, travel across state lines, or travel to other countries. Transmission of the coronavirus can quickly spread across all circles surrounding the individual depicted in the center of the model. The role of nursing is to care for individuals, families, and communities. This is even more challenging during a pandemic because contact with infected individuals and groups also puts the nurse at-risk of being infected with the virus and can add to the spread of the disease.

### Background

The center for nursing classification and clinical effectiveness, at the University of Iowa, is well-known for publishing several books linking the nursing interventions classification (NIC) and the nursing outcomes classification (NOC) to nursing diagnoses developed by NANDA-I (Johnson et al., 2006, 2012; Johnson, Bulechek, Dochterman, Maas, & Moorhead, 2001). Research focused on previous linkage work provided a valid and reliable methodology for this work. More recently a publication focused on nutrition diagnoses (Mantovani, Moorhead, & Abe, 2020) adopted a new structure for the linkages based on changes in the format of nursing diagnoses published in the most recent edition of NANDA-I (Herdman & Kamitsuru, 2018). This project focused on using the new diagnosis format adopted by the NANDA-I.

### Methods

To respond to the current pandemic, we formed a team of seven nurse experts to identify linkages of valid and reliable NANDA-I nursing diagnoses, NOC outcomes, and NIC interventions focused on COVID-19 in the spring of 2020. These terminologies are referred to as NNN. They

are coded, interoperable, and available for nurses and other care providers to plan care for individuals and families in response to community needs. We used five steps in the linkage process. The first step in developing NNN linkages focused on the identification of relevant nursing diagnoses. A table was created to organize the NNN linkages based on the nursing diagnoses identified. We included the diagnostic code, and the definition for each nursing diagnosis selected.

In the second step, an initial list of outcomes was added to the table and the outcomes were grouped in categories based on components of the identified nursing diagnoses. We included an outcome to measure resolution of each nursing diagnosis selected. The process for this step varies slightly depending on the type of nursing diagnoses selected. Each problem-focused nursing diagnosis was linked to outcomes that align with measuring the *defining characteristics, related factors, at-risk populations, and associated conditions*. The second type, risk nursing diagnoses, do not have defining characteristics, so the linkages for these diagnoses focus on *related factors, at-risk populations, and associated conditions*. Once the outcomes were selected and added to the table, the third step focused on creating a list of nursing interventions that targeted the related factors for each nursing diagnosis. The interventions were then added to the linkage table. All interventions and outcomes are listed alphabetically.

The fourth step focused on additional reviews of the linkages to clarify the alignment of the NNN concepts and whether they are a good fit. For example, for a community nursing diagnosis the outcomes should focus on the community level and the interventions should target a group or community rather than an individual. For this phase of the review, each nurse expert carefully considered the definitions of the nursing diagnosis, outcomes, and interventions selected. In addition, we determined the fit of the NOC indicators to the components of the nursing diagnosis and the appropriateness of the NIC activities for treating each nursing diagnosis.

**Table 1. NANDA-I, NOC, and NIC linkages for Community Response to COVID-19**

**NANDA-I diagnosis: Deficient Community Health (00215)**  
**Definition: Presence of one or more health problems or factors that deter wellness or increase the risk of health problems experienced by an aggregate**

<b>Outcome to measure resolution of the nursing diagnosis</b>	
Community Health Status (2701)	
<b>Outcomes to measure defining characteristics</b>	
Community Immune Status (2800)	
Community Program Effectiveness (2808)	
Community Risk Control: Communicable Disease (2802)	
<b>Outcomes associated with related factors</b>	
Community Competence (2700)	
Community Health Screening Effectiveness (2807)	
Community Resiliency (2704)	
<b>Outcomes associated with at-risk population and associated condition</b>	
Community Risk Control: Chronic Disease (2801)	
<b>Suggested nursing interventions for problem resolution</b>	
Case Management (7320)	Health Education (5510)
Communicable Disease Management (8820)	Health Policy Monitoring (7970)
Community Health Advocacy (8510)	Health Screening (6520)
Community Health Development (8500)	Program Development (8700)
Environmental Management: Community (6484)	Resiliency Promotion (8340)
Fiscal Resource Management (8550)	Surveillance: Community (6652)

**NANDA-I diagnosis: Ineffective Community Coping (00077)**  
**Definition: A pattern of community activities for adaption and problem-solving that is unsatisfactory for meeting the demands or needs of the community**

<b>Outcome to measure resolution of the nursing diagnosis</b>	
Community Resiliency (2704)	
<b>Outcomes to measure defining characteristics</b>	
Community Competence (2700)	
Community Health Status (2701)	
Community Immune Status (2800)	
Community Program Effectiveness (2808)	
Community Risk Control: Communicable Disease (2802)	
<b>Outcomes associated with related factors</b>	
Community Health Screening Effectiveness (2807)	
Community Grief Response (2703)	
<b>Outcomes associated with at-risk population and associated condition</b>	
Community Risk Control: Chronic Disease (2801)	
<b>Suggested nursing interventions for problem resolution</b>	
Case Management (7320)	Health Education (5510)
Communicable Disease Management (8820)	Health Screening (6520)
Community Health Advocacy (8510)	Health Policy Monitoring (7970)
Community Health Development (8500)	Program Development (8700)
Conflict Mediation (5020)	Resiliency Promotion (8340)
Consultation (7910)	Risk Identification (6610)
Environmental Management: Community (6484)	Social Marketing (8750)

**Table 1. Continued**

**NANDA-I diagnosis: ineffective community coping (00077)**  
**Definition: A pattern of community activities for adaption and problem-solving that is unsatisfactory for meeting the demands or needs of the community**

Environmental Risk Protection (8880)	Support System Enhancement (5440)
Fiscal Resource Management (8550)	Surveillance: Community (6652)

We reviewed the NNN linkages until we reached consensus. As we discussed the NNN linkages, we identified potential new diagnoses, outcomes, and interventions for future development as a final fifth step in the linkage process.

The experts used their knowledge, clinical judgment, and clinical practice experience to make final decisions on the linkages. Part one of this project focused on the identification of NNN linkages for the community and Part two on psychosocial and physiological problems considering three scenarios at the individual level: individuals sheltering in place to avoid the virus; individuals with the virus but recovering at home; and individuals requiring hospital care with or without ventilator support.

**Findings**

Two community level nursing diagnoses were identified as key problems appropriate for a pandemic related to COVID-19: *Deficient Community Health* (00215) and *Ineffective Community Coping* (00077). These nursing diagnoses are important for any community experiencing a global pandemic and fit well with the model we developed. Only problem-focused nursing diagnoses or risk nursing diagnoses were considered. Health promotion nursing diagnoses were not included in the linkages for a pandemic because in a crisis nurses focus on the priority problems communities are experiencing. The table constructed for this community level response to COVID-19 begins with the nursing diagnosis, code, and definition (Table 1). *Deficient Community Health* (00215) is from the domain 1, Health Promotion of taxonomy II. *Ineffective Community Coping* (00077) is from domain 9, Coping/Stress Tolerance (Herdman & Kamitsuru, 2018).

For the nursing diagnosis *Deficient Community Health* (00215), eight nursing outcomes and 12 nursing interventions were selected as part of the linkage process (See Table 1). In comparison for the nursing diagnosis, *Ineffective Community Coping* (00077), nine nursing outcomes and 18 nursing interventions were determined to support a community challenged with providing a response to the COVID-19 pandemic.

Table 2 provides a beginning list of proposed nursing diagnoses, outcomes, and interventions for future development. The table identifies 11 nursing diagnoses, 10 nursing

(Continued)

**Table 2. Proposed NANDA-I Nursing Diagnoses, NIC Interventions, and NOC Outcomes for Future Development**

Potential NANDA diagnoses	
Community Health Security Deficient	Infectious Hazards: Community
Compromised Community Grieving	Ineffective Community Health Management
Compromised Community Sheltering-in-place	Ineffective Community Protection
Compromised Community Social Distancing	Perceived Community Vulnerability
Deficit Community Resiliency	Risk for Infection: Community
Deficit Community Resources	
Potential NOC outcomes	
Community Personal Protective Equipment Adherence	Community Risk Control: Pandemic
Community Coping	Community Sheltering-in-Place Adherence
Community Grief Resolution	Community Social Distancing Adherence
Community Health Security	Community Social Support
Community Infection Control	
Community Pandemic Readiness	
Potential NIC interventions	
Case Identification: Infectious	Community Sustenance Support
Community Area Restriction: Pandemic	Coping Enhancement: Community
Community Environmental Management: Infection	Emergency Care: Disaster
Community Health Emergency Information Management	Emergency Care: Pandemic
Community Health Emergency Management	Environmental Management: Community Worker Safety
Community Infection Protection	Grief Facilitation: Community
Community Pandemic Preparedness	Infection Control: Community
Community Risk Identification	Research Data Collection: Community
Community Sheltering-in-Place Support	Triage: Pandemic
Community Social Distancing Support	

outcomes, and 19 nursing interventions for a total of 40 new concepts to support nursing practice during a pandemic. We have provided concept labels to capture the areas we found missing during the linkage process. These are arbitrary concept names that capture the focus on the nursing diagnosis,

outcome of intervention and can be refined as the work of developing these concepts is done.

## Discussion

Nurses are educated to implement the nursing process; it is the signature of the profession and the focus of clinical practice. Nursing science seeks knowledge specifically related to the discipline, which can support the day to day practice of nurses. In addition, the nursing process has the capacity to offer support to clinical decision-making to achieve the quality of nursing care desired for individuals, families, and communities, especially in the throes of this health care crisis. Critical to the nursing process internationally, nurses have been involved in the development of standardized nursing terminologies to enhance the ability of nurses to interact and share data worldwide. It is essential that nurses involved with terminology development identify the gaps in the current classifications to advance the current state of nursing practice related to pandemics. We are at a critical juncture in the health of citizens globally and we need to share resources quickly with nurses and other healthcare providers across the international community. COVID-19 knows no geographical boundaries.

## Linkage Challenges Within the NNN taxonomies

This linkage study identified relevant NNN concepts for planning a response to a pandemic. However, we faced some challenges in identifying useful diagnoses and interventions. The NANDA-I classification uses axes to define the dimension of the human response that nurses use as part of the diagnostic process. There are seven axes that describe a nursing diagnosis (Herdman & Kamitsuru, 2018). For this study, two dimensions are important. Axis 1 describes the focus of the diagnosis and Axis 2 describes the subject of the diagnosis (individual, family, group, caregiver, and community). Unlike NIC and NOC, the NANDA-I Taxonomy II does not have a domain dedicated to community level nursing diagnoses, making it more difficult to quickly identify community level problems in the taxonomy. The inclusion of a table of community level nursing diagnoses would be helpful in the next edition of the NANDA-I work.

NIC does have a community level domain, but not all interventions for groups are placed in this domain. In several cases, we had to rely on the definition of an intervention to determine if the intervention was developed for groups or communities. This may occur because the actions the nurse chooses to perform for an intervention may be the same for a group or an individual. For example, the intervention, *Resiliency Promotion* (8340), is defined as "assisting individuals, families, and communities in development, use, and strengthening of protective factors to be used in coping with environmental and social stressors" (Butcher, Bulechek, Dochterman, & Wagner, 2018, p. 326). This intervention is in the family domain in NIC. In contrast, all community level



outcomes in NOC are found in the community domain and the indicators used for measuring an individual or a community level outcome are not the same.

### Community Nursing Diagnoses for Pandemics

Only two problem-focused nursing diagnoses were selected to structure the linkages of NIC interventions and NOC outcomes at the community level. *Deficient Community Health* (00215) was added to the NANDA-I taxonomy in 2010 and provides *defining characteristics* and *related factors* for nurses to consider when selecting nursing diagnoses based on their assessment data (Herdman & Kamitsuru, 2018, p. 148). It focuses on an aggregate or group with one or more health problems and fits the concept of a community level nursing diagnosis with an emphasis on programs to meet community needs. *Ineffective community coping* (00077) was added to the NANDA-I taxonomy in 1994 and was revised in 1998 and again in the latest edition in 2018. It provides *defining characteristics*, *related factors*, and the new category *at-risk populations* as key components of the nursing diagnosis (Herdman & Kamitsuru, 2018, p. 329). This diagnosis focuses on community activities to adapt and solve problems and considers stress, vulnerability, and powerlessness as defining characteristics, for example. The related factors focus on community resources. Exposure to pandemics and epidemics could be added to the list of at-risk populations for this nursing diagnosis to better address outbreaks of infectious diseases such as COVID-19.

### Potential Use of the Concept Contamination to Describe Pandemics

We considered using two other community focused nursing diagnoses in the linkages we identified for COVID 19: *Contamination* (00181) and *Risk for Contamination* (00180). The definition of *Contamination* (00181) is "exposure to environmental contamination in doses sufficient to cause adverse health effects" (Herdman & Kamitsuru, 2018, p. 424). The *defining characteristics* are categorized into pesticides, chemicals, biologics, pollution, waste, and radiation. No definitions are provided for these terms and it was difficult to conclude that the biologics category included viral infections. The key word in each of these categories is "exposure." The *related factors* are focused primarily on external factors such as chemical contaminants in food and water, inadequate protective clothing, and use of noxious materials, for example. The *at-risk populations* category does not include exposure to viral infections.

The definition of the nursing diagnosis *Risk for Contamination* (00180) is "susceptible to exposure to environmental contaminants, which may compromise health" (Herdman & Kamitsuru, 2018, p. 426). Since this diagnosis is a "risk for" diagnosis, no defining characteristics are used to describe this potential problem. The related factors are identical to those listed for *Contamination* (00181). Both nursing diagnoses were added to the NANDA-I taxonomy in 2006 and

revised in 2017. We concluded that these nursing diagnoses were not a good match to the COVID-19 pandemic. They were more clearly aligned with environmental contamination such as bioterrorism, disasters, chemical spills, or radiation.

### Potential Linkage of Disaster Related NICs and NOCs to NANDA-I Diagnoses

We discovered additional issues with linking NOC outcomes and NIC interventions to the two problem focused nursing diagnoses appropriate for the pandemic. Examples of outcomes we did not include in the linkages were *Community Disaster Readiness* (2804) and *Community Disaster Response* (2806). Although these are community focused outcomes, the definitions focus on "natural or man-made calamitous events" (Moorhead, Swanson, Johnson, & Maas, 2018, p. 166-167). The indicators focus on activities the communities would evaluate using the adequate to totally adequate measurement scale. Some of the indicators would be useful for evaluating a response to the COVID-19 pandemic such as "surge capacity of hospital resources" or "mass immunization plan" from the *Community Disaster Readiness* (2804) outcome, while other indicators, such as "notification network to alert response personnel," better address the readiness of a community to respond to a tornado or hurricane event, for example. This definitional issue is also present in the NIC interventions *Bioterrorism Preparedness* (8810) and *Community Disaster Preparedness* (8840) (Butcher et al., 2018).

We found fundamental differences between how communities respond to a disaster compared to a pandemic. The community response to disasters such as weather-related tornadoes, hurricanes, and floods draws the responders to a localized area to assist victims of these events. There is a naturally occurring end to the event and resources and emergency responders can be focused on the area of damage when the natural event is concluded. Forecasting of peak exposures and confirmed cases to determine a downward trend in new cases can be severely compromised by the required social distancing and subsequent "flattening of the curve." This extends the time when responders can begin to focus on the area(s) of damage and return to "normal" activities. It also severely stretches healthcare resources and abilities to adequately continue to respond to the outbreak. The protection of emergency responders differs greatly from the risk of responders to COVID-19. In the case of a pandemic, community efforts should not draw more people to the affected area and early social distancing is the key strategy to responding to "hot spots" that develop because of the spread of the disease.

### Proposed New NNN Labels for Development

We recommend the development of specific nursing diagnoses, outcomes, and interventions to address epidemics and pandemics. We would be the first to admit that this

is a preliminary list and others may be needed once the pandemic has run its course. An outcome focused on *Community Coping* (proposed) would have been a good match for the nursing diagnosis *Ineffective Community Coping* (00077). This outcome needs to be developed to capture the challenges of the lifestyle changes placed on community members when there is no available treatment for a new strain of a virus. In addition, an outcome for *Community Social Support* (proposed) is needed. A NIC intervention focused on providing community support such as *Coping Enhancement: Community* (proposed) would also need to be developed to accurately treat this nursing diagnosis. The addition of these suggestions for outcomes and interventions would enhance the linkages to the NANDA-I classification for this problem.

Social distancing has become a common strategy for mitigation activities related to COVID-19. Table 2 suggests the development of a nursing diagnosis called *Compromised Community Social Distancing* (proposed). This problem-focused diagnosis would focus on the issue of groups of individuals coming together in social situations during a pandemic. We have all heard about individuals continuing to go to the beach during spring break in Florida this year. An outcome named *Community Social Distancing Adherence* (proposed) should be developed to measure how well individuals follow this mandate during a pandemic. In addition, an intervention focused on *Community Social Distancing Support* (proposed) could be useful for nurses working in the community.

Another area that needs to be addressed by nursing terminologies is related to the predicted death rate associated with this pandemic and the ability of a community to mourn. A problem-focused nursing diagnosis to describe community grieving such as *Compromised Community Grieving* (proposed) is needed. The ability of friends and family to come together to support the loss of a loved one is severely impacted during a pandemic. An outcome to measure *Community Grief Resolution* (proposed) is needed and an intervention focused on *Grief Facilitation: Community* (proposed) could provide strategies help a community respond to losses that occur during a pandemic.

Sheltering in place became a common strategy used by governors in many states to reduce exposure to COVID-19. We recommend the development of a nursing diagnosis called *Compromised Community Sheltering-in-Place* (proposed) be developed for future editions of the NANDA-I classification. The addition of a new NIC intervention, *Community Sheltering-in-Place Support* (proposed), could identify strategies to assist community members to comply with this request from city, state, or country officials. A NOC outcome, *Community Sheltering-in-Place Adherence* (proposed) should focus on measuring adherence to a government mandate for community members to remain in their homes to reduce or delay the spread of viral pandemic such as COVID-19.

A problem-focused nursing diagnosis should be added to the NANDA-I classification focused on *Compromised Community Resilience* (proposed). This concept is important in a pandemic because of the length of time a community needs

to restrict large public gatherings and activities and protect individuals from viral exposure. At the same time other essential workers, employed in health care, public services, and in the food chain for example, are continuing to work in the community and interact with the public. These individuals face new challenges and lack of resources to do their work safely in a COVID-19 environment. The fifth edition of NOC added an outcome, *Community Resiliency* (2704) and the third edition of NIC published an intervention for individuals, families, and communities called *Resiliency Promotion* (8340) although many of the activities are focused on individuals and families rather at the community level. These standardized outcome and interventions would provide key linkages for this proposed community focused nursing diagnosis.

A lack of resources has been a challenge for everyone during this pandemic. Shortages of food, cleaning supplies, and paper products have made headlines across the country. Shoppers have faced empty shelves at the supermarket and hoarding has been a common problem. Critical shortages of personal protective equipment and ventilators have been challenges in healthcare delivery. We recommend a new nursing diagnosis to address this issue: *Deficient Community Resources* (proposed). A variety of proposed interventions and outcomes to address these challenges are provided in Table 2.

The only risk for diagnosis we recommend for future development is *Risk for Infection: Community* (proposed). The impact of COVID-19 at the community level will change how individuals participate in social groups in the future. We are only beginning to see changes in our culture that will result from this pandemic. An outcome focused on *Community Infection Control* (proposed) is needed to measure changes that will become part of our "new normal." In the future, employees coming to work ill or with symptoms of respiratory problems will not be tolerated as workplace policies change in response to this pandemic. Working at home has become much more desirable to both employers and employees as an attempt to "flatten the curve" of this pandemic. A new intervention called *Infection Control: Community* (proposed) is also needed.

## Future Work

There is much development work needed to address the many content gaps we found from this linkage study. Many new nursing diagnoses, interventions, and outcomes were identified from this project. We believe that additional risk nursing diagnoses may need to be developed for each of the actual problems we identified. We hope other nurses will join us in ensuring that the needed community focused nursing diagnoses, outcomes, and interventions are developed and validated to enhance our preparation for providing care during a pandemic. These situations, like so many times in our past, highlight the best qualities in our profession and make us proud to be nurses.

### Conclusion

This paper focuses on a community response to COVID-19. The manuscript provides a new model, *nursing care in response to pandemics model* to depict the current global pandemic. NANDA-I nursing diagnoses combined with NOC outcomes and NIC interventions listed in the article support nursing practice by promoting and stimulating the use of three nursing standardized terminologies. Despite the high demands on nurses' time, the need for valid and reliable documentation of nursing care continues during the crisis. Additional terminology focused on nursing diagnoses, interventions, and outcomes for pandemics needs to be developed.

### Implications for Nursing Practice, Education, Research, and Policy

The COVID-19 pandemic highlights and reinforces the importance of nursing participating in community efforts to minimize the impact of this virus that currently has no prevention treatment options or vaccine available. In community settings, nurses have a vital role in monitoring, evaluating, and providing information regarding prevention, symptoms, and treatment of physiological and psychosocial response to the infection. The NNN linkages identified in this manuscript serve as important resources for nurses working in community settings by providing models and examples of care plans based on standardized nursing terminologies and supporting nurses at a time when decisions need to be made quickly. In pandemic environments nurses may need cross-training in areas they do not routinely provide care. Care plans that facilitate this training can improve the nurses' confidence and ability to provide quality care in difficult situations.

The NNN linkages to the current pandemic are an important learning resource for students and faculty, especially for community health nursing or public health nursing courses. The expansion of the content of the classifications is an important addition to the work and will greatly expand the community level problems, outcomes, and interventions that students can use to assess and provide care to communities during their educational experiences.

Research is needed to validate the linkages used in community settings focused on the experiences of healthcare workers during this pandemic. With standardized nursing data using nursing diagnoses, outcomes, and interventions at the community level, and the lessons learned from caring for patients during this pandemic, nurses and other professional can contribute to and influence policy decisions at the local, state, country, and global level. We believe the pandemic provided an opportunity to enhance the comprehensiveness of all three terminologies and increase the number of nursing diagnoses, outcomes, and interventions focused on the community level of care.

### Author contributions

Sue Moorhead designed and directed the research project and was involved with the initial draft of linkages and primary writing of manuscript. Tamara Gonçalves Rezende Macieria and Karen Dunn Lopez did the model development and introduction and the critical review of article. Vanessa Monteiro Mantovani assisted with writing, reviewed linkages, and the critical review of the article. Elizabeth Swanson reviewed linkages, and did the critical review of final draft of article. Cheryl Wagner reviewed the linkages and critical review of final draft of article. Noriko Abe formatted tables and references and did the final critical review of the draft of the article.

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### References

- Begley, S. (2020). *Who is getting sick, and how sick? A breakdown of coronavirus risk by demographic factors*. STAT. Retrieved from <https://www.statnews.com/2020/03/03/who-is-getting-sick-and-how-sick-a-breakdown-of-coronavirus-risk-by-demographic-factors/>
- Baral, S., Logie, C. H., Grosso, A., Wirtz, A. L., & Beyrer, C. (2013). Modified social ecological model: A tool to guide the assessment of the risks and risk contexts of HIV epidemics. *BMC public health*, 13(1), 482. <https://doi.org/10.1186/1471-2458-13-482>
- Butcher, H. K., Bulechek, G. M., Dochterman, J. M., & Wagner, C. M. (Eds.). (2018). *Nursing interventions classification (NIC)* (7th ed.). Amsterdam: Elsevier.
- Center for Disease Control and Prevention (2020). Implementation of mitigation strategies for communities with local COVID-19 Transmission. Retrieved from <https://www.cdc.gov/coronavirus/2019-ncov/downloads/community-mitigation-strategy.pdf>
- D'Antonio, P. (2019). The great flu and after: Why the nurses? *American Journal of Public Health*, 109(6), 832-833. <https://doi.org/10.2105/AJPH.2019.305093>
- De Avila, J., & Chen, T. P. (2020). To fight coronavirus, states call on retired medical staff and new graduates. *The Wall Street Journal*, (2020, March 31). Retrieved from <https://www.wsj.com/articles/to-fight-coronavirus-states-call-on-retired-medical-staff-and-new-graduates-11585647003>
- Golden, S. D., & Earp, J. A. L. (2012). Social ecological approaches to individuals and their contexts: Twenty years of health education & behavior health promotion interventions. *Health Education & Behavior*, 39(3), 364-372.
- Herdman, T. H., & Kamitsuru, S. (Eds.). (2018). *NANDA international nursing diagnoses: Definitions and classification 2018-2020* (11th ed.). Stuttgart, Germany: Thieme.
- Hewlett, B. L., & Hewlett, B. S. (2005). Providing care and facing death: Nursing during Ebola outbreaks in central Africa. *Journal of Transcultural Nursing*, 16(4), 289-297.
- Johnson, M., Bulechek, G., Dochterman, J. M., Maas, M., & Moorhead, S. (Eds.). (2001). *Nursing diagnoses, outcomes, and interventions: NANDA, NOC, & NIC linkages*. Maryland Heights, Missouri: Mosby.
- Johnson, M., Bulechek, G., Butcher, H., Dochterman, J. M., Maas, M., Moorhead, S., & Swanson, E. (Eds.). (2006). *NANDA, NOC, and NIC linkages: Nursing diagnoses, outcomes, & interventions* (2nd ed.). Maryland Heights, Missouri: Mosby.
- Johnson, M., Moorhead, S., Bulechek, G., Butcher, H., Maas, M., & Swanson, E. (2012). *NOC and NIC linkages to NANDA-I and clinical conditions: Supporting critical reasoning and quality care* (3rd. ed.). Amsterdam: Elsevier.
- Kuehnert, P. L. (1991). Community health nursing and the AIDS pandemic: Case report of one community's response. *Journal of Community Health Nursing*, 8(3), 137-146. <https://doi.org/10.1177/1043659605278935>



- Lounsbury, D. W., & Mitchell, S. G. (2009). Introduction to special issue on social ecological approaches to community health research and action. *American Journal of Community Psychology, 44*(3-4), 213.
- Mantovani, V. M., Moorhead, S., & Abe, N. (2020). NANDA-I, NOC, and NIC linkages for nutritional problems. *International Journal of Nursing Knowledge*. <https://doi.org/10.1111/2047-3095.12279>
- Moorhead, S., Swanson, E., Johnson, M., & Maas, M. L. (Eds.). (2018). *Nursing outcomes classification (NOC): Measurement of health outcomes* (6th ed.). Amsterdam: Elsevier.
- Turner, T. (2020). What you should know about COVID-19 if you are older or have a chronic condition. Retrieved from <https://www.drugwatch.com/news/2020/03/10/what-you-should-know-about-covid-19-if-you-are-older-or-have-a-chronic-condition/>
- Tzeng, H.-M. (2003). Fighting the SARS epidemic in Taiwan: A nursing perspective. *JONA: The Journal of Nursing Administration, 33*(11), 565-567. Retrieved from <http://doi.org/10.1097/00005110-200311000-00005>
- Ueda, M., Martins, R., Hendrie, P. C., McDonnell, T., Crews, J. R., Wong, T. L., & Stewart, F. M. (2020). Managing cancer care during the COVID-19 pandemic: Agility and collaboration toward a common goal. *Journal of the National Comprehensive Cancer Network*. Retrieved from <http://doi.org/10.6004/jnccn.2020.7560>
- World Health Organization. (2020a). WHO timeline–COVID-19. Retrieved from <https://www.who.int/news-room/detail/08-04-2020-who-timeline-%2014covid-19>
- World Health Organization. (2020b). Coronavirus disease 2019 (COVID-19): Situation report-100. Retrieved from [https://www.who.int/docs/default-source/coronaviruse/situation-reports/20200429-sitrep-100-covid-19.pdf?sfvrsn=bbfbf3d1\\_6](https://www.who.int/docs/default-source/coronaviruse/situation-reports/20200429-sitrep-100-covid-19.pdf?sfvrsn=bbfbf3d1_6)