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Racial Disparities in Cancer Care | Access to Care for Transgender Veterans | Hepatitis C Among US Veterans | Battling Tobacco Use at Home | [illegible] | How Might the Provision of Culturally Competent Services Be Enhanced for American Indian and Alaska Native Veterans? | Improving Trends in Gender Disparities | Suicidality Among Hispanic and African American Veterans Following Surgery

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COVER: The Difference Is Power mural reflects the transformative public health contributions of 4 nurses, the advocacy for equitable health care for all, and the embodiment of our differences and shared collectivism. It is a visual opportunity for us to pause and celebrate nursing and public health. The purpose of this *AJPH* supplemental issue on "Nursing and Public Health" is to disseminate knowledge about pioneering evidence-based practices, translational research findings, and futurist pedagogical guidance, and to inspire action by nurses and everyone working in public health and health care.
Cover concept and selection by Aleisha Kropf. Mural by artists Jessica Sabogal and Shanna Strauss, commissioned by Catherine Gilliss, RN, PhD, FAAN, Dean of the University of California, San Francisco School of Nursing. Printed with permission.

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BACKMATTER

OTHER DEPARTMENTS

Public Health Nurses: The Most Essential Single Factor



This special issue of *AJPH* on nursing and public health celebrates a long history of nursing aimed to protect, promote, and improve public health. According to a 1926 *AJPH* editorial, 1885 may have been the first year a graduate nurse was employed in a public health setting (https://bit.ly/37ZtUl0). Nurses were actively involved in the American Public Health Association (APHA), formally launching the APHA Public Health Nursing section of *AJPH* a century ago, in 1922.

AJPH has long acknowledged, documented, and celebrated the importance of nursing to public health. A literature search in PubMed found that the first *AJPH* article about public health nurses was published in 1913. In this article, the health nurse was proclaimed the "most essential single factor" (https://bit.ly/3LuiAek; p350) for promoting and improving public health. Perusal of 1913 *AJPH* titles found topics related to many of the articles in this Nursing and Public Health supplement: various vulnerable populations (infants, children, higher age groups), social evil in relation to health, sex hygiene, the freezing of vaccines, and numerous air washing and other environmental health topics.

A 1924 census of public health nursing reported 3032 agencies doing public health nursing, 78% of which employed their first public health nurse in 1914 or later. *AJPH* editors noted, "This stock taking of public health nursing in the United States shows what has been done and also what there is still to do to make public health nursing available to all who want and need it" (https://bit.ly/37ZtUl0; p823). During the 1920s, *AJPH* articles began to appear with such topics as mental hygiene, teaching children about wholesome foods, the injurious effects of tobacco on youths, climate, racism ("the color problem"), public health nursing qualifications and education, the interprofessional collaboration among public health disciplines including nursing, the relation of the public health nurse to the practicing physician, public health nomenclature, and public health nursing effectiveness research (https://bit.ly/3PvLcae). One author asked, "Is the public health nurse a carrier of infection?" (https://bit.ly/3wAF5sB) which, in the COVID-19 era, is once again an important topic.

Since 1913, *AJPH* has published 14 articles per year on average related to nursing, with yearly numbers increasing over time. In 1923, there was a regular column titled "Public Health Nursing" by Annie M. Brainerd. By far, the greatest number of articles in *AJPH* related to nursing in a year was 172 in 2021; 22 have already been published to date as we write this editorial for the Nursing and Public Health supplement in 2022.

We are honored to serve as guest editors of this special issue that builds on more than a century of *AJPH* recognition of the multifaceted role and crucial service of nurses and provides a glimpse of nursing's thought leadership, research, education, and practice in the 21st century. Given our proud history, unique disciplinary insights, workforce presence, and leadership capacity, we expect the nurse as innovator and leader, trusted team member, and skilled practitioner will continue wholeheartedly to solve pressing public health problems of today and the future.

Will these same public health topics and global health priorities persist for the next century? Or will technological, genomic, precision health, and pharmacological solutions shift these conversations? To those of you who are our readers 100 years from now, we hope you perceive that this special issue expresses our passion for nursing and public health, the urgency with which we strove to address the immense challenges of our day, and the legacy we upheld as a foundation for your anticipated service, education, and research. We are optimistic that in the future nurses will continue working together with colleagues of all disciplines, making real progress toward a shared vision of health for all. AJPH

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9 Years Ago

Safety of Aspiration Abortion Performed by Nurse Practitioners, Certified Nurse Midwives, and Physician Assistants Under a California Legal Waiver

Because the average cost of a second-trimester abortion is substantially higher than that of a first-trimester procedure, shifting the population distribution of abortions to earlier gestations would result in safer, less costly care. Increasing the types of health care professionals involved in abortion care is one way to reduce this health care disparity. . . . We found that the care provided by newly trained NPs, CNMs, and PAs was not inferior to that provided by experienced physicians. . . . Moreover, on the basis of findings in other studies, we expect this risk difference to narrow further over time. . . . As the demand for health care providers increases under US health care reform, one part of the solution for all health care, including abortion care, is to allow all qualified professionals to perform clinical care to the fullest extent of their education and competency.

From *AJPH,* March 2013, p. 458–460, passim

46 Years Ago

Nurse Practitioners and Nursing Practice

The concept of expanded roles for professional nurses is not new. . . . Undoubtedly, many innovative changes in the system of nursing education are required to fully implement the concept of nurse practitioners. Undergraduate, graduate, and continuing nursing education programs need to focus upon the preparation of nurse practitioners for expanded roles. The emphasis on clinical nursing in graduate education that is based on an essential core of knowledge of the science and practice of nursing is definitely a movement in the right direction. One thing is certain—as the nurse practitioner is recognized and accepted for his or her needed contributions to the health care delivery system—there is increased hope of achieving improved health care for all Americans.

From *AJPH,* March 1976, pp. 245–246, passim

Nursing and Public Health Special Issue

Linda A. McCauley, RN, PhD, Catherine M. Waters, RN, PhD, and Karen A. Monsen, RN, PhD, MS

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In this *AJPH* special issue, "Nursing and Public Health," nurses and their colleagues share novel practice insights, cutting-edge research findings, educational guidance, and urgent calls to action for nurses and everyone working in public health and health care today. The articles showcase nursing research, leadership, education, and practice responses to critical public health challenges, such as the climate crisis, the COVID-19 pandemic, trauma and related issues, and workforce needs.

PLANETARY HEALTH

Numerous articles focus on climate-related issues. Kurth and Potter (p. S259) exhort nurses to join forces to address the planetary health crisis, strongly supporting the public health infrastructure to address climate change and other planetary health crises. LeClair et al. (p. S256) explicate the challenges we will all face because of climate change, which inflicts unjust burdens on marginalized and displaced peoples, as well as other species and their interconnected ecosystems. Climate justice in nursing addresses the social, racial, economic, environmental, and multispecies factors related to climate changes and crises. Climate equality can be achieved by centering the experiences and knowledges of frontline and fence line communities and safeguarding nature to achieve planetary health. Watts and Brugger (p. S241) address how using paleofire data (i.e., sedimentary records of ancient fires) for public health planning related to wildfires can improve future public health system adaption, population health, and planetary health.

COVID-19

Several articles address COVID-19 pandemic issues. Throughout the COVID-19 response, nurses at local, state, and federal levels have consistently answered the call with a resounding "Yes," performing jobs that blend clinical knowledge, science, and public health. Zauche et al. (p. S226) describe public health nursing (PHN) roles at the Centers for Disease Control and Prevention and how the nursing profession has been essential in ensuring the health and safety of our most vulnerable groups. As the COVID-19 pandemic has exacerbated the public health and health equity challenges experienced in the United States, Morone et al. (p. S231) underscore the importance of including nursing perspectives when addressing public health issues. Nurses hold significant positions in strengthening, rebuilding, and reimagining the public health system in the United States and advancing public health, yet they are underrepresented in the policy- and agenda-setting spaces.

McCauley (p. S218) responds to the articles by Zauche et al. and Morone et al., emphasizing the importance of nurses to public health policy and practice. Harris et al. (p. S245) describe a practical approach to health coaching based on stages of vaccine readiness and acceptance. Nurses are leading the nation's vaccine administration efforts and may be the most accessible source of answers to questions on safety, side effects, and benefits. Harris et al. offer a detailed explanation of the stages of vaccine readiness and acceptance that moves the conversation forward, instead of mainly focusing on vaccine hesitancy.

Additionally, Kershner et al. (p. S279) describe the implementation of a large, open, drive-through point of distribution site for eligible individuals to receive COVID-19 vaccinations. Such a safe and efficient distribution of preventive treatments, COVID-19 vaccines, via point of distribution sites were critical to mitigating significant morbidity and mortality of the general public. Freed et al. (p. S284) discuss the role of nurse practitioners in community and academic health center settings in response to the needs of vulnerable populations during a pandemic. Their nurse practitioner–led initiative provided patients and staff a safe and effective option for in-person, evidence-based, patient-centered, community-based clinical care during the COVID-19 pandemic. Finally, Singer et al. (p. S288) examine how spirituality may inform health and health care

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beliefs and behaviors among Black sex workers during COVID-19. Their findings indicate that integrating religion and spirituality in community-engaged health interventions may be one way for PHN to meet their needs and facilitate culturally safe care.

APPROACHES

Articles in this special issue also showcase PHN innovations and effectiveness across diverse settings and populations. A mural (p. S268) depicting pioneering nurses from diverse backgrounds who contributed to the fields of nursing and public health celebrates their successes. Szanton (p. S265) describes an evidence-based intervention that nurses could implement to increase the ability of older adults and their families to thrive in place. This is a timely solution, particularly as health care shifts away from acute care hospitals to home- and community-based settings. Ballard et al. (p. S298) describe programming to address the long-term consequences on the health of children, adults, and communities that adverse childhood experiences can have. As health systems implement adverse childhood experience screening in primary care, a new trauma-informed approach in PHN, delivered through maternal–child home visiting programs, can help identify and respond to families with current or historical trauma who may not access primary care. Support for rapid innovation through evidence-informed interventions such as trauma-informed approach PHN can equip public health systems and nurses to respond more quickly to the crisis of childhood trauma, particularly in the most underserved communities.

Huling et al. (p. S306) introduce the use of modern causal inference techniques for studying real-world PHN intervention data, enabling the rigorous study of policy-relevant questions of intervention effectiveness. This work is possible because practicing public health nurses have generated rigorous data during their routine documentation of evidence-based interventions for a high-risk population: children at risk for child welfare referrals. They used a multidisciplinary terminology called the Omaha System, which was designed to guide, document, and measure intervention effectiveness. Monsen (p. S220) responds to the articles by Ballard et al. and Huling et al., asserting that PHN family home visiting is ready for widespread dissemination, as nurses are equipped to translate family home visiting evidence into practice.

COMMUNITY RESILIENCE

Having influence at the population and community health levels is integral to advanced PHN practice. With a focus on promoting and creating community resilience, Duva et al. (p. S271) share their insights on a low-cost, replicable nurse-led intervention to address public mental health needs. They demonstrate how nurse-led innovative trainings and cross-sector programs support population mental health by strengthening the well-being of individuals, families, and communities. This feasible, effective implementation is part of a multifaceted approach that was adapted to improve population mental health during the COVID-19 pandemic. Austin et al. (p. S275) describe an academic–practice collaboration's community-based intervention that combines community-based participatory methods and community-driven data to deepen the understanding of whole person health that includes strengths, challenges, and needs and serves as a platform for data-driven decision making. This novel approach lays the foundation of a system based on equitable health promotion and a shift in the focus of community narratives from deficits to strengths. Waters (p. S224) responds to the articles by Austin et al. and Duva et al., emphasizing PHN impact on strengthening community resilience. This is further exemplified by Horning (p. S269), who describes how PHN researchers at the University of Minnesota are partnering with the Twin Cities Mobile Market to rigorously study the full-service mobile market's effects on diet quality and food security.

POLICY

Furthermore, numerous articles address policy matters related to challenges facing the PHN workforce and education. Kneipp et al. (p. S292) describe an urgent need for reenvisioning workforce enumeration to ensure a public health workforce that is adequate for meeting the current goals of several public health and nursing initiatives. Reiss-Brennan et al. (p. S253) call for an end to siloing, or separating, primary care and public health. They emphasize that nurses are perfectly positioned to launch this seismic shift for US health care, including the integration of data systems, staffing, and strategic planning. Moreover, they call for meaningful partnerships between primary care, public health, and community organizations to achieve this level of cohesion.

ACADEMIA

Thurman et al. (p. S314) discuss the challenges facing PHN faculty, who

possess expertise that is crucial to advancing public health and preparing nurses as practitioners, educators, and scientists to address social determinants of health and health inequities and to improve public health systems. They show how traditional academic structures in which PHN faculty work and the efforts needed to protect and improve public health are misaligned, and they urge PHN faculty to take collective action—as systemic change in nursing academia is necessary for the discipline to engage in the critical work of dismantling broken systems and building toward an equitable future.

Jones et al. (p. S237) urge schools of nursing to respond to the call for deeper investments in PHN, both in didactic and clinical courses, to prepare a workforce ready to address public health threats. Oerther and Oerther (p. S250) discuss educating public health nurses in the context of massive planetary environmental challenges brought about by the actions of humanity (i.e., in the Anthropocene). To ensure that no one is left behind, they propose solutions to the central question facing PHN educators adept in patient and individual as well as population health: "How do we improve interprofessional environmental health education to achieve effective collaboration beyond the bedside?"

Harris et al. (p. S231) emphasize the urgent need to train the next cadre of nurses who are interested in public health and health policy careers to prepare them for future challenges. Johnson (p. S222) responds in support of the recommendation of Harris et al. to expand PHN and health policy programs and dives deeper into long-standing issues needed to address advanced PHN education to have its maximal effect. Finally, Hassmiller (p. S262) discusses how advancing the recommendations from the National Academy of Medicine Committee's "The Future of Nursing 2020–2030" consensus study report will revitalize public health nursing.

FINAL THOUGHTS

We are encouraged by the compelling messages this *AJPH* special issue advances. Even as this special issue celebrates the power and potential of nursing, we realize we have barely scratched the surface of nursing's contributions to the public's health. Nor have we adequately explicated today's urgent public health challenges that are in need of a comprehensive, holistic nursing response. We urge nurses to lead, innovate, and advance public health—now, more than ever. AJPH

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CONFLICTS OF INTEREST

The authors have no conflicts of interest to declare.

Superheroes Can Be Experts Too: The Importance of Nurses to Public Health Policy

Linda A. McCauley, RN, PhD

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The COVID-19 pandemic has inflicted structural damage to public health systems that we cannot yet fully comprehend. Although much attention is now paid to COVID-19 issues of social and economic upheaval, public health nurses remain focused on the cracks in health care's foundation—such as the slow drip of resignations, revenue loss, and rural clinic closures—that are steadily undermining our country's ability to provide health services to all citizens. Nurses, the "health care heroes" celebrated at the start of the pandemic, remain "inside the house," and they can see the direct causal relationships between health system breakdowns and the global disruptions making headlines today.

Frontline heroes can be system experts too. And yet, the visibility of nurses in public health policy remains woefully lacking. Despite nursing being the largest health care profession, chief nursing officers account for only about 0.8% of voting power on hospital boards, and nurses make up about 2.3% of voting power on community health boards.[1] The National Academy of Medicine's 2021 *Future of Nursing Report 2020–2030* (https://bit.ly/3NhiuJh) highlights this staggering dichotomy between nurses' presence in health systems and their representation in roles of influence. The National Academy of Medicine underscores the needs not only to invest in nursing education and practice but to cultivate the leadership potential of nurses as well.[2]

Two articles in this special issue of *AJPH* (Zauche et al., p. S226; Morone et al., p. S231) describe the public health leadership roles nurses assumed during the pandemic, and both reach similar conclusions: the visibility of public health nurses must continue to grow. Florence Nightingale is widely acknowledged for her leadership both in the design of care and in measuring population health outcomes and instituting public health interventions. Despite Florence's legacy, the contributions of public health nurses have been largely overshadowed by prominent figures in medicine and epidemiology. A key focus of this special issue is to understand why.

Morone et al. argue that the lack of nursing appointments to policy boards and committees is entrenched in historical, structural, and social factors associated with a predominately female workforce. Male-dominated structures and institutions continue to preside over decisions affecting a health care workforce composed primarily of female nurses. The COVID-19 pandemic amplified nursing voices, yet nursing leaders are seldom present among policy groups addressing COVID-19–related issues, such as vaccine hesitancy and the deployment of services to underserved communities. When policies do not reflect the nursing perspective, critical oversights are bound to occur: Although physicians and epidemiologists offer a remarkable knowledge base, nurses lead in carrying the trust of people and communities. Nurses alone bring insights from human touch points across the lifespan and in every care setting imaginable.

Zauche and her colleagues from the Centers for Disease Control and Prevention (CDC) illustrate this point. This stellar group of nursing leaders in the CDC aims to highlight the impact of the organization's nursing workforce, which has gone largely unnoticed throughout CDC history. From nurses' central role in malaria surveillance in 1947 to the more than 200 nurses working in research, epidemiology, public health, clinical care, and communications today, CDC nurses have played a pivotal role in safeguarding the health of US populations.[3] Nurses holding doctorates frequently serve in the Epidemiology Investigation Service, and nurses comprise the largest membership of the Commissioned Corps of the US Public Health Service. Together, these nurses offer a diversity of expertise that should be considered invaluable from a health care policy perspective.

Nurse leaders such as those at the CDC must be called on when national groups assemble in response to large-scale threats such as COVID-19. It is imperative to include nurses on committees deliberating the financing of

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public health infrastructure in particular. Likewise, funding bodies need to allocate substantially more direct public funding to community and public health nursing (including competitive nursing salaries). Real change starts at the policy level, where decisions are made on what we pay for and how much is spent. It is time for nursing to own the influence that they have earned. AJPH

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Trust, Translation, and Transparency in Public Health Nurse Family Home Visiting

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Evidence over the years has demonstrated the clear impact of public health nurse (PHN) home visits on outcomes of those raising infants and children: PHNs save lives and improve health and social outcomes—not just in the short term, but for decades to come.[1–3] The family home visiting articles in this special issue of *AJPH* (Ballard et al., p. S298; Huling et al., p. S306) extend and advance intervention effectiveness knowledge for PHN family home visiting practice. They also demonstrate that PHNs are ready and willing to do whatever it takes to provide effective, high-quality, life-changing care and transparently document outcomes to prove quality and effectiveness.

In this era of extreme accountability and transparency for health care professionals, PHNs serve as leaders and exemplars of what can be done with nursing data to demonstrate effectiveness and value. PHNs have been generating useful, valid, and reliable data through routine documentation for more than two decades—consistently validating positive family home visiting outcomes in program evaluation and research.[3–5] Based on an extensive body of literature across home visiting programs, translations of PHN family home visiting evidence to practice in everyday public health have been highly successful and should continue. Indeed, the public health system would be well advised to add PHN family home visiting to any population of interest to enhance outcomes and reduce downstream social and financial costs. What, then, is preventing the widespread deployment of PHN family home visiting to address the complex health and social needs of those at highest risk for poor outcomes?

First, consider that although we affirm PHN family home visiting's effectiveness, we are slow to acknowledge and trust that it is the PHN—who is highly educated, emotionally available, and greatly connected—who makes the intervention effective.[4,5] Instead, we put our trust in "evidence-based programs" that diminish the role of the PHN to that of a technician who delivers a scripted intervention. Expanding PHN family home visiting programs depends on trusting and respecting the capability of skilled PHNs and supporting their ability to tailor interventions to each person. This is fundamental to expanding the availability of PHN family home visiting, simply because funding mechanisms require PHNs to be prepackaged in expensive, restrictive evidence-based programs rather than embedded as expert interventionists acting in the fabric of the public health system to improve the public's health.

Second, let us question the notion that evidence-based PHN family home visiting services should be available only as replicated evidence-based research programs. Such replication is a costly process often accompanied by burdensome requirements of accreditation and oversight as well as extensive, time-consuming data collection protocols. This results in siphoning of resources away from the PHNs and public health agencies and into the external programs, thereby reducing funds available to pay PHNs to do the work. Furthermore, such models have restrictive eligibility requirements that are in opposition to the mission of many public health departments: to serve those who need services in their jurisdictions. In fact, PHN family home visiting is effective for a broad range of family home visiting groups and needs,[1–5] and to deny effective services to those who are in need in the name of program fidelity is unethical.

Finally, let us acknowledge the truth in the data generated by PHNs and support the most trusted profession to practice to the full extent of its licensure in our communities. PHNs are equipped and ready to do so, but the systems in which PHNs must function need to take a hard look at political assumptions and willingness to act on the evidence PHNs have provided. PHNs have long accepted the responsibility of demonstrating intervention effectiveness; this is the message that the Ballard et al. and Huling et al.

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articles affirmed once again. It is time to listen. AJPH

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Mobilizing Support for the Future of Advanced Public Health Nursing Education

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As a public health nurse educator, I was deeply disappointed when our advanced public health nursing (APHN) master's program shuttered in the late 2010s. I therefore found Harris et al.'s description (p. S231) of the evolution of their APHN program and health policy specialty at the University of California San Francisco (UCSF) to be an inspiring example that should compel nursing education leaders nationwide to consider how they can garner support for APHN education in their own institutions and communities. As evidence mounts regarding the influence of social determinants of health and our world continues to endure a time of upheaval that has magnified inequities on multiple fronts (e.g., the COVID-19 pandemic, climate change, racial injustice, violent geopolitical conflicts), our moral obligation to prepare a workforce that can effectively address structural drivers of health is stronger than ever. If nursing is to reach its potential in influencing health equity, we must teach nurses how systems outside the human body work (e.g., political systems) as well as how systems within the human body work (e.g., the cardiovascular system). We cannot do this without nursing faculty who have advanced preparation in public and population health nursing.[1,2]

Although analyzing the future of APHN education is not their primary purpose, Harris et al. briefly recommend expanding the number of APHN and policy programs nationwide. Their recommendation—which I wholeheartedly support—compels me to reflect on and amplify what others have said regarding the state of APHN education, including our struggle within nursing to recognize the value of the APHN specialty.[2,3] If nurses are to effectively step up as the systems-level practitioners that this pivotal point in history demands, we must begin by advocating for support for APHN education and the value of the specialty from both within and outside the profession.

The evolution of UCSF's APHN and health policy programs over the last two decades is a bright spot in what has otherwise been a bleak period for APHN education nationwide. For decades, scholars have warned that the public health nursing specialty was at risk of extinction because of external and internal pressures that have indeed caused APHN graduate programs and the public health nursing workforce to dwindle over time (e.g., biomedicalization and emphasis on direct care to individuals, proliferation of doctor of nursing practice programs, faculty shortages, stagnant funding for public health).[2,3] With the recent releases of the *Future of Nursing* report and the new American Association of Colleges of Nursing (AACN) Essentials—both of which emphasize health equity and social determinants of health—we cannot allow the APHN specialty to disappear if nursing is to be an influential player in addressing health inequities.

Harris et al. discuss how student demand was a factor in the evolution of their program. This reminded me of what I heard in conversations with public health nursing experts as a research manager for the *Future of Nursing* report: a market-based approach alone, where we passively wait for student demand to drive the proliferation of APHN programs, is insufficient to meet societal needs for a nursing workforce that addresses health equity at a systems level. To be sure, interest in public health broadly has grown even as APHN programs have dwindled,[3] suggesting that interest in APHN will exist if we can harness it. We must articulate a clear vision for APHN education, advocate for resources to support it (e.g., increased Health Resources and Services Administration funding), proactively recruit traditional and second degree students who are interested in public health into the specialty, and ensure there are jobs and leadership opportunities in education, research, policy, and practice waiting for them upon graduation.

This latter point requires us to address the challenges facing our specialty within public health systems too, where low salaries and benefits relative to nurses in acute care, few public health nurses in leadership roles—particularly those

from diverse backgrounds—and limited opportunities for promotion limit enticing employment opportunities that can help drive demand for APHN education.[4] Failure to proactively create and support such opportunities means we lose out on the benefits of nursing leadership, as can be seen from evidence suggesting that communities where local health departments had a nurse as their lead executive experienced greater improvement in community health outcomes than those with a lead executive who was not a nurse.[4,5]

Programs such as UCSF's will be at the forefront of preparing nurses for public health leadership roles, and advocating for the very policies needed for the APHN specialty to proliferate so that society can benefit from its expertise (e.g., innovative ways of funding public health by governmental and nongovernmental organizations; increased research funding from the National Institutes of Health, the Centers for Disease Control and Prevention, and others to support science exploring APHN effectiveness; support from foundations and other organizations for mentoring and residency programs that can further develop APHN leadership potential postgraduation).[4] In nursing education, where we pride ourselves on being innovative leaders, we must get creative in how we leverage the wealth of resources across the campuses on which we teach. We need to create cutting-edge programs and community partnerships in public health to prepare a nursing workforce that is ready to step into policymaking spaces to advocate for health equity and the critical role of APHNs in achieving it. APHN faculty cannot achieve this alone; we all must value what the specialty can offer our profession and the public. AJPH

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Public Health Nursing's Impact on Strengthening Community Resilience

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Although there is not a universal definition of community resilience, research indicates the positive impact resilience can have on a community's health and quality of life, particularly if it is bolstered and buffered by accessible, equitable, and sustainable systems.[1] The collective resilience of an already strained public health system was tested during the COVID-19 pandemic. Beginning with the Henry Street Visiting Nurse Service in 1895, public health nursing was envisioned by Lillian Wald and Mary Brewster to promote community resilience, in cooperation with multisectoral private–public partnerships, by meeting people where they are without blaming them for their problems.[2]

Two articles in this supplement demonstrate the impact of public health nursing practices and policies on strengthening community resilience at multiple levels of influence: adaptive (ability to adjust), absorptive (ability to cope), anticipatory (ability to predict and be proactive), and transformative (ability to transform systems to deal with change and uncertainty).[3] Guided by the Community Resiliency Model, Duva et al. (p. S271) describe the impact of a nurse-led public health intervention designed to meet population mental health needs during the COVID-19 pandemic. In partnership with cross-sector entities in Georgia, nurses trained the public to build community resilience capacity against stress from adversity or trauma. Guided by the Public Health 3.0 and community-based participatory frameworks, Austin et al. (p. S275) describe a community-validated mobile application that provided actionable data to communities to address substance use during the COVID-19 pandemic, shifting the focus of the communities from a deficit-based approach to a strength-based or resilience approach.

These holistic, asset-based practical solutions employed technology in novel ways to address existing and emerging public health issues caused by an unexpected pandemic. Nurses know better than most other health professionals where the public health safety net system works and has plasticity and where the system does not work. Public health nurses know how to improve quality of care and serve diverse populations and communities more effectively and efficiently and in an egalitarian way. Too often, public health uses unnecessarily hierarchical and siloed approaches that focus on the deficits of populations, especially vulnerable or underrepresented populations, and on how population deficits contribute to the detriment of communities. Not many people intentionally want to be sick or intentionally want to engage in unhealthful behaviors, such as substance use, that negatively affect them and their communities. Not everyone, however, believes that they have volition and autonomy over circumstances in their lives.

Community participation gives communities a collective voice to provide feedback about public health nursing interventions that will affect the health of their citizenry. Although it may feel time intensive to engage with the community on solutions instead of providing a solution to the community, such an investment could have significant multigenerational health impacts: current generational accumulated stress, adversity, and trauma could be minimized, and future generational community resilience could be maximized to prevent and protect against accumulated stress, adversity, and trauma. Sometimes grassroots public health efforts are what is needed to solve community problems and protect community assets. Sometimes it does "take a village" to strengthen community resilience. This is the essence of the work of Duva et al. and Austin et al. They provide a blueprint for public health nursing interventions that built community resilience capacity against stress from psychological trauma and substance use during the COVID-19 pandemic.

We invite public health nurses to reimagine accessible, equitable, and sustainable public health systems by developing the leadership capacity of local communities to strengthen community resilience. They can do so by such means as organizing consumer or community advisory boards, encouraging community participation in private and public partnerships, and inspiring

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communities to provide testimonials on their efforts to their local public health commissions and policymakers. AJPH

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Answering the Call: The Response of Centers for Disease Control and Prevention's Federal Public Health Nursing Workforce to the COVID-19 Pandemic

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Many public health challenges face our world today, including systemic racism, the opioid epidemic, and the COVID-19 pandemic. Nurses are well-qualified and well-positioned to respond to these challenges, as nurses represent 50% of the global health workforce and are leaders not only in clinical settings but also in public health.[1] The professions of nursing and public health have been closely intertwined since the founding of the modern-day nursing profession by Florence Nightingale, a pioneer in the field of epidemiology.[2]

Nursing incorporates many tenets of public health. Nurses are taught to view individuals within the context of their communities and to consider each patient's social determinants of health in the provision of care. Nurses have in-depth knowledge of disease and wellness and are trained to plan, implement, and evaluate health interventions based upon health assessment at both the individual and population levels. In addition, nurses are trusted professionals who communicate and educate patients and communities about important health messages related to disease prevention and wellness promotion while considering cultural implications. The purpose of this editorial is to describe the contributions of nurses at the US Centers for Disease Control and Prevention (CDC) during the COVID-19 pandemic, and to generate a call to action to support the need for a strong public health nursing workforce.

NURSES AT THE CENTERS FOR DISEASE CONTROL AND PREVENTION

Nurses are integral to the workforce of many health care organizations, including state and local health departments and the CDC, the public health agency of our nation. The CDC aims to protect the US population from disease and disability by conducting scientific research and surveillance that provides health information to the public and responds to new and emerging health threats.[3] Nurses at the CDC perform a variety of roles, serving as clinicians, health scientists, epidemiologists, public health advisors, nurse consultants, and communication and education specialists. Nurses fulfill leadership and managerial roles at various levels within the agency. In addition, many CDC nurses are commissioned officers of the US Public Health Service (USPHS), one of the eight active-duty uniformed services of this nation. Of more than 6100 Commissioned Corps officers in the USPHS, nurses comprise the largest percentage of health professionals.[4] Nurses have also been part of CDC's Epidemic Intelligence Service program, a globally recognized fellowship program renowned for its response efforts to investigate outbreaks of infectious disease and environmental and occupational health and safety issues throughout the program's 70-year history.[5]

RESPONSE TO THE COVID-19 PANDEMIC

Since the onset of the COVID-19 pandemic, the nursing profession has been in the world's spotlight as nurses have

been on the front lines providing care for COVID-19 patients, performing key functions in state and local health departments, and preventing severe acute respiratory syndrome coronavirus 2 (SARS-CoV-2) transmission in health care facilities, workplaces, and communities.[6] At the CDC, nurses have been at the forefront of CDC's response to the pandemic. The CDC and Agency for Toxic Substances and Disease Registry Nurses' Work Group (CNWG), a group of nurses that provide expertise and support to nurses throughout the agency, have assisted in disseminating and fulfilling requests for deployments to support the COVID-19 response at CDC.

The CDC activated the Incident Management System for the 2019 COVID response in January 2020. As a part of this response, an application called Emergency Operations Management System tracks the work hours of employees, fellows, and contractors who contribute to the response. The CNWG maintains an administrative list of all CDC nurses who are a part of the CNWG membership, although not all nurses who work at CDC are members of CNWG. Using information from Emergency Operations Management System and CNWG's administrative list, we determined that, among 190 CNWG members, 146 (76.8%) were deployed on the COVID-19 response at some time between January 21, 2020, and September 18, 2021. Together, they logged more than 24 600 person-days and nearly 198 000 person-hours on the response.

Nurses contributed to multiple COVID-19 task forces supporting the agency's response through COVID-19 deployments. Except for Commissioned Corps officers, all deployments were voluntary; agency Commissioned Corps officers were also deployed across the country on behalf of the Office of the Assistant Secretary for Preparedness and Response. The following roles and contributions of CDC nurses parallel the work of dedicated public health nurses at state and local health departments:

Responding to Clinical Inquiries

CDC's COVID-19 response deployed clinicians, including CDC nurses, to answer clinical inquiries 24 hours per day. The call center initially answered questions related to the clinical determination of persons under investigation, collection and shipping of specimens to CDC, and contact tracing. As transmission of SARS-CoV-2 accelerated in communities, the call center began fielding questions from frontline clinicians and health departments regarding guidance about COVID-19 testing and available assays, treatment, underlying medical conditions, risk mitigation, serological viral indicators, and viral shedding. CDC clinicians provided real-time consultation for inquiries related to a wide variety of topics. Most inquiries came from clinical sites in which clinicians inquired about exposure risk, regarding both their own safety and transmission risk to patients.[7] In addition, frequent inquiries included risk assessment after a known or potential exposure, implementing the correct return-to-work strategy for exposed personnel, isolation and quarantine guidance, and guidance on personal protective equipment (PPE) use in a health care setting. CDC nurses also participated in a series of clinical outreach and communication activity calls to educate health care providers.

Creating Guidelines to Reduce Transmission Risk

Throughout the COVID-19 response, multidisciplinary teams, including nurses, created guidelines for health care settings, correctional institutions, schools and childcare facilities, businesses and workplaces, and many other community settings. CDC nurses organized calls with CDC's partners and webinars to answer questions to help schools, businesses and workplaces, and communities make key decisions about safely resuming operations by incorporating COVID-19 mitigation strategies. CDC nurses have developed materials and resources during the COVID-19 response, including guidance that helps people understand what actions they can take to reduce the risk of COVID-19 as well as accompanying toolkits to help operationalize the guidance. For example, CDC nurses were vital contributors in the development of telehealth guidelines to reduce the risk of exposure to SARS-CoV-2 in health care personnel, patients, and communities.

Providing Personal Protective Equipment Guidance

The COVID-19 pandemic created an unprecedented need for respirators as well as immediate guidance and information dissemination related to the use, disinfection, reuse, and optimization of respiratory protection devices for health care and public safety workers. The National Personal Protective Technology Laboratory team located within the National Institute for Occupational Safety and Health includes scientists, nurses, and engineers who conduct research on PPE and promote

proper respirator selection, maintenance, and use. In addition, this group fielded questions related to PPE via e-mail, which was a critical extension of the CDC's COVID-19 response. This team provided responses to more than 7000 inquiries over 19 months from the public regarding PPE.

Leading Vaccine Distribution and Monitoring Safety

CDC nurses worked with state, tribal, local, and territorial health departments to facilitate the roll-out and distribution of COVID-19 vaccines to priority groups by providing oversight and coordinating field teams in assigned regions. CDC nurses also contributed to the development of COVID-19 vaccine training and educational materials for health professionals, including online training modules and guidance for vaccine transportation, storage, preparation, and administration. In addition, nurses were deployed to the CDC's Vaccine Task Force to monitor the safety of the COVID-19 vaccines through the Vaccine Adverse Event Reporting System, the Myocarditis Outcomes After mRNA COVID-19 Vaccination Investigation Team, and v-safe, a smart phone–based app that contains links to Web-based surveys where individuals can report any adverse effects after vaccination.[8] On the Vaccine Task Force, nurses reviewed and replied to vaccine-related inquiries; performed abstraction of medical records for reports of adverse events, including myocarditis and cerebral sinus venous thrombosis; and called clinicians to conduct surveys about myocarditis. In addition, nurses provided clinical support and helped coordinate and develop standard operating procedures for the CDC's COVID-19 v-safe pregnancy registry. Nurses called pregnant people to assess pregnancy outcomes following vaccination; data from the v-safe pregnancy registry directly informed clinical guidance for COVID-19 vaccination during pregnancy.

Serving as Health Department Liaison Officers

Several CDC nurses worked as health department liaison officers, serving as the primary conduit and resource for state, tribal, local, and territorial public health agencies as well as other federal partners across the nation, including Health and Human Services, Assistant Secretary for Preparedness and Response, and Federal Emergency Management Agency. Health department liaison officers provided guidance, resources, and tools necessary to meet the needs of various partners in several areas, including contact tracing, case investigation, COVID-19 vaccination, and testing access. They also helped address the safety and health of those at increased risk for severe COVID-19 illness and those at increased risk of acquiring or transmitting COVID-19.

Providing Protection for the Workforce

Workforce protection for emergency response activities is coordinated through the Office of Safety, Security, and Asset Management. This office's Occupational Health Clinic (OHC) permanent staff of 10 registered or advanced practice nurses, two physicians, and support staff play a pivotal role in ensuring the health and safety of those involved in responses. With the surge in response activities because of COVID-19, the OHC required additional health care and public health staff. In the last year, the OHC provided medical clearances for multiple responses, including COVID-19, polio, Ebola, wildfires, hurricanes, and Operation Allies Welcome, which supported the evacuation of US citizens and Afghanistan nationals to the United States.[9] Civil servant health care professionals and USPHS officers, most of whom were registered and advanced practice nurses, deployed to the OHC to support the increased demand. More than 5000 medical clearances have been completed during the pandemic thus far, all response and critical laboratory staff are monitored daily for illness, and COVID-19–symptomatic or –positive staff are monitored and provided medical advice. In addition, COVID-19 and influenza vaccination clinics ran simultaneously, administering thousands of vaccines to CDC staff, contractors, and other federal employees. Polymerase chain reaction testing for SARS-CoV-2 was also instituted and available to all employees.

Leading and Supporting Field Deployments

CDC nurses also supported diverse field deployments, many of which included leadership roles. These influential leadership positions included providing clinical and epidemiological support in tribal nations and leading outbreak investigations in settings such as medical centers, summer camps, and households. In state, tribal, local, and territorial offices throughout the United States, CDC nurses were involved with contact tracing in federal

prisons and early repatriation missions. In addition, they conducted infection-control assessments of long-term-care facilities, screened for COVID-19 symptoms at international airports, and supported health departments. CDC nurses also served as Career Epidemiology Field Officers[10] and field team leads, coordinating communication between CDC field and headquarters teams, local and state public health officials, laboratories, and medical staff. They developed standard operating procedures and served as subject matter experts for a variety of topics ranging from infection prevention and control to specimen collection in long-term-care facilities, mass testing sites, and as part of large state-led surveys.

Other Roles

Other roles included but were not limited to serving as quarantine medical officers, performing phlebotomy and collecting nasal swab specimens for epidemiological investigations, providing analytic support, addressing vaccine hesitancy, and improving vaccine confidence. Nurses also contributed to scientific studies by conducting qualitative interviews with public health workers to assess the effects of the COVID-19 pandemic on their mental health. Many nurses published high-impact articles in journals, including CDC's *Morbidity and Mortality Weekly Report* and *New England Journal of Medicine*.[11–14]

In summary, CDC nurses served in a variety of capacities, including roles in clinical practice, surveillance, data analysis, public education, and leadership, all of which significantly contributed the federal COVID-19 response. Although it is important to highlight the various roles of nurses within CDC, recognizing the work of nurses beyond the federal level is crucial in understanding the broader impact of the nursing profession in efforts against the COVID-19 pandemic. Nurses have continuously and courageously provided patient care at the bedside. They have also served within local and state public health agencies and departments as policy experts, contact tracers, researchers, epidemiologists, nurse consultants, and patient advocates. In this capacity, nurses have provided the necessary care and resources to underserved communities who may otherwise go without proper health care follow-up or guidance. As such, nurses, both those in clinical settings and those in public health, have been essential in efforts to curb this pandemic.

A CALL TO ACTION

The COVID-19 pandemic has increased the visibility of both the nursing and the public health professions and has highlighted the incredible, multifaceted roles that nurses have in responding to public health crises. However, the COVID-19 pandemic has exposed vulnerabilities in our public health systems globally and nationally at the federal, state, and local levels rooted in a lack of public health investment, which has contributed to a shortage of public health nurses.[15,16] The current public health nursing workforce is insufficiently sized to adequately address a pandemic, much less prevent and address underlying causes that have contributed to COVID-19 mortality and morbidity, such as chronic diseases and health inequalities.[17,18] It is estimated that the United States has about half of the public health nurses needed to meet the public health needs of our nation.[17,18] Consequences of a shrinking public health nurse workforce can compromise the ability of health departments to respond effectively during crises such as the COVID-19 pandemic and can exacerbate other public health issues that existed before the pandemic. The heavy toll of the COVID-19 pandemic can be felt by nurses worldwide. Many nurses fighting the pandemic on the front lines are exhausted and burned out.[19,20] Prioritizing and protecting the health and mental well-being of nurses will strengthen nurse resilience, which is essential for sustaining the nursing workforce.[20]

Crises, like a pandemic, can prompt change. It is essential that we emerge from the COVID-19 pandemic with a reimagined and stronger public health system. The American Nursing Association and National Academy of Medicine have called on all levels of government to increase funding to further develop the public health nursing workforce.[15,16,21] In addition, nursing education curricula need to incorporate more content and clinical practicum hours related to public health. Although the American Association of Colleges of Nursing has guidelines for incorporating population-focused and public health concepts into curricula, most nursing programs heavily focus on acute care content with almost all clinical practicum hours occurring in acute care or hospital settings.[22] The emphasis on acute care in nursing education is perpetuated by this same focus on the National Licensure Examination. As a result, many nurses do not even consider careers in public health.

Nurses are trained to be communicators, critical thinkers, innovators, and leaders. The value and contribution that these skills, paired with clinical experience and compassion, bring to

the field of public health cannot be overstated. Throughout the COVID-19 response, nurses have consistently answered the call with a resounding "Yes," performing jobs that blend clinical knowledge, science, and public health.

It is essential to invest in strengthening the public health nurse workforce; leverage the skills of nurses in public health surveillance, program management, and policy development; and elevate nurses as leaders. We need a strong public health nurse workforce, especially at the local and state levels, but also at the federal level. As demonstrated through work in the COVID-19 pandemic, nurses are critically needed to protect and promote the health of all individuals and communities in our world. No pandemic—neither the current COVID-19 pandemic nor future pandemics—will be conquered without the leadership and vital contributions of nurses at every level. AJPH

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The COVID-19 Pandemic and the Push to Promote and Include Nurses in Public Health Policy

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The response to the COVID-19 pandemic highlighted the microcosm of public health and health equity challenges that we are experiencing in the United States. The pandemic response also heightened the importance of including nursing perspectives when addressing public health issues. However, nurses are largely excluded from national public policy conversations about the pandemic response. Here we explore the historical, structural, and social factors that created and perpetuated this dynamic and offer ways to amplify the visibility and influence of nursing perspectives in shaping public health policy at the academic, health system, and research levels.

NURSES: A CRITICAL WORKFORCE ESSENTIAL TO HEALTH CARE

Nurses represent a sizable workforce essential to health care and play a critical role in promoting and implementing public health policy. Nursing is the largest health care and support profession in the United States, with more than 5.8 million US nurses overall (registered nurses, licensed practical or vocational nurses, and nursing assistants) and 3.8 million registered nurses (https://bit.ly/35sWKsJ).[1] Nurses provide care in multisector community settings across the care continuum and have unique patient-adjacent perspectives and skills that can aid public health policy development, including interpersonal and communication skills and support and management skills (Figure 1).

In outpatient settings, nurses are educating communities, administering community-based and home-based specialty care, and serving as community care team coordinators. At the bedside, nurses are routinely leveraging their training and skills to transform access to and delivery of health care across communities and sectors through quality improvement initiatives, research, and policy advocacy. Nurses are also critical in disaster response and mitigation efforts. The COVID-19 pandemic highlighted how nurses endure to provide compassionate and competent care when caring for critically ill and infectious patients, despite challenging work environments. This multifaceted expertise makes nurses ideally suited for cross-collaborative policy development roles (https://bit.ly/3NEQVcO).[2,3] However, despite these invaluable positions and skills, nurses are notably underrepresented in public health media and policy discussions.

Broadening public understanding and awareness of the rigorous training, unique knowledge and skills, and essential roles of nurses is imperative to increasing nurse visibility and inclusion in policy, media, and decision-making spaces. For instance, nurses receive extensive health care training and skill development in disease treatment, management and prevention, and health and wellness promotion. Nurses excel at interdisciplinary team leadership and are experts in patient education, adapting treatments and crafting self-management regimens.

Nurses are also most often responsible for disease and public health monitoring, assessment, and planning decisions. In hospital and care settings, nurses often spearhead efforts to enhance care quality by leading quality improvement efforts, care delivery system planning and operations, and resource allocation. Nurses' unique set of knowledge, skills, expertise, and perspective is critical to informing and crafting local, state, and national public health innovation and transformation. Neglecting to include them in policy-making conversations and decisions is detrimental to patients, communities, and national health.

	Entry-Level Nurse Competencies	Advanced-Practice Nurse Competencies
Interpersonal and Communication Skills		
Conflict resolution, team building, and delegation	2.2d Demonstrate ability to conduct sensitive or difficult conversations 6.4c Engage in constructive communication to facilitate conflict management	6.4h Manage disagreements, conflicts, and challenging conversations among team members 6.4i Promote an environment that advances interprofessional learning
Collaboration with patients, family, other health professional team members, and leaders from other disciplines	2.2a Demonstrate relationship-centered care. 6.3a Integrate the roles and responsibilities of health care professionals through interprofessional collaborative practice	2.2g Demonstrate advanced communication skills and techniques using a variety of modalities with diverse audiences 6.3d Direct interprofessional activities and initiatives.
Advocacy for patients, communities, and the health professional team	3.4b Describe the impact on population outcomes, including social justice and health equity 3.5e Evaluate the effectiveness of advocacy actions	3.4g Design comprehensive advocacy strategies to support the policy process 3.5i Demonstrate leadership skills to promote advocacy efforts that include principles of social justice, diversity, equity, and inclusion
Communication skills through active listening; expressing ideas and information clearly, verbally, and in writing; and emotional intelligence	2.2c Use a variety of communication modes appropriate for the context 2.2f Demonstrate emotional intelligence in communications	2.2h Design evidence-based, person-centered engagement materials
Support Skills		
Compassionate attitude and striving to understand	2.1a Demonstrate qualities of empathy 2.1b Demonstrate compassionate care	2.1d Promote caring relationships to effect positive outcomes 2.1e Foster caring relationships
Being willing to make a change and influencing others to set and achieve goals	2.7c Recognize the need for modifications to standard practice	2.7f Synthesize outcome data to inform evidence-based practice, guidelines, and policies
Management Skills		
Strategic thinking, problem solving, and decision-making	3.3a Describe access and equity implications of proposed intervention(s) 7.1a Describe organizational structure, mission, vision, philosophy, and values	3.3c Analyze cost-benefits of selected population-based interventions 7.1e Participate in organizational strategic planning
Clinical leadership for patient care practices and delivery, including the design, coordination, and evaluation of care for individuals, families, groups, and populations	3.3b Prioritize patient-focused and/or community action plans that are safe, effective, and efficient in the context of available resources	2.9i Analyze system-level and public policy influence on care coordination
Accountability for evaluation and improvement of point-of-care outcomes, including the synthesis of data and other evidence to evaluate and achieve optimal outcomes	3.4c Identify best evidence to support policy development	3.4f Identify opportunities to influence the policy process
Lateral integration of care for individuals and cohorts of patients	3.2a Engage with other health professionals to address population health issues	3.2e Challenge biases and barriers that impact population health outcomes
Information management or the use of information systems and technologies to improve health care outcomes	8.1b Identify the basic concepts of electronic health, mobile health, and telehealth systems for enabling patient care 8.3e Identify impact of information and communication technology on quality and safety of care	8.1g Identify best evidence and practices 8.3k Pose strategies to reduce inequities in digital access to data and information.
Stewardship and leveraging of human, environmental, and material resources	3.6a Identify changes in conditions that might indicate a disaster or public health emergency	3.6f Collaboratively initiate rapid response activities to protect population health
Knowledge and Expertise		
Embracing professional development and life-long learning through education, reflective learning, courses, seminars, and programs	10.2a Engage in guided and spontaneous reflection of one's practice	10.2i Foster activities that support a culture of lifelong learning
Credibility of competency by practicing ethically, and the ability to use ethical considerations to guide decisions and actions	9.1c Demonstrate ethical behaviors in practice	9.1h Analyze current policies and practices in the context of an ethical framework
Managing care, knowledge of technology, patient safety, and resource management	8.2b Explain how data entered on one patient impacts public and population health data	8.2h Generate information and knowledge from health information technology databases
Participation in identification and collection of care outcomes	2.5a Engage the individual and team in plan development	2.5j Develop evidence-based interventions to improve outcomes and safety
Risk anticipation for individuals and cohorts of patients	2.5e Anticipate outcomes of care (expected, unexpected, and potentially adverse)	2.5i Prioritize risk mitigation strategies to prevent or reduce adverse outcomes
Design, implementation, and integration of evidence-based practice(s)	4.1b Demonstrate application of different levels of evidence 4.2a Evaluate clinical practice to generate questions to improve nursing care	4.1i Engage in scholarship to advance health 4.1l Disseminate one's scholarship to diverse audience using a variety of approaches or modalities 4.2k Evaluate outcomes and impact of new practices based on the evidence

FIGURE 1— Summary of Nursing Leadership Practice Competencies

Source. Information was adapted from the American Nurses Association Leadership Competencies; the American Association of Colleges of Nursing (AACN) Competencies and Curricular Expectations for Clinical Nurse Leader Education and Practice (https://bit.ly/3NEQVcO); *The Future of Nursing: Leading Change, Advancing Health* (https://bit.ly/3DqDrgp); and the National Academies of Sciences, Engineering, and Medicine's "Future of Nursing 2020–2030: Charting a Path to Achieve Health Equity" (https://bit.ly/3JBKa9k). Icons are from http://thenounproject.com. Entry-level and advanced-practice nurse competencies are from AACN's *The Essentials: Core Competencies for Professional Nursing Education* (https://bit.ly/3ivPpLS). Numbers refer to the domains and the two levels of subcompetencies as indicated in *The Essentials.*

UNDERREPRESENTATION OF NURSES IN HEALTH POLICY DISCUSSIONS

For more than 19 consecutive years, nursing has consistently ranked as the most trusted profession in the United States (https://bit.ly/3uGdlC5). However, evidence suggests that when journalists and media outlets are looking to find influential voices representing US public health, they rarely turn to nurses. The George Washington University Center for Health, Policy, and Media Engagement released a 20-year update of the original 1997 Woodhull Study on Nursing and the Media.[4] The findings revealed that nurses were quoted in 2% of public commentaries in newspapers, magazines, and health industry publications covering health-related issues and were mentioned in only 13% of the media sampled. When cited, nurses were quoted on topics related to the profession of nursing itself, as opposed to their perspectives on or expertise in public health, health policy, or the health care industry. By contrast, physicians were quoted 10 times more frequently (21%) than nurses.

Media representation is consequential to policy-making agendas and action. The results from the updated Woodhull Study reflect the underrecognized value of nursing and the implications of perpetuated bias and inequity within the media. Notably, in the second phase of the recent Woodhull replication, researchers asked journalists and communication, public relations, and media staff from health care organizations and university settings to comment on why nursing expertise was not solicited more often.[5]

The study team found that although nurses were considered useful in enriching a health-related news story, journalists did not believe that nurses were credible voices of authority. Interviewees also cited difficulty finding experienced nurses to interview and stated that health care organizations and universities often do not nominate their nursing staff as authority figures. In addition, the results suggested systemic barriers to nursing inclusivity at the level of editorial processes and policies that prevent nurses from being sourced. Finally, the findings revealed that the nursing profession was less strategic than other health professions (e.g., medicine) in engaging public health journalists.[5]

Although representing a sizable health care workforce, nurses are also significantly underrepresented in leadership arenas, adding another element to their public policy invisibility. For instance, among the thousands of US hospital networks, only 33 hospital chief executive officers are nurses (https://bit.ly/3qR4P20). Moreover, despite there being four times as many registered nurses as physicians in the United States, currently three nurses are members of Congress (https://bit.ly/36LeuAf), as compared with 17 physicians (https://bit.ly/3JZN08e). These statistics illustrate that limited progress has been made since the 2010 Institute of Medicine report *The Future of Nursing: Leading Change, Advancing Health* highlighted the value and critical importance of nursing perspectives and presence in decision-making roles (https://bit.ly/3DqDrgp).

Additional sociocultural and structural factors based on gender, media preferences, and medical hierarchy contribute to the invisibility of nurses in the media and in public health and policy discourses. Most apparent is that nursing is still a predominantly women-dominated field, with more than 87% of nursing assistants and vocational and registered nurses identifying as women (https://bit.ly/3uHZkDO). Even as nursing becomes increasingly gender diverse, it continues to be deemed "women's work," undervalued both figuratively and literally as just part of the hospital "room and board."[6] In this regard, nursing is no different from other female-dominated fields wherein women are less likely than men to be called on as expert sources (https://bit.ly/3iOLtWS; https://bit.ly/3K185za).[7]

The continued omission of nursing perspectives in the media may also be partly due to the disinterest of lay or academic outlets in highlighting nurses' work. Deena Costa, the senior author of the article "Ignoring Nurses: Media Coverage during the COVID-19 Pandemic,"[8] shared that the study team initially received rejections from several lay newspapers and academic journals before the group's work was published in the *Annals of the American Thoracic Society*. When asked about the etiology of these continued rejections, Costa replied that "some [publishers] said we were trying to do too much, and others said it wasn't impactful enough. One journal just said they weren't interested in it. Period" (D. Costa, personal communication, 2021).

Furthermore, perspectives about the value of nurses have deep roots within the medical hierarchy. Historically, nurses have been viewed as subservient and submissive to the male-dominated field of medicine, a likely nascent factor of this power imbalance.[9] This long-held perception of nursing as a low-skilled, physician–servant profession ignores nurses' tremendous levels of skill and autonomy and continues to be perpetuated through media misrepresentation. For example, *Saving Lives: Why the Media's*

Representation of Nursing Puts Us All at Risk examines the role of nursing's misrepresentation and underrepresentation in the media in perpetuating stereotypes, including in many popular medical television shows in which physician characters offer all necessary care and nurses possess little expertise or value and are portrayed as peripheral servants.[10]

All of these synergistic and interrelated factors contribute to nursing's current low-impact position in public discussions about health policy. The implications of this underrepresentation and misrepresentation of nurses in national public health dialogues and policy agenda setting are far-reaching and detrimental to public health progress. The COVID-19 pandemic has presented a stark example of this invisibility and provides a ripe opportunity to shift the current dynamic toward greater nurse inclusivity in public health policy dialogues.

COVID-19: AN EXEMPLAR OF NURSING'S INVISIBILITY

The COVID-19 pandemic revealed a dismal picture of nursing representation in public health and health policy discussions and decision making. Staff nurses were at the forefront of advocating for policies on safe working environments, and nurse scientists found innovative solutions to the pandemic's challenges, including research examining delivery of care for patients with COVID-19 and the differential effects of the virus across populations.[11] However, no nurses were included in the Trump administration's Coronavirus Task Force. In response to this omission, Dermenchyan and Choi opined that nurses bring essential knowledge, skills, and experience to health policy decision making, citing that a nurse on the task force would be an opportunity to include valuable interdisciplinary perspectives (https://bit.ly/3qOal5m).

This trend of omission from policymaking tables was not limited to the Trump administration; Joe Biden's Transition COVID-19 Advisory Board—originally composed of commissioners, physicians, public health experts, and academics—also did not include nurses (https://bit.ly/3uK0Mpd; https://bit.ly/3iUVrG0). In a CNN opinion piece, Ghazal and Dorsen argued that nurses could provide critical expertise for the advisory board, offering an important perspective regarding hospital staffing issues and resource shortages in health care systems (https://cnn.it/3iTn2HG). In response, Jane Hopkins, a psychiatric nurse, was later added to the board (https://bit.ly/3iU3P8U).

Underrecognition of nurses' role is not limited to national policy conversations. For instance, throughout the pandemic school nurses have frequently been left out of critical discussions about reopening schools safely. Many education officials have neglected to offer school nurses a seat at the table when decisions about COVID-19 school safety are being made, and in many cases nurses' recommended protocols have been ignored (https://wapo.st/3JXdiZ5).

The COVID-19 pandemic continues to place a significant strain on nurses' health, well-being, and ability to properly perform their jobs, and minoritized nurses have been disproportionately affected.[12] Particularly devastating are studies showing that nurses of color account for more than half of the deaths among nurses caused by COVID-19, despite representing only 24.1% of the workforce (https://bit.ly/3iSBkZb). Furthermore, during the pandemic onset, nurses cited a concerning trend of fear of repercussions and retaliation in response to their advocacy for proper protective equipment and other hospital policies. Many nurses were ambivalent about being regarded as "health care heroes" in the media, which they felt was an oversimplification implying that they were willing to sacrifice themselves for others (https://bit.ly/3LuROTI). To add, this performative appreciation of nurses was coupled with omission of their voices from media coverage and policy planning and development.

RECOMMENDATIONS TO INCREASE NURSE VISIBILITY

Across fields and levels of education, nurses possess a multitude of transferable skills for public health policy development. Thus, it is paramount that policy development at the system, local, and national levels incorporate nursing representation. Moreover, academic institutions serve as a key entry point for journalists and policymakers to engage nurse experts. To this end, we highlight recommendations and practical tools to increase nursing visibility and influence in public health policy at the individual, community, systems, and national levels.[13]

Nurse Educators and Academic Institutions

As outlined in the newly revised Core Competencies for Professional Nursing Education of the American Association of Colleges of Nursing, there are missed opportunities to empower individual nurses to engage in policy and advocacy work during their nursing

education. Notable examples include integrating transformative learning experiences during nursing and clinical education, such as:

- Embedding structural (political) competencies and health policy curricula within nursing education at the associate, bachelor, master, and doctoral levels. Structural competencies should outline how policies shape the health care work environment and affect health at the community level.[14,15]
- Teaching nurses the value of media presence and visibility by incorporating training on the use of social and lay media as a personal and professional advocacy tool.[16]
- Establishing interdisciplinary collaboration opportunities between schools of medicine, pharmacy, social work, and public health. Interdisciplinary collaboration promotes exposure of nurses and their expertise and enhances understanding of different roles and scopes of practice across disciplines.[17] Collaboration may also promote a better understanding of complementary roles of nursing, medicine, and other disciplines.

Community Health Organizations and Health Systems

Leaders at the community and health systems level should leverage nurses' existing leadership, communication, and advocacy skills. Examples of ways to further build on and disseminate nurses' transdisciplinary lens and expertise include:

- Explicitly allocating seats for nurses on various committees, boards, and quality improvement projects. Serving on boards allows nurses to partner with other leaders to promote change and advance health.[18]
- Enhancing community perceptions and knowledge of nurses' wide-ranging roles by referring journalists and media outlets seeking to publish health care–related stories to nurse informants.

Nurse Scientists

Nurse scientists possess additional leadership and interdisciplinary expertise transferable to health policy development and agenda setting. Opportunities to leverage research-trained nurses include:

- Increasing the number of doctorally prepared nurses engaged in the health policy process, whether through participation in institutional decision making, engaging with policies and procedures, or taking action at the local or national government level.
- Preparing and presenting policy briefs, writing letters to editors and elected officials on public health–related issues, and educating the lay public through speaking engagements with local community-based and civic organizations. These are excellent ways to directly influence the policy-making process.
- Expanding pathways for nurses to conduct policy-relevant and action-oriented research through fellowship training opportunities and involvement on boards (e.g., the Robert Wood Johnson Clinician Scholars Program, the National Clinician Scholars Program, and the Nurses on Boards Coalition).

CONCLUSIONS

The COVID-19 pandemic has underscored how nurses' voices have been underrepresented in public health policy. Nurses occupy a critical mass of the health care and public health domains and possess unique and transferable skills and perspectives relative to public health policy. However, they are often excluded as authority figures and content experts in public health policy development and agenda setting. The cyclical nature of the social and historical factors contributing to this exclusion with respect to media presence and public health policy leadership perpetuates such underrepresentation. Increasing the visibility of nurses will require collective promotion of the profession as a source of credible and competent expertise in promoting the health of communities and populations across settings including the academic, community, health system, and policy arenas. AJPH

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Shoring Up the Frontline of Prevention: Strengthening Curricula With Community and Public Health Nursing

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The terms "frontline" and "prevention" are now common everyday household words heard across America. However, the most exigent focus for investments in prevention is unclear, as is the location of the true frontline. County Health Rankings demonstrate that 80% of our health outcomes are not resolved within clinical or acute care settings.[1] However, the number of nurses practicing in community and public health settings has been consistently declining, from 4% of the workforce in 2013 to 2.9% in 2020.[2] Existing disparities in nursing salaries may be a contributing factor to the decline. In 2021, the US Bureau of Labor Statistics[3] reported the average national registered nurse salary to be $75 330, whereas the average public health nursing salary is $68 661.[4] Furthermore, public health funding decreased substantially across the nation prior to the pandemic, leading to lost staff positions, which resulted in a weaker public health workforce and infrastructure.[5] Each successive surge of the COVID-19 pandemic has exposed the dire need for more nurses in public health and community settings. For years to come, concerns about the nursing workforce are likely to persist as we witness intensifying health care demands created by changes in the delivery of health care services, population shifts, and health care transformation.

In spite of these trends, many schools of nursing across the nation design and deliver a curriculum with a central focus on illness care or disease treatment to be rendered in inpatient settings.[6] As a result, our nation's essential health interests beyond the bedside remain unequivocally compromised.

In this article, we argue that the predominant and pervasive curricular focus of nursing education on acute care has limited the ability to prepare a workforce ready to address public health threats, which has become more evident since the onset of COVID-19. We advocate for (1) intentional changes in nursing curricula designed to reinforce didactic teaching of public health sciences and social determinants of health, and (2) deeper investments in three-way community–academic–practice partnerships to promote a nursing workforce equipped for intersectoral practice in settings outside of the hospital, leading to a far-reaching impact on population health.

ADDING POPULATION HEALTH TO CURRICULAR CONTENT MAPPING

Mapping population health in the nursing curriculum requires academic and health institutions to shift from a singular focus on individual holistic needs to a framework that emphasizes social and structural determinants of health, both in didactic and clinical training. Simply put, it is insufficient to address social needs, which represent the downstream effects of root causes. Instead, a robust nursing curriculum requires a critical examination of the upstream social determinants of health that directly and indirectly cause poor health outcomes.[7] To inform the development of national nursing education guidelines, the Council of Public Health Nursing Organizations[8] issued a statement in 2019 outlining priority social determinants of health and recommending key action steps for implementation in academic and practice settings. The consistent refrain of these recommendations is the need to increase faculty development in community and public health, population health, advocacy, and policy to shape action-oriented curricula that will equip students to address racism, poverty, environmental injustice, and violence.

The American Association of Colleges of Nursing[9] and the National Academies of Sciences, Engineering, and Medicine[10] recently published revised guidelines for nursing education; the cross-cutting theme of both documents is *not* a call for greater investments in acute care but rather a reinvigoration of public health values and principles for population health and health equity. Hailed by some as a paradigm shift in nursing education and practice, this emphasis is not new for public health nurse educators. Since 1965, community and public health nursing content has been part of the required baccalaureate nursing curriculum.[11] However, advancing the quality and augmenting the impact of community and public health nursing education, practice, and research is critical for improved local to global health outcomes.

To prepare nursing students for practice through the lens of public health, we propose weighting, leveling, and distributing epidemiology, biostatistics, environmental science, emergency management, disaster preparedness, social determinants of health, health equity, care coordination, and disease prevention as the didactic core throughout the nursing curriculum. In addition, we assert the need for the clinical core of the nursing curriculum to include opportunities for intervention at all levels of practice: preparing nurses to design and deliver care at the level of the individual, family, community, systems, and populations.[12]

To implement this directional change, essential knowledge and skills in systems awareness, change management, cost containment, resource allocation, communication, team building, equity, and inclusion are required for competent, evidence-based practice, as is the development of competencies in informatics, data science, design, and systems thinking. Furthermore, an understanding of how local, national, and global structures, systems, politics, and rules and regulations contribute to the health outcomes of individual patients, populations, and communities will support students in developing agility and advocacy skills.

Additionally, effective advocacy requires consideration of the social needs of individuals, which are inextricably connected to structural determinants at the community, society, and policy level. Therefore, to affect the health of populations, nurses are called upon to make this broader, more integral connection between policies, systems, and environmental impact.

LEVERAGING COMMUNITY–ACADEMIC–PRACTICE PARTNERSHIPS

Didactic teaching provides nursing students with the conceptual foundation to achieve competency, whereas clinical practice allows students the opportunity to develop and demonstrate competency.[13] To ensure effective clinical experiences, deliberate investments of time and resources are needed to support the development of mutually beneficial partnerships between community practice sites and academic institutions. This intentional work results in high-quality, positive experiences for students, practice sites, and clients alike.[14]

Evidence suggests that academic–practice partnerships positively affect outcomes for patients, staff, and student learners, providing a formalized means for translating evidence-based practice principles to improve clinical decision-making, increase staff knowledge of evidence-based practice and experiential learning, and inspire the growth of evidence-based population health initiatives.[6,15]

Student learners immersed in academic–practice partnerships have unique opportunities to become experienced in evidence-based practice analysis and translation while growing their ability to become skilled, compassionate caregivers and attentive patient advocates. These partnerships provide opportunities to seek external funding to address population health concerns, build community capacity, and expand the existing public health nursing workforce. Overall, the published literature highlights the benefits of academic–practice partnerships to clinical agencies, school-based settings, ambulatory care, and health departments by providing an eager, competent student workforce to address individual, family, and community concerns.[15] Although academic–practice partnerships have traditionally focused on health care environments, there is now an opportunity to invest ardently in 3-way community–academic–practice partnerships based in communities and community agencies. The priority for these partnerships is relationship building through the lens of equity, capacity building, and reciprocal service-learning benefits.

We encourage nursing faculty to pursue intersectoral partnerships beyond traditional clinical sites, exposing students to a wide variety of practice environments that deliver essential public health services. Examples of nontraditional partners include faith-based communities, where evidence has shown improved access to care and community capacity through the teamwork of nurses and community health workers.[16,17] Partnerships with libraries promote community connections for

those experiencing food insecurity, homelessness, and mental health crises[18] while educating community and public health nurses on the application of evidence to inform practice.[19] Additional partners could include commercial businesses, housing programs, governmental or nongovernmental organizations, transportation, and urban planners. By investing in unique partnerships, nurse educators challenge the stereotypical role of bedside nurse and affirm the upstream role of and place for nurses, who are bringing health to where people live, learn, work, play, worship, and age. Successful partnerships with sustainable outcomes will expand awareness of nurses' full scope of practice beyond the acute care setting, where many nursing schools and faculty currently limit their clinical training. A recent report issued 10 recommendations to prepare faculty to teach community and public health nursing, including the call to revise recruitment, hiring, orientation, and professional development practices to reflect public health nursing guidelines and competencies.[20] Developing structures and processes for successful community–academic–practice partnerships will strengthen clinical education and improve the preparation of the future public health nursing workforce. Additionally, the realities of structural determinants of health are more apparent in community settings, providing students with a real-world perspective about precursors to health outcomes and barriers to access.

In addition to providing learning opportunities for students, community–academic–practice partnerships are a mechanism for continuing professional development for the current community and public health nursing workforce across practice settings. Many community and public health nurses work in small, local public health departments unaffiliated with large academic institutions or hospitals and have limited access to evidence-based resources or financial support for professional development. Since 2017, the Nursing Experts Translating the Evidence project, an interprofessional collaborative effort between nurses and librarians, has been educating public health nurses on the acquisition, translation, and application of evidence to inform their practice.[19] Through active community–academic–practice partnerships, community and public health nursing educators and governmental and nongovernmental public health agencies can build capacity for community and public health nursing practice for the future, as we continue to apply evidence-based, data-driven problem solving through the pandemic and beyond.

CONCLUSION

In schools of nursing across the country, administrators face dual expectations: managing faculty shortages and centering population health in curriculum revision focused on competency-based strategies.[9,10] Given the small percentage of nurses who presently practice in community and public health, it is increasingly difficult to find faculty with expertise. However, instead of decreasing community and public health nursing clinical education hours and replacing them with more acute care clinical education hours, we urge schools of nursing to respond to the call for deeper investments in public health nursing, both in didactic and clinical courses, as outlined in this article. Furthermore, we implore administration, accrediting bodies, and educators to audit the inclusion of public health nursing guidelines in curriculum development and to mandate continuing professional development through leading public health nursing organizations, as highlighted in the *Future of Nursing 2020–2030* report.[10]

The time is right for the profession of nursing to influence the direction of health care delivery and health outcomes for populations and communities. Leading nursing organizations agree that population health and social determinants of health are drivers of change within the profession. May we not lose the opportunity to move forward boldly, not in appeasement but in authentic, robust curriculum reform that will shore up the frontline of prevention and propel the role of nurses and the profession of nursing from the bedside to the community. For nurses to be fully competent to address the social and structural determinants of health—in the context of all communities where 80% or more of health decisions happen in everyday life, work, and play—we must strengthen and reform the nursing curriculum to fully include these concepts and competencies. People, communities, and health systems are waiting on us to do it differently. Public health nursing educators are the leaders who can influence this future. Our time is now. AJPH

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Paleofire Data for Public Health Nursing Wildfire Planning: A Planetary Perspective

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Public health is increasingly threatened by global warming, land use, and changing wildfire patterns that shape vegetation type, structure, and biodiversity and ultimately affect ecosystem services and our society.[1] Uncontrolled large wildfires emit greenhouse gases and aerosols that induce direct and indirect climate feedback through radiative forcing in the atmosphere[2] and irreversible changes of natural vegetation, thereby further accelerating climate change and associated fire risks.[3] Wildfires are also harmful to human health because they create high pollution concentrations of fine particulate matter that are 2.5 micrometers or smaller ($PM_{2.5}$) and concentrations of coarse particulate matter that are between 2.5 and 10 micrometers in size. When inhaled, particulate matter significantly increases a myriad of health outcomes, including overall mortality, cardiovascular mortality, and emergency department visits for respiratory morbidity, congestive heart failure, chronic obstructive pulmonary disease, and angina.[4,5] Between July and October 2020, high $PM_{2.5}$ concentrations from massive wildfires surrounding a large regional hospital in the western United States were associated with a 6% increase in COVID-19 cases.[6] Risks for developing adverse health effects from wildfire smoke are greatest among people who are living with chronic conditions; who are experiencing intergenerational racial, economic, and housing discrimination; and who are facing social inequities from the COVID-19 pandemic.[4] The unprecedented recent wildfires in the western United States and their ill effects on human health and society, as well as the multiple other threats to people and places brought about by climate change, draw attention to the increasing urgency of developing new public health approaches and long-term adaptation strategies to support future population health.

Public health nurses routinely work with people living in communities affected by wildfires, and they provide care such as health assessment, referrals to health and social services, education, shelter care, case management, disease surveillance, screening, vaccination, and collaborative planning. New cross-disciplinary perspectives and collaborations to inform and implement more effective strategies to address threats to population health are urgently needed. Planetary health is a cross-disciplinary perspective that explains how humans and natural systems are connected and how the exploitation of ecosystems and natural resources anywhere is damaging to the health of the planet.[7] Planetary health is also a cross-disciplinary social and scientific movement that aims to protect and improve the health of the planet and all its inhabitants.[7] Understanding past wildfire events can help determine effective adaptive strategies for future public health nursing services that support planetary health.

UNDERSTANDING CHANGES THROUGH PALEOFIRE SCIENCE

Satellite data and other observations of the past decades suggest that the recent wildfire severity is unprecedented in many regions compared with the Holocene, defined as the past 12 000 years after the end of the Last Glacial Period.[3] In addition, wildfire risks emerge in previously fire-free regions; for example, Greenland experienced a first natural fire in 2017. These recent observations suggest that rapidly changing wildfires and associated disruption of natural systems in response to climate change and growing human activities result in large atmospheric smoke plumes.

Observational fire data covering the past few decades give valuable information on current wildfire events.[1] However, these data hardly capture long-term trends (i.e., centennial to millennial time scales) of wildfires and associated atmospheric emissions that may help to improve future fire models and thereby provide the base to adapt public health systems.[3] To understand long-term trends, natural archives

preserve fire history on a wide range of spatial scales in the past beyond the period of observational fire data; examples include polar and high-alpine ice cores; lake, peat, and marine sediment cores.[3,8,9] Such paleofire records are based on measurements of the gaseous tracers ammonium and nitrate or particulate matter, such as levoglucosan and black carbon, and charcoal that reflect different components of wildfire-induced atmospheric smoke pollution.[8,9] These paleofire records have previously identified complex regional interactions of humans, ecosystems, and climate change.[3]

Submicron-sized (100–500 nm in diameter) black carbon particles from wildfires and fossil fuel during the industrial era (i.e., the past 250 years) measured in ice cores and lake sediments can be used as a direct tracer for the release of harmful $PM_{2.5}$ to the atmosphere.[8,10] Such paleo black carbon records have been established from both polar and high-alpine glaciers on several continents and are recently developed from lake sediments.[10] These found significant changes of fire activity in response to climate and human impact and enhanced pollution levels varying both in time and space. For example, the 13th century first humans arriving in New Zealand from Polynesia used fire for land clearing that caused enhanced black carbon concentrations in Antarctic ice cores more than 7000 kilometers away.[11] In addition, these ice cores give a long-term analog of past societies' responses not only to fire but also to other events, such as the Black Death pandemic of the 14th century or climatically warmer or cooler periods that, together with written historical sources, add to a holistic understanding of societies in the past (Figure 1).[9] These historical data can help with understanding current wildfire effects and needed adaptation strategies.

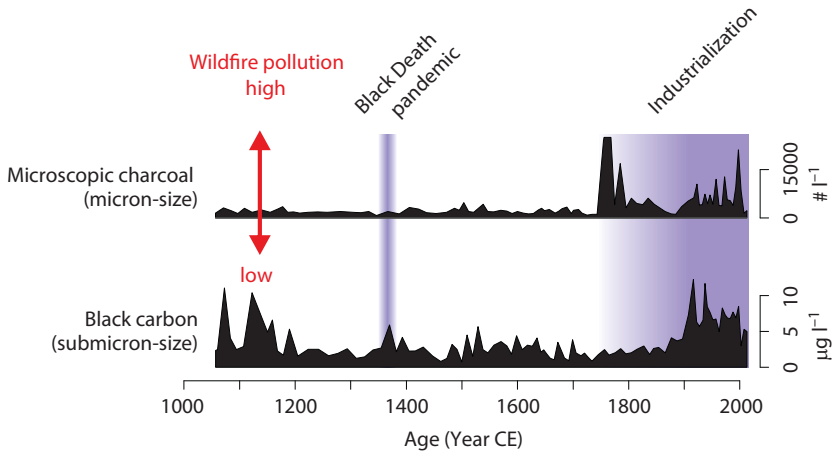

FIGURE 1— Paleofire Data From Colle Gnifetti Glacier Ice Core in the European Alps Showing Concentration Changes of Microscopic Charcoal Fragments and Black Carbon Over the Past 1000 Years

Note. CE = common era. Microscopic = larger than 10 µm. Black carbon = a fraction of submicrometer-size particulate matter. Indicated are the Medieval Black Death pandemic and the recent industrial period.
Source. Brugger et al.[9]

INCORPORATING PALEOFIRE DATA INTO ADAPTATION STRATEGIES

Public health nurses' work uniquely spans between nursing and public health with a focus on community, system-level change, and population health equity.[12] As such, public health nurses are experts in the needs of the populations in which they serve.[12] As the climate crisis continues, there will be an increased need for rapid implementation of local adaptation strategies against wildfires to protect future population health. With public health nurses being well positioned to understand population health needs, planetary health, and the health consequences of wildfires, public health nurses can improve upon wildfire adaptation planning and essential public health services by understanding historical perspectives from past fires.[9,11,13]

Paleofire data provide direct estimates of historical atmospheric emissions from past wildfires and associated harmful concentrations of particulate matter over long distances. Incorporating paleofire data into public health adaptation strategies demonstrates the concept within planetary health that human needs and natural systems are connected.[7] Furthermore, given that large parts of society do not believe in global warming and future associated wildfire changes,[14] public health nurses can use paleofire and paleoclimate data as a tool to communicate climate oscillations, centennial-to-millennial scale wildfire patterns, and how these wildfires have affected past societies. Public health nurses are representatives of a trusted health profession who are skilled in translating scientific or medical information in relatable

terminology while addressing cultural sensitivity.[12] By using paleofire data as a storytelling communication tool, public health nurses can address their communities' diverse views on climate change and wildfire patterns.

In the United States, approximately 43% of Americans are worried about the consequences of wildfires to their local areas.[14] Paleofire data provide an understanding of the geographic distribution of future wildfire risks with changing climate and socioecological factors and the frequency and return intervals between wildfires in a given area.[3] Comparing and contrasting paleofire data with recent observational fire data can be useful to identify locations potentially vulnerable to future wildfires. Public health nurses can prioritize and target adaptation strategies for communities that are at risk for experiencing wildfires and associated smoke plumes. Public health nursing adaptation strategies can include home assessments for ventilation and filtration, diagnosis of comorbidities, identification of economic and social capital, assessment for availability of asthma rescue and reliever medications, and access to clean water. Additional planning could involve public health nurses partnering with regional tertiary care systems to support preparation for wildfire events and potential surges in Emergency Department use. Additionally, public health nurses can combine paleofire data with recent observational fire data to identify potential locations to establish nonurgent screening clinics that could be used during a regional wildfire event for nonurgent health assessment screenings. Combining paleofire data with recent observational fire data can support public health nurses in identifying the communities that are at highest risk and guide a targeted approach to implementing wildfire and wildfire-associated smoke plume adaptation strategies.

Given the ongoing COVID-19 pandemic and immediate health needs surrounding the pandemic, planning for wildfires may not be in the forefront of public health nursing practice. However, planning for the health consequences associated with wildfires will continue to be needed, with the consequences associated with wildfires potentially worsening the COVID-19 pandemic.[4,6] To address future wildfire consequences, public health nurses may need to collaborate with partners across disciplines and organizations and with community partners. To identify collaborators, public health nurses can reach out to emergency planners within state, local, and territorial public health departments and tertiary care systems, frontline emergency planners, paleofire and wildfire scientists at universities, and community members with lived wildfire experience. By having community members with lived experience, the collaboration would be investing in a community-based participatory approach. By having a team with diverse perspectives and diverse organizational approaches led by public health nurses or public health emergency planners, such collaborations could plan for mitigating health risks associated with wildfires in the coming decades, thus promoting an equitable and sustainable health system. AJPH

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Health Coaching Across the Stages of Vaccine Readiness and Action: A Practical Guide for Public Health Nurses

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Severe acute respiratory syndrome coronavirus 2 (SARS-CoV-2), which causes COVID-19, is part of a family of coronaviruses. It was identified to be the cause of a highly contagious severe respiratory syndrome that resulted in a global pandemic starting in early 2020.[1] In the United States, relatively high COVID-19 morbidity and mortality have been documented among older adults, people with chronic health conditions, people with low socioeconomic status, the underinsured, and those from diverse racial and ethnic backgrounds.[2,3] For example, African Americans represent 13.4% of the US population but accounted for more than 24% of the COVID-19–related deaths.[4,5] Adjusted for age, the rate of death from COVID-19 is twice as high for Latinx, African American, and Indigenous people as it is for their White counterparts.[6,7] COVID-19's disproportionate impact on racial and ethnic minorities and vulnerable populations has amplified the need to increase vaccination outreach among these groups as a matter of equity.

In May 2020, just a few months after the initial identification of the SARS-CoV-2 virus, the US federal government established a program (Operation Warp Speed) to accelerate the development of an effective vaccine against COVID-19. Several months after the establishment of Operation Warp Speed, Pfizer-BioNTech, Johnson & Johnson, and Moderna all received Emergency Use Authorization from the US Food and Drug Administration for their vaccines against COVID-19. The development of an effective vaccine against COVID-19 was a major accomplishment of science and was seen as the primary public health strategy to reduce infections and deaths and thereby to end the pandemic. Yet, lack of vaccine uptake puts in peril the goal of controlling the spread of the virus, particularly among communities that are at greatest risk of contracting and dying of the illness.[8]

The reasons for the lack of COVID-19 vaccine uptake among some communities in the United States are multifaceted, some of which include concerns about the safety or effectiveness of the vaccines, the speed in which the vaccines were developed, misinformation about the vaccines, and systemic barriers affecting community access (i.e., online appointment systems, inadequate transportation, and lack of child care).[9,10] For many communities of color, including African American and Latinx individuals, COVID-19 vaccine reluctance is rooted in both historical and contemporary experiences of systemic racism, forced sterilization of Latinx women in California, the Tuskegee Study of Untreated Syphilis in the Negro Male (renamed as the US Public Health Service Syphilis Study at Tuskegee), marginalization, medical distrust, neglect from the scientific and medical communities, poor public health infrastructure, and institutional abandonment.[2,3,10] In addition to those reasons, the politicization of the vaccine development process and efforts to increase vaccination after the 2020 US presidential election have deepened distrust among some communities. However, although many Americans, including members of communities of color, have significant reasons to be skeptical about receiving the COVID-19 vaccine, skepticism does not always equal vaccine refusal.[10]

Nurses and other public health workers conducting vaccination outreach play a critical role in engendering trust in vaccines, specifically COVID-19 vaccines. A 2021 Kaiser Family Foundation survey found that 79% of US adults who have not yet been vaccinated say they would likely turn to a trusted nurse, doctor, or other health care

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provider when deciding whether to get a vaccination.[11] As health care professionals, nurses and other public health workers are often a patient's first clinical contact and are among the most trusted sources of information about the vaccines. They are well positioned to have discussions about COVID-19 vaccines, having served on the front lines of the fight against the pandemic in both inpatient care and public health response through leadership in contact tracing and case investigation efforts. Nurses are leading the nation's vaccine administration efforts and, to many, are the most accessible source of information for questions about safety, side effects, and benefits.[11,12] To be effective, nurses and other public health workers require an understanding of the reasons that prevent people from getting vaccinated and have practical tools to support people with their decisions regarding if, when, and how they get vaccinated against COVID-19. We propose a framework, developed by a nurse scientist, titled the Stages of Vaccine Readiness and Action, along with health coaching tools that are applicable to each stage of the framework to increase vaccination uptake among all communities at risk for contracting the SARS-CoV-2 virus.[13] Altogether, our experiences and the vignettes in this perspective are based on our work of training and supporting more than 11 500 pandemic response specialists, vaccine outreach workers, and other pandemic response specialists (including many nurses) across the state of California.[14]

Our Stages of Vaccine Readiness and Action framework (Box 1) was adapted from the transtheoretical model,[15] which was developed to understand how people engage in complex health behavior change by assessing readiness and motivation. We posit that individuals move through five stages of vaccine readiness and action: vaccine skepticism, vaccine curiosity, vaccine readiness, vaccine action, and vaccine maintenance. The relationship between the stages in the framework are cyclical, and individuals can move in either direction at different points in time when exposed to new information (e.g., negative news reports) or negative experiences (e.g., a family member who had an adverse reaction). For each stage, different strategies or interventions drawn from the techniques of health coaching may help to move the person to the next stage of the cycle and subsequently to action, in which they are actively seeking vaccination against COVID-19. These techniques are based on decades of research in health coaching and its parent philosophy of motivational interviewing as methods to influence health behavior to improve chronic disease management, combat addiction and destructive behaviors, and improve health.[16–19] Below, we provide a case scenario along with a brief overview of each of the stages of vaccine readiness and action and provide health coaching strategies that can be used to move persons from one stage to the next.

VACCINE SKEPTICISM

> Joe is a healthy, middle-aged adult who has known only a few people mildly affected by COVID-19. He's suspicious of the hurried pace of vaccine development and doesn't like being "pushed into" getting the vaccine.

Vaccine skepticism refers to a disinterest in or lack of trust in vaccines generally or specifically regarding the COVID-19 vaccine. One of the main drivers of the distrust in the COVID-19 vaccines is the politicization of the vaccine development process.[20,21] Although politicization has deepened vaccine skepticism in some sectors, skepticism may be found across the political spectrum.[22,23] Unlike the commonly used term vaccine hesitancy, vaccine skepticism acknowledges the various reasons why people might not be interested in the vaccine, including safety concerns, uncertainties about potential side effects, misinformation, medical racism, or distrust in the government or health care institutions. Some vaccine skeptics may have deeply entrenched beliefs and may not be open to discussions about receiving a COVID-19 vaccine. Others may be willing to engage in discussion if the approach is respectful. The HEAR technique (Box 1) is a tool to defuse emotion and explore motivation and beliefs in a nonconfrontational way, regardless of the drivers of skepticism.[24] The HEAR technique is an acronym for hear, express gratitude, ask about pros and cons, and respond. It begins with asking open-ended questions to understand someone's perspective more deeply and reflecting back to them their thoughts and feelings (hear), as well as to share appreciation for the person's willingness to talk or share concerns (express gratitude). Asking about the reasons that people do not want to get the vaccine (cons) and any motivation that they may have to get the vaccine (pros) is a powerful way to open a conversation about personal motivations for and against vaccination (ask about pros and cons). The final step is to ask if it's okay to share more information about the person's specific concern for them to consider as they make their own decision (respond). Someone in the stage of vaccine skepticism may not be ready to change their mind; reaching

BOX 1— Applying Health Coaching Techniques to the Stages of Vaccine Readiness and Action Framework

Stage	Health Coaching Technique and Examples
Vaccine skepticism: Expresses lack of interest in vaccination; this includes people with deeply entrenched beliefs as well as those open to conversation.	Technique: HEAR technique with pros and cons 1. Hear: Ask open-ended questions to understand individuals' concerns. Reflect back their feelings and thoughts. *When you say "safety," could you tell me about your specific concerns?* *You don't like the idea of being pushed to get a vaccine. Could you tell me more?* 2. Express gratitude. *Thanks for sharing that!* 3. Ask about and summarize pros and cons. *What reasons might you have to not want to get vaccinated?* *What reasons might you have to want to get vaccinated?* *So, it sounds like, on one hand, . . . and on the other hand, ... Did I miss anything?* 4. Respond: Offer information to build on knowledge and motivations. *You mentioned being concerned about the development being rushed. Would it be okay if I shared what we know about the vaccine safety and how the vaccines were developed so quickly?*
Vaccine curiosity: Interested in learning more about vaccination but has questions	Technique: Ask-tell-ask 1. Ask open-ended questions to understand concern more deeply. *What kinds of side effects are concerning you?* 2. Tell: Share information about what they do not already know. *You're correct that some people have had severe allergic reactions. Those are rare, but to be safe, vaccine sites have everyone wait at least 15 minutes after their shot to make sure they can be helped if they were to have a reaction.* 3. Ask a follow-up question. *What do you think about that?*
Vaccine readiness: Expresses desire to get vaccine but may face barriers	Technique: Action planning 1. Ask permission to discuss barriers. *Would it be helpful to talk about your options for transportation?* 2. Create a menu of options together. Ask what would work for them. *What options are you considering? May I share options that have worked for others? What do you think is the best option for you?* 3. Ask follow-up questions about first steps, when, and with whom. *What do you think is the first step? When could you do that?* 4. If the plan is complex, ask about confidence that the plan is doable. *Let's do a reality check. On a scale of 1–10, where 1 is not confident at all and 10 is very confident, how confident do you feel that you can. . . .* 5. Ask the person to describe the plan in their own words. *We've talked about a lot today. Just to be sure we're on the same page, would you mind describing next steps in your own words?*
Vaccine action: Actively seeking vaccination	After making plans to get vaccinated, people may still face barriers. These can be addressed through action planning.
Vaccine maintenance: Completed an initial vaccine series and now needs to receive regular follow-up vaccination to maintain protection	After having completed their initial series, people will likely need to receive regular follow-up vaccinations (i.e., "booster" shots) to maintain their immune response. Even after completing the initial series, people's feelings about additional vaccines may range from skepticism ("Hey! I did my part! I'm done with shots!") to readiness ("Wait, my health department isn't offering them at my assisted living facility. How can I get there to get it?") Technique: Tailor to their stage of readiness about boosters The techniques described above can still be used to address people in each stage of readiness, though they should be tailored to the more specific concerns or questions of the maintenance phase. For example, here is how one might use the HEAR technique to address someone in the state of vaccine skepticism about maintenance vaccines: 1. Hear: Ask open-ended questions to understand contact's concerns. Reflect back their feelings and thoughts. *You are frustrated. You feel like you did your part to get vaccinated, and now you're being asked to get another shot.* 2. Express gratitude. *Thank you so much for getting vaccinated in the first place! That's such a great way to protect your community. I'm impressed that you did that even though you hate shots!* 3. Ask about and summarize pros and cons. *What were your reasons for getting the initial vaccine?* *What would be the bad things about getting another shot?* *What do you think are the good things about getting another shot?* 4. Respond: Offer information to build on knowledge and motivations. *Would it be okay for me to share some of the reasons that other people I talk to are choosing to get another shot?*

the point at which they are open to new information is a significant achievement.

VACCINE CURIOSITY

> Elena has been meaning to talk with her 14-year-old daughter's pediatrician about getting the vaccine and is glad you called her today. Her sister told her that the vaccine can disrupt the menstrual cycle and might later affect fertility. She wants to know if it's safe for young people who might someday want to have kids.

Individuals in this stage of vaccine curiosity are interested in getting vaccinated but have questions or concerns that they would like to address first. These may include questions about the safety or effectiveness of the vaccine, whether it is needed after "natural immunity" is acquired from infection, side effects, or lifelong consequences such as effects on pregnancy or impact on chronic illness. The "ask-tell-ask" technique uses open-ended questions to explore concerns and share tailored information that these individuals can use to make an informed decision about receiving the vaccine. For example, if someone shares, "Yes, I've been thinking about it, but I wonder if I should just wait and see," a public health nurse might respond, "Thanks for sharing that! May I ask what you've heard that makes you want to wait and see?"

VACCINE READINESS

> Antonia wants to get the vaccine but cannot take time off work. On weekends she takes care of her kids and doesn't want to put them at risk by bringing them to the vaccination site.

People who are vaccine ready want to get the vaccine but may face various barriers, including but not limited to the ability to navigate the registration system, transportation to the vaccine administration site, immigration concerns, accessibility and site hours, inadequate access to the Internet to schedule appointments online, and competing responsibilities. Action planning is a health coaching tool that may be used to support people in breaking down complex challenges into next steps (Box 1). This entails developing a menu of options from the individual's experience and asking what would work best for them. Follow-up questions can help an individual think about the first step, how and when they can do it, and who can support them to the point of full vaccination.

VACCINE ACTION

> Suneet scheduled his vaccine appointment online and showed up at the pharmacy over his lunch break on time to receive it, but he was told that his appointment was actually at a different location across town. When he asked if he could receive it at the current pharmacy he was at, he was told that he could not. Frustrated, he returned to work without having received the vaccine.

Someone in the stage of vaccine action is actively seeking a vaccine but may continue to experience barriers to receiving the vaccine. As in the stage of vaccine readiness, action planning is a tool that can help them overcome barriers that they encounter. Should they encounter barriers that prevent them from securing a vaccine, they may be back at the stage of vaccine readiness, and a return to vaccine action may be the next step.

VACCINE MAINTENANCE

> Charles completed his primary vaccine series. However, he is skeptical about being asked to get a "booster" shot. "First, they say that if I get two shots, I'm protected, and now they're talking about a booster shot! Why should I trust anything they say anymore?"

Individuals in the vaccine maintenance stage may have completed a primary COVID-19 vaccine series and now require regular vaccine boosters to maintain protection against the virus. It looks increasingly likely that maintaining immune protection against COVID-19 will require regular maintenance vaccines or boosters. Even among people who have completed a primary vaccination series, their response to being asked to get additional vaccinations will likely range from skepticism to readiness. Understanding their stage of readiness for additional boosters can allow the public health nurse or outreach worker to use the tools described above to respond respectfully. For example, one might recognize Charles's response described above as an example of vaccine skepticism and use the HEAR technique to engage with him (Box 1).

CONCLUSIONS

The Stages of Vaccine Readiness and Action framework provides a set of tools to identify and respectfully engage with people at different stages of readiness. It is important to note that the stages of vaccine readiness are fluid. The issues that people are considering may span several stages, and people may not move linearly between stages. For example, the individual who doesn't think he needs the vaccine as a young, healthy person but who is planning to

get it to appease a family member might be simultaneously in the stages of vaccine skepticism (because he doesn't think he needs the vaccine) and vaccine readiness (because he intends to receive the vaccine). Although vaccine skepticism and vaccine curiosity can often be addressed on the individual level, effectively addressing challenges faced by people who are vaccine ready may require breaking down system-level barriers to achieve full vaccination.[25] Promoting uptake of the COVID-19 vaccine is the critical task of the moment. Our Stages of Vaccine Readiness and Action framework, coupled with health coaching tools, may provide a practical approach to equipping people such as public health nurses and outreach workers on the front lines of vaccine outreach and administration. AJPH

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Improving Interprofessional Environmental Health Education Using the Leave No One Behind Framework

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In the midst of the Anthropocene, two questions continue to confront humanity: (1) How can technology be used to help us to continue to thrive when faced with the limitations of the global carrying capacity of the natural world? (2) How can social contracts be improved to promote justice, equity, diversity, and inclusion as the financial benefits—and environmental consequences—of thriving are apportioned among individuals, communities, and countries? Training future environmental health professionals with the tools they will need to solve these questions is a challenge for educators.

ENVIRONMENTAL HEALTH IN PUBLIC HEALTH NURSING

The environment—where people live, learn, and labor—is a critical determinant of health. The practice of environmental health—undertaken by sanitarians, nurses, physicians, and engineers, among others—originated in the mid-19th century as humanity congregated increasingly in dense urban environments such as London, England.[1] During the Great Sanitary Awakening, Edwin Chadwick's efforts to revise the English Poor Laws (i.e., the social contract of the time) were as important as Joseph Bazalgette's efforts to design and construct London's sewers (i.e., the technology of the time). Both the work of Chadwick and the work of Bazalgette were influenced by the chief nurse theorist of the time, Florence Nightingale.

Nightingale's environmental theory—the normal state of a human is one of health, and the chief purpose of the nurse is to modify the environment to restore health—continues to guide research, education, and practice of environmental health into the 21st century.[1–3] The human rights–based approach foreshadowed by Nightingale—"everyone has the right to a standard of living adequate for the health and well-being of himself and of his family"[4(Article25)]—underlies the conceptual framing of modern sustainable development. The consensus meaning of sustainability was introduced globally in the seminal report, "Our Common Future,"[5] which set the stage for the 1992 United Nations Conference on Environment and Development (also known as the Earth Summit) and the signing of the United Nations Framework Convention on Climate Change.

Although many public health nurses (PHNs) will recognize the definition of sustainable development as "meet[ing] the needs of the present without compromising the ability of future generations to meet their own needs,"[5(paragraph27)] fewer may be familiar with the entirety of paragraph 27 from the Overview section of the report.[5] In particular, *poverty is no longer accepted as inevitable* [emphasis added], and the report notes that the true limitations on development arise from the twin challenges of (1) current social organization and available technology and (2) nature's ability to attenuate the effects of human activities.

Within the reality of a planet undergoing massive environmental challenges brought about by the actions of humanity (i.e., the Anthropocene), the central question facing educators of PHNs is, how do we implement interprofessional environmental health education to achieve effective collaboration beyond the bedside and into the community?[6] As a proposed answer to this question, we suggest that the "leave no one behind" framework of the United Nations Sustainable Development Goals (SDGs) is an important piece of the puzzle, which may be highlighted using examples of nurses and engineers working together to achieve SDG

number 2, zero hunger, as well as SDG number 11, sustainable cities and communities.[7]

TWO EDUCATIONAL EXAMPLES

The SDGs include 17 goals, which are underpinned by three universal values: (1) the necessity of a human rights–based approach, (2) the commitment to leave no one behind, and (3) the central role of gender equality and women's empowerment. The UN's *State of the World's Nursing – 2020* report highlighted the fact that many members of the global nursing workforce are women, and therefore elevating and promoting nursing has an additional benefit of contributing to gender equality and women's empowerment.[8] Nightingale's environmental theory foreshadows a human rights–based approach to development. But what about the commitment to leave no one behind, and how does nursing bring a unique contribution to interprofessional environmental health education?

According to the Missouri Department of Health and Senior Services, "public health nursing is the practice of promoting and protecting the health of *populations* [emphasis added] using knowledge from nursing, social, and public health sciences" (https://bit.ly/3LEpNJb), whereas the code of ethics for nurses highlights "the care of *individuals* [emphasis added], families, groups, and communities" (https://bit.ly/3Jc18tU). Among those professionals who practice environmental health—including sanitarians, physicians, and engineers—PHNs bring the unique perspective of formal preservice education *both* [emphasis added] in patient health (i.e., at the bedside) and in population health (i.e., beyond the bedside and into the community). By contrast, the preservice education of physicians focuses primarily on bedside care of individual patients (i.e., an MD or DO working in public health often obtains additional training such as the MPH when working with populations in the community), whereas sanitarians and engineers share an ethical obligation to protect "the public" (and thereby lack specific training on caring for individuals). This unique preservice education of PHNs—patient care plus population health—is highlighted in two examples of coteaching engineers and nurses in Missouri.

The first example of interprofessional environmental health education includes the cross-training of students of engineering to adopt qualitative research methods often used by PHNs, such as interpretive phenomenology, when engineers interview stakeholders from within heterogeneous communities.[9,10] This novel approach to interprofessional environmental health education among engineers and PHNs is particularly useful when engineering students undertake open-ended, project-based learning such as the redesign of local food systems, which consider the twin goals of improving nutrition and reducing the environmental footprint.[11] Using the framework of leave no one behind means that aspirations of SDG 2, zero hunger, may be met "when *all people* [emphasis added], at all times, have physical and economic access to sufficient, safe, and nutritious food that meets their needs and food preferences for an active and health life."[(12paragraph1)] Thus, students of engineering studying how to redesign the local food system for Phelps County, Missouri, have learned from PHNs how to address the issues of food and nutrition security for all people, which results in achieving no one left behind.

The second example of interprofessional environmental health education includes the cross-training of students of nursing to understand the engineering design of government-funded housing projects such as the federal Housing Act of 1949. This novel approach to interprofessional environmental health education among engineers and PHNs is particularly useful when nursing students undertake community-embedded windshield surveys. Using the framework of leave no one behind means that aspirations of SDG 11, sustainable cities and communities, may be pursued as PHNs begin to understand how the intersection of policies—such as redlining—and the work of engineers—designing and building housing funded by federally backed home loans—contributed to the poor health outcomes observed in the cities of today.[13] Thus, students of nursing studying the "Delmar Divide"[14]—a boulevard that runs from east to west through St. Louis, Missouri, demarking a socioeconomic and racial border between the northern and southern regions of the city—have learned from engineers how the use of technology to implement biased policies contributed to health inequities that impact modern cities.

CONCLUSION

These two examples of coteaching engineers and nurses in Missouri highlight the importance of maintaining a global perspective while addressing the health of local populations.[1,15] In particular, the importance of leveraging the three universal values of the SDGs—human rights, no one left behind, and gender equality—are centered to improve

interprofessional environmental health education. As described previously, nurses have an important leadership role to play as humanity confronts the important questions of the Anthropocene and convergence research is used to develop new solutions to these ongoing challenges.[16] For example, engineers and sanitarians can practice alongside and learn with nurses (i.e., revisiting the collaborative period of Bazalgette, Chadwick, and Nightingale using modern technologies and social contracts such as leaving no one behind). Translators, developing the materials necessary for interprofessional education,[16] have an explicit opportunity to leverage the unique contribution nursing brings to interprofessional environmental health education through the use of the leave no one behind framework. AJPH

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An Overlooked Strategic Powerhouse: How Nurses Can Rise to the Challenge of Integrating Public Health and Primary Care

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Although the United States is one of the wealthiest countries in the world and a leader in biomedical innovation, its health care system is consistently ranked among the worst in terms of cost and health outcomes. Americans have short life expectancies, high infant mortality and obesity rates, and soaring chronic disease rates compared with other wealthy nations. In 2021, the National Academy of Medicine (NAM) was charged with examining what it would take to improve US primary care. The NAM report described the practice of siloing public health from primary care or treating these areas as separate fields of scientific inquiry, practice, and billable service.[1] NAM identified this separation as a key driver of poor health outcomes and health inequities in the United States. The Institute of Medicine (IOM) examined similar phenomena in a 2012 report, noting how the two fields tend to operate independently, despite complementary functions and common goals.[2]

Where these silos persist, we see communication and process breakdowns at the point of care. For instance, when large swaths of Americans turned to trusted primary care providers for COVID-19 vaccine insights, their primary care providers did not always have the most up-to-date information, in part because of a lack of interprofessional cohesion (including fragmented public health messaging and data systems). If we are to remedy such issues, a substantive paradigm shift must take place: We must move toward what DeSalvo et al.[3] termed "Public Health 3.0." In this model, multiple sectors, specialties, and stakeholders form coalitions to mobilize data, people power, and resources in a strategic manner to advance health for all. To be truly strategic, we must think carefully about how to leverage nurses—who care for patients across the lifespan and in nearly all public health nursing (PHN) and primary care settings—within these coalitions.

The 2021 NAM report urges health care teams to undertake the mission of integrating systems. However, NAM stops short of describing exactly how teams ought to accomplish this aim and the proposed makeup of said teams. Like any group project, success will depend on the ability of teams to identify leaders and clearly delineate responsibilities. The purpose of this editorial is to explore the potential of PHN and primary care nurses and to describe the roles they might assume in the collaborative integration of their respective silos.

WHO ARE PUBLIC HEALTH AND PRIMARY CARE NURSES?

PHN is "the practice of promoting and protecting the health of populations using knowledge from nursing, social, and public health sciences."[4(p1)] Between 37 000 and 41 000 public health nurses practice in the United States across all states and territories, with many employed by state and local departments of health.[5] Although public health nurses often provide direct clinical services, their roles vary greatly, depending on community needs. Public health nurses may focus on health promotion, disease surveillance, community-based participatory research, or health advocacy, among other areas.[5] In addition to health departments, they may be found working in "schools, homes, community health centers, clinics, correctional facilities, worksites, out of mobile vans and even dog sleds."[4(p1)]

Primary care nurses, on the other hand, are found in primary care offices, telehealth and concierge health practices, retail health clinics, and community health clinics. These nurses promote primary prevention, manage chronic conditions, and support quality of life across disease trajectories. They often

work with people and families over many years, providing important continuity of care within fragmented health care systems. Of the 3.5 million nurses practicing in the United States, only about 9% practice in ambulatory care, which encompasses primary care.[6] This includes approximately 55 625 primary care nurse practitioners.[7]

Primary care nurses often work alongside public health nurses in community clinics and departments of health. Both may occupy roles spanning organizational levels from patient care, to care coordination, to office management, and to senior leadership. All nurses receive information on PHN and primary care in their prelicensure programs. However, few nurses are exposed to integrated models of care in communities; rarely is the power potential of fully integrating these two areas covered sufficiently either. Nurses can embrace their power and influence by developing education and certification programs that integrate these silos, teaching emerging nurses how to work across disciplines to improve health care.

THE VALUE OF LEADING FROM THE FRONT LINE

The 2021 NAM report clearly stresses the importance of placing patients, families, and communities at the center of measures for improved primary care (Box 1). This approach aligns with the nursing paradigm, which imagines optimized care as a web of considerations (one's family, culture, lived environment, finances, etc.), with the patient or community at the center. Nurses are therefore primed to consider how interlocking systems bear on individual and population health outcomes. At all levels, nursing preparation assumes this paradigm and emphasizes competencies relevant to public health leadership, including interprofessional collaboration, stakeholder engagement, and data analytics. These factors position nurses as ideal early adopters and influencers of professional integration.

Public health nurses and primary care nurses bring an intimate, human understanding of illness and barriers to care as well. Nurses live and work every day in the microtrenches of care, and they are trained to understand how everyday frustrations fit into a "macro" picture of fragmented systems and professional silos. We cannot underestimate the value of this perspective in strategic planning and change management. Nurses ought to be recognized and supported as frontline leaders with the skills, acumen, and lived experience necessary to achieve reforms.

BOX 1— Opportunities for Public Health–Primary Care Integration

- Improve treatment and management of chronic complex medical and psychosocial conditions
- Improve effectiveness of dissemination and prevention and health promotion
- Increase primary care capacity to influence public health goals
- Bring larger focus to health of a community through connected healing and trusted relationships
- Reach families that do not have primary care through diverse integrated teams
- Meet people where they live and work, including settings such as schools and day care, senior citizen settings, places of worship, barber shops, salons, and libraries

Source. Based on data from National Academies of Sciences, Engineering, and Medicine.[1]

ACTION AT EVERY LEVEL

Nurses can demonstrate this leadership potential through simple steps, including the following:

- Nurses of all levels can pursue continuing education opportunities in PHN or primary care.
- Nursing employers should cover continuing education costs, along with professional development opportunities (such as conferences).
- Nurses of all levels can advocate for integration and educate colleagues via engagement with professional associations, social media, op-ed writing, workplace events, and in-services, among others.
- Nurse managers can lead campaigns to promote work cultures where primary care is seen not as a specialty, but rather as essential to the implementation of all health care.
- Nurse leaders can shift their organization toward an integrated model through the careful selection of data systems, the formation of strategic partnerships, and interprofessional staffing.

Nurse leaders should collaborate with primary care, public health, and community organizations to cultivate Public Health 3.0 coalitions.

SUSTAINING INTEGRATION THROUGH EDUCATION

Nurse educators will play a pivotal role in sustaining this work. In most nursing programs, there is too much focus on acute care and not enough focus on both primary care and public health. From the undergraduate level to the doctoral level, academic nurse leaders and faculty should critically examine curricula for such oversights. To start, nursing faculty should incorporate data analytics—a core public health

competency—into curricula, regardless of the subject at hand. This will show future nurses that, with the right data, they can influence and continuously evaluate change from the individual level to the population level. It will also create a pipeline of nurses who are prepared to build data conduits from PHN surveillance to primary care practice. Any opportunities for weaving analytics and PHN science into doctoral dissertations should be considered.

In clinical settings, nursing students need to witness and participate in the integration of public health and primary care through hands-on learning. Students should have exposure to positive role models functioning at the top of their license in primary care. In fact, before home health nurses moved to staffing under private home care companies, students would have rotations with providers managing complex care at home. Limited hospital stays have further separated nurses practicing in hospitals from the communities where their patients live, work, and play. It is time to collaboratively revamp clinical education to ensure immersion across practice environments and disciplines.

CONCLUSION

For nearly three decades, the IOM, NAM, and other leading organizations have called for greater primary care–public health integration. Despite this urging, no one entity—educational or professional—has assumed accountability for implementation. Nurses are familiar with stepping up to wicked problems in health care when leadership is needed. Change will happen at the front lines of care; if true integration is to occur, it will take place in senior centers, places of worship, adult daycares, barbershops, beauty salons, and libraries. Nurses, already a trusted presence in these spaces, will be there to lead the way. AJPH

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Defining Climate Justice in Nursing for Public and Planetary Health

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Climate justice is key to protecting public health in climate change. The United Nations describes immediate threats and unjust harms for people and ecosystems resulting from a rise in global temperature.[1] As public health nurses (PHNs) and representatives of the Alliance of Nurses for Healthy Environments' Global Climate Justice in Nursing Steering Committee,[2] we believe that PHNs are uniquely positioned to address climate injustices in partnership with communities and ecosystems. The purpose of this editorial is to propose a definition of climate justice in nursing. To support the development of this definition, the following sections briefly explore (1) the climate justice movement, (2) climate justice frameworks, (3) a definition of climate justice in nursing, and (4) implications for nursing roles in climate justice through research, education, advocacy, and practice.

THE CLIMATE JUSTICE MOVEMENT

Climate change intensifies health burdens caused by environmental racism, which has impacted Black, Indigenous, and other communities of color for centuries through overexposure to polluted and risky geographies.[3,4] These communities are sometimes referred to as "frontline" or "fenceline communities." Frontline communities are those that are often the first to experience the impacts of climate change and whose members have important insights and skills in coping and policy solutions.[3] Fenceline communities are groups living close enough to an industrial or toxic environment to experience harm from the associated pollution and are at elevated risk for further harm from climate events.[4]

The concept of climate justice was created as a submovement of the environmental justice movement to redefine climate change as a human rights and environmental justice issue.[3] Public health equity is intrinsic to the vision that grassroots leaders advanced in the 1991 Principles of Environmental Justice.[5] Formal climate justice principles were published in 2002 for the Earth Summit in Bali,[3] and policy recommendations were published that same year at the Second National People of Color Environmental Leadership Summit.[6] Further recommendations were put forth at the national Mobilization for Climate Justice when a climate justice community delegation attended the 2009 United Nations Climate Change Conference in Copenhagen.[7] The climate justice movement continues to evolve and strengthen.

CLIMATE JUSTICE FRAMEWORKS

In the following subsections, we consider three frameworks that provide elements important to defining climate justice in nursing, including the Just Transition Framework, the Planetary Health Education Framework, and the Critical Environmental Justice Nursing for Planetary Health Framework.

Just Transition Framework

The Just Transition Alliance, formed in 1997, created principles for a transition from an extractive economy to a regenerative economy.[8] The Climate Justice Alliance adapted the Just Transition Alliance's principles into a Just Transition Framework.[9] The Just Transition Framework is applied by the Climate Justice Alliance to respond to escalating climate disasters in the United States, where they provide technical training and capacity building for frontline communities. The framework guides strategies that are rooted in the work of environmental justice groups and labor unions, in alliance with fenceline and frontline communities, to define a transition away from polluting industries that are harming workers, public health, and the planet. Thus, planetary health is regarded as integral to this transition.

Planetary Health Education Framework

The Planetary Health Education Framework highlights the interconnectedness

between Earth's natural systems and the health of all forms of life and considers the geographical and temporal distribution of social, environmental, distributive, intergenerational, and multispecies justice issues.[10] "Multispecies justice" is a term that expands the idea and practice of justice to encompass and respond to the destruction of multispecies lifeways, advances the rights of Nature, and rejects the idea of human exceptionalism.[11] The framework supports learners by equipping and enabling them with the necessary knowledge, skills, literacy, values, and attitudes to drive transdisciplinary and mutually reinforcing actions that protect and restore planetary health. It calls for the elimination of systemic inequities and acknowledgment of how historical, political, and geographical injustices have disenfranchised populations and degraded ecosystems.

Critical Environmental Justice Nursing for Planetary Health Framework

The Critical Environmental Justice Nursing for Planetary Health Framework describes how planetary health injustices have been fueled by supremacy (e.g., White, male, human) and capitalism for centuries, guaranteeing disadvantages for all but a few and creating the illusion of scarcity to justify extraction.[12] This framework conceptualizes the human roots in planetary health, expressed as patterns of violence (e.g., slavery, ecocide, femicide, and genocide) that are manifested in patterns of public health (e.g., despair, morbidity, and mortality). Thus, patterns of domination (e.g., racism, sexism, classism, ableism, and speciesism) overlap and mutually reinforce these injustices. The framework calls for a radical shift toward worldviews and ways of knowing that embrace regeneration and transformation of existing power relationships for health.

DEFINING CLIMATE JUSTICE IN NURSING

Climate justice has become a driving force for innovation in science and is at the forefront of the planetary health and environmental justice movements; yet, it has not been formally defined in relation to nursing. We used the previously described principles and frameworks to guide the development of an initial definition of climate justice in nursing to help inform climate justice strategies in public health nursing research, education, advocacy, and practice:

> Climate justice in nursing addresses the social, racial, economic, environmental, and multispecies justice issues of the climate crisis through centering the experiences and ways of knowing in frontline and fenceline communities and safeguarding the rights of Nature to achieve planetary health.

IMPLICATIONS FOR ADVANCING CLIMATE JUSTICE

PHN research in climate justice has only recently emerged but is grounded in environmental justice and planetary health. PHN researchers are using critical methodologies for transforming power relationships in the context of planetary health.[12] PHNs need to develop new interventions and case studies for ecological mitigation, restoration, and regeneration to advance multispecies justice and improve public health.

As climate injustices increase, PHNs will need to be prepared in the science and practice of planetary health to better understand how to protect the environments that people and multispecies communities live in. The interconnection of public and planetary health should be considered a critical global component of PHN education and the PHN standards of practice. Planetary health pedagogical frameworks that promote justice provide new opportunities for expansion into regenerative worldviews and ways of knowing.[3,12]

Just as PHNs need new orientation to knowledge, policy solutions for climate justice must be centered within the ways of knowing, needs, and experiences of frontline and fenceline communities and ecosystems. PHNs design and implement public health policies to promote population health equity. Continued development of this definition of climate justice in nursing will further clarify and accelerate our policy work. Meaningful inclusion and input are critical to ensuring policy solutions provide benefits for communities and ecosystems.

Many climate-affected communities are leading the way in developing solutions to the climate crisis.[2] Through the formation of transdisciplinary and nurse–community partnerships, PHNs can support community-led interventions and be responsive to the interconnectedness of climate injustices to improve public health. As the definition of climate justice in nursing is used and informed by nurse partnerships with communities and ecosystems, we anticipate that the definition will evolve and inform future global nursing work to advance climate justice.

CONCLUSION

The climate crisis is an immediate public health threat. Climate justice is central to restoring planetary health and rights for all life. We welcome critical discourse to catalyze PHN action in advancing climate justice through community and ecosystem partnerships.

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The Public Health Crisis Is Planetary—and Nursing Is Crucial to Addressing It

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If the Earth were our client, her status would be multisystem failure. She is not ready for hospice, but she does need intensive care to survive. Signs and symptoms include catastrophic wildfires, unprecedented and extended periods of severe heat, climate-related disasters of historic proportions, massive biodiversity loss, deforestation and desertification of the land, emerging infectious and zoonotic diseases including COVID-19, severe air pollution, and changes in water quality and availability. Each of these changes profoundly impacts the health of humans and often impacts structurally vulnerable populations disproportionately.

In September 2021, more than 200 global nursing, medical, pharmacy, dental, and public health journals issued a joint statement titled, "Call for Emergency Action to Limit Global Temperature Increases, Restore Biodiversity, and Protect Health." Its authors wrote:

> As health professionals, we must do all we can to aid the transition to a sustainable, fairer, resilient, and healthier world. Alongside acting to reduce the harm from the environmental crisis, we should proactively contribute to global prevention of further damage and action on the root causes of the crisis.[1(p1135)]

PLANETARY HEALTH

To accomplish these goals, we must work collaboratively to redesign our current model, shifting from illness care to health care based on principles of planetary health.

"Planetary health is a solutions-oriented, transdisciplinary field and social movement focused on analyzing and addressing the impacts of human disruptions to Earth's natural systems on human health and all life on Earth."[2]

The planetary health movement calls for a great transition of all human sectors. Public health nurses are perfectly positioned to lead this transition because they have always addressed sources of harm, promoted strategies to protect our nation's most vulnerable citizens, and advocated for policies that protect our water, air, and land. Now the planetary health paradigm connects the knowledge and skills of public health nursing to a global movement for change.

Appreciation for the broader context in which people live, work, commune, and connect has been a foundational feature of all nursing from Florence Nightingale and Lillian Wald onward, as is working with individuals, communities, and populations collaboratively to prevent poor health outcomes, enhance wellness, and advocate for more equitable health outcomes for all. This framework of nursing—now the most trusted profession in the United States for the 20th year in a row[3]—is a powerful force to guide the contribution of public health–focused nurses and health professionals to address what is the greatest public health crisis of our time. Nurses and other health workers are needed not only to ensure that public health and health care delivery is made more environmentally sound (given that the health sector contributes approximately 8% of all US greenhouse gasses, a proportion that has increased[4]) but also to help reduce the need for the volume of health care delivery itself. Prevention of illness, thus reducing health care service use,[5] is a cardinal goal of public health nursing that will bring even further benefit in the Anthropocene era. The National Academy of Medicine, among others, has called for decarbonizing the health sector,[6] which will contribute to global goals as well as bring health cobenefits to populations.[7]

PUBLIC HEALTH AND THE GREAT TRANSITION

Public health and health care delivery systems likewise must do a better job of adapting to the multiple health impacts that are ensuing from planetary health stresses, including the COVID-19 crisis. Needs include improved surveillance and data systems, as well as best practices in communicating the climate crisis and how it affects people locally. Annual surveys show that most of the American public now believes that the climate crisis is already affecting their health and the health of their communities. This recognition must be leveraged in advocating to enhance public health infrastructure. The Centers for Disease

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Control and Prevention's BRACE (Building Resilience Against Climate Effects) framework should be funded at a level that is more commensurate with the urgent crisis.

Representing a key portion of the global health workforce, nurses form the backbone of public health and health care delivery systems. Planetary health concepts must become part of the curriculum for preparation and continuing professional development of the nursing workforce. This has been recognized in the American Association of Colleges of Nursing's competencies for nursing, which include a call for planetary health content (see additional resources in the Appendix, available as a supplement to the online version of this article at https://ajph.org). Curricular elements of such a planetary health approach have been identified, and alliances including the Global Consortium on Climate and Health Education are working to ensure uptake in clinical schools.

An agenda for public health and nursing in the Anthropocene must include addressing mitigation and adaptation strategies at every level, emphasizing prevention and including a laser focus on equity. This can begin with education as health professionals, which could be enhanced by credentialing and licensing board inclusion of planetary health content. For nurses, this includes a continuation of the shifting emphasis from acute care or "illness care" to broader population health using a "planetary health care" framing. As trusted messengers, nurses can provide anticipatory guidance to patients and communities. Higher engagement of health departments in this work can leverage the BRACE framework, and public health nurses can be engaged in developing green offices with best practices to support community sustainability. Regional planning should be better supported and integrated across public health and health care systems. Workforce resilience must be addressed, including mental health services. Finally, reversal of the decline in public health spending must occur, now more than ever.

CALL TO ACTION

Global nursing organizations have called for significant action on climate change and other issues that threaten planetary health. Some organizations are leading the way with practical ways for nurses to get involved. For example, the Alliance of Nurses for Healthy Environments sponsors Nurses Drawdown (see additional resources in the Appendix), which offers tangible steps that all nurses, including public health nurses, can take to draw down greenhouse gases and improve the health of humans and the planet. In addition, the American Nurses Association has launched an innovation committee on planetary and global health to support nurses who are taking action on planetary health.

We must take bold action to eliminate the causes of our current crisis, including challenging continued use of fossil fuels that impact air quality and contribute to climate change. We must work to adequately protect structurally vulnerable populations. The nation's public health infrastructure needs a massive investment of federal and state funding. Public health must be universally recognized as the first line of defense if we are to have a sustainable health care system. Policies need to ensure equitable access to knowledge and resources to protect structurally vulnerable populations in a world undergoing climate change. Public health nurses can be part of redesigning our cities and communities to ensure access to clean air, water, green space, and healthy foods for all people. Finally, public health messaging must convey a sense of urgency and preparedness. We need to take mitigation steps now while also promoting adaptation and resilience to the changes already in play. At the same time, public health nurses and all health professionals must convey hope that if we work together across disciplines and political parties, we can build a healthy future for humans and all life on Earth. AJPH

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Revitalizing Public Health Nursing for the Future

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Susan B. Hassmiller is the senior adviser for nursing at the Robert Wood Johnson Foundation and the director of the Future of Nursing: Campaign for Action. She served as the senior scholar-in-residence and senior adviser to the president on nursing at the National Academy of Medicine from January 2019 through August 2021, where she was a key member of the leadership team for the report, The Future of Nursing 2020–2030: Charting a Path to Achieve Health Equity.

Public health nurses have served valiantly on the front lines of the COVID-19 pandemic for the past two years, saving lives through contact tracing, educating people about self-isolation and quarantining, vaccinating communities, and interpreting for their communities vacillating guidance from the Centers for Disease Control and Prevention (CDC). They have worked long hours and assumed new and unfamiliar roles without adequate staffing. I include school nurses in my definition of public health nurses because school nurses take on similar roles to improve population health. They improve health care access; engage school communities, parents, and health care providers to promote wellness and improve health outcomes for children; and address social needs and the social determinants of health for the families and communities they serve.

Yet, the government's decision to underfund the public health infrastructure for more than a decade has undermined the ability of public health professionals to respond to the pandemic as robustly as they could have.[1] These funding shortfalls have meant that as public health nurses have devoted their efforts to mitigating the pandemic, they have watched long-standing efforts to address maternal health care and other vital programs lose ground.[2] Working in underresourced communities, many public health nurses have witnessed firsthand the devastating and unequal toll that the pandemic has taken on poor and marginalized communities. They find themselves under siege from a segment of the public and some political and media figures who have threatened, cursed, and attacked them.[3] Frustrated parents have criticized school nurses when their children have been subjected to quarantine and isolation. In addition, acute care nurses' more visible contributions have received more attention than public health nurses' efforts to combat the pandemic.

THE FIELD IS STRESSED

In many cases, their stress has reached a breaking point: a CDC survey released in July 2021 found that more than half of people working in public health at the state, tribal, local, and territorial levels during the pandemic reported symptoms of depression, anxiety, suicidal thoughts, and post-traumatic stress disorder.[4] Many public health nurses are retiring or seeking higher-paying jobs in other health care settings. Within the public health workforce, participation by nurses has fallen faster than that of other professional groups.[5]

We must commit to a better future for public health nurses that starts with fully funding the field and recognizing that they are essential to improving population health and advancing health equity. Public health nurses intervene at early ages, focus on prevention, and connect with their communities to understand and address social needs and the social determinants of health, according to the National Academy of Medicine (NAM) report, *The Future of Nursing 2020–2030: Charting a Path to Achieve Health Equity*.[6] School nurses, among the most visible public health nurses, are sometimes the only health professionals schoolchildren visit regularly. They detect illnesses early, help manage chronic conditions, and provide mental health support. Yet, one in four schools has no school nurse, and 35% employ a school nurse only part-time.[7] Schools with a higher proportion of low-income families are less likely to employ a school nurse. The NAM report contains comprehensive recommendations that, if followed, would provide public health nurses with the support and structure they need to care for themselves and their communities more fully.

RECOMMENDATIONS TO REVITALIZE PUBLIC HEALTH NURSING

Perhaps most important, the NAM report recommends that federal and state governments ensure adequate funding for school and public health nursing, including paying public health nurses competitive wages compared with nursing positions in other health care organizations and sectors. "Underfunding limits the ability of school and public

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health nurses to extend health care services and create a bridge between health care and community health," the report notes.[6(p176)] The Biden administration has taken an important step in committing significant resources to buttress the public health nursing workforce.[8] Similarly, the report calls on the government to rapidly increase the number of public and community health nurses. Students who plan to work in professional shortage areas should be eligible for scholarships and have their loans forgiven, the report notes. Similarly, the government and private foundations should provide major investments for nursing education and traineeships in public health.

In addition to the infusion of federal funds to support public health nursing, the report calls on federal, tribal, state, local, and private payers and public health agencies to explicitly value nurses' contributions to care by reforming payment systems to pay for services that address the social determinants of health and advance health equity. Payment systems should reimburse for team-based care, improved communication between providers and patients, and proven interventions and strategies that can reduce health inequities.

The report recognizes that too few nurses are entering public health nursing to fill vacant positions and replace the many public health nurses who are on the cusp of retirement or leaving the field. To that end, the report calls on schools of nursing to better incorporate the social determinants of health and health equity into the curricula and to expand community learning opportunities. This will better prepare all nurses to advance health equity, regardless of the care setting in which they ultimately seek employment, and should encourage more nursing students to seek out these roles upon graduation.

The report also recognizes the need for our society to fully support nurses to enable them to advance health equity. The report includes a number of recommendations for creating structural and cultural changes, primarily that nursing education programs, employers, nursing leaders, licensing boards, and nursing organizations initiate the implementation of structures, systems, and evidence-based interventions to promote nurses' health and well-being, especially as they take on new roles to advance health equity. One cultural change that could be particularly beneficial for public health nurses could include requiring them to take time off, because the CDC survey found that public health workers who were unable to take time off from work were nearly twice as likely as others to experience poorer mental health. Although employers allowed their workers to take time off, the workers said they did not take time off because of feelings of guilt, because no one else was available to take their place, or because they worried about work accumulating during their absence.[3]

Finally, the report calls on all nursing organizations to leverage the expertise of public health nurses. It calls on the Council of Public Health Nursing Organizations (composed of the Alliance of Nurses for Healthy Environments, the American Nurses Association, the American Public Health Association Public Health Nursing Section, the Association of Community Health Nursing Educators, the Association of Public Health Nurses, and the Rural Nurse Association) to work with other leading nursing organizations to develop a shared agenda for nursing to address the social determinants of health and to advance health equity. The nursing organizations should identify specific priorities across nursing practice, education, leadership, and health policy.

Taken together, these comprehensive recommendations offer a roadmap to rebuild and revitalize the public health nursing workforce to better protect our nation's health, address the social determinants of health, and advance health equity. AJPH

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Public Health Nursing and Older Adults: The CAPABLE Model

Sarah L. Szanton, RN, PhD, and Alice Bonner, RN, PhD

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Public health nurses have a long history of leading prevention and treatment of child health, parenting, infectious disease prevention, public health screening, and anticipatory guidance of all stages of life. Within these domains, there are many home-visiting programs for children, such as the Nurse-Family Partnership. One vital area of public health nursing that receives less attention is supporting older adults and their families within their communities.

BACKGROUND

For older adults, physical function is often ignored by the US health care system as being beyond the bounds of medical care, but, in some ways, it is the very foundation of older adults' ability to engage in meaningful roles. People with disability should be supported and included in society at any age and ability. The environmental context that includes social and physical attributes is crucial to support older adults to function with a range of abilities and disabilities.

Too often, public health nurses and other home visitors have focused on clinical issues such as diabetes and congestive heart failure; however, often it is more urgent to address social determinants of health such as lack of food, inability to bathe, and social isolation. There is an urgent need for public health nurses to adopt models of care that fully integrate the social determinants of health along with the clinical status of the older adult.

THE CAPABLE MODEL

One such model of care is Community Aging in Place—Advancing Better Living for Elders (CAPABLE), a four- to five-month, participant-directed, home-based program that increases mobility and function of older adults in their home environment. CAPABLE achieves this through identifying what matters to the older adult, their strengths, and optimal "fit" within the home environment. Each visit is tailored specifically to the older adult's self-selected goals. An interprofessional team comprising an occupational therapist (OT) and registered nurse (RN) works with the older adult to understand the person's goals (e.g., to walk downstairs, take a shower, or get dressed without pain) and then use modern behavioral science, such as action planning, along with home modifications by a handy worker, to enable the older adult to achieve them. In the CAPABLE program, the team conducts 10 in-home visits with participants to achieve six person-centered functional goals.

As examples, if a participant wants to be able to prepare food rather than wait for a neighbor to help, the OT and participant strategize feasible, energy-conserving approaches and tools. To complement these strategies, the nurse uses behavioral activation strategies to help the participant manage depressive symptoms and pain if they are interfering with meal making. The handy worker stabilizes stairs, levels or repairs floors, and improves lighting to enable participants to practice newly learned mobility skills safely and efficiently.

The CAPABLE program began in 2009 with a pilot and has since been tested in multiple peer-reviewed studies that show that the program reduces disability and depressive symptoms, increases confidence about completing daily tasks without falling, and reduces costs through reduced hospitalizations and nursing home visits (savings of approximately $22 000 per participant over two years).[1,2] CAPABLE participants routinely describe the life-changing impact of newly being able to take a bath, cook a meal with ease, or go to community events. CAPABLE is currently becoming embedded into systems of care[3,4] and in three states in Medicaid.

CAPABLE addresses equity because it is tailored to each individual's cultural beliefs, strengths, and goals. Clinicians visiting the home do not presuppose anyone's goals, nor their individual strengths. In CAPABLE, each person gets the same number of visits and

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potential goals, but the program completely tailors the content to the older adults. One person's goals may be to make meals without pain and shortness of breath, while another's might be to walk down the stairs and get into a car.

CAPABLE builds on the strengths of older adults using an approach that promotes self-efficacy. Able to bathe, dress, and leave the house, older adults are once again ready to advise small businesses, take care of grandchildren, contribute to their religious communities, and run for political office. People aged 65 years and older are our fastest growing natural resource.

CAPABLE AND AGE-FRIENDLY HEALTH SYSTEMS

CAPABLE may also be delivered through the Age-Friendly Health Systems model based on a framework using the four M's: what *matters*, *mentation, medication,* and *mobility*.[5]

For example, with CAPABLE, the RN and OT begin the first home visit by asking each participant what matters most to them. This becomes the basis for the older adult's goal setting and action plans for the program. The RN reviews the older person's medications and asks detailed questions about their regimen. In some cases, this leads to identification of potential adverse effects or interactions and a recommendation for the older person to have a conversation with their primary care provider. Regarding mentation, or the mind, both the RN and OT address issues related to potential dementia, delirium, and depression. As noted earlier, studies on CAPABLE have demonstrated improved scores on depression scales and referrals as needed when dementia or delirium are identified. Finally, the OT and handy worker address functional capacity through extensive evaluation of the older person and the home environment, including providing home modifications as indicated.

A PUBLIC HEALTH APROACH

Public health nurses are well positioned to provide CAPABLE across the United States. The illustrious history of public health nurses includes the pivotal role of district nurses. If there were sufficient funding for public health nurses, those nurses could become familiar with the strengths and needs of older adults in their districts and assess them for CAPABLE eligibility.

In addition, public health departments and Area Agencies on Aging assess people for the need for home-delivered services; as part of that assessment, they could evaluate for CAPABLE, which could trigger a referral. Public health nurses could do this through health departments or other regional approaches to reaching older adults. In Massachusetts, the Area Agencies on Aging and Aging Service Access Points are implementing CAPABLE statewide through the Medicaid (MassHealth) 1915c Frail Elder Waiver. Four other states have received or identified funding to implement CAPABLE statewide via Medicaid or other state authorities. Similar to home-visiting programs for first-time parents, CAPABLE could be organized through health departments for people who have been identified in a health risk assessment to need resources and support to maintain their ability to age within the community. This is but one way for public health nurses and their interdisciplinary colleagues to use strengths-based approaches to improve older adults' health and well-being.

As The Future of Nursing 2020–2030 report[6] makes clear, public health nursing and the US health care system must focus on achieving health equity built on strengthened community-based programs and services for people of all ages and abilities, across income levels and multiple cultural belief systems. Nurses are perfectly positioned to bring together public health, health care, social services, education, and public policy.

The health of communities can flourish within a system that supports health outcomes and wellness instead of simply capturing patient visits. As fiscal incentives align with population health, public health nurses will lead and ensure that people of all backgrounds and health states are included in equitable approaches to promoting quality of life. Demonstrating health benefits, as well as optimizing overall costs for the public and decision-makers, will help promote policy changes to build an effective public health and health system infrastructure.

CAPABLE is one model in which unleashing people's potential can support their desire to contribute meaningfully to their communities. As health care shifts away from acute care hospitals to home and community-based settings, we must leverage the power of older adults, nurses, and public health departments to support well-being and quality of life of all people equitably within each community. AJPH

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Public Health Nursing: *Difference Is Power* Mural

Catherine M. Waters, RN, PhD

Across the walls in the hallway of the School of Nursing building at the Parnassus campus of the University of California, San Francisco (UCSF), the 16-foot by 8-foot *Difference Is Power* mural honors and acknowledges the lives of nurses from diverse backgrounds, who made pioneering, unique, and significant contributions to the fields of nursing and public health. Catherine Gilliss, Dean of the UCSF School of Nursing, commissioned the mural in late 2017 after nursing students advocated more representation of contemporary images of people from diverse backgrounds to look at and to be inspired by as they enter the School's main office. The artists, Jessica Sabogal and Shanna Strauss, took five months to complete the mural offsite. In a public ceremony, the mural was installed on October 2, 2019.

Much of the public art that has become a UCSF hallmark can be found on the Parnassus campus. As a public university, the mural is seen by countless passersby. In the mural, the artists bridge nursing and public health images of the past with nursing and public health images of today. The mural is a representation of the importance of diversity, equity, and inclusion in advancing health care for all. On the walls of a learning environment, the mural spotlights the accomplishments of four extraordinary nurses who made a difference by improving health care delivery to low-income families in rural communities; leading the way as a public health officer in the care of mothers, infants, and children during the most difficult years of the AIDS epidemic; innovating to advance the next generations of the nursing workforce to be reflective of society; and working to care for the transgender community. The four nurses in the mural are, from left to right, Sarah Gomez Erlach, Florence Stroud, Marilyn Chow, and Emma Deboncoeur. The *Difference Is Power* mural reflects the revolution of public health nursing and provides a visual opportunity for us to pause and celebrate nursing. AJPH

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Permission to use the photo has been granted by the person who commissioned the mural (Catherine Gilliss, Dean of the University of California, San Francisco, School of Nursing), and the artists (Jessica Sabogal and Shanna Strauss).

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The author has no conflicts of interest to disclose.

FIGURE 1— Shopping for Bread and Fruit Complete, Mobile Market Schedule in Hand

Source. Scott Steble for the University of Minnesota School of Nursing. Printed with permission.

Addressing the Critical Need for Timely Solutions for Improved Food Access and Food Security

Melissa L. Horning, RN, PhD, PHN

Experiencing food insecurity is linked to myriad poor health outcomes and comes with a $77 billion price tag in annual medical care costs.[1] In the United States, 10.5% of people experienced food insecurity.[2]

The Twin Cities Mobile Market of The Food Group[3] is working to turn the needle on health disparities and improve equity. The Twin Cities Mobile Market is a grocery store on wheels, a city bus converted into a grocery store. As you step inside, there are shopping carts and baskets. The seats have been removed and replaced with shelving and coolers for healthy foods from across the food groups—a one-stop-shop—a full-service single aisle grocery store.

The Twin Cities Mobile Market goes to the doorsteps of communities that experience lower access to grocery stores and places where food affordability is more challenging. The mobile market staff hear stories from customers that suggest the mobile market is having a positive influence in the community. Community members are concerned about food—how to access it, afford it, buy it, cook it, and eat healthy foods.

In Minneapolis and St. Paul, Minnesota, public health nursing researchers at the University of Minnesota are partnering with the Twin Cities Mobile

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FIGURE 2— The Twin Cities Mobile Market Ready and Open for Business at a Community Stop

Source. Scott Steble for the University of Minnesota School of Nursing. Printed with permission.

FIGURE 3— Prepping to Open by Restocking a Shelf

Source. Scott Steble for the University of Minnesota School of Nursing. Printed with permission.

Market to study the impact of the full-service mobile market.

Starting with small studies with promising findings,[4–6] this partnered research has grown into a large cluster randomized trial to rigorously study the impact of the full-service mobile market on diet quality and food security. The data show that even before the COVID-19 pandemic, in 2019, 85% of mobile market customers experienced food insecurity,[6] and in 2021, 92% experienced food insecurity, demonstrating the high food needs of the mobile market customers.

Food access and affordability matter. Food can bring people together, as we all need to eat, but not everyone has equitable or affordable access to healthy, quality foods. As public health nurses and public health nursing researchers, we can and must continue to innovate to address disparities in food access and food security in collaboration with our clients, community partners, and within our systems. AJPH

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A Nurse-Led, Well-Being Promotion Using the Community Resiliency Model, Atlanta, 2020–2021

Ingrid M. Duva, RN, PhD, MN, Jordan R. Murphy, PhD, PNP, and Linda Grabbe, PhD, FNP, PMHNP

The wrath of COVID-19 includes a co-occurring global mental health pandemic, raising the urgency for our health care sector to implement strategies supporting public mental health. In Georgia, a successful nurse-led response to this crisis capitalized on statewide organizations' existing efforts to bolster well-being and reduce trauma. Partnerships were formed and joint aims identified to disseminate a self-care modality, the Community Resiliency Model, to organizations and communities throughout the state. (*Am J Public Health*. 2022;112(S3):S271–S274. https://doi.org/10.2105/AJPH.2022.306821)

COVID-19 exacerbated stress and trauma universally, creating a secondary pandemic that increased demand for mental health care in a system on the verge of crisis. An intense and immediate need for population well-being support resulted, and subsequent requests for resiliency training quickly followed. In response, three nurses in Georgia certified to teach the Community Resiliency Model (CRM) fast-tracked existing efforts to share this mental wellness training program across their state.

INTERVENTION AND IMPLEMENTATION

CRM, developed by the Trauma Resource Institute, has a rapidly growing body of evidence.[1–4] The model helps individuals (1) understand stress reactions in biological terms, (2) distinguish between sensations of distress and well-being, and 3) use sensory awareness skills to deal with difficult situations.[5]

The nurses created a Web site (www.crmgeorgia.org) to share their information and facilitate implementation of the model. In largely rural Georgia, variability in resources and access to care compound existing health disparities, so novel approaches were required.[6] Cross-sector partnerships between health care and community organizations improve implementation outcomes.[7] This prompted the nurses to strategically align with Resilient Georgia, a statewide coalition of more than 600 partners and stakeholders committed to addressing childhood trauma and building a stronger, more resilient Georgia, and the Georgia Nurses Association (GNA), the largest professional nursing association in the state.

The collaboration provided funding for participants, increasing the program's capacity to provide classes at no charge, and created a larger network to support statewide reach. The objective was to reach all of Georgia's 159 counties with free CRM classes. This would ensure geographically dispersed training and access to CRM throughout the state. The program aim was to support well-being for all Georgians by increasing resilience to stress and trauma. A logic model depicting this "pathway to resilience" is shown in Figure A (available as a supplement to the online version of this article at http://www.ajph.org).

Our cross-sector approach improved program planning, connecting nurses directly to community leaders to better understand local needs, provide follow-up consultations, and refer interested participants to the Trauma Resource Institute for CRM teacher certification.[4] The Georgia Nurses Association hosted the virtual classes and conducted evaluations. Resilient Georgia added CRM to its "roadmap" for 16 regional grantees (a cluster of counties or organizations focused on increasing resilience). Grantees selected dates for a series of one-hour virtual CRM classes, remotely provided via Zoom's Webinar platform. Word of mouth led other organizations to schedule classes. Class participants were

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introduced to CRM and the six easy-to-use wellness skills (Table 1).[5] Three-hour workshops to reinforce model concepts and provide practice in CRM skills were offered as follow-up.

PLACE, TIME, AND PERSONS

This nurse-led approach for innovative population mental health was based in Atlanta but delivered across the state of Georgia. Program planning began in March 2020. The first virtual training was held in June 2020 and is ongoing. Free, virtual sessions were piloted with the Georgia Nurses Association and two health care organizations: Emory Healthcare, Georgia's largest health care organization, and Grady Healthcare, the state's largest public, not-for-profit provider. During this trial period of virtual deployment, training reached individuals in more than 50 of Georgia's counties, with the goal of eventually providing training in all 159 of the state's counties.

Collaborating with Resilient Georgia cast a broader net. Its funding included training for caregivers of the most vulnerable children and families in 16 multicounty Georgia regions. Community coalitions in the middle, northern, western, and eastern regions were also trained one by one via locally focused, remote delivery. Other training included staff from state-level organizations such as the Department of Education, Department of Juvenile Justice, and Division of Family and Children Services, as well as the Georgia Association of School Nurses and Association of Social Workers.

The program targeted all Georgians, beginning with front-line health care workers. During an 18-month response to the COVID-19 crisis, more than 1000 Georgians were trained. The largest number of participants trained at one time was 140, with an average of 20 individuals per training session.

PURPOSE

Resilience is protective against stress and trauma. The pandemic is a stressful and traumatic event at all levels. Risk of burnout, secondary stress, suicidality, and intent to leave the profession existed among health care workers before COVID-19 and is expected to worsen. In the populace, poor mental health, substance use, domestic violence, and self-injury are concerns.[8] Previous CRM research demonstrated increased well-being in members of low-resource and low-recovery communities[1,9] and reduced secondary traumatic stress and an improved sense of well-being among front-line health care workers.[2,3] CRM incorporates trauma awareness along with resiliency skills, and thus it is a universally applicable model. Based in neuroscience, CRM is an evidence-informed approach to population mental health in times of both stability and crisis. Its concepts and skills are intended for laypersons and can be peer taught, and accordingly the model is an inexpensive, feasible approach that can be adapted and sustained in local contexts.

EVALUATION AND ADVERSE EFFECTS

Participant feedback was collected after each training on a four-question Likert

TABLE 1— Community Resiliency Model (CRM) Skills

Skill	Description	Training Participant Exemplar:
Tracking	Conscious awareness of body sensations, differentiating between pleasant and unpleasant; basis for all CRM skills	Nurse walking into a patient room: "I sense my body and am aware of my tight shoulders and shallow breathing. As I notice these, I notice that I take a deep breath and feel more relaxed."
Resourcing	Something that brings a sense of peace, safety, joy, or calm and awareness of associated body sensations	Teacher with students: "We start the day by naming a source of joy, like a favorite toy, and name the body sensations that go with it—'jiggly face' and 'bubbly chest' are common ones."
Grounding	Awareness of sensations of support and security in the present moment	Police officer: "Before I step out of my patrol car, I place my hand on my [bullet-proof] vest, rest it there for a second, and feel stronger."
Gesturing	Spontaneous, comforting gestures used intentionally to move into a resilient state	Student feeling anxious: "I purposefully stand up straighter, push my shoulders back and my chest out, and I feel more confident and in control."
Help now!	Emergency strategies used when one is in a very distressed state: quick, focused activation of senses	Social worker/mother working from home and feeling agitated: "I could look around the room and name the colors or objects that I see, usually just in my head, not out loud, and I feel calmer."
Shift and stay	Using a CRM skill and intentionally lingering with the experience until the unpleasant sensation or emotion abates	Medical student: "I was frustrated and in a bad mood, and I thought of my beach resource, remembering the sensory details of that experience. I stayed thinking about it and noticing sensations for about 15 seconds and noticed a shift into a better emotional state."

scale and a qualitative question in Survey Monkey. Class organization, instructor effectiveness, content relevance, and incorporated skills were ranked on a scale of poor (1) to excellent (5); the overall mean ranking was 4.6 (range = 3–5). Remarkably, after just one hour of virtual CRM training, participants reported anecdotal use of CRM skills for their own well-being and to support others. Debriefings were held with collaborators every three months to identify improvement opportunities, primarily related to registration and scheduling. Evaluations also included the number of counties reached (50), the number of participants taught (almost 1000 in 18 months), and the number of referrals to CRM teacher certification through the Trauma Resource Institute (10).[4] The implementation, including evaluations, has continued.

There have been no reported adverse effects of the implementation. CRM is highly trauma sensitive and invitational. For individuals with a trauma history, body awareness skills may be challenging or unpleasant, so CRM teachers are prepared to guide participants who become unsettled.

SUSTAINABILITY

A goal for sustainability is to certify more teachers to champion content in their local community. Any motivated person can become a CRM teacher. However, as influential community members, nurses are well positioned to integrate CRM teaching in both personal and work settings, contributing to a more widespread and scalable solution to the pandemic's trauma. The model has a strong mind–body component, so it fits well with nursing's whole-person health paradigm. Community health nurses are ideally situated to teach CRM and champion resilience.

CRM training sessions are live, brief, and free-standing. They offer a protective effect with the potential to contribute to large-scale improvement of public mental health.[10] This program can be initiated for the price of a teacher certification (see the Trauma Resource Institute Web site).[4] CRM is affordable and accessible, two critical aspects of a scalable and sustainable intervention. The large number of attendees and the distribution of locales trained contribute to a "critical mass" of resiliency. As community resiliency is enhanced, stress levels are more likely to stay low, even in the face of crises and emergencies, thus meeting the interests of community stakeholders for well-being across the state.

PUBLIC HEALTH SIGNIFICANCE

The public deserves attention to its collective mental health. Stress and trauma are ubiquitous, and the pandemic is an ongoing crisis that is exacerbating mental health problems and creating trauma at all levels of society. CRM is an efficient self-care model that complements other stress-reducing or clinical mental health modalities (e.g., psychotherapy, yoga, mindfulness practices). Leveraging nursing leadership and cross-sector partnerships to implement CRM is feasible and can be part of a multifaceted approach to improving population mental health. AJPH

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I. M. Duva contributed to conceptualization, implementation, and evaluation of the program. J. R. Murphy contributed to the implementation of the program. L. Grabbe contributed to conceptualization and the implementation of the program. All of the authors contributed to the writing of the article.

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CONFLICTS OF INTEREST

There are no conflicts of interest to declare.

HUMAN PARTICIPANT PROTECTION

The actions described here were taken for public health purposes and not for research. Following the involved institution's review board determination process, this implementation did not meet the published criteria for review.

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A Community-Based Participatory Intervention in the United States Using Data to Shift the Community Narrative From Deficits to Strengths

Robin Austin, RN-BC, PhD, DNP, DC, Sripriya Rajamani, PhD, MBBS, MPH, R. Clarence Jones, MEd, Kelly Robinson, RN, BSN, and Milton Eder, PhD

With Minneapolis, Minnesota, partners, we developed a community-based participatory intervention using a mobile health application to provide actionable data to communities. More than 550 participants completed the survey. Key messages included strengths in our homes, neighborhoods, and faith communities. Key challenges were related to substance use and sleeping. We jointly conducted virtual community meetings such as webinars, Facebook Live shows, and online newsletters to begin to shift the community narrative from deficits to whole-person health, including strengths. (*Am J Public Health*. 2022;112(S3):S275–S278. https://doi.org/10.2105/AJPH.2022.306852)

In alignment with Public Health 3.0, we community members and nurses worked in partnership for communities to obtain timely and reliable community data for narrative development using a community-validated mobile health (mHealth) application (app).

INTERVENTION AND IMPLEMENTATION

Our long-term goal was to address health inequities by empowering communities with their own data to begin to shift the self-perceived community narrative from deficits to that of a whole-person, strengths-based perspective.[1,2] Such narrative development underlies successful community transformation, and individuals benefit from community environments that buffer or mitigate challenges.[3]

Definitions that guided intervention development were as follows:

- Public Health 3.0 is a partnership in which leaders serve as chief health strategists, partnering across multiple sectors and leveraging data and resources to address social, environmental, and economic conditions that affect health and health equity.[1]
- Community resilience is the sustained capacity to cope, strive, and be supported through equitable buffers that address sources of acute and chronic stress.[3]
- Narrative shifts are essential to influencing our perceptions of who deserves empathy or support, and who does not, by examining the systemic barriers to resilience and the opportunities to reshape the landscape to overcome those barriers.[2]
- Whole-person health consists of environmental, psychosocial and emotional, physical, and health-related behavioral aspects of health.[4]
- Strengths are health assets: skills, capabilities, actions, talents, and potential in each family member, each family, and the community.[4,5]

Community members (individuals and organizations) and nurses (community members, faculty, and students) committed to a shared goal of making valuable local data available and accessible to the community.[1] We agreed that the data should incorporate strengths and resilience along with social and behavioral determinants of health and related challenges (whole-person health).[6–8] We chose a research-ready mHealth app for data collection with a consent page and 42 brief health assessments of strengths, challenges, and needs across all of health (Figure 1 and Figure A, the latter available as a supplement to the online

My Living	My Mind & Networks	My Body		My Self-Care
Income	**Connecting**	Hearing	Breathing	Nutrition
Cleaning	Socializing	Vision	Circulation	**Sleeping**
Home	**Role change**	Speech & language	Digestion	Exercising
Safe at home and work	**Relationships**	Oral health	Bowel function	Personal care
	Spirituality or faith	Thinking	Kidneys or bladder	**Substance use**
	Grief of loss	**Pain**	Reproductive health	Family planning
	Emotions	**Consciousness**	Pregnancy	Health care
	Sexuality	Skin	Postpartum	Medications
	Caretaking	Moving	Infections	
	Neglect			
	Abuse			
	Growth & development			

FIGURE 1— Omaha System Assessments Across Four Domains of Health

Note. Bolded terms = community-determined health priorities.

version of this article at https://www.ajph.org). The app provides a personalized summary report for each participant, and aggregate data may be viewed in a community dashboard.

It incorporates a simplified version of the rigorous standardized multidisciplinary health terminology and instrument, the Omaha System.[9] The Omaha System has been used for two decades by public health nurses and others to understand whole-person health of diverse populations.[9] Over a series of meetings discussing health priorities, community members decided to collect data for 13 of the 42 Omaha System assessments (bold assessments in Figure 1).

The Omaha System exists in the public domain and may be viewed online at omahasystem.org.[10] The mHealth app is freely available for use in clinical and research settings through the University of Minnesota office for technology commercialization.[11]

We surveyed community members during neighborhood COVID-19 testing events. Adults accessed the survey by computer, tablet, or smartphone and received a $10 gift card upon completion. Many shared the survey link with acquaintances. This unexpected sharing of the virtual survey link by local participants resulted in data submissions from more than 550 participants, split evenly between local neighborhoods and elsewhere (New York to California). We organized and interpreted the data together with community members at three community events.

We jointly conducted community meetings using multiple virtual modalities, such as webinars and Facebook Live shows, and disseminated our findings in online newsletters.

PLACE, TIME, AND PERSONS

In the Minneapolis, Minnesota, metro area during Fall 2020, we convened numerous stakeholders to plan and implement the intervention. Stakeholders included an organization promoting the health of persons of color, a nursing organization of persons of color, an organization providing educational support for vulnerable young children, a neighborhood council, the local governmental health department, individuals in the community, and nursing students and faculty.

PURPOSE

In partnership with communities, the purpose was to provide actionable data to communities to begin to shift the community narrative from deficits to whole-person health, including strengths.

EVALUATION AND ADVERSE EFFECTS

Key messages gleaned from this experience included greater strengths among local residents in comparison with those elsewhere, particularly in our homes, our neighborhoods, and our faith communities. Key challenges were related to substance use and sleeping. Compared with those without substance use challenges, those with substance use challenges had half as many strengths and five times as many challenges. Sleep-related issues resonated with community members deeply and became a focus of further community dialogue regarding the importance of sleep for overall well-being. Community members shared these findings and our intervention broadly, raising awareness of the power of community-led assessments to begin community narrative development.

We observed no adverse effects. One community partner observed,

> Utilizing the app has allowed us to reach a diversity of neighborhoods,

> individuals, and groups with information that is being used for strategic health planning purposes. The students have added greatly to the project by their availability and willingness to assist as we are engaged in this project.

Another shared,

> Working on the project was a robust experience and working with members from the community–academic partnership really made this project fun as everyone brought something different to the table.

Some neighborhoods collected local data to understand how the COVID-19 pandemic and the opioid epidemic affected both individuals and the broader community. The data that community members shared with the local health department suggested a need for additional resources to address substance use issues.

Limitations of the intervention are related to the challenge of avoiding bias in the data, because representing all groups in the community may be difficult using this sampling strategy. Therefore, the findings are not generalizable. There is a critical need to understand the community's perspective regarding such whole-person health strategies. Community members were enthusiastic about engaging with the University to continue this work.[12]

SUSTAINABILITY

A community-based participatory intervention using data to shift the community narrative from deficits to strengths created buy-in from key stakeholders in the community and a strong commitment from all partners to continue efforts. Nursing students and faculty committed to ongoing participation. Funding needs consisted mainly of incentives for survey completion, as the app was freely available.

Partners were already working in collaboration with various communities that were eager to have access to compelling local data. A new collaborator noted,

> The app is a great opportunity and experience that is bringing our community together to learn about this valuable tool that will be beneficial and lead to positive health outcomes. The data will provide better understanding on identifying the needs of the community and utilizing the data to propose for programs/services that are culturally specific to this community.

PUBLIC HEALTH SIGNIFICANCE

This community-based intervention aligns well with Public Health 3.0, building a new community narrative by engaging community members through data.[1] This approach has potential to enable cross-sector partnerships in collecting and using data to inform actions. Public health nurses are ideally positioned in community to contribute to and co-lead this transformation. This ongoing intervention is building toward a positive community-empowered approach with the goal of achieving equitable health care, starting by shifting the health narrative in communities and neighborhoods from deficits to whole-person health, including strengths.[1] AJPH

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CONFLICTS OF INTEREST

The authors report no potential or actual conflicts of interest.

HUMAN PARTICIPANT PROTECTION

The data were deidentified, and this study was deemed exempt from oversight.

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Using the Points of Distribution Site Model for Timely and Safe Administration of COVID-19 Vaccinations During the Pandemic

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The Georgia Department of Public Health–East Central District and its local partners implemented an open, drive-through point of distribution site to administer the COVID-19 vaccine to eligible populations. The site was in Augusta, Georgia, from mid-December 2020 through mid-May 2021. The target population for this intervention was individuals eligible for the COVID-19 vaccine to prevent and slow transmission of severe acute respiratory syndrome coronavirus 2 infection. The point of distribution site successfully provided 42 342 vaccines. (*Am J Public Health*. 2022;112(S3):S279–S283. https://doi.org/10.2105/AJPH.2022.306820)

The safe and efficient distribution of preventive measures during large public health emergencies is critical to mitigate significant morbidity and mortality of emerging diseases.[1] One mechanism to distribute preventive measures to the public is points of distribution sites (PODs). The overall goal of a POD is to systematically distribute preventive measures in the time frame necessary to mitigate the negative consequences to individuals without symptoms of the disease.[2]

INTERVENTION

Mass vaccination among populations is necessary to reduce cases, hospitalization, and deaths related to the severe acute respiratory syndrome coronavirus 2 (SARS-CoV-2) with the hope of ending the pandemic.[3] To promptly serve the large numbers of individuals eligible for vaccination in a safe environment, we established an open, drive-through POD site. Our goals in using the POD site were (1) to promptly administer COVID-19 vaccines without contributing to the transmission of SARS-CoV-2 virus, and (2) to sustain the POD site until the eligible population received the vaccine. To meet the goals of the intervention, we established protocols and procedures for vaccine administration. We formed a multidisciplinary team based on the Federal Emergency Management Agency's standardized structure for medical countermeasures.[4] Nurses filled numerous roles throughout the use of the POD, including as clinical supervisor and in screening, medical evaluation, vaccine distribution, clinical monitoring, personnel management, and data entry. Management also ensured that the POD site was sustained over a projected time frame of six to eight months.

PLACE AND TIME

The POD site was a closed elementary school campus in Augusta, Georgia. The site was operational from mid-December 2020 to mid-May 2021. The site was opened to the public eight hours daily, Monday through Saturday. Most teams worked 10 to 12 hours daily (four to five days per week) to provide ongoing oversite, planning and operations, logistics, and security.

PERSON

The target population for the intervention was individuals in the public eligible for vaccines in the district. The largest county included was Richmond, Georgia. A total of 78 616 individuals older than 65 years, 299 616 individuals aged 18 to 64 years, 13 166 individuals aged 16 to 17 years, and 25 686 individuals aged 12 to 15 years were eligible

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for vaccines. In addition, embedded in the implementation of the POD site was the staff needed to operate the site, approximately 53 staff members daily, 20 volunteers daily, and 6 soldiers from the National Guard. Staff included health care providers as outlined by the Public Readiness and Emergency Preparedness Act (PREP Act; Pub L No. 109–148) declaration,[5] emergency preparedness specialists, administrative support teams, information technology specialists, security and safety professionals, and communication specialists (Figures 1 and 2).

PURPOSE

The SARS-CoV-2 virus is highly transmissible and led to a devastating pandemic.[6] The purpose of the intervention was to reduce barriers to vaccine access and provide a safe, convenient location for the local population to obtain vaccines to prevent and to slow the transmission of SARS-CoV-2 infection, thus promoting optimal population health.[7]

IMPLEMENTATION

The planning, response, implementation, and sustainability of the POD site was critical for providing the eligible public with access to vaccination. The Georgia Department of Public Health–East Central Health District was responsible for the POD site. The large-scale public health emergency demanded a long-term response and required significant human and material resources.[8]

The district used the Federal Emergency Management Agency framework for a standardized command structure, with the incident commander (district health director) and three command staff (public information officer, safety officer, and liaison officer).[8] We organized the POD site using the standardized medical countermeasures structure to meet the goals and objectives of the intervention with existing community partners and agencies (e.g., board of education, local emergency management agency, colleges of nursing, emergency medical services agencies) and National Guard soldiers.[8] (Figure 1, "POD Organization," details how the site was organized.)

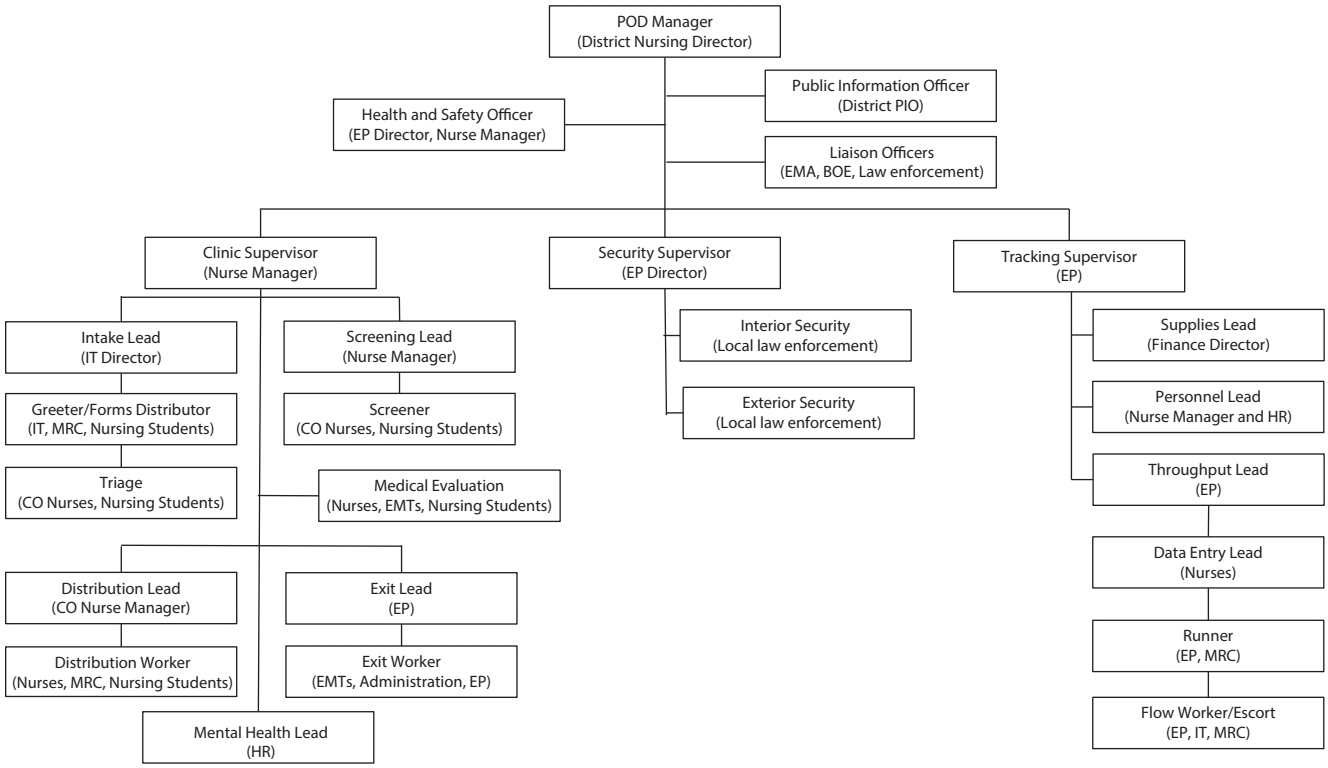

FIGURE 1— POD Organization Chart Demonstrating How Each Role in the POD Organization Was Filled With Teams From Within the Georgia Department of Public Health–East Central Health District and Community Partners: Augusta, GA, Mid-December 2020–Mid-May 2021

Note. BOE = Board of Education; CO = county; EMA = emergency management agency; EMTs = emergency medical technicians; EP = emergency preparedness team; HR = human resources team; IT = information technology team; MRC = Medical Reserve Corps; POD = point of distribution.

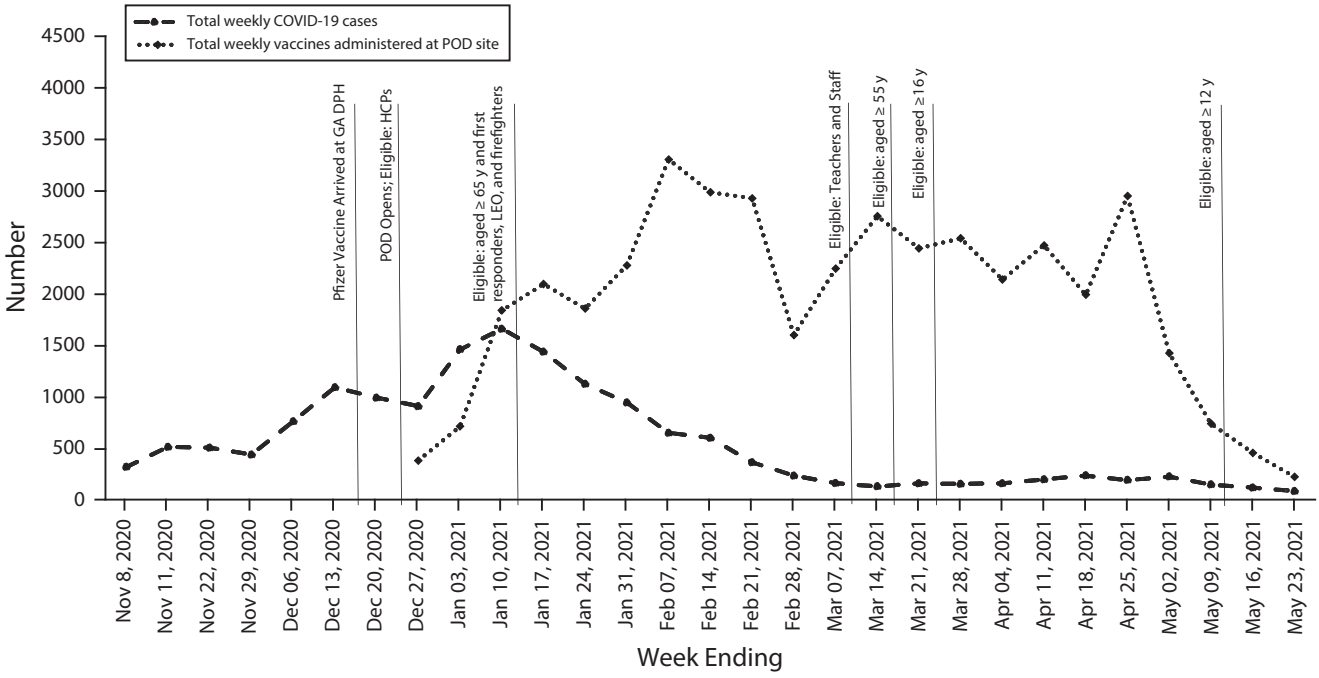

FIGURE 2— Richmond County Weekly COVID-19 Cases Compared With Weekly COVID-19 Vaccines Administered at a Single POD Site: Augusta, GA, Mid-December 2020–Mid-May 2021

Note. GA DPH = Georgia Department of Public Health; HCP = health care professional; LEO = law enforcement officers; POD = point of distribution. Staged vaccine eligibility criteria for residents in Georgia are included. The data on vaccines administered was obtained from the emergency preparedness supervisor from the POD site.

The leaders in the Incident Command System (ICS) and POD management implemented strategies to ensure the health and safety of all staff members and their families. Broad strategies to ensure the health and safety of all staff included the following:

- providing specialized training for team leaders, staff, and volunteers;
- having adequate numbers of trained staff, including partnering with student nurses from a local college of nursing (approximately 20 to 50 hours total);
- employing evidenced-based protocols and procedures to protect against the transmission and spread of SARS-CoV-2;
- providing vaccinations for eligible individuals, personal protective equipment supplies based on Centers for Disease Control and Prevention (CDC) recommendations at the time of the intervention, and other preventive physical and environmental measures; and
- ensuring the physical safety and security of the staff.

As with all public health interventions in response to public health emergencies, ongoing planning and evaluation were critical to the success of the site. The ICS team met daily and as needed to ensure sustained site operations. Open communication between the leadership team with the ICS and the team leaders embedded in the site was scheduled daily and was always encouraged throughout the daily operations. Team leaders had direct communication with their teams to ensure that all issues were identified and reported to team leaders and the ICS leadership for timely resolution. Daily meeting included discussion of SARS-CoV-2 updates, COVID-19 vaccination updates, safety and security needs and updates, and changes in POD staffing.

After the implementation of the POD site, the administration of the COVID-19 vaccine began. Georgia's government leaders decided to approach vaccinating a large population via a staged approach that was based on specific risk factors associated with morbidity and mortality from SARS-CoV-2 infection. This staged approach affected which individuals in the population could receive the vaccine during a given time frame (Figure 2). Therefore, several levels of screening and medical evaluation were necessary to ensure that eligible individuals received vaccines safely. Several actions were implemented to provide the vaccines safely, which included the following:

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- safe storage and handling of vaccines, including storage per manufacturer and CDC guidelines with transportation of vaccines daily to the POD site and continual temperature monitoring via a temperature data logger;
- employing health care professionals qualified to administer vaccines in accordance with the PREP Act[5] (including nontraditional licensed or certified health professions, previously active and recently retired professionals, and health care students) specifically trained on the administration and side effects of COVID-19 vaccines;
- educational information about the vaccines and potential side effects communicated both verbally and in writing to eligible individuals at the site; and
- physical observation of individuals who received the vaccine based on the time frames recommended by the CDC and Advisory Committee on Immunization Practices.[9]

EVALUATION

The intervention successfully provided first and second doses of 42 342 Pfizer, Moderna, and Janssen vaccines administered to eligible individuals at the POD site. At the end of the intervention, 26.4% and 21.8% of individuals aged 18 years or older were provided first and second doses, respectively; and 43.1% and 38.6% of individuals aged 65 years or older were provided first and second doses, respectively, in the catchment area (including all efforts to provide vaccination in the district). The number of COVID-19 cases in Richmond County (which is the largest county in the district) declined as the number of COVID-19 vaccines administered increased (Figure 2).

ADVERSE EFFECTS

Adverse effects were limited to ICS leadership and POD staff, with poor morale, burnout, and fatigue being most prevalent.[10] The health departments in the district lost 26% (n = 12) of the clinical staff during the height of the pandemic. Fatigue was most noted in the number of absences unrelated to illness, which increased significantly during the POD intervention.

SUSTAINABILITY

The POD site was closed when the demand for vaccines could be managed in normal operations of the health departments. Administration of vaccine is still readily available through multiple health facilities; therefore, the continued use of the POD site was not necessary.

PUBLIC HEALTH SIGNIFICANCE

Implementation of a large, open, drive-through POD site for eligible individuals to receive COVID-19 vaccination was critical to slowing the transmission and spread of the SARS-CoV-2 virus on the local, state, national, and international levels. According to the Georgia Department of Public Health, the weekly death rate (per 100 000 persons) in the district was 2.0 in November 2021, 6.92 in January 2021, 6.72 in February 2021, 1.83 in May 2021, and 3.67 in November 2021. Individuals who have received COVID-19 vaccinations now experience fewer consequences of the virus, including decreased admissions to hospital and decreased death rates.[11] Overall, the COVID-19 vaccine is a major mitigating factor of the negative effects associated with the pandemic.[11] AJPH

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R. Y. Kershner, S. R. Beckham, S. M. Stewart, and K. A. Allen performed the review of statistics. R. Y. Kershner and K. A. Allen wrote the article. All authors performed the review of literature and data and edited the article.

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HUMAN PARTICIPATION PROTECTION

No protocol approval was necessary because our team analyzed only de-identified data.

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COVID-19 Evaluation and Testing Strategies in a Federally Qualified Health Center

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Federally Qualified Health Centers (FQHCs) are organizations that provide primary care services to our nation's most vulnerable communities. This nurse practitioner–led intervention sought to double the number of available COVID-19 evaluation and testing appointments within an FQHC. Results showed a significant increase in the availability of respiratory clinic appointments, the number of completed appointments, and the number of tests completed. This demonstrates nurse practitioners' ability to work with organizations to develop innovative systems that can be adapted for future use. (*Am J Public Health*. 2022;112(S3):S284–S287. https://doi.org/10.2105/AJPH.2022.306827)

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This intervention took place within a Federally Qualified Health Center (FQHC) that is associated with an academic health center in the Pacific Northwest. At the beginning of the COVID-19 pandemic, the first author, a family nurse practitioner, quickly garnered support from the clinic's leadership team, procured resources, developed workflows and protocols, and mobilized and trained staff and clinicians in the creation of a service in which a clinician (i.e., nurse practitioner, physician, or physician assistant) evaluated and tested patients of all ages for COVID-19. This service, later deemed a "respiratory clinic," started in a tent outdoors in March 2020 and moved indoors in October 2020. The clinic separated patients exhibiting symptoms of COVID-19 from patients and staff who were not. Specifically, this nurse practitioner–led intervention sought to double the number of available COVID-19 evaluation and testing appointments within the respiratory clinic between November 1, 2020 and March 31, 2021.

INTERVENTION AND IMPLEMENTATION

Patients who contacted the FQHC were triaged by phone or video visit by a registered nurse, nurse practitioner, physician, or physician assistant, and referred for in-person respiratory clinic evaluation based on symptom profile. The goal of each respiratory clinic visit was to determine the patient's acuity and appropriate level of care, and to offer COVID-19 testing when indicated. Potential outcomes of a respiratory clinic visit included testing, treatment, recommendation to self-monitor in the community during a quarantine or isolation period and return as needed, transfer to an emergency department, or any combination of these.

Before November 1, 2020, the respiratory clinic was staffed by one clinician and two medical assistants five days per week. Ten patient appointments were available per four-hour clinic session, or 50 per week. Although this had been adequate, the onset of winter months, increased time spent indoors during the upcoming holiday season and reduced ability to socially distance, and the anticipated co-occurring presence of other respiratory conditions such as seasonal influenza increased the risk of transmission of and complications from COVID-19.[1] The intervention increased staffing to three medical assistants and two clinicians on November 1, 2020. With this change, 10 patient appointments were available per clinician, totaling 20 patient appointments per four-hour session or 100 per week, double the number available before the intervention. The clinic projected a two-fold increase in the number of available appointments compared with the previous five months.

PLACE, TIME, AND PERSONS

This project took place within an FQHC in Portland, Oregon between June 20,

2020 and March 31, 2021. FQHCs are federally funded, patient-centered organizations that provide comprehensive, cost-effective primary health care services to our nation's most underserved communities.[2] This FQHC serves over 17 000 individuals; approximately half are considered low income, 34% are of a racial or ethnic minority, 71% are uninsured or publicly insured, and over 50% have one or more chronic medical conditions (Troy Carpenter, e-mail communication, August 28, 2020). Patients served by FQHCs have higher rates of chronic medical conditions such as hypertension, diabetes, kidney disease, asthma, obesity, mental health, and substance use disorders than the general population.[2] Individuals with chronic conditions are at higher risk of hospitalization and all-cause mortality than those without.[3] When chronic conditions are combined with illnesses such as COVID-19, an individual's risk of death increases between 1.5-fold and fivefold.[4]

PURPOSE

Because of the baseline elevated risk for the patients served, the impacts of social determinants of health, and the risk of poor health outcomes, FQHC staff sought to increase the number of available respiratory clinic appointments, increase testing for and treatment of COVID-19, manage comorbidities more effectively, encourage patients to reduce high-risk behaviors, mitigate preventable adverse outcomes, and reduce burden on emergency departments and hospitals by maintaining care in the primary care medical home.[5]

EVALUATION AND ADVERSE EFFECTS

Pre- and postimplementation data compared the number of available respiratory clinic appointments between June 20, 2020 and March 31, 2021. Results showed a significant increase in the availability of respiratory clinic appointments, the number of completed appointments, and the number of tests completed during these months (Figure 1). Overall COVID-19 detection rates at this FQHC were higher than the state average during this intervention (7.4% and 6.0%, respectively), a possible reflection of the elevated baseline risk of the FQHC population.[5] There was a direct correlation between the number of respiratory clinic appointments available, appointments completed, and tests performed.

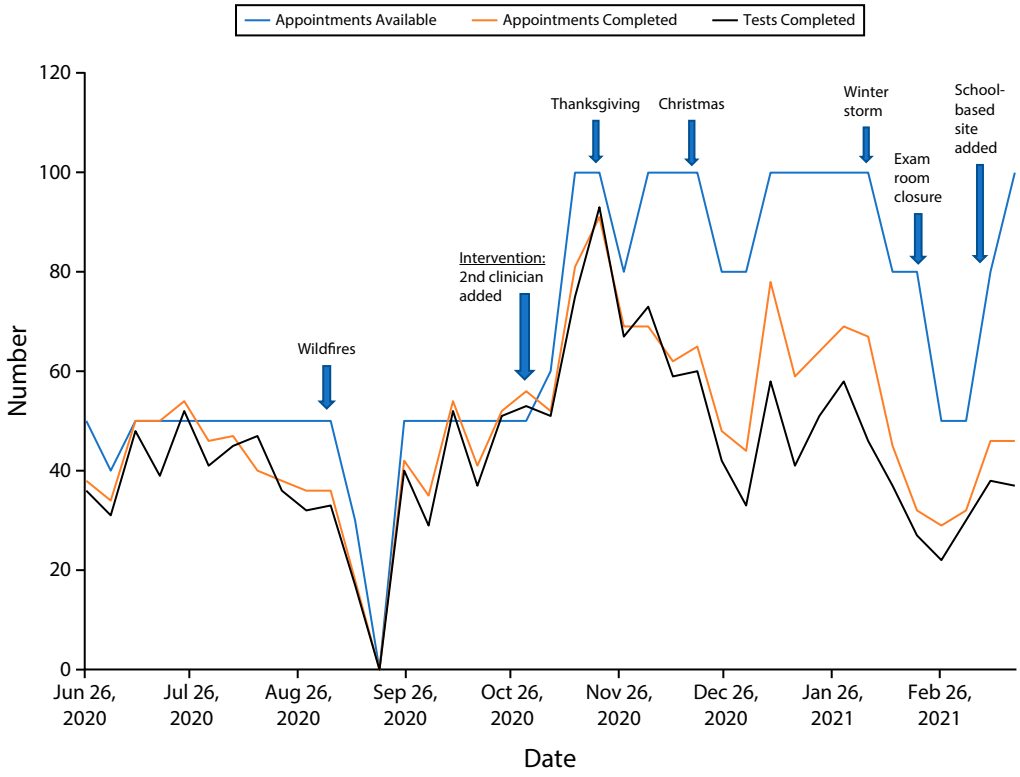

FIGURE 1— Available Appointments, Completed Appointments, and Completed Tests at a Federally Qualified Health Center COVID-19 Respiratory Clinic: Portland, OR, June 20, 2020–March 31, 2021

The anticipated rise in community prevalence of COVID-19 during the implementation of this project was a contributing factor to its success.

Ethical considerations were threefold. First, individuals of lower socioeconomic status often experience barriers to accessing health care, such as inconsistent access to transportation; historic distrust of the health care system; implicit and explicit clinician bias, particularly when health care systems are at capacity; and potential consequences of detected test results, such as loss of employment or housing.[6–8] To address some of these barriers, community health workers assisted patients diagnosed with COVID-19 with accessing housing, transportation, community funds, food and medication delivery, cleaning supplies, and interpersonal violence resources, as well as scheduling medical and behavioral health visits. Second, this intervention increased staff exposure to COVID-19 and the overall risk of contracting this disease. Three measures were taken to mitigate risk of disease transmission between patients and staff: the academic health center infection prevention and control team continuously reviewed the respiratory clinic space, workflows, and procedures to ensure safety and best practice; staff was provided with the proper amount and type of personal protective equipment; and the FQHC distributed this work equally among clinicians and medical assistants while offering those with high-risk circumstances the opportunity to opt out. Finally, as of November 2020, clinician burnout was at an unprecedented high point.[9,10] Close attention was paid to workforce well-being, which ultimately played a large role in capacity improvement measures and sustainability.

SUSTAINABILITY

This respiratory model paved the way toward safe integration of respiratory and nonrespiratory care. At the conclusion of the intervention, this model was applied across primary care and outpatient practices within both the FQHC and the larger academic health center, increasing the number and type of staff doing this work, distributing it more evenly across the system, and increasing access to respiratory care overall.

PUBLIC HEALTH SIGNIFICANCE

The COVID-19 pandemic has reshaped how health care is delivered in the United States. It also highlighted inequities and disparities that existed long before COVID-19 was first detected.[11] This intervention developed evidence-based workflows and protocols and maintained access to basic health services that were urgently needed for medically underserved communities during a pandemic.[11] This intervention highlights the critical role of nurse practitioners in community and public health. It underscores nursing acumen and skill, and the unique insight nurses have into the needs of their health systems, colleagues, and communities. It also exemplifies the expertise nurse practitioners have in the development of policies, protocols, and systems that enable each discipline to work to their full scope of practice, in a safe, efficient, and effective manner, to meet the needs of vulnerable communities in an evidence-based and patient-centered way. Finally, this intervention demonstrates the ability of the nurse practitioner to work with health systems of all sizes to advocate for resources, create innovative methods, and deliver high-quality, evidence-based, patient-centered care in a time of crisis. This nurse practitioner–led model can be adapted to future respiratory endemics and pandemics and used in the ongoing care of patients suspected to have or diagnosed with COVID-19 in ambulatory and primary care settings. AJPH

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S. L. Freed created and led this project to meet the requirements for the Doctor of Nursing Practice program at the Oregon Health and Science University School of Nursing and was lead clinician for this article. D. Thiele was the chair for this Doctor of Nursing Practice project and provided feedback and guidance in the creation of this article. M. Gardner was the lead medical assistant for the respiratory clinic and participated in data collection for this project. E. Myers was the clinic medical director during the time of this project and supported all respiratory clinic efforts.

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HUMAN PARTICIPANT PROTECTION

The project was not deemed as research involving human participants by the Oregon Health and Science University institutional review board (IRB) due to its nature as quality improvement (IRB #22180).

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Culturally Safe Nursing Care for Black Sex Workers in the Greater Chicago Area, 2020–2021

Randi Beth Singer, PhD, Natasha Crooks, PhD, Amy K. Johnson, PhD, Ariel U. Smith, PhD, Linda Wesp, PhD, Rebecca Singer, DNP, Alexa Karczmar, BA, Jahari Stamps, Bronwen Pardes, MA, Crystal L. Patil, PhD, and Alicia K. Matthews, PhD

Complex structural and social factors have created health inequities for Black sex workers. Black people, including those engaged in transactional sex, report leaning on spiritual beliefs to guide health-related decision-making, including whether to get the COVID-19 vaccine. Public health nurses can improve the health of Black sex workers through culturally safe care, which may include a community-stated vision of spiritual support. (*Am J Public Health*. 2022;112(S3):S288–S291. https://doi.org/10.2105/AJPH.2022.306836)

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Black sex workers (SWs) experience identity-based stigma resulting from the criminalized nature of sex work and the intersection of their minority identities (i.e., race, sexual orientation, gender identity).[1] Moreover, systemic barriers to culturally safe care, such as lack of care provider diversity or awareness, perpetuate inequities experienced by Black SWs. Public health nurses (PHN) are uniquely poised to combat stigma and provide culturally safe care to SWs.

Cultural safety, initially articulated by Irihapeti Ramsden, explicitly addresses issues of historical and ongoing oppression and power differences that manifest through our institutions and clinical practices.[2] Nursing and health equity scholars continue to use and apply this model, most recently adapting it for clinicians working with lesbian, gay, bisexual, transgender, queer, intersex, asexual plus (LGBTQIA+) people. Mukerjee et al.[3] identified five guiding tenets of culturally safe care:

1. partnerships,
2. personal activities of daily living,
3. patient centering,
4. prevention of harm, and
5. purposeful self-reflection.[3]

Committing to culturally safe care involves learning about people, using effective communication, and adopting practices aligning with community needs. This may mean including elements of religion to facilitate community-informed public health interventions to reduce barriers to preventive care,[4] like COVID-19 vaccinations, for some Black SWs.

INTERVENTION

To address inequities and support culturally safe health care innovations, we partnered with Howard Brown Health, a federally qualified health center, to complete a qualitative study with Black SWs (n = 16) living in Chicagoland. Our community advisory board, cofacilitated by a respected community member, comprises current and former SWs, outreach workers, caseworkers, health care providers, and researchers who iteratively developed a qualitative interview guide to capture SWs' physical, sexual, and emotional health needs; conceptualizations and experiences of safety; and COVID-19–specific questions. Current and former SWs were trained to conduct interviews. This analysis focuses on themes related to religion and COVID-19.

PLACE AND TIME

This qualitative assessment of health-related needs and experiences of Black SWs in the greater Chicago area occurred from December 2020 through April 2021, the height of COVID-19.

PERSONS

The population included Black adults from Chicago who exchanged sex (oral,

anal, or vaginal) for something of value (resources, money, or survival needs) within the past 12 months. Participants' ages ranged from 23 to 42 years (mean = 30.8). More than 50% were LGBTQIA+. Most had at least some college education (Table 1).

PURPOSE

We used qualitative interview data to understand what cultural safety practices would look like for PHN caring for Black SWs. We examined how a cultural safety framework can be used by PHN to inform how factors, such as violence, stigma, and criminalization, which have been further exacerbated by the pandemic, had an impact on Black SWs' ability to practice harm reduction and health-promotion behaviors.[5] Historically, Black Americans have managed disease threats by turning to religion, defined here as the role of church or clergy, belief in a higher power, or support found through spiritual practices such as praying, yoga, meditation, and song.[6] We explored how Black SWs in Chicago have used religion to guide coping and health-related decision-making during COVID-19. We highlight how infusing religion within community-based health interventions can be a cultural safety practice for PHN.

TABLE 1— Participant Demographics: Black Sex Workers in the Greater Chicago Area, Illinois, December 2020–April 2021

Variable	No. (%)
Age, y	
20–24	2 (12.50)
25–29	5 (31.25)
30–34	5 (31.25)
35–39	3 (18.75)
≥ 40	1 (6.25)
Race/ethnicity	
Black not Latinx	13 (81.00)
Multiple races	3 (18.75)
Gender identity	
Cisgender woman	5 (31.25)
Cisgender man	4 (25.00)
Genderqueer or nonbinary	1 (6.25)
Transgender woman	5 (31.25)
Intersex female	1 (6.50)
Sexual identity	
Queer (bisexual, pansexual, demisexual, gay)	9 (56.00)
Heterosexual	7 (44.00)
Education	
College or advanced degree	3 (18.75)
Some college	10 (62.50)
High-school degree	1 (6.25)
GED	1 (6.25)
< high-school degree	1 (6.25)
PrEP use: yes	5 (31.25)

Note. GED = completion of General Educational Development; PrEP = HIV preexposure prophylaxis.

IMPLEMENTATION

We reached individuals within this vulnerable population by using clinic-based flyers, social media (e.g., Instagram), private community e-mail lists, and word of mouth. Participants gave consent and received a monetary incentive ($50) for participation. Interviews were conducted over a secure institutional Zoom platform. Trust in a higher power emerged as a key theme across participants of various ages, backgrounds, sexual orientations, and gender identities.

Regarding COVID-19, participants spoke about spiritual beliefs and practices they used to cope. For example, when asked about their concern about contracting COVID-19, those not concerned explained that a higher power predetermined the likelihood of transmission. A 28-year-old transgender woman said, "I know God is the number one factor in any situation. . . . If he wants you to get it [COVID-19], he's going to allow you to come in contact with it. If he don't, he's not going to allow you to have it." When we inquired about COVID-19 vaccination, participants used this same theological argument to assert how the vaccine was part of God's plan and suggested that faith in the vaccine is faith in God.

In response to questions about emotional health and safety, participants described ways that God provides guidance and affirmation to counteract danger. A 31-year-old cisgender man said, "Religion centers me . . . surrendering to a power higher than myself and knowing that there are things at work that are bigger than me is very, very liberating."

EVALUATION

Participant responses reflected three core themes. First, in alignment with other research, religious practices provide a foundation of support for SWs with intersecting health needs. Su found that religious coping was associated with decreased posttraumatic stress disorder and increased psychological well-being, highlighting the impact of religion on health outcomes.[7]

Second, participants highlighted the power of prayer in maintaining peace, psychological well-being, and security. This finding mirrors the work of Shaw, who examined populations at risk for HIV (including SWs) in Malaysia and identified that prayer served as a conduit for health assistance, and religion served to support care for their health.[8]

The third core finding underscores how mistrust in medical institutions, stemming from a long-standing history of medical abuse of Black bodies, has been mitigated by religion.[9–11] As stories of maltreatment have been passed down from generation to generation, stories of protection by Jesus, the church, and family prayer have been passed down, too. Together, this builds confidence in religion while undermining potential benefits of scientific advances.[4,9] Given this complex relationship between medical mistrust and religion, nurses providing outreach must understand how historical trauma, religion, and disease prevention intersect for Black SWs to facilitate care in keeping with spiritual practices.[10,11] To inform community-based, trauma-informed, culturally safe interventions for Black SWs, more research is needed to evaluate religion's role in coping and medical decision-making.

This work has limited generalizability given the qualitative focus on a small population of Black SWs in Chicago. Despite limitations, this study expands understanding of the ways religion may affect COVID-19 health beliefs and behaviors among Black SWs. Findings from this study will help pave the way for culturally safe, community-informed public health interventions moving forward.

ADVERSE EFFECTS

We observed no adverse effects.

SUSTAINABILITY

At the forefront of holistic care, public health nurses are uniquely positioned to combat stigma and provide culturally safe care for Black SWs.[3] This study exemplifies how nurses can center community voices, learning about how a community integrates scientific advances such as COVID-19 vaccines within a vision of religious and spiritual support. As expert patient partners, nurses must understand and accept that communities' confidence in religion may outweigh distrust in a medical system rife with oppression and injustice.[12] Integrating questions, informed by the cultural safety framework, regarding the impact religion has on health allows PHN to better understand patients' lives. Nurses' self-reflection can uncover presumptions for health care decision-making and return to a focus on harm prevention, especially for communities experiencing structural injustice and health inequities.[13]

PUBLIC HEALTH SIGNIFICANCE

Cultural safety requires purposeful self-reflection consisting of a lifelong process of exploration that fosters trust and addresses power imbalances.[3] Educating nurses through a cultural safety framework is crucial to guide nurses in building relationships with individuals from diverse communities and sets the foundation for conducting holistic assessments that include an exploration of religion. AJPH

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contents of this article and have agreed to be accountable for all aspects of the work.

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We are grateful for our community partners and our participants, and we dedicate this work to Mistress Velvet and Baby T.

CONFLICTS OF INTEREST

We have no potential or actual conflicts of interest.

HUMAN PARTICIPANT PROTECTION

This study was approved by the University of Illinois Chicago institutional review board.

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Enumeration of Public Health Nurses in the United States: Limits of Current Standards

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Recent national initiatives in nursing and public health have emphasized the need for a robust public health nursing (PHN) workforce. In this article, we analyze the extent to which recent national enumeration surveys base their counts of this workforce on the definitions, scope, and standards for practice and practice competencies of the PHN nursing specialty.

By and large, enumeration surveys continue to rely on practice setting to define the PHN workforce, which is an insufficient approach for meeting the goals of major nursing and public health initiatives.

We make recommendations for the development of new standards for PHN enumeration to strengthen the broader public health infrastructure and evaluate PHN contributions to population-level outcomes. (*Am J Public Health*. 2022;112(S3):S292–S297. https://doi.org/10.2105/AJPH.2022.306782)

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Over the past several years, an ongoing series of complementary yet independent efforts have directed the nation and the nursing profession toward an emphasis on health promotion and disease prevention. These include the Department of Health and Human Services' Public Health 3.0 initiative (PH3.0),[1] the American Association of Colleges of Nursing's (AACN's) Enhancing Public Health Concepts in Nursing curricula,[2–5] the American Nurses Association's updating of Public Health Nursing: Scope and Standards of Practice,[6] and the National Academy of Medicine's Future of Nursing 2020–2030 report.[7] The lack of standardized criteria for determining which nurses in the nation should be "counted" as a public health nurse has hindered efforts to generate a more robust public health nursing (PHN) workforce for decades.[8] While enumeration surveys have yielded some insight into the specialty role of PHN, the data are not sufficient to determine if an adequate PHN workforce is available to respond to current population health challenges and plan for future needs.

NATIONAL TRENDS IN PUBLIC HEALTH AND NURSING

PH3.0 is a national effort that returns public health to its population-based origins.[1] PH3.0 strategies include improving the social determinants of health (SDOH) by engaging with multiple sectors and community partners to generate a collective, positive effect on population health with a focus on "upstream" factors. By necessity, embracing PH3.0 requires the transformation of local public health funding away from the provision of clinical, disease treatment–oriented services within local public health departments toward prevention and health promotion activities.

Specific to the nursing profession, the AACN—a leading national organization focused on nursing education—has increased expectations that core public health concepts are elevated to essential components and integrated throughout nursing curricula for undergraduate and graduate nursing programs nationwide.[3,4] Current revisions to the AACN Essentials in 2021 continue to promote public health core concepts in nursing education.[5] Despite these curricular mandates, there has been a drastic reduction in graduate nursing programs that prepare nurses for advanced PHN practice

roles,[9,10] while at the same time the demand for masters of public health programs has increased.[11]

Finally, over the past 3 years, the Council of Public Health Nursing Organizations has updated the PHN practice competencies,[6] and the American Nurses Association has drafted a new scope and standards for PHN practice.[6] External to the profession, the Robert Wood Johnson Foundation funded the National Academy of Medicine to "[chart] a path forward for the nursing profession."[7(p4)] The report recognizes the expertise of PHNs in addressing SDOH and identifies the need to ensure a sufficient distribution of nurses with a public health specialty to tackle the challenges of the next decade.[7]

Although each of these initiatives began before the arrival of COVID-19, the pandemic brought a sense of urgency and renewed interest in a PHN workforce able to adequately respond to population health trends, community needs, and national emergencies. With the persistent demands of COVID-19, public health as a discipline with a distinct set of competencies within the nursing profession has, at least temporarily, brought some recognition to the central role public health nurses have in protecting the health of people in the United States.[12,13] Against the backdrop of what feels like a perpetual state of needing to justify PHN's existence as a specialty area of nursing practice, particularly from within our own discipline,[9] some nurse scholars have questioned whether there is a future for PHN at all.[11] Taken together, the pandemic and the national impetus to move public health toward addressing SDOH as outlined in PH3.0, a window of opportunity exists to strengthen the PHN workforce. To seize this opportunity, however, clear, measurable, and standardized criteria that reflect accepted definitions of the PHN specialty are needed to discern which nurses, among the greater nursing workforce, are doing the actual work of public health.

DEFINING VS ENUMERATING PUBLIC HEALTH NURSING

Professional organizations representing the nursing workforce have written definitions of PHN in key documents used to guide PHN practice (Table A, available as a supplement to the online version of this article at http://ajph.org, provides a detailed list of select definitions). Used to direct PHN scope and standards of practice and practice-based competencies, a common denominator across definitions emphasizes population-based functions. As these definitions make clear, the population-focused roles are what differentiate PHN from other specialty areas of nursing practice. The well-known Public Health Intervention Wheel (aka The Minnesota Model)[14,15] defines the scope of PHN practice by the population-based work nurses do at the individual, community, and systems levels that delineate it as a specialty practice.

Although widely accepted definitions for PHN are readily available, a chasm exists between the roles and functions reflected in them and how we identify which segment of the nursing workforce fulfills these roles. Since 1915, there have been regular efforts to enumerate the PHN workforce[16] through national surveys of the nursing and public health workforce conducted or contracted by the Health Resources Services Agency Bureau of Health Professions, the National Sample Survey of Registered Nurses, the National Council of State Boards of Nursing, and the National Association of County and City Health Officials. To our knowledge, only 1 survey has sought to profile the PHN workforce in a more extensive and detailed manner than that conducted by the national sources identified here.[17]

Despite the extent to which we rely on these surveys for planning workforce needs in the United States as Tilson and Gebbie[8] noted almost 2 decades ago, and restated by others more recently,[18] enumeration surveys have been plagued by highly variable criteria for determining whether to "count" a nurse as a member of the PHN workforce. This lack of precision has severely impeded our ability to determine the actual number or supply of public health nurses in the workforce. Moreover, it has left us unable to assess if communities meet the recommended national minimum standard of a public health nurse-to-population ratio of 1 to 5000 in the United States, and, as COVID-19 has so painfully taught us, it rendered us unable to determine if this standard is adequate to meet the needs of the population during regular times and in times of crisis.[19]

Given the population-based initiatives described previously and the public health challenges that we face as a nation, we analyzed how national workforce enumeration studies have operationally defined PHN and measured the roles, functions, and job tasks or activities engaged in by public health nurses. Table B (available as a supplement to the online version of this article at http://ajph.org) details the measurement approaches taken for enumerating public health nurses across 7 national enumeration surveys from sources listed previously.

Notably, surveys designed to enumerate the public health workforce did not differentiate nurses by the level of licensure (licensed practical nurse or registered nurse) or educational preparation, whereas those enumerating the nursing or PHN workforce did so. Regardless of the target workforce, all surveys used practice settings to define public health nurses. Only 1 included a formal operational definition of PHN that used practice setting as a criterion;[17] others defined public health nurses through their primary practice setting by default. Among surveys of the nursing workforce, response options used to count public health nurses by their settings spanned "public health," "public health/community health agency" (and specified these agencies were not clinic-based agencies), and those working in "justice, public order, and safety."

Relevant to the roles and functions that are prominent in defining the PHN specialty (Table A), no surveys of the public health workforce capture the roles public health nurses fufill within their primary practice setting. Among surveys of the nursing workforce that include tangential indicators of the roles and functions that are part of formal definitions of the specialty, either "position held" or the "specialty area of a nurse's primary practice position" were most often used. Notably, the University of Michigan's Center of Excellence in Workforce Studies[17] survey is the only one since 2000 that was designed to enumerate and characterize public health nurses, specifically. The survey did include a "job function" item, although the response options were limited in number (n = 9). This was the only item among the included reports that captured data to delineate job function in a way that can be mapped onto both individual and population-level role functions specified in the definitions that guide the PHN specialty (Table A).

When included, measures of percentage full-time equivalent (%FTE) were most often used to sum the total %FTEs of public health nurses at the organizational level or identify the proportion of time spent in a primary and secondary setting. Only the National Sample Survey of Registered Nurses[20] asked nurses to estimate the percentage of their time in a typical work week spent carrying out several different job functions or tasks. Even the far more comprehensive University of Michigan survey[17] of public health nurses restricted the %FTE questions to the proportion of time nurses spent across program areas, rather than the job functions or tasks carried out within program areas.

REENVISIONING MEASUREMENT CRITERIA FOR PUBLIC HEALTH 3.0

Our analysis indicates that, for the past 2 decades, practice setting is primarily used to identify which members of the public health or nursing workforce are doing the work of PHN. With a single exception, the measurement strategies used for enumeration do not reflect the defining features of PHN that undergird the specialty's definition for professional practice, the scope and standards of practice, or practice competencies. Measuring the PHN workforce in this manner is problematic on 3 fronts: (1) the use of setting as a proxy for roles and function, (2) the limited taxonomies used to characterize roles and functions, and (3) the minimal capture of %FTE spent carrying out multilevel job functions—particularly among positions, specialty areas, or program areas where nursing job functions may vary widely across individual and population levels of care. In what follows, we recommend 3 directions for reenvisioning how to more accurately enumerate the PHN workforce moving forward.

Moving Beyond Setting for Roles and Functions

We argue that setting may be acceptable when the sampling frame is restricted to governmental health departments whose core missions and functions are to achieve the Essential Public Health Services[21]—all of which occur at the population level. As such, it can be reasonably assumed that the nurses working within them or employed by them are carrying out the vision, mission, and functions of public health and are guided by the scope and standards and practice competencies of the PHN specialty.

When we attempt to enumerate which nurses function as public health nurses outside of health department agencies, the waters become murky, and setting alone is inadequate to identify which nurses are carrying out, and how frequently they are carrying out the roles and functions defined in each of the soon-to-be-released scope and standards' 8 salient areas for PHN practice:

1. health promotion and protection,
2. emergency preparedness and disaster recovery,
3. environmental safety and quality,
4. clinical interventions,
5. care coordination,
6. cross-sector collaboration and community engagement or partnership,

7. research, and
8. policy and advocacy.[6]

Inconsistencies in how national surveys[21,22] define settings outside health department agencies add to a lack of precision and likely bias data in the direction of overinflating estimates of the PHN workforce. Ultimately, a setting-centered approach fails to accurately enumerate public health nurses whose roles and functions focus on broader population-level determinants and adversely affects our ability to ensure the health of the US public.

Developing Taxonomies of Roles and Functions

The use of non–public health taxonomies to assess the roles and functions of nurses cannot tell us if nurses are practicing in a manner consistent with PHN definitions, scope and standards of practice, or practice competencies. In acute care or hospital settings, there is a fairly narrow, well-defined, and relatively uniform range of roles and functions that nurses carry out when working in, for example, a "critical/intensive care" setting or specialty.[20(p7)] In community-based and public health settings and specialties, there is significantly greater variation in the roles and functions of nurses across levels of care that span the range of individuals, families, communities, and larger populations.

Given this, we recommend that more definitive categories of job roles and functions, such as those being developed in the Public Health Workforce Taxonomy Revision Project,[18] are widely adopted in surveys intended to enumerate or characterize the PHN workforce. Ongoing since 2014, this project now includes 46 common daily job functions carried out by the public health workforce—all of which are categorized within the Essential Public Health Services.[21] Applying public health–specific taxonomies to identify the roles and functions nurses are engaged in would likely substantially reduce measurement error and more accurately reflect the population-based activities that define PHN practice.

Percentage of Time Spent on Public Health

A final recommendation is to shift the paradigm of enumeration in a way that can account for nurses carrying out PHN roles and functions based on an allocation of the %FTE they spend on them. Adopting this as a standard moving forward can also serve as a benchmark for the extent to which our nation is meeting the visions put forward in PH3.0 and the many nursing education and practice initiatives that seek to center a population health orientation within the profession. Capturing %FTE allocated to carrying out roles and functions will, for example, enable us to determine whether nurses working in community-based settings are, in fact, doing the work of addressing SDOH lauded in both the AACN Essentials[2–5] and the Future of Nursing 2020–2030 report.[7] Moreover, combining measures of %FTE with the more granular taxonomy of roles and functions such as those in the Public Health Workforce Taxonomy Revision Project[18] will allow us to discern whether nursing efforts to tackle SDOH (regardless of setting) reflect the upstream focus required to make meaningful progress toward achieving health equity.

Each measurement feature that is problematic for enumerating the PHN workforce can be remedied with increased and strategic collaboration between nursing and public health workforce researchers. As the many initiatives currently underway seek to shift nurses practicing outside the governmental public health system toward the provision of more population-focused care, methods for assessing this change are urgently needed. Similarly, adopting more precise approaches for understanding the roles, functions, and activities that public health nurses working within or for governmental public health systems are engaged in can assist administrators in these agencies to assess the extent to which they may be understaffing or underutilizing their own PHN workforce, or both.

While certification might be proposed as a strategy to identify public health nurses in workforce surveys, we do not believe this is viable for 2 reasons. First, PHN-specific certifications have been recently discontinued, despite opposition from those within the PHN specialty.[23] Second, while registered nurses in a small number of states may obtain a registration certificate as a public health nurse from their board of nursing, their registration is voluntary, and there is an associated cost when registering.[24,25] If this approach were used, nurses who decide not to register as a public health nurse through the board of nursing despite working in a population-focused role would go uncounted. As such, the absence of a national approach to licensing and the variation in state rules and statutes make this strategy unfeasible.

CONCLUSIONS

At this critical juncture when awareness of public health is heightened and the role of nurses in health care is celebrated, organizations must ensure accurate enumeration of public health nurses. There is an urgent need for a

uniform national framework for data collection, analysis, and reporting to more accurately quantify the size, distribution, and contributions of the PHN workforce. While the exact methodological specifications need development, measurement criteria grounded in PH3.0, the 8 updated roles and functions in the revised PHN scope and standards of practice, and the developing Public Health Workforce Taxonomy Revision Project[18] is crucial, where setting and actual engagement in activities related to PHN roles and functions would be combined for PHN enumeration purposes moving forward.

We envision an approach that provides enhanced clarity and allows for comparable, standardized data to be used by decision-makers, policymakers, and public health strategists who depend on assessments of public health nursing supply and demand. Moreover, future work to pinpoint where these 8 roles and functions intersect with PH3.0 strategies could provide insight into public health nurses' current and future contributions to public and population health.

Public health nurses are professional registered nurses whose practice has an impact on individual-, community-, and systems-level outcomes.[26] Their multifaceted engagement, through their specialty-delineated roles and functions, distinguishes them from many other nurse colleagues working in community-based settings. There is now a clarion call through PH3.0 for organizations to align PHN practice roles with the scope and standards of this nursing specialty, and we must be able to measure the extent of the PHN workforce moving in that direction. This will require incorporating standardized definitions, roles, and functions that are specific to public health nurses into surveys so the results will be more useful for creating workforce plans that integrate public health nurses into the broader public health infrastructure and can inform how we evaluate the PHN contribution to population-level outcomes. While health workforce needs and resources differ by geography, population demographics, and political will, a desired outcome remains one that prioritizes public health organizational practices that move PHN roles in the direction of PH3.0. To achieve this goal, however, public health nurses must be included in decision-making processes for determining new enumeration approaches going forward. AJPH

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Trauma-Informed Home Visiting Models in Public Health Nursing: An Evidence-Based Approach

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Traumatic experiences can have significant health effects, particularly when they are experienced during childhood. Structural determinants of health including environmental disasters and limited access to mental health services and affordable housing can contribute additional stress for parents with a personal history of childhood adversity. These factors can directly affect their children, contributing to intergenerational trauma.

Pregnant people and families with young children are often referred to public health nursing maternal and child home visiting (HV) programs when there are concerns about historical or evolving childhood trauma. The strict eligibility and participation requirements of existing evidence-based maternal and child HV programs can exclude families that have experienced or are experiencing childhood trauma and its effects and can limit innovation by public health nurses, a hallmark of the field.

Therefore, we advocate and describe the implementation of the Trauma Informed Approach in Public Health Nursing (TIA PHN) model, which incorporates a trauma-informed approach into a traditional maternal and child HV program in 3 California counties. TIA PHN, which began enrollment in March 2021, involves public health nurses and community health workers and integrates program evaluations in pursuit of evidence-based status. (*Am J Public Health*. 2022;112(S3):S298–S305. https://doi.org/10.2105/AJPH.2022.306737)

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Trauma, which includes adverse childhood experiences (ACEs), has long been recognized to have substantial negative effects on health and health behaviors across the life span. It is only in recent years that trauma has become recognized as a public health crisis that affects entire systems and communities across generations.[1] In the United States, evidence-based maternal and child home visiting (HV) programs have shown great promise for optimizing family health and, thus, reducing the long-term health-related effects of trauma.

Programs such as the Nurse Family Partnership and Healthy Beginnings are generally funded through county, state, and federal sources.[2–4] These interventions require extensive research before they can be considered evidence-based and thus eligible to be supported by public funds and disseminated widely. They also perpetuate structural bias in that the counties and organizations that are already well resourced are the ones that are able to secure funding to implement and evaluate these types of programs.[5] Furthermore, such requirements do not allow for flexible implementation of innovative approaches tailored to local needs and populations. As a result, health systems miss opportunities for public health nurses to have a positive impact on families experiencing trauma.

Since 2017, the Sonoma County (California) Field Nursing Team has been implementing the Trauma Informed Approach in Public Health Nursing (TIA PHN) HV program to mitigate toxic stress, improve resilience, and optimize health among low-income families that are at high risk for trauma and are experiencing medical or social challenges.[6] Currently being piloted in 3 Northern California counties, the TIA PHN model is not yet considered evidence-based but represents a

promising HV alternative for families affected by trauma. Here we describe the evolution of HV models and argue that innovation in addition to fidelity to evidence-based practice should be considered for HV and field nursing in the community. Furthermore, we suggest that support for interventions such as TIA PHN, which is evidence informed, can equip public health systems and nurses to respond more quickly to the crisis of childhood trauma, particularly in the most underserved communities.

BACKGROUND

Experiencing or being exposed to traumatic events during childhood can have substantial long-term effects on children, families, and communities across the life span and across generations. Extensive research demonstrates that ACEs (defined as 10 forms of abuse, neglect, or household dysfunction before the age of 18 years) are both common and predict poor health and social outcomes in childhood and adulthood.[7–9] The experience of trauma can result in stress responses that alter a child's biology and brain architecture, with long-term consequences on health including asthma, sleep disorders, and infections resulting in hospitalization.[9] In addition, ACE exposure is correlated with high risks and poor outcomes in pregnancy, including greater odds of maternal depression, preterm birth, and fetal death.[10]

The effects of ACEs and the resulting toxic stress have been declared a public health crisis.[1] Trauma is not limited to ACEs, however, and can include community violence, homelessness, structural violence such as racism, environmental disasters driven by climate change, and global pandemics.[11]

Screening for trauma and its consequences (e.g., toxic stress, posttraumatic stress disorder) can identify individuals most at risk for poor health and social consequences. Families that screen positive can be supported in accessing the care they need to address and mitigate trauma. Broad population screening of families for historical (parental) and evolving childhood trauma has gained acceptance, and research supports the acceptability of screening in clinical settings, including during pregnancy, as part of well-child pediatric visits, and by community-based nurses who work with parents of infants.[12–16]

In 2019, in response to growing data on the causal relationship between trauma and poor health, the surgeon general of California enacted a policy to guide implementation of ACE screening for children and adults in primary care settings. The ACEs Aware initiative provides reimbursement through Medicaid for screenings that are conducted in primary care settings as well as training and clinical protocols for settings that serve the Medicaid population. The goal of this policy initiative is to decrease ACEs and toxic stress by half within a single generation through statewide system change.[17] Although this is a bold and important effort to change California's public health care system, limitations of screening within primary care settings exist.

MEETING THE UNIQUE NEEDS OF FAMILIES WITH TRAUMA

Screening for ACEs in primary care is feasible and acceptable, but not all individuals are seen within primary care settings, even publicly funded ones.[18,19] In addition, simply screening for ACEs does not take into consideration the individual or family experience and the context in which trauma takes place (e.g., homelessness), nor does it mitigate or respond to evolving trauma within a family setting. Public health nursing, specifically maternal and child HV services involving a trauma-informed approach, is an ideal complement to primary care with respect to screening for trauma and responding to its consequences.

Traditional Home Visiting Services

Traditional maternal and child HV programs originated in the United States under a model of prevention and social justice with the goals of identifying medical, social, or safety needs early and linking families to community resources.[20] The first HV programs focused on improved maternal and infant health, universal kindergarten, and support for immigrant communities. Around the time of the civil rights movement, HV was an important component of efforts to address poverty and social inequities. Toward the end of the 20th century, HV was identified as a potential tool to prevent child abuse and neglect.[21] Currently, maternal and child HV programs seeking government funding through the Maternal, Infant, and Early Childhood Home Visiting Program must implement evidence-based models focused on 6 prevention-based areas:

1. improving the health of mothers, newborns, and children;
2. preventing child maltreatment and reducing emergency room visits;
3. improving school readiness;

4. reducing crime and violence;
5. improving economic stability; and
6. improving referrals and coordination of community resources.[2]

Current State of Home Visiting Services

In recent years, attention has pivoted toward funding of and referrals for models that are considered evidence-based, with the understanding that replicating services to model fidelity is more likely to result in positive outcomes. Several HV models have successfully demonstrated improved health and social status for enrollees, earning recognition as evidence-based models.[22] Pediatricians have argued in favor of greatly expanding HV to families of young children through the use of available evidence-based models, with an endorsement of closer ties to primary medical home sites.[21,23]

However, replicating model delivery to a scale that meets actual community needs can pose a challenge as fidelity measures move from the academic to the practice setting.[24] An analysis of data from Maternal and Infant Home Visiting Program Evaluation (MIHOPE) and MIHOPE–Strong Start studies of 4 evidence-based HV programs (delivered to 4229 families in 12 states and 2900 families in 17 states, respectively) confirmed benefits of selected early childhood and family health measures seen in the original studies. However, there was only limited benefit found in relation to expected birth outcomes and prenatal behavior, despite verification that services were delivered to fidelity.[3] To our knowledge, these HV programs did not formally incorporate an ACE tool or a trauma-focused curriculum. We are not aware of any studies that have evaluated curricula specifically addressing the effects of trauma on maternal and child HV participants.

Inequities in access to evidence-based programs. Although previous research has shown that HV programs in general have demonstrated effectiveness in the provision of education, advocacy, and resources to families who are at high risk for adverse experiences, there are few data to support whether individual programs directly address the needs of families who have already experienced or are currently experiencing adverse events.[25] Furthermore, many families who would benefit from HV services are often ineligible or unable to participate in programs with proven efficacy because many of them have strict eligibility requirements that are challenging for families in crisis.[26] Of the 19 evidence-based maternal and child HV programs eligible for funding from the federal Maternal, Infant, and Early Childhood Home Visiting Program, 7 either require or strongly recommend that clients be first-time parents enrolling early in pregnancy; however, families experiencing historical and emerging trauma are less likely to access prenatal care, making necessary early enrollment very challenging.[27]

Indeed, there are clear demographic disparities between those being served by evidence-based programs and those enrolled in emerging models; for example, 53% of clients enrolled in emerging models are Latinx/Hispanic (as compared with only 30% of those in evidence-based models), and 55% speak English as their primary language (as compared with 76% of those in evidence-based models).[28] These differences underscore the need for more equitable access to evidence-based HV services for vulnerable families. Families with historical and ongoing trauma may benefit most from tailored services that specifically address adverse childhood experiences. Emerging models providing a trauma-related curriculum in their approach offer an alternative to vulnerable families unable to meet the inclusion and participation criteria of existing evidence-based HV programs. It is hoped that, as these emerging models gather evidence to support their effectiveness, a greater number of evidence-based programs will extend to a wider population of diverse families in need of services.

Family First Prevention Services Act. The Family First Prevention Services Act of 2018 seeks to prioritize upstream interventions for families in which children have suffered maltreatment through expansion of referrals to evidence-based programs instead of to foster care.[29] However, in an examination of the effectiveness of available evidence-based models in addressing the complexities of this high-risk group, Testa and Kelly questioned whether unintended consequences could arise for subsets of the population (e.g., families living in poverty).[30] In addition, although strict adherence to fidelity measures and targeted eligibility has been cited as a factor in the success of evidence-based models, flexibility to address the root causes of parental challenges offers a more inclusive approach than filtering HV participants through narrow criteria known to correlate with effectiveness in research settings.[31,32]

Furthermore, financial constraints on publicly funded preventive social and medical programs coupled with limited HV resources have resulted in the majority of referrals to HV services involving families referred after a

negative medical or social outcome has already occurred, including challenging life circumstances.[20] These very experiences and circumstances, however, can make it difficult for families to participate in HV programs because of either participation requirements (e.g., meeting on a set schedule) or eligibility requirements (e.g., being a first-time parent).

Many referrals to the Sonoma County Field Nursing Program are for families that have already encountered significant life stressors and traumas. From 2018 to 2021, more than one third of families referred were experiencing homelessness, and more than 40% were experiencing substance use. In fiscal year 2020–2021, half of families referred were experiencing interpersonal violence at the time of their first home visit, and 54% were experiencing current mental health concerns (as compared with 34% in 2018–2019 and 33% in 2019–2020). This shift from preventing trauma to responding to it indicates a new paradigm for HV programs. A unique area of focus regarding family challenges is parents' own childhood trauma history.

Addressing parents' childhood trauma histories. Several HV programs have piloted use of ACE questionnaires with data collected by home visitors, and findings have shown that higher child ACE scores are linked to developmental delays and that higher adult scores are correlated with postpartum depression.[33,34] An examination of the nuances of social workers and PHNs delivering ACE questionnaires to parents receiving home visits revealed that higher ACE scores corresponded to positive depression screening responses.[35] Beyond the utility of ACE data in facilitating an understanding of the sequelae of trauma, ACE questionnaires can promote reflection of parents' and caregivers' experiences and what they wish to mitigate and prevent in their own child's experience. Therefore, we propose that incorporating adult ACE screening combined with a trauma-informed curriculum for parents receiving HV services represents an innovative approach to meeting the needs of high-risk families that are not adequately served through existing evidence-based models.

TRAUMA-INFORMED APPROACH IN PUBLIC HEALTH NURSING

The Sonoma County Field Nursing Team developed the TIA PHN model in response to an increase in unmet needs among clients and as a means of addressing the crisis-driven nature of many of the referrals coming into the program.[36] TIA PHN is an example of an innovative, evidence-informed maternal and child HV approach that acknowledges and addresses the effects of toxic childhood stress to break the cycle of intergenerational trauma.[6] In 2017, rates of homelessness, intimate partner violence, and mental health concerns among families enrolling in the county's Field Nursing Program increased by 17% to 28% in the months immediately following the Sonoma Complex Fire, which destroyed more than 5300 homes and significantly affected the community's overall economy and safety net.[37] Since 2017, the county has experienced nearly annual wildfires, flooding, and the COVID-19 pandemic. Each of these disasters has had a significant social and medical impact on the families served by the Field Nursing Team.

In response, the TIA PHN model incorporates trauma-informed principles in all client and staff interactions, the delivery of the TIA PHN model curriculum, and conversations about ACEs with optional use of the original 10-item ACE questionnaire while continuing to implement the case management components employed in most evidence-based models: voluntary participation, development of an individual service plan, mental health screenings and referrals for adult caregivers, and developmental screenings and referrals for children. The participants consist of families in 3 counties referred by medical providers and community-based organizations to the maternal and child HV sections of public health departments; families included are those identified as having a high-risk pregnancy and those experiencing trauma (past or current).

Multidisciplinary Team

An integral component of the TIA PHN model is the use of a multidisciplinary team consisting of a public health nurse (PHN) and a community health worker (CHW). Use of such a team has been shown to improve participants' perception of the help and education they receive and to increase participants' reports of improved self-confidence and feeling that they have someone to talk to who cares.[38] The TIA PHN model acknowledges the need for nursing expertise outside of the clinic setting to identify and support families with complex medical needs (e.g., low birthweight, preeclampsia) and to provide and reinforce education surrounding medical risks associated with pregnancy and the postpartum period (e.g., sepsis, postpartum hemorrhage). The model also recognizes the

need for CHWs to help support enrolled families with culturally competent health and safety education, demonstration of the use of social and medical services, and provision of assistance such as transportation to medical appointments. Currently, however, there are no evidence-based maternal and child HV programs that incorporate the collaborative efforts of a PHN–CHW team.[4]

Providing Trauma-Informed Health Education

To address historical and evolving traumas experienced by enrolled families, the TIA PHN model incorporates a curriculum aimed at providing trauma-informed health education. The curriculum was developed after an extensive review of the literature on ACEs, toxic stress, and trauma and their correlations with poor health outcomes. It provides both content and guidance for engaging in conversations with clients in the following overarching areas: (1) brain development and ACEs, (2) pregnancy and the postpartum period, and (3) mitigation of toxic stress through healthy eating, exercise, sleep, relationships, mental health, and mindfulness.[36] Rather than relying on a didactic approach to education, the curriculum employs motivational interviewing techniques to encourage clients' self-reflection and participation in the information being shared. Clients are encouraged to identify existing strengths and, in collaboration with the PHN or CHW, identify goals related to each topic that they would like to achieve. These goals are then supported by the PHN and CHW through additional education and linkages to local resources.

Although the original 10-item ACE questionnaire is offered to adult clients, neither its completion nor reporting of scores is required. Instead, the focus of the conversation is on the effects that ACEs have on long-term health and the ways in which families can empower themselves to mitigate these effects and improve health. TIA PHN staff are encouraged to use their discretion as to the timing and frequency of delivery of the model curriculum. This flexibility in the curriculum structure acknowledges that many home visits occur as a family encounters a crisis that inhibits their ability to be receptive to education or engage in self-reflection.

Proposed Evaluation

After initial pilot work in Sonoma County, the TIA PHN model is currently in the midst of an expanded 30-month pilot phase in the counties of Napa, San Francisco, and Sonoma.[6] The goal of this work, which involves a partnership with a nursing academic partner and is funded by the California Home Visiting Program, is to advance the TIA PHN model from evidence-informed to evidence-based status so that it can be disseminated widely and supported through government funding. The program evaluation is designed to answer a pair of questions: First, does implementation of the proposed program result in improved family health for program participants? Second, is there a difference in health and health care outcomes between clients who receive the TIA PHN intervention and comparable Medi-Cal recipients in the 3 counties? Over the course of the 30-month pilot, it is estimated that 750 families will be reached across the study counties. Data for the comparison group will be derived from Medi-Cal administrators in each county as well as other population-based information.

Client-level outcome data from program participants will be compared with a demographically similar Medicaid (Medi-Cal) nonparticipant population in the 3 counties. Outcomes of interest include rates of child immunization; contraception; linkage to primary medical and dental care; insurance coverage; rates and mean durations of breastfeeding; rates of screening, identification, and referral for perinatal mood disorders (e.g., depression); and rates of screening, identification, and referral for child developmental delays.

All indicators are standardized across counties and can be compared with county-level population data already being collected by Medicaid administrators or programs such as the Special Supplemental Nutrition Program for Women, Infants, and Children. Indicators are recorded by HV staff as clients exit the program. In addition, mean intervention durations will be tracked, along with whether, when, and how often clients receive the 3 overarching elements of the TIA PHN curriculum described earlier. Data will be collected by PHNs and CHWs as they deliver services and complete the intervention components and will be documented in the electronic health record system of each county. Indicators for clients who have completed the program will be abstracted quarterly from each county electronic health record; data on clients who were lost to follow-up or who chose not to continue their participation in the program will also be tracked.

In addition, the team will examine data describing the reach and recipients of the TIA PHN model and differences with Medi-Cal participants with respect to age, stage at enrollment (prenatal, postpartum/newborn,

pediatric), gender identity, sex at birth, sexual orientation, racial/ethnic identity, language spoken at home, numbers of pregnancies and live births, and reason for referral, including housing insecurity, substance use, mental health concerns, intimate partner violence, and medical fragility. These data will help to identify whether the TIA PHN program is achieving its goal of reaching the most vulnerable populations. Preliminary data from the 3 counties show that 42% of enrollees between March and October 2021 reported a history of mental health concerns, 40% were homeless or housing insecure, approximately 25% reported intimate partner violence, and more than 20% reported current or past substance misuse (Table 1).

Two essential components of the TIA PHN model are the flexibility that it allows the PHN–CHW team in responding to the needs of clients and the discretion it affords them in determining the appropriate timing for delivery of various aspects of the intervention. Delivery of the ACE conversation, routine screenings, and the curriculum will be tracked for each participant enrolled. Other fidelity measures include recording of standardized training and assessment of staff participation in peer support (one on one and in groups). PHN and CHW staff will contribute qualitative data on facilitators of and barriers to implementation as well as information about their own experiences in delivering the program, including tailoring it to clients' needs. If feasible, the team will also conduct in-depth qualitative interviews with a subset of program clients to understand their experiences, with a particular focus on ACE conversations. These data will contribute to an overall understanding of the potential longer-term feasibility and effectiveness of more in-depth ACE conversations in contrast with simple ACE screening in primary care.

MOVING THE FIELD FORWARD

Public health researchers and policymakers in California are prioritizing the need to screen for ACEs within primary care and other health care settings. The California Department of Public Health has enacted a policy in which all Medi-Cal patients who access primary care in the state will be screened for ACEs. Although this is an important state-level policy, there is a need to offer interventions for families with historical or emerging trauma that may benefit from greater assistance to achieve healthy outcomes; interventions within medical settings are in early development, and an evidence base has not yet been established.

Because of their close relationships with families and the length of time afforded to each visit, home visitors are uniquely poised to address the health and social needs of families that have been exposed to adversity.[39] Current evidence-based HV programs primarily cater to families before situations of crisis (e.g., enrolling only first-time parents early in pregnancy); therefore, it is less likely that those programs will identify and remedy situations of late prenatal medical care, fetal exposure to substances, and risk of child abuse or neglect in families with prior child welfare involvement. In addition, these programs lack precise curricula focused on historical and emerging trauma.

In response, Sonoma County public health nurses developed a model that brings a trauma-informed approach to public health nursing to a community that has experienced devastating environmental crises caused by the Tubbs, Nuns, and Pocket Fires (2017); the Kincade Fire (2019); and the Glass and Lightning Complex Fires (2020). The TIA PHN model incorporates ACE conversations with optional screening facilitated by a multidisciplinary HV team of PHNs and CHWs. The team's ability to address trauma in a bicultural and bilingual manner can promote resilience in families with young children in which historical or emerging trauma has been identified.

The TIA PHN model is an example of an intervention building on the evolving work of public health nursing, an ethos embodied for more than 100 years to

TABLE 1— Childhood Trauma Risk Factors at Program Enrollment in Napa, San Francisco, and Sonoma Counties: California, March–October 2021

Risk Factor	Enrolled Families or Primary Caregivers, No. (%)
Past or current child protective services involvement	45 (13.8)
Past or current mental health concerns	136 (41.8)
Currently homeless or housing insecure	130 (40.0)
Past or current intimate partner violence	98 (30.2)
Past or current substance misuse (including alcohol and marijuana)	75 (23.1)

Note. The sample size was 325.

meet the needs of the populations served.[40] As public health nursing HV teams seek to employ evidence-based responses for families identified by the California ACEs Aware campaign, rigorous scientific evidence is needed to prove the effectiveness of existing practices for this population. According to preliminary findings from the TIA PHN pilot, clients achieved 80% to 100% of health-related outcome goals when receiving the intervention an average of 12 times over approximately 6 months.[6] The TIA PHN model represents an evidence-informed approach in the process of evaluation with aspirations of eventually becoming an evidence-based model that meets the needs of families with historical and emerging trauma. In line with our state's goals, the program hopes to have an impact with respect to disrupting intergenerational trauma. AJPH

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CONFLICTS OF INTEREST

The authors have no conflicts of interest to declare.

HUMAN PARTICIPANT PROTECTION

No protocol approval was needed for this research because the data reported are regular service data collected from all home visiting clients enrolled in the study program.

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Public Health Nurse Tailored Home Visiting and Parenting Behavior for Families at Risk for Referral to Child Welfare Services, Colorado: 2018–2019

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Objectives. To examine public health nurse (PHN) intervention tailoring through the Colorado Nurse Support Program (NSP). Our 2 specific aims were to describe the NSP program and its outcomes and to determine the effects of modifying interventions on short- and long-term outcomes among NSP clients.

Methods. In our retrospective causal investigation of 150 families in Colorado in 2018–2019, intervention effects were modeled via longitudinal modified treatment policy analyses.

Results. Families served by PHNs improved in terms of knowledge, behavior, and status outcomes after receiving multidimensional, tailored home visiting interventions. Case management interventions provided in the first month of PHN home visits had lasting effects on behavior outcomes, and 2 additional case management interventions in the first month were estimated to have even more of an impact.

Conclusions. Modern causal inference methods and real-world PHN data revealed a nuanced, fine-grained understanding of the real impact of tailored PHN interventions.

Public Health Implications PHN programs such as the NSP and use of the Omaha System should be supported and extended to advance evaluations of intervention effectiveness and knowledge discovery and improve population health. (*Am J Public Health*. 2022;112(S3):S306–S313. https://doi.org/10.2105/AJPH.2022.306792)

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Public health nurse (PHN) home visiting is known for its tailored interventions and its effectiveness for high-risk populations such as families that have multiple complex social and health needs and whose children have the potential for long-term sequelae of early childhood adverse events.[1–5] Intervention tailoring, defined as personalizing care to meet specific client needs, is key to PHN intervention effectiveness.[2–6]

For decades, policymakers have mandated outcome evaluation to ensure PHN home visiting program effectiveness and justify continued funding. Administrators have responded to these mandates by adopting formal protocols (e.g., evidence-based guidelines[7]) and programs (e.g., the Nurse Family Partnership)[6] that, in turn, generate data through routine PHN documentation for program evaluation and research.[8–12] Use of PHN-generated data sets for causal modeling is in its infancy; however, interventions tailored to meet diverse client needs create problematic data confounding with respect to the numbers and types of interventions a client receives and their outcomes.[13] Adjustment for this confounding is critical to understanding the impact of PHN interventions.[13]

In PHN home visiting, clients receive a series of PHN visits, and in each visit interventions are applied. Over time, client characteristics, outcomes, and interventions vary, creating a rich source of information but also complex, time-varying confounding.[13] The numbers and types of interventions delivered at a visit depend on the

client's baseline health information, the numbers and types of interventions delivered in the past, and how the client responded to those interventions. These dynamics need to be taken into account in assessing the effects of interventions and their timing. As confounding is especially strong given the nature of PHN intervention tailoring, traditional methods of estimating time-varying intervention effects such as marginal structural models may result in biased or highly variable estimates of effects.[14,15]

Recent work in causal inference has focused on estimating causal effects that depend on the observed number of interventions.[16–18] These methods aim to answer questions such as "What would outcomes look like if, counter to fact, the numbers of interventions everyone received were slightly different than in reality?" The control group accounts for the observed data, and a comparison is made with the hypothetical population that received slightly more (or fewer) interventions. These approaches are referred to as modified treatment policies (MTPs), as they examine what occurs when the application of a treatment or intervention is slightly modified from actuality.[16]

The confounding present in this hypothetical comparison tends to be less difficult to adjust for than that associated with marginal structural models provided that the hypothetical increase or decrease in interventions is not too large,[16,17] as MTPs require weaker assumptions. This stems from the fact that the counterfactual questions they pose are not drastically different from how interventions were applied in reality. MTPs have been extended to address time-varying interventions (longitudinal MTPs [LMTPs]) and are capable of answering counterfactual questions that depend on both individual characteristics and intervention timing, as in PHN intervention tailoring.[16]

Given the complexity and longitudinal nature of the PHN intervention tailoring problem, correspondingly complex and rich longitudinal data sets are needed to examine such intervention modifications. The data must incorporate information on the factors that affect PHN intervention tailoring to control for potentially time-varying confounding.

Although PHN home visiting programs have often employed electronic health records as documentation,[9–12] 1 PHN support program generated data that were suitable for the study of both interventions and outcomes over time. The Nurse Support Program (NSP) was designed as a collaborative partnership between a local public health district and a number of county human service departments in Colorado to support families in need. PHNs visit families biweekly to provide evidence-based, tailored interventions known to maintain family integrity, improve family dynamics, and facilitate positive behavior change.[6,7] Case management (CM) referrals to community resources for emergency funding, health care services, substance use cessation, or grief services are made only when appropriate and when needed by families. To be eligible for the program, families must be referred by child protective services and qualify for assistance from Colorado Works–Temporary Assistance to Needy Families. Established in the early 2000s for a single county, the NSP has grown to include agreements with 3 counties served by the public health district.

In response to the need to evaluate the effects of the interventions on client outcomes, the NSP implemented a comprehensive measurement, decision support, and documentation process in 2013 using the Omaha System,[8] a research-based nursing classification intervention and outcome system. This system has been employed to guide, document, and evaluate diverse PHN services including PHN home visiting programs across populations and settings in the United States and globally.[7,8]

Using NSP data generated through routine PHN documentation, we examined intervention tailoring using LMTPs to deepen understanding about the impact of PHNs in terms of improving and optimizing intervention tailoring and outcomes. Our 2 study aims were (1) to describe the NSP and outcomes using PHN-generated Omaha System data and (2) to determine the effects of modifying interventions on short- and long-term outcomes among NSP clients.

METHODS

This retrospective, collaborative study involved practicing PHNs and academic researchers.

Instrument

The Omaha System consists of 3 relational instruments with documented psychometric properties: the Problem Classification Scheme (client assessment and problem list), the Problem Rating Scale for Outcomes (problem evaluation), and the Intervention Scheme (used for care planning and services; Table B, available as a supplement to the online version of this article at http://www.ajph.org).[19,20] The Omaha System exists in the public domain, and evidence-based encoded interventions for PHN home visiting practice are available online at the system's Web site.[7] The NSP provides

extensive Omaha System training and mentoring, including specific guidelines for practice and documentation (e.g., identifying which system problems should be assessed in common scenarios, how often a system problem should be rated, and how to document tailored NSP interventions).[8] Monthly practice sessions support uniformity in system use. Quality of documentation is measured quarterly through peer and supervisor reviews with reflective feedback.

Analysis

We used R version 4.1.1 in conducting all of our analyses.[21] For our first aim (providing a description of the NSP), standard descriptive and inferential statistics were used to analyze program data. We used LMTPs, which allow for interventions to be longitudinally measured and for a counterfactual increase or decrease in interventions to occur at any specified time point of interest, for our second aim (assessing the effects of intervention modifications). Here the causal effect is the expected change in outcomes given the intervention modification: $E[Y(A_k+\delta)] - E[Y]$, where $E[Y(A_k+\delta)]$ is the expected potential outcome if the intervention at month k is modified by shifting the number of interventions by δ (for this study, $\delta = +2$ and -2) and $E[Y]$ is the expected outcome in the observed data.[22] Those who receive more interventions often have more problems and worse outcomes and are otherwise different from those who receive fewer interventions; therefore, there is confounding.

The confounding in this study had a complex structure given consideration of time-varying interventions that may depend on what happened in the past. The assumptions required for our aim 2 analysis were as follows: (1) the intervention modifications were plausible in that they were in the range of the observed number of interventions for all individuals, and (2) there was sequential ignorability in that all of the factors affecting the number of interventions received in a given month and the observed data in future months were measured.

Figure 1 shows the directed acyclic graph created on the basis of our study assumptions; arrows depict the causal structures and confounding relationships among the baseline and time-varying covariates, interventions, and outcomes.[23] Our first assumption holds because the intervention modifications explored were small (±2) and there were no modifications that made an individual's number of interventions negative. Because the Omaha System captures information about why PHNs make care decisions, large degrees of the factors needed for our second assumption were measurable, yet some still may remain unmeasured. Given the emphasis on caretaking and parenting in the NSP, outcome variables were classified as caretaking and parenting Knowledge, Behavior, and Status (KBS) scale scores measured on a 5-point Likert scale longitudinally.

Targeted maximum-likelihood estimation,[24,25] an alternative to g-computation and inverse probability weighting, was used to control for the time-varying confounding implied in Figure 1.[26,27] Targeted maximum-likelihood estimation requires estimation of inverse weights and regression functions; for these we used a combination of logistic regression, Bayesian additive regression trees, and others.[28–31]

Modifications to the number of CM interventions were considered because

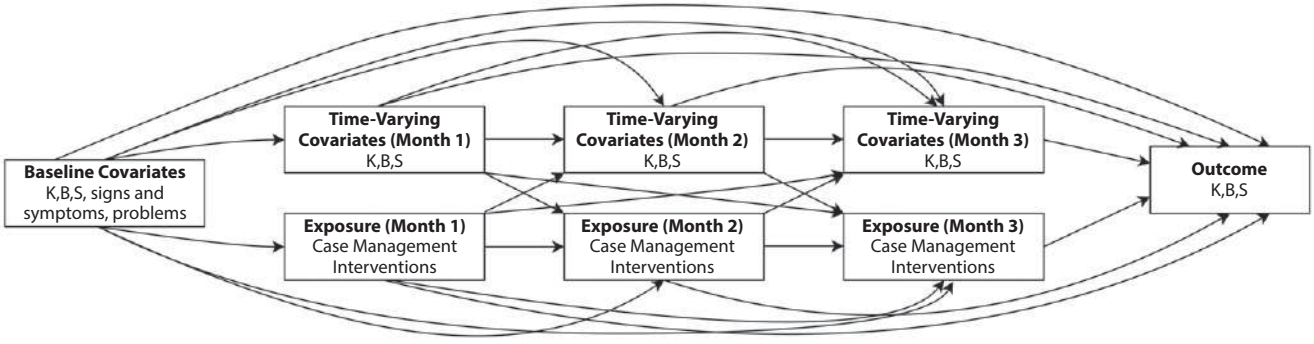

FIGURE 1— Time-Dependent Confounding, Interventions, Baseline Information, and Knowledge, Behavior, and Status Outcomes for Clients: Colorado, 2018–2019

Note. B = behavior; K = knowledge; S = status. The diagram illustrates how previous outcomes and interventions can affect future interventions and shows the causal ordering of data required for a longitudinal modified treatment policy analysis. Each arrow represents a relationship among variables and the direction of the relationship.

variations in these interventions had been associated with differential outcomes in previous research.[7] Hypothetical increases of 2 CM interventions were modeled at month 1, month 2, and month 3 separately. Similarly, we modeled hypothetical decreases of 2 CM interventions separately at months 1, 2, and 3. Modifications of 2 interventions were selected because a modification of 1 intervention may not be clinically relevant and larger modifications may deviate too substantially from the observed number of interventions, which would induce stronger confounding and more difficult adjustments. For each analysis, the change in month 4 KBS scores and the change in scores at the final measurement were estimated. Positive changes indicated that KBS outcomes were improved by the hypothetical change in the number of CM interventions, whereas negative changes indicated that outcomes were worsened.

Study Cohort

The data used in this study were generated through routine documentation of NSP PHN home visits in multiple counties with the Omaha System from May 2017 to December 2019. For the LMPT analysis, only data for primary caregivers were used. The variables used are summarized in the following sections; a full list of the variables is provided in Table A (available as a supplement to the online version of this article at http://www.ajph.org). The unit of analysis was the primary caregiver for each family.

Covariates, Exposures, and Outcomes

Baseline covariates. We controlled for total numbers of problems, signs or symptoms, and overall baseline KBS scores for each case to adjust for baseline information. Both total numbers of signs or symptoms for all problems and the total number for each problem were included. In addition, the presence of each sign or symptom for the caretaking and parenting problem was considered. The first KBS scores for each problem and each case were extracted to calculate mean baseline KBS scores across all problems as a baseline control variable. The overall mean KBS scores and first KBS scores for income and caretaking and parenting were included as baseline covariates. The baseline KBS data for other problems were excluded because of the amount of missing data (50% or more).

Exposures. Exposures were operationalized as the numbers of CM interventions in each of months 1, 2, and 3.

Time-varying covariates. In practice, health care providers adjust their care based on prior assessments and interventions, and thus KBS scores (monthly mean KBS scores overall and for each problem) and interventions were considered as time-varying confounders. In each case, the numbers of interventions were calculated for all problems and caretaking and parenting interventions provided in each month by all categories (teaching, guidance, and counseling; treatments and procedures; CM; and surveillance) to adjust the estimate of relationships between CM interventions and client outcomes. Each time-varying covariate was used to adjust the effect of subsequent exposure on the outcome (Figure 1). For instance, we controlled for the total numbers of teaching, guidance, and counseling; CM; and surveillance interventions during month 1 in studying the effects on outcomes of CM interventions delivered during months 2 and 3. There were limited amounts of missing data for caretaking and parenting and overall KBS variables in month 3 (25%–35% of the sample). We addressed this issue via multiple imputation with the R package and random forest imputation; indicators of missing data were included as additional time-varying covariates.[32]

Outcomes. Outcomes were operationalized as knowledge, behavior, and status with respect to the caretaking and parenting problem: (1) the first measured of each of the knowledge, behavior, and status outcomes monthly from month 4 to the final month and (2) the knowledge, behavior, and status outcomes measured in the last month of visits (which occurred in month 4 or later). Thus, there were 6 outcome variables (3 outcome measures × 2 time points) analyzed in 6 independent models. There were no missing outcomes.

RESULTS

A total of 339 individuals in 150 families were served by PHNs in the NSP in 2018–2019. Their services and outcomes and the findings of the causal intervention effectiveness analysis are described in the sections to follow.

Nurse Support Program Characteristics

As noted, 150 families (consisting of 339 individuals) were served and discharged from the program during the study period. On average, family primary caregivers had 3.2 signs or symptoms and received 164 interventions for 4.5 problems over 9 months of visits

(range = 4–19 months). In addition to caretaking and parenting (100%) and income (93%), the most frequent problems addressed were mental health (37%), the postpartum period (31%), substance use (25%), family planning (23%), and pregnancy (22%). The most common signs or symptoms were difficulty providing physical care or safety (26%), use of recreational drugs (14%), inaccurate or inconsistent use of family planning (14%), and sadness, hopelessness, or decreased self-esteem (10%). The vast majority of interventions involved surveillance (50%), followed by teaching, guidance, and counseling (30%) and CM (20%). By problem, interventions overwhelmingly focused on caretaking and parenting (47%) and income (24%); the remaining problems were addressed in 2% to 6% of interventions.

The mean and median numbers of CM interventions were 4.1 and 3 (range = 0–28), respectively, in month 1; 2.67 and 2 (range = 0–28) in month 2; and 2.09 and 1 (range = 0–16) in month 3. Outcomes improved significantly overall for knowledge (from 2.88 [less than basic knowledge on admission] to 3.56 [basic to adequate knowledge on discharge]), behavior (from 3.45 [inconsistently appropriate behavior] to 4.05 [appropriate behavior]), and status (from 3.66 [moderate to minimal signs or symptoms] to 4.11 [less than minimal signs or symptoms]; all *P*s < .01). Trends were similar across problems with some variability.

Case Management Intervention Effects

The LMTP intervention tailoring analysis focused on primary caregivers, whose demographics were provided in aggregate by the NSP. Clients were on average 29.9 (SD = 8.6) years of age and were primarily female (94%) and unmarried (68%). Omaha System data for LMTP analyses were available for 146 primary caregivers who received PHN visits for at least 4 months.

A hypothetical increase of 2 CM interventions in month 1 was estimated for caretaking and parenting behavior outcomes at both month 4 (change = 0.07; *P* = .02) and the final month (change = 0.11; *P* < .01; Figure 2). Conversely, a hypothetical decrease of 2 CM interventions during month 1 was estimated to result in a decrease in caretaking and parenting final behavior outcomes (change = −0.07; *P* = .01; Figure 2). Although not significant, a hypothetical increase of 2 CM interventions in month 1 was positively related to status outcomes for month 4 (change = 0.06; *P* = .16) and the final month (change = 0.04; *P* = .27). Finally, a hypothetical increase of 2 CM interventions in any month did not result in a significant change at month 4 or the final month in knowledge outcomes (changes from −0.01 to −0.05; *P* = .89 to .07).

DISCUSSION

This retrospective study of existing PHN data justifies LMTPs as appropriate methods for analyzing public health nursing practice, demonstrates the value and effectiveness of the NSP, and provides additional evidence of the importance of intervention tailoring. The NSP descriptive analysis showed that outcomes among families served by PHNs improved after the families received multidimensional, tailored home visiting interventions, in line with findings from numerous previous studies such as those examining PHN home visiting data sets[9–12] and the Nurse Family Partnership.[6]

Our retrospective longitudinal analysis involving advanced statistical techniques indicated that CM interventions provided early on during PHN home visits had a lasting impact on behavior outcomes. The finding that a reduction in the number of CM interventions in the first month of PHN visits resulted in worse behavior outcomes indicated that the number of CM interventions applied in the first month had a positive impact on behavior outcomes and that 2 more CM interventions in the first month may have even more of an effect. Further research with additional and larger data sets is needed to confirm and extend these findings.

Our findings regarding NSP program characteristics and outcomes demonstrate the importance and value of attention to program and documentation fidelity support for NSP PHNs. This aligns with Omaha System guidance to ensure the validity of findings when standardized documentation data are repurposed for evaluation and research.[8] NSP program leaders affirmed that the findings observed reflected fidelity with program goals, expected assessments, and evidence-based interventions. This lends important process and content validity to our intervention tailoring findings and results. The rigor of the program and the findings related to the data lends confidence that PHNs both intervened appropriately and documented correctly. Generating such valuable data may be time consuming; therefore, administrators and PHNs must ensure that workflows are optimized to reduce documentation burden.[8,33]

The small but significant improvement in short- and long-term caretaking and parenting behavior is meaningful given the granularity of our analysis. Such fine-grained guidance derived

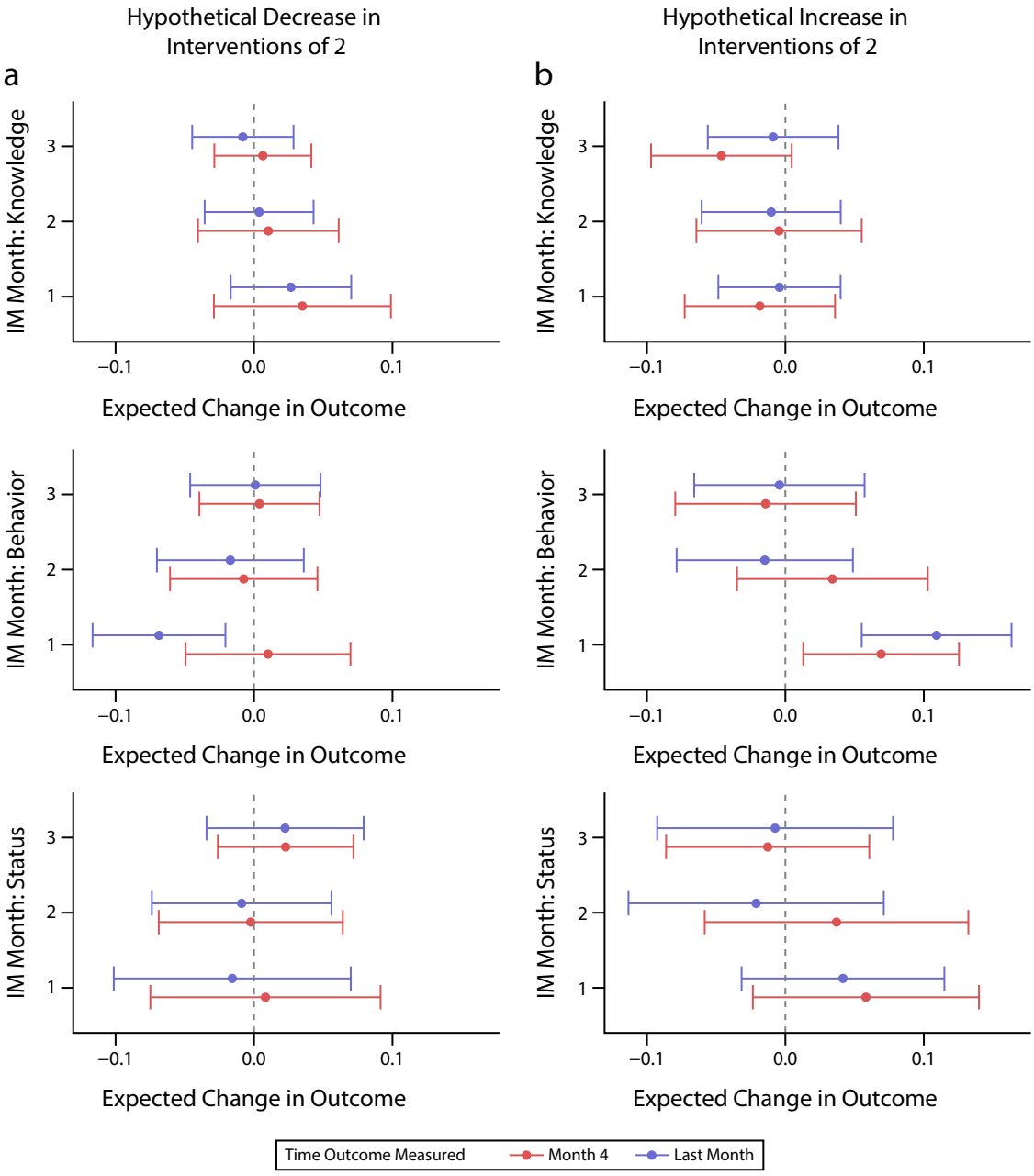

FIGURE 2— Expected Changes in Knowledge, Behavior, and Status Outcomes Under Hypothetical (a) Decreases by 2 and (b) Increases by 2 in the Number of Case Management Interventions: Colorado, 2018–2019

Note. IM = intervention modification. When interventions are modified in a given month, they are held fixed in all other months. A positive change means that outcomes improve with a given hypothetical modification in interventions. Error bars represent 95% confidence intervals.

from PHNs' own data aids in optimizing intervention tailoring and acknowledges that interventions are already well tailored. The broad practice recommendation that 2 additional CM interventions be considered in the first month of services acknowledges that problem, target, and care description intervention components are absent. Such broad advice is useful in that it allows for intervention tailoring on the part of PHNs, who can direct CM interventions to areas that may be of the most benefit for a specific client.[9–12] In future LMTP research, various intervention components should be examined with respect to their impact on PHN outcomes.

There are unique data considerations in using LMTPs. The longitudinal intervention and KBS outcome data generated through routine documentation during PHN NSP home visiting were extracted manually to achieve our goal of understanding how PHNs may improve intervention strategies and optimize outcomes. This study demonstrates that adherence to documentation protocols and data extraction processes is fruitful. Therefore, improving documentation and data extraction procedures is warranted and critical for future research.

This study has introduced LMTPs as a way of assessing the impact of PHN interventions and their tailoring when granular, longitudinal PHN data are available. LMTPs are useful for informing incremental, as opposed to revolutionary, changes in practice because they focus on questions concerning what would occur in the event of such changes. We examined the timing of application of interventions; with a larger data set, further examination of interesting modifications would be possible, such as timing and adaptivity to client characteristics (e.g., what outcomes would result if interventions were shifted up or down for those who had low KBS scores at any visit?). However, for the valid use of LMTPs, sufficiently rich data on the many factors affecting PHN intervention tailoring are necessary.

The analytical aim of this study was causal in nature: to understand what changes in outcomes would occur if interventions were modified in certain ways. When aims are explicit, the assumptions required for a valid analysis are transparent. In particular, a valid LMTP analysis requires that all confounders that could affect the number of interventions at any given time point be measured.[34] It is not possible to guarantee that all confounders have been measured, and as such our results are subject to potentially not having a causal interpretation. This can be remedied in future analyses by considering sensitivity analyses assessing the robustness of findings to unmeasured confounders. However, the specificity of the Omaha System data enabled us to capture a substantial number of critical confounders, making our results plausible. Note that although intervention effects may have varied among individual PHNs, our estimated effects can be interpreted as an average over the distribution of such effects.[35]

Limitations

This study had several important limitations. First, the sample size was small, and thus we had limited ability to detect nuanced intervention effects. Second, because it was generated in a single region of the United States, the sample may be limited in terms of its representativeness of PHN clients more broadly. Third, our study was observational, and thus it is possible that the presence of unmeasured confounders biased our results. Future work should be conducted to assess the sensitivity of study results to unmeasured confounders.

Public Health Implications

Decision-makers and administrators should continue to support and extend PHN home visiting programs such as the NSP and use of the Omaha System for the purposes of improving constituent outcomes and population health. Also, they should make data available for advancing evaluations of PHN intervention effectiveness and knowledge discovery. Our study contributes to the body of knowledge supporting investment in members of the PHN workforce as key contributors to improving the health of vulnerable populations. Our findings should be used as evidence to advocate for changes at the policy and system levels to advance and support PHN intervention and outcome work.

Conclusions

This study demonstrates the potential of modern causal inference methods paired with real-world PHN data to deepen understanding of the effects of PHN interventions on outcomes among this group. LMTPs in conjunction with highly detailed Omaha System data showed the feasibility of achieving a more nuanced, fine-grained understanding of the real impact of such interventions. PHNs should consider offering 2 additional CM interventions in the first month to improve behavior outcomes among primary caregivers of families at risk for child welfare service involvement to optimize outcomes through intervention tailoring. Consistent with the results of previous PHN home visiting effectiveness studies, our findings demonstrate the known effectiveness of PHN interventions and outcome measures, reinforcing the importance of maintaining and supporting a qualified PHN workforce and thereby advancing PHN contributions to improve population health. AJPH

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CONTRIBUTORS

J. D. Huling, R. R. Austin, M. M. Doran, V. J. Swarr, and K. A. Monsen conceptualized the study design and analytical strategy. J. D. Huling and S.-C. Lu developed and implemented the statistical analyses. J. D. Huling developed and implemented the causal analyses. All of the authors drafted, wrote, and edited the article.

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CONFLICTS OF INTEREST

The authors have no conflicts of interest to declare.

HUMAN PARTICIPANT PROTECTION

The University of Minnesota institutional review board deemed this study not to be human participant research. Full protocol approval was not needed because deidentified data were used.

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Challenges Facing Public Health Nursing Faculty in the United States: COVID-19 as a Catalyst for Change

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We present an analysis of challenges facing public health nursing faculty members (PHNF) in the United States and their broader societal implications. The COVID-19 pandemic has exacerbated these challenges, making them untenable.

Current academic structures—influenced by the broader sociopolitical climate—are problematic for PHNF: they disincentivize PHNF from researching social determinants of health and public health systems, teaching systems-level content that may be deemed "controversial" and that is not included on licensure exams, and engaging in service through advocacy and community partnerships. The fault lines within health care, public health systems, and higher education indicate that it is time to reevaluate how to incentivize socially just and equitable outcomes.

Toward this goal, we propose that collective action and systemic change, including the perspectives of PHNF, is needed to better realize our shared goals. The analysis serves as a catalyst for conversations about academic structures, health care systems, the role of public health, and the kind of society we envision for ourselves and future generations. (*Am J Public Health*. 2022;112(S3):S314–S320. https://doi.org/10.2105/AJPH.2022.306819)

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COVID-19 has become a generation-defining pandemic. Although the inhospitable and unsustainable environments of nurses working in US hospital settings during the pandemic have been well documented,[1] less attention has been paid to how public health nurses working in various settings, including academia, have fared. As public health nursing faculty members (PHNF), our unique perspective of the pandemic—adjacent to the frontlines but fundamental to contributing to the evidence base, educating the public, and building the nursing workforce pipeline—has highlighted a critical need to reimagine the systems within which we work.

Since COVID-19 emerged, PHNF have been asked to meet prepandemic expectations in teaching, research, and service productivity within the uncharted realities and uncertain future that quickly became standard. At the same time, they have advocated for the needs of our current and future "health care heroes" working in hospitals who have been largely abandoned as the pandemic rages on. However, it is the most egregious of these challenges—the affronts to PHNF's credibility and ethical principles—that has catalyzed the need for change. Examples of these challenges include university leaders across the country implementing COVID-19 protocols in alignment with partisan decision-making at state and local levels and governmental public health agencies making recommendations steeped in individualism as opposed to the collective good. Such policies and recommendations have often been in direct contradiction to the principles of public health and evidenced-based practice.

In this article, we critically analyze the challenges facing PHNF that result from the current systems in which we work. We argue that these examples illustrate the need for a paradigm shift across academic nursing and society more broadly. We draw on our perspectives as PHNF to illuminate larger systemic, structural, and cultural issues in higher education that require attention and

investment from the US public writ large if we are to prepare our future nurses, and citizens, with the knowledge and skills needed to achieve a healthy and equitable society. Long-standing health and social inequities have been revealed and exacerbated by the pandemic, and the role of PHNF in calling for and driving public dialogue is more important than ever. Next, we provide a brief overview of the scope of public health nursing in the United States before turning our attention to challenges specific to PHNF.

Ample evidence reveals gaps in understanding surrounding public health nurses' (PHNs') unique focus, preparation, role, and essential activities.[2–4] Accounting for more than 20% of the public health workforce but just 1.5% of the registered nursing workforce,[5,6] PHNs are distinct from other nursing specialties in their population-level focus on health. PHNs focus on the health of aggregates, which translates to examination of groups of people sharing certain characteristics and lived experiences (e.g., people living in a defined geographical community or identifying as a certain ethnicity). As such, this work is concerned with affecting group-level health indicators (e.g., addressing persistent inequities across health outcomes by social group). Unlike individual-level approaches to addressing health that have dominated nursing for decades and that focus efforts on the individual as the locus of intervention and change (e.g., precision health, symptom science and management), public health nursing operates from a systems-level perspective that views society, institutions, and policies as the locus of change. As such, PHNs must understand, develop, evaluate, and critically engage with stakeholders, programs, policies, laws, and institutions that shape social determinants of health and group-level health indicators to create upstream systems-level change.

One salient example of how a concept critical to public health and PHNs has been often misused by those focused on individual-level interventions, is the application of social determinants of health.[7] This term is frequently used to describe connecting individual patients with nonmedical resources that affect their ability to engage with the health care system or in healthy behaviors (e.g., providing patients with bus passes to attend health care appointments). Although important, this is an instance of meeting a social need, not addressing a social determinant of health. By definition, social determinants of health operate at systemic levels and must therefore be addressed through systems-level interventions (e.g., improving the public transportation system so that everyone benefits, or ensuring a livable wage so that everyone can afford to access public transportation). This issue highlights the different knowledge and skill sets that addressing social determinants of health requires, which have been reported to be lacking among nursing faculty.[8] This lack of conceptual clarity in past and present scholarship is problematic for a profession positioning itself to sit at tables of influence focused on addressing social determinants of health (as evidenced by recent priority-setting documents for nursing; e.g., the Future of Nursing Report,[5] the new National Institute of Nursing Research [NINR] Strategic Plan[9]) and highlights how the specialized expertise of PHNF is crucial to achieving health equity.

Yet, PHNF who do possess the expertise needed to work at the systems level often find themselves in the crosshairs of an increasingly hostile political landscape that remains a largely unacknowledged barrier. Specifically, public health is largely a function of local, state, and federal government, and the funding, implementation, and enforcement of public health programs and policies are often beholden to the political needs and strategies of a few elected officials. This reduction of public health imperatives to political football leaves PHNF, like public health more broadly, to balance what their science, scholarship, teaching, and service indicates should happen against frequently misaligned partisan realities. Like public health, public universities are especially vulnerable to state-level policy and politics, and partisan priorities often have tangible impacts on PHNF at such institutions. For these reasons, we focus this analysis on PHNF at public research universities in the United States as they strive to fulfill their tripartite mission of research, teaching, and service. Outlining how and why current systems work against PHNF in public universities as we rebuild the nursing and public health workforces decimated by the pandemic will codify the need to reimagine our systems and enact change.

COVID-19 AS CATALYST FOR REENVISIONING OUR SYSTEMS

Academic faculty at universities in the United States focus on 3 priority areas: (1) to develop a program of science and scholarship with clear impact, (2) to educate future generations, and (3) to give back to their profession through service. In evaluating progress toward these areas, universities have created metrics to define success. Over time, a status quo in which these metrics are uncritically accepted as what is

required for academic success has been established. However, the fault lines within our health care and public health systems as well as higher education indicate that it is time to reevaluate whether current metrics incentivize socially just or equitable outcomes.

Using Albert Hirschman's *Exit, Voice, and Loyalty*[10] as a heuristic, we posit that PHNF have reconciled their tensions with the status quo and maintained a "loyalty" to their institutions, professions, and students by infusing concepts such as social justice and structural competence throughout their courses[11] without challenging the economic and power structures driving higher education and health care in the United States. In the wake of the pandemic, however, it is apparent that this loyal subversion maintains and even reinforces a broken status quo of prevailing individualistic ideologies. That is, such loyalty relies on the efforts of individual faculty members who value public health to insert relevant concepts into the curriculum or their science ad hoc, instead of demanding a cultural shift in which social justice and health equity are expected outcomes of the academic enterprise. Further, leaving social justice up to individual nurse educators is problematic, owing to differing interpretations and conceptualizations of social justice across the profession.[12] Finally, loyalty on the part of individuals does not effect systemic change. Individuals may feel better in knowing that they have followed a righteous path in the face of structural opposition, but ultimately, this loyal subversion creates complacency about our current systems. Given this, we are now witnessing a logical end to the loyalty and maintenance of the status quo and the unjust systems this perpetuates.

Returning to Hirschman,[10] the remaining option is to exercise voice to wield the collective power of the largest segments of the health care and public health workforces.[13,14] PHNF may not hold all the answers, but PHNF do have specialized knowledge about the challenges and opportunities in public health and nursing practice to inform and expand public debate about social justice and health equity. We recognize, however, that the systems within which we work, partisan realities of public universities in the United States, and broader American culture often render such voices silent, even in the face of devastating inequities such as those endured by many during the COVID-19 pandemic. Thus, in the next sections we exercise voice by drawing attention to how current systems and structures undermine the ability of PHNF to succeed in advancing health equity and in preparing the future workforce to understand and address social determinants of health. We achieve this by focusing on the 3 pillars of academia: research, teaching, and service.

PUBLIC HEALTH NURSING RESEARCH

In the wake of the COVID-19 pandemic, it is critical that we accelerate the translation of knowledge and focus on science that can advance social justice.[15] It has been argued that public health interventions cannot be socially just unless they attend to the larger social determinants of health that create inequities.[16] However, there is little support for PHNF to conduct such research to improve health equity by explicitly targeting social determinants of health or public health systems and infrastructure, as the majority of funding for health disparities research to date has targeted individual-level care delivered through the health care system.[17] The National Institutes of Health has not typically funded research on systems improvement,[18] and the recently founded Patient-Centered Outcomes Research Institute represents an increased focus on delivery of clinical services. This is in stark contrast with the previously identified lack of a centralized mechanism for research on public health systems and services.[18,19] Funding priorities that exclusively advance individual-level interventions have thus limited advancements in public health nursing science and undermined progress on social determinants of health, populations, and systems.

In addition to funding priorities that are not inclusive of public health research, the institutions within which PHNF work have been slow to fully prioritize our most urgent social problems. Many public universities profess a commitment to serving their communities and fostering an ethic of public service and social justice; some have established centers for community engagement or community partnerships.[20] This type of community engagement is central to public health nursing science and to the pursuit of socially just research. However, abundant evidence shows that university cultures, infrastructures, and tenure decisions impede community-partnered research and action.[21] University structures continue to grade contributions to science in terms of awarded research dollars (which compensate for cuts in state funding) and ratings in citation indexes, instead of considering real-world impact on people and populations.[22] These metrics have been widely criticized,[23] and they impede the ability of PHNF to engage

authentically with communities over the long term to maintain reciprocal partnerships essential for meaningful public health nursing research.

The dissemination of research findings is critical to the advancement of science, but linking tenure and promotion decisions to journal impact factors and researcher h-index values limits the reach of science unnecessarily and unjustly to those with access to discipline-specific journals that are typically behind paywalls. Furthermore, at most research-intensive public universities, dissemination of research findings in non–peer-reviewed products is not counted as scholarship, further impeding the ability of community partners and policymakers to incorporate evidence into real-world efforts to change systems. These metrics undermine the ability of PHNF to pursue policy-relevant community-engaged research, and they contribute to a pervasive cultural belief that health and education exist merely for the private benefit of the individual instead of as public goods for healthy communities.

PUBLIC HEALTH NURSING EDUCATION

Education is a university's most visible mission. As a result, course content and students' achievement are of interest to policymakers, taxpayers, and other stakeholders.[24] In nursing education, close attention is paid to metrics such as the *US News & World Report*'s annual rankings of "best" nursing schools.[25] Pass rates on the National Council Licensure Examination (NCLEX) are closely monitored as this is the nationwide examination for the licensing of registered nurses, with accreditation, funding, and prestige based on these rates. Given public scrutiny and the outsized importance of the NCLEX in nursing education, PHNF face misalignments between institutional priorities and public health principles, because the NCLEX does not cover public health nursing content.[25] In environments driven by NCLEX pass rates, there is little incentive for students or faculty to engage with or master content traditionally considered to be solely the purview of public health nursing. Thus, content related to social determinants of health, health inequities, and systems-level practice is often relegated to a stand-alone public health nursing course in the final semester of baccalaureate degree programs or discussed only within the context of individual-level practice.[5(p199)]

Similar dynamics extend to graduate education. For example, curricula in PhD programs emphasize methods and theories that focus on explaining and intervening upon individual-level behaviors, social needs, and health outcomes, with little to no coverage of emancipatory methods and theories that might prepare nurse scientists strategically to produce scholarship focused on understanding, critiquing, and changing systems. This siloing of content has contributed to an overall neglect of public health nursing across the curriculum and to the implication that public health nursing is not "real nursing."

As the pandemic has unfolded, the broad scope of nursing practice, and the importance of public health nursing in particular, have become more apparent to the public. Within public universities, however, PHNF have found themselves and their course content at the center of partisan gamesmanship at local, state, and federal levels. Because public health nursing is concerned with social determinants of health and health equity, PHNF must discuss politically fraught topics such as structural racism, white supremacy, and misogyny—all of which have roots in laws and policies that continue to produce inequities. Yet, even in the face of racial inequities laid bare by the pandemic, officials in many states have made unprecedented attempts to censor this content.[26]

Partisan gimmicks notwithstanding, a growing consensus that predates the pandemic is reflected in both the *Future of Nursing 2020–2030: Charting a Path to Achieve Health Equity*[5] and the revised American Association of Colleges of Nursing (AACN) Essentials. Both call for nurses across the spectrum to be better educated in social determinants of health, health inequities, and systems-level practice. Attaining the *Future of Nursing* report's vision and meeting the expectations of accreditation bodies require PHNF with the expertise to teach students and support the curricular changes needed to thread this content throughout the curriculum. At present, however, the pipeline of nurses with public health expertise from diverse backgrounds who could lead these efforts has nearly dried up: graduate programs in advanced public health nursing at US universities have nearly disappeared,[27] the AACN has retired the Advanced Public Health Nurse certification exam, and a dwindling number of doctoral candidates in nursing are supported to pursue scholarship addressing social and structural determinants of health. This trend mirrors the broader erosion of the public health workforce,[14] and as university policies dictate enrollment numbers needed for economic vitality, the degradation of advanced public health

nursing programs has further undermined PHNF and, subsequently, the public's health.

PUBLIC HEALTH NURSING SERVICE

Universities often view service to the profession as the least important academic role, accounting for little weight in annual and tenure reviews.[28] Particularly for pretenure PHNF, the importance of strategic, limited service is consistently reinforced by senior faculty mentors, leadership, and administration. This approach may facilitate success in current systems, but it reduces service to fragmented tasks focused largely on peer review and committee appointments rather than a holistic set of productive activities with their own impact. This precludes any meaningful contribution of service work to faculty scholarship or teaching, which for PHNF is critical. Hospital academic affiliations and partnerships facilitate the scholarship of nurse faculty focused on clinical care and individual-level patient interventions, with minimal to no need for added service work to facilitate those relationships, because academic medicine incentivizes clinical partners to be involved in research with preexisting policies and procedures.[29] By contrast, PHNF often use service activities to build a network from which to identify collaborators, find partners willing to contribute precious resources to research that falls outside the scope of their job responsibilities, and navigate complex issues such as data sharing.

Academia's narrow view of service also discounts advocacy work as a form of population-level PHN practice. Nursing consistently frames itself as the patient's advocate (see Provision 3 of the American Nurses Association Code of Ethics[30]); however, in public health nursing, advocacy often occurs at a systems level rather than the individual level.[31] The discounting of advocacy as service for PHNF reflects the reliance of public health funding and policies on government and thus politics, which includes partisan agendas intended to dismantle long-accepted tenets of public health (e.g., mandating vaccines) and halt the uptake of new, emerging evidenced-based practices (e.g., mask wearing).[32] Additionally, PHNF at state-funded research universities are public employees. Technically, there are no constraints on political engagement for public employees, but especially in states known to be combative to public health policies, it may be risky for PHNF to engage in advocacy work lest they be perceived or accused of having partisan motivations.[33,34] Therefore, many PHNF have to choose between engaging in activities crucial to public health and protecting themselves and their livelihood. Perhaps the politicization of facts about public health could have been mediated or avoided had PHNF and other nurse scholars felt empowered to be an active presence in the policy realm during COVID-19.

INTERMEDIATE ACTION STEPS: BUILDING TOWARD THE FUTURE

The issues facing our profession and the public's health are daunting, but within crisis lies opportunity. Indeed, although the pandemic has exacerbated preexisting fault lines within our society, it has also clarified the need for immediate action. Importantly, a movement within nursing academia is beginning to take shape. For example, the much-anticipated *Future of Nursing*[5] report released in May 2021 highlights the unique knowledge and skills of the nursing workforce. This consensus report explicitly endorses the important role of the nursing profession in the complex work of aligning public health priorities with medical and social care to reduce disparities and improve equity.[5] These are central tenets of public health nursing, and achieving the important goals of the report will require the unique expertise of PHNF. Similarly, in November 2021, the NINR released its draft strategic plan framework to guide research efforts and priorities over the next 5 years. The draft framework prioritizes health equity, social determinants of health, population and community health, prevention and health promotion, and systems and models of care.[9]

Although encouraging, these actions will require close shepherding if they are to truly usher in a new paradigm. If adopted and implemented, the vision set forth by the new NINR strategic plan has the potential to transform nursing science and address many of the recommendations included in the *Future of Nursing* report. However, the urgency of this work has yet to fully permeate the nursing profession as some are already questioning the need for a paradigm shift, suggesting that the status quo needs no disruption.[35] Thus, we suggest supporting PHNF whose work, when at its best, is a partnership with communities. This will ensure dialogue that determines not if we disrupt our current systems, but rather how to best do so. This support should include clearer protections for all nursing faculty, but especially PHNF, as they engage in the policy arena to advance data-based, scientifically driven policies that are free from partisanship. It should also include protected time for PHNF to develop authentic community

partnerships. These partnerships are essential for the coproduction, implementation, and dissemination of knowledge that is rooted in the experiences of those most harmed by social and structural inequities. We fear that without these steps, the efforts of PHNF to help nursing achieve this important vision will remain muted and society will continue to suffer.

NEED FOR COLLABORATION AND PUBLIC CONVERSATION

There is a direct connection between the obstacles faced by PHNF at public universities in the United States, our country's tragic response to the COVID-19 pandemic, and the nursing workforce exiting at rates that threaten the collapse of the US health care infrastructure.[36,37] Traditional academic structures—and the economic interests that shape them—are clearly misaligned with the work needed to protect and improve public health. The loyal subversion of individual PHNF members is insufficient to achieve the goals of our profession and serve society: we must show in academia that we value public health as fundamental not just to nursing practice, education, and science, but to social justice. Collective action and systemic change will be required in nursing academia if our profession is to maximize its voice and play a central role in tackling the health and social inequities that continue to plague our society. We join Dillard-Wright[38] in calling for a radical imagination to disrupt the status quo and extend an invitation to the nursing discipline writ large to engage in the difficult but hopeful work of rebuilding and transforming the systems in which we work and for which we prepare future nurses, nurse educators, and nurse scientists.

We contend that although PHNF are critical to this work, it is not ours alone. We have suggested short-term, intermediate steps toward action, but a clearly charted path for successful system transformation will require ongoing collaboration and public conversation. The issues that we have outlined are intended to raise public consciousness and inspire our collective imaginations toward a healthier future in which we can all flourish. We do know, however, that as with any social movement, this particular effort toward reenvisioning health and education as public goods necessitates participation from a broad, intentionally diverse coalition. The challenges facing PHNF stem from collective problems that will require complex solutions informed by public conversations about academic structures, health care systems, the role of public health, and what kind of society we envision for ourselves and for future generations. As nursing schools field record numbers of applications,[39] it is imperative that we welcome our future colleagues into institutions that are living out their professed commitments to the public good and graduate them into a profession that is true to its community-based roots and its commitment to social justice. Ultimately, as a society, we must consider our work as a public good to support the changes that need to occur within the education system, and move away from reducing the sole function of education as workforce preparation to preparing citizens who have the capacity to engage in the critical conversations needed to empower society to flourish. AJPH

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Climate Change, Public Health, Health Policy, and Nurses Training

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There are few educational programs in the United States that have a primary focus on preparing nurses to engage in all levels of public health, health policy, and climate change. The United Nations sustainability development goals (SDG) and the *Future of Nursing 2020–2030: Charting a Path to Achieve Health Equity (2021)* report underscored the importance of key stakeholders, including nurses, engaging in advocacy and policy to promote health equity.

We discuss the role of nursing at the intersection of public health, policy, climate change, and the SDG. We also discuss the history and merger of the University of California San Francisco (UCSF) School of Nursing public health and health policy specialties, a significant innovation in our effort to promote health equity.

We provide a brief overview of the redesigning of our curriculum that meets the needs of today's learners by including content on climate change, data analytics, and racial, social, and environmental justice. Finally, we emphasize the need to train the next cadre of nurses interested in careers in public health and health policy for us to meet the challenges facing our communities. (*Am J Public Health*. 2022;112(S3):S321–S327. https://doi.org/10.2105/AJPH.2022.306826)

The history of nursing is solidly anchored in nurses' engagement in public health and in advocating changes in policy. Mary Seacole is an example of a nurse's contribution to public health and policy. A nurse of color who rose to prominence during the Crimean War, Seacole is known for her care of wounded soldiers and her public health efforts in caring for victims of yellow fever, cholera, and dysentery.[1] Another example is Lilian Wald, who linked housing with health outcomes. Nurses' presence in the communities they serve is frequently advocated, as nurses serve a pivotal role in public health and health policy.[2] These examples demonstrate a history in which nurses' contribution to public health and policy were driven primarily by racial and ethnic discrimination, which denied them access to spaces where they could make significant differences in the field. This has changed, however, with the presence of US congresswomen Lauren Underwood and Cori Bush, both registered nurses working to address racial disparities in health and housing through policy at the federal level.

The racial uprising in the United States in 2020 as a result of the murder of unarmed Black Americans brought renewed attention and calls to eradicate systems of racism and racial and ethnic discrimination, including institutional and public policies that continue to broaden inequalities and disparities in health. The racial uprising in 2020 and the focus on health equity and climate change illuminate the continuing need to ensure that nurses are prepared to engage in advocacy to benefit the public's health. More recently the *Future of Nursing 2020–2030* report emphasized the importance of nurses' engagement in advocacy and policy to promote health equity.[3] It states that "[in] addition to addressing social needs, nurses are called upon to inform and implement policies that will ultimately affect the greatest numbers of people in the most profound ways."[3]

When the World Health Organization (WHO) declared 2020 the Year of the Nurse (extended to 2021 because of the impact of the COVID-19 pandemic), it highlighted that the investment in nursing promotes equity. Significantly, it stated that nurses are critical to the

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global efforts to meet the sustainable development goals targets.[4]

NURSING AND SUSTAINABLE DEVELOPMENT GOALS

The sustainable development goals, adopted unanimously by the United Nations member states in 2015, established 17 targets that promote equitable social and economic development. The goals recognize the intersectionality between health, education, and economic growth. Furthermore, the SDG acknowledge that addressing climate change is pivotal to achieving all 17 targets, including the reduction of poverty (https://bit.ly/36d85h0).[5,6] The sustainable development goals also brought needed attention to gender equality, work that provides a livable wage and economic growth, reduced inequalities, decisive climate action, sustainable cities and communities, and peace, justice, and strong institutions.[5,7]

Although the link between nursing and target 3 (good health and well-being) is unquestionable, the SDG offered nursing an opportunity to discuss its engagement in a broader approach to public health and policy, especially as health is threaded throughout several of the other goals as an indispensable condition to meeting all the targets. Importantly, the role of nurses in advocating the goals is supported by leading nursing organizations, including the International Council of Nurses and several US-based nursing organizations, including the American Nurses Association and the American Academy of Nursing.[8–10]

Furthermore, the SDG present nurses with a unique opportunity to develop and implement nursing education and a research agenda that responds to current concerns that negatively affect health, including research on the impact of a changing climate on individuals, families, and communities in the United States and globally.[8,11–14] Moreover, the SDG offer an opportunity to further advance nursing education and research that centers equity in terms of gender, race, ethnicity, education, and the elimination of poverty and hunger, and to promote social, economic, and environmental justice by eradicating systemic racism and racial discrimination. Future leaders in nursing will be equipped with the tools to drive public health and health policy, which in turn will strengthen institutions that serve communities.[14,15]

Rosa et al.[16] suggest that for nurses to assume leadership roles in promoting social justice, equity, and the SDG, it is necessary that nursing education and research include the following: (1) every nursing student at all levels of education must have an integrated curricular requirement to advance their understanding of politics and policy that would provide requisite education on the workings of policy and politics and related implications to teach students how to live and work in those spheres; (2) students and practicing professional nurses must have opportunities to do internships, residencies, and placements and have other forms of experience in public health and policy forums that interface with nongovernmental organizations and other agencies in their localities, state, nation, and beyond; (3) nursing scholarship that centers antiracism initiatives, health equity, and the elimination of health disparities must be advanced; and (4) leaders in nursing must have the responsibility to build relationships with people of influence and thought leaders to fully engage and integrate nursing's contribution in policy and public health arenas.[16]

The COVID-19 pandemic upended lives, economies, and health care infrastructure domestically and globally. It also provided an opportunity to increase awareness of the severe disparities in access to health care, wealth, food security, and stable housing as well as mass migration in and between countries—further exacerbating the crises brought on by climate change and the pandemic. It did, however, point to the fact that health care and public health systems cannot function without nurses and that nursing leadership is pivotal in addressing health and social crises. The pandemic also renewed calls for nurses to lead. At the UCSF School of Nursing, the masters of science graduate program includes 2 pioneering specialties that are at the forefront of equipping new generations of nurse leaders with the programmatic, policy, and political tools necessary to ensure nurses' response to current and future crises. These 2 specialties are advanced public health nursing (APHN) and health policy nursing. Students entering our programs are either practicing registered nurses with a bachelor of science degree or a second-degree nursing student who has completed an accelerated registered nursing program before starting either the graduate APHN or the health policy nursing specialty.

THE HISTORY OF THE 2 SPECIALTIES

The focus of the APHN specialty is to learn macrolevel skills in managing aggregates of clients, communities, environments, and health systems in a clinical nursing context. The coursework and practice-based learning provide a foundation for planning and

evaluating community and public health programs; learning about community and public health concepts, health promotion, population-level interventions, grant writing, health care systems, leadership, and health policy; addressing health disparities of vulnerable and diverse populations; and practicing and consulting in diverse and multicultural settings and partnering with communities. Nurses who graduate from the APHN specialty understand the complex interactions between health and the social determinants of health and are able to identify systems-level solutions that can maintain or improve the health of diverse, vulnerable, and underserved populations and communities. Some master of science graduates whose specialty is APHN have taken positions implementing programs in public health departments and in other settings, including director of a statewide initiative to increase flu vaccination rates for elementary school students, state-level public health department coordinator of COVID-19 response, senior country-level technical nursing adviser for maternal child health in a global setting, and director of public health respite and sobering center for a department of public health.

Historically, the APHN specialty has adapted to the changes in competency expectations and revisions for community and public health nurses.[17] Coursework for the APHN specialty is focused on the role of an advanced public health nurse, public health practice and APHN competencies, developing theoretical understanding of structural and social determinants of community and public health, and skills that demonstrate an ability to collaborate with community members to create partnership in planning, implementing, and evaluating programs with a focus on prevention and well-being. More recently, we have included topics on social and environmental justice, structural determinants of health, police violence and its effects on mental health in communities of color, and climate change and global health impacts.

Students engage in a community-based public health residency practicum in which they are evaluated on their skills and attainment of community and public health competencies. Residencies are a minimum of 240 hours and must include APHN competencies. Some examples of residency settings are public health departments, schools and universities, parishes and faith-based programs, home care, rural health, refugee and immigrant clinics, primary care clinics, jails and prisons, ambulatory outpatient facilities, voluntary organizations, and a variety of community, public, and private agencies and organizations.

Public Health Residency Experiences

Several APHN students' residency practicums are done in collaboration with a county-level public health nursing department. One example of a longitudinal, long-term partnership (more than 10 years) between the university and a county-level public health nursing department is a project focused on addressing mental health disparities in pregnant and postpartum women who receive WIC (Special Supplemental Nutrition Program for Women, Infants, and Children) services. Each year the partnership responds to the needs of the community. The project began with developing an intervention called the WIC postpartum depression screen, which implemented depression screening for clients and was conducted by WIC staff. This partnership has resulted in a multiphase intervention that has been expanded to 8 WIC sites in Alameda County, California; in it, WIC staff completed depression screening for more than 20 000 pregnant and postpartum women. In 2018 through 2019, the WIC postpartum depression screen conducted 4852 client screenings, 8.6% of which were positive for being at risk for depression.[18]

On March 17, 2020, Alameda County issued shelter-in-place orders to curb the spread of the severe acute respiratory syndrome coronavirus 2 (SARS-CoV-2), which is responsible for COVID-19. All WIC offices were closed to in-person appointments and given the directive to convert to remote operations and to discontinue ancillary activities, thereby stopping postpartum depression screenings. Part of this lapse in screening was attributable to the in-person paper-based format used before the pandemic. An organizational transition to a new electronic health record system called WICwise in the fall of 2019 coupled with closing county offices to in-person appointments reduced the client screenings at the county level. Responding to the impact of the COVID-19 pandemic, our APHN student intern worked with staff from the Alameda County Health Department to transition their depression screening program to a remote telehealth format. This transition facilitated the continuation of services for pregnant women in need and reinstated the depression screening program.[19]

APHN students have engaged in projects that included the development of a toolkit used to assist in training community providers, enabling them to screen and refer low-income women in California's San Francisco Bay Area for maternal depression. The toolkit was developed to support the implementation of California

Assembly Bill 2193, which went into effect July 2019.[20] AB 2193 requires all obstetric and prenatal care providers to screen their patients for depression at least once during their pregnancy or 6 months postpartum. Our APHN and health policy students will continue to support and evaluate the implementation of this new law across the state.

Health Policy Specialty

The UCSF School of Nursing established master's and doctorate specialty programs in health policy in 2002 with initial funding from a Health Resources and Services Administration training grant. The founding faculty of the program believed that health policy education was a missing piece in nursing education and that a focused health policy specialty program would help to prepare nurses with the skills needed to play a greater role in local, state, and national policymaking and to act as policy leaders in a variety of settings.[4] The program has met and continues to meet all the accreditation requirements, demonstrating the strength of providing policy analysis skills to nurses prepared at the post-baccalaureate level.

As in the APHN program, entering students are either practicing registered nurses with a bachelor of science degree or a second-degree nursing student who has completed an accelerated registered nursing program before starting the graduate program. Doctoral students have completed a master's degree or enter directly after completing a bachelor of science degree in nursing.

The program focuses on theory and contemporary policy issues and provides nurses with the skills with which to address those issues. It is designed to provide the tools to understand, analyze, communicate, and advocate, and to research policy issues relevant to health, health systems, and health services delivery. The master of science degree program includes a 15-month curriculum of classroom study and a summer policy residency. Courses help students identify and critically analyze and assess the impact of laws, regulations, and policies at the institutional, local, state, and national levels; use in-depth knowledge of the history, structure, theory, and process of health policymaking in the United States (and, in some cases, internationally); evaluate the evidence base for policy proposals; and plan, implement, and evaluate policies.

Students completing the program understand the economic, ethical, and social implications of policy decisions for various affected groups and are prepared to creatively and effectively advocate evidence-based and data-driven policy change. The program emphasizes sensitizing students to the effects of policy on marginalized groups and developing students' capacity to identify emerging issues. The program offers an intensive in-person educational experience, and as of fall 2021 has graduated a total of 130 masters and 88 doctoral students.

Program graduates have secured positions in government agencies, the biotech industry, health care institutions, private health care foundations, academic institutions (as faculty and research staff), professional nursing organizations, and other advocacy or policy organizations. Many students have been promoted to policy and leadership positions in the organizations where they conducted their residency after enrolling in the program, thus moving from the bedside to the center of policy decision-making.

Health Policy Residency Experiences

A highlight of the program is the students' summer policy residencies, in which they spend a minimum of 240 hours working in a policy-related setting specifically selected to match their policy interests. Students have been placed in congressional offices, national advocacy organizations in Washington, DC, the WHO in Geneva, professional organizations in the United States, state legislative offices and regulatory agencies, and local public health and policy organizations. During these mentored residencies, students have the opportunity to prepare policy briefs, engage in public hearings, collect data and conduct policy analyses, and prepare policy recommendations to policymakers and decision makers at all levels, including at the global level. Additionally, these residencies offer students the opportunity to represent nurses, who play an important role in a range of policy arenas. For example, one student's residency experience at the WHO with the chief nursing officer led to the opportunity to contribute to the data collection for and authorship of the "State of the world's nursing 2020: investing in education, jobs and leadership" report.[4] Another student's residency at the WHO involved the preparation of a training program that is used to educate regulators globally on several aspects of policies to regulate tobacco products.

Additional student residency experience includes being involved in preparing policy guidance on improving maternity care through midwifery, making recommendations for policymakers at the federal, state, and territorial levels and to private health sector decision makers.[21] Finally, a student's

residency in a state congressional office in Sacramento, California, provided the evidence-based and policy options that ultimately resulted in an expansion of access to care for all children regardless of immigration documentation status. The doctoral program in health policy is a focus area for students whose research interests are in health policy and health sciences research.

MERGING THE SPECIALTIES

The specialties we have described have operated independently of each other. However, providing our students with the collective tools they need to meet the major challenges facing health care infrastructure globally and domestically created the opportunity to merge them. Graduates of the APHN specialty are learning about policy, and it is stipulated that, without adequate systems-level change, public health cannot address health disparities, social and health inequalities, medical mistrust, medical racism, the negative effects of climate change, or food insecurities. Health disparities demand a public health workforce that is educated in policy analysis and the creation of systems-level solutions driven by nurses. Our merged specialty, which will begin enrolling students in fall 2022, will provide an opportunity for nursing educators to meet the needs of today's learners who are passionate about the issues we have mentioned.

Although our 2 specialties were separate from each other, they have traditionally collaborated by offering students the opportunity to enroll in overlapping courses. As the current pandemic has increased the call for more nurses to be involved in leadership at the organization level, at the institutional health systems level, and in the political arena, we hope that this long collaboration on a formal merger of these 2 specialties will equip learners with the tools they need to engage with public health and policy experts in their field. The merger of the 2 specialties has provided a chance to blend both curricula to attract students with an interest in being a force for social justice and health equity.

The demand for our specialties is driven primarily by nurses who are interested in establishing a career in public health or health policy and want to be a part of systems-level change to address health and social issues upstream rather than downstream (i.e., prevention and mitigation). Our specialties were created from the perspective of nurses who are experts in the field of public health and health policy. We differ from traditional programs of masters-level public health, policy, or advanced practice registered nursing by bringing the unique nursing advocacy perspective to public health and policy.[22]

MEETING THE NEEDS OF TODAY'S LEARNERS

As the climate crisis continues to affect our local, state, national, and global communities, students have consistently asked for additional resources to assist them in meeting the climate challenge. The persistent droughts, wildfires, and heatwaves in California; the racial and social uprising in summer 2020; and the merger of our public health and health policy specialties have given us an opportunity to expand our course offerings to include content on climate change and its impacts on health, equity, and social justice issues (i.e., environmental, economic, and racial issues).

Our main objective is to create a course that will be of interest to nurses and all students in the UCSF health professional schools. Our goal is to create a broad interdisciplinary survey and interactive course on climate change and its consequences that will include presentations by experts. Climate change and global warming cause extreme weather events; affect air quality, water, food production, industry, and economic and political stability; and present many other global challenges to sustainability.[23] The effects of climate change on health are broad and include communicable and noncommunicable diseases, such as childhood asthma, diseases of hunger, and HIV.

In this course, our students will gain the skills to link climate change with social justice, connecting climate change to health disparities, inequities, and other social vulnerabilities. Climate change affects every area of life and has an increased impact on vulnerable marginalized and minoritized populations. Social justice affects reach of the police state and the criminalization of poverty and homelessness, which increased in the evacuation process of the recent fires in several states across the United States. The people who are most likely to be affected by the climate crisis are least likely to be included in the conversation on how to respond to the crisis. Thus, this course will center the voice and perspective of nurse policymakers, public health officials, and local community activists.

Our merged, innovative curriculum also gives learners a foundation in data analytics to prepare them to use large public data sets so they can respond to health disparities. The volume of routine health care procedures data and population-level social determinants of

health data is growing at an unprecedented pace. The availability of electronic health records, insurance claims data, and mobile health data and the ability to link these health care systems data with census, survey, and other data sources have brought fundamental changes to health care delivery, policy design and evaluation, and population-level health initiatives.

In this increasingly data-driven health care landscape, the UCSF policy and public health specialties recognize that nurses working in the public health and policy sectors must have the skills to use a variety of data sources to advance the policy process and public health strategies with data-driven solutions. We will teach this content integrated with research methods and data analysis to enable learners to prepare, use, and disseminate data in meaningful ways to inform evidence-based policy responses and public health initiatives to solve the problems of today and the future.

RECOMMENDATIONS

As our nation and our global communities continue to experience climate change, disparities in health, and structural inequalities, there is an urgent need to train the next cadre of nurses to meet the moment through decisive public health and health policy experiences.[6] Furthermore, public health and health policy nurses are essential to meeting the SDG and eradicating systems of oppression that fuel inequalities. Thus, based on our experience and evidence, we offer the following recommendations for educating and training the next generation of nurse public health and health policy leaders:

1. ensure that nurses receive the knowledge and skills needed to engage in policy arenas at all levels (i.e., institutional, local, state, national, and global);
2. review, as needed, curricula to ensure that they are meeting the key areas recommended by the *Future of Nursing 2020–2030*;
3. recognize that not all advanced nursing roles are clinical by using language in educational competencies that includes nurses with primary roles in health policy and public health;
4. properly delineate the roles of nurses in public health and health policy in educational competencies;
5. integrate climate change and social justice content as standalone courses rather than topics embedded in an existing course;
6. expand the number of public health and policy programs and specialties across US schools of nursing, thus training more nurses in this area; and
7. enhance nursing schools' curricula to explicitly include content that focuses on ending systemic racism, racial and ethnic discrimination, and other inequalities among minoritized and marginalized communities.

CONCLUSIONS

Although few programs in the United States have a primary focus on preparing nurses to engage in all stages and at all levels of public health and health policy, such education is aligned with the American Association of Colleges of Nursing (AACN) educational essentials, including the emphasis on the policy role and the public health role in addressing social determinants of health and health disparities and promoting equity. The AACN makes it clear that preparation in health policy and public health and population health are equally important as preparation to work in clinical settings, emphasizing the need for nurses to have the ability to "analyze systems-level and public policy influence on care coordination."[10(p61)]

Similarly, the latest AACN essentials propose that nurses be prepared to conduct policy research and understand how policy and regulations affect public health and health care delivery. Therefore, schools of nursing must evolve to meet the needs of today's learners who are interested in public health and health policy careers. Although our merged specialties provide the first step in preparing future nurses to engage in these arenas, we hope that they will also provide a blueprint to assist other schools of nursing in developing similar specialties. We also hope that our specialties demonstrate how nursing school curricula can be enhanced to include content that focuses on ending systemic racism and racial/ethnic discrimination and on increasing access and opportunities for minoritized and marginalized communities.[11,13] AJPH

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O. O. Harris conceptualized the topic that guided the development of the article and oversaw the final submission. All authors wrote sections of the article.

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The authors have no conflicts of interest to declare.

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