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Nursing strategies to address health disparities in genomics-informed care: a scoping review

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ABSTRACT

Objective: The objective of this review was to map the available global evidence on strategies that nurses can use to facilitate genomics-informed health care to address health disparities to inform the development of a research and action agenda.

Introduction: The integration of genomics into health care is improving patient outcomes through better prevention, diagnostics, and treatment; however, scholars have noted concerns with widening health disparities. Nurses work across the health system and can address health disparities from a clinical, research, education, policy, and leadership perspective. To do this, a comprehensive understanding of existing genomics-informed strategies is required.

Inclusion criteria: Published (qualitative, quantitative, mixed methods studies; systematic and literature reviews; and text and opinion papers) and unpublished (gray) literature that focused on genomics-informed nursing strategies to address health disparities over the past 10 years were included. No limitations were placed on language.

Methods: The review was conducted in accordance with the JBI methodology for scoping reviews. A search was undertaken on May 25, 2023, across 5 databases: MEDLINE (Ovid), Embase, Cochrane Library (Ovid), APA PsycINFO (EBSCOhost), and CINAHL (EBSCOhost). Gray literature was searched through websites, including the International Society of Nurses in Genetics and the Global Genomics Nursing Alliance. Abstracts, titles, and full texts were screened by 2 or more independent reviewers. Data were extracted using a data extraction tool. The coded data were analyzed by 2 or more independent reviewers using conventional content analysis, and the summarized results are presented using descriptive statistics and evidence tables.

Results: In total, we screened 818 records and 31 were included in the review. The most common years of publication were 2019 (n = 5, 16%), 2020 (n = 5, 16%), and 2021 (n = 5, 16%). Most papers came from the United States (n = 25, 81%) followed by the Netherlands (n = 3, 10%), United Kingdom (n = 1, 3%), Tanzania (n = 1, 3%), and written from a global perspective (n = 1, 3%). Nearly half the papers discussed cancer-related conditions (n = 14, 45%) and most of the others did not specify a disease or condition (n = 12, 39%). In terms of population, nurse clinicians were mentioned the most frequently (n = 16, 52%) followed by nurse researchers, scholars, or scientists (n = 8, 26%). The patient population varied, with African American patients or communities (n = 7, 23%) and racial or ethnic minorities (n = 6, 19%) discussed most frequently. The majority of equity issues focused on inequitable access to genetic and genomics health services among ethnic and racial groups (n = 14, 45%), individuals with lower educational attainment or health literacy (n = 6, 19%), individuals with lower socioeconomic status (n = 3, 10%), migrants (n = 3, 10%), individuals with lack of insurance coverage (n = 2, 6%), individuals living in rural or remote areas (n = 1, 3%), and individuals of older age (n = 1, 3%). Root causes contributing to health disparity issues

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varied at the patient, provider, and system levels. Strategies were grouped into 2 categories: those to prepare the nursing workforce and those nurses can implement in practice. We further categorized the strategies by domains of practice, including clinical practice, education, research, policy advocacy, and leadership. Papers that mentioned strategies focused on preparing the nursing workforce were largely related to the education domain (n = 16, 52%), while papers that mentioned strategies that nurses can implement were mostly related to clinical practice (n = 19, 61%).

Conclusions: Nurses in all domains of practice can draw on the identified strategies to address health disparities related to genomics in health care. We found a notable lack of intervention and evaluation studies exploring the impact on health and equity outcomes. Additional research informed by implementation science that measures health outcomes is needed to identify best practices.

Supplemental digital content: A French-language version of the abstract of this review is available: http://links.lww.com/SRX/A65.

Keywords: equity; genomics; health disparity; nursing

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Introduction

In many countries, genomics has improved health outcomes for individuals living with common conditions, such as cancer and cardiovascular disease, those with rare diseases, and those at risk of genetic conditions. Health care professionals are striving to integrate genomic discoveries to advance the health and well-being of all people, regardless of their social or economic status. Despite these efforts, genomics-informed health care is giving rise to a wide range of ethical, legal, and social issues. For instance, access to genomics-informed interventions, such as genetic testing, counseling, and screening programs, is inequitable within and across countries and populations, resulting in the benefits of genomics not being evenly experienced within societies.[1–9] These challenges exist in high-income countries and are even more pronounced when compared with low- and middle-income countries.[10] Understanding the strategies that support the safe and equitable integration of genomics is crucial to addressing health disparities.

Genomics involves the study of all genes in a person's DNA (their genome), including interactions of those genes with each other and the environment, and how they influence the growth, development, and functions of the body.[11] The expansion of genetic testing has enabled individuals and families to determine their risks of developing specific conditions (predictive testing); confirm or rule out disorders or conditions (diagnostic testing); determine how they respond to medications (pharmacogenomic testing); and inform reproductive decisions (reproductive testing).[11] Genomics research is leading to evidence-based clinical applications, guidelines, and precision health care for many common health conditions.[12,13] Genomics-informed health care, such as targeted and precision therapies, can also lower the treatment and symptom burden for individuals and the health system, and optimize the allocation of scarce health care resources with earlier diagnosis, which may require fewer or less invasive interventions.[14,15] Furthermore, the proliferation of direct-to-consumer testing is enabling individuals to learn more about their ancestry, kinship, disease risk, and impact of lifestyle on health outcomes on their own terms, separate from the health care system.[11] Lastly, genomic discoveries are expanding the field of epigenetics, which takes into consideration the impact of the environment, social factors, lifestyle, and life stresses on processes such as DNA methylation and how this is linked to health outcomes. Epigenetics provides avenues to consider health disparities and strategies to ensure health for all.[16]

Health disparities and other equity issues are a growing concern. For instance, evidence shows that certain populations, (eg, those with lower socioeconomic status, those who experience negative impacts of racial discrimination, those living in rural and remote communities) have inequities in accessing

genomic technologies and health disparities.[1–9] There is also concern that racial and ethnic minorities are under-represented in genomics research, hindering the applicability of discoveries for these groups.[17–19] Reluctance to join research studies and mistrust in the medical community are influenced by past medical research maleficence that disproportionately affected marginalized groups.[1,20–22] These are situations that must be addressed by health care providers.

To ensure that genomic discoveries contribute to positive health outcomes for all, health disparities, social disadvantage, and the misuse of genomic discourses that perpetuate racism must be carefully considered during the integration of genomics-informed care. To accomplish this, a strong understanding of root causes and practices that dismantle intersecting structures and social processes that contribute to inequities in genomics health care and research are needed.[21,23] As such, ensuring that nurses and other allied health professionals are prepared to engage with these issues is an important step towards equitable and safe genomics-informed health care.

Worldwide, over 27 million nurses work as clinicians, researchers, administrators, educators, and policymakers across health systems.[24] A core value of nursing is to address social justice and equity. The International Council of Nurses' Code of Ethics states that nurses must collaborate with others and advocate for equity and social justice in access to health care and resource allocation to promote human rights and public good.[25] By attending to the root causes of health disparities within the context of genomics-informed health care, nurses can advocate for equitable genomic health care, and contribute to improved patient outcomes and sustainable health systems. Therefore, promoting nursing strategies that specifically address equity and structural barriers to health for all is needed to ensure that the integration of genomics into health care does not widen existing disparities.[8]

The World Health Organization is calling for advocacy, financing, infrastructure, and trained personnel to support equitable access to genomics.[12] Equipping nurses with genomics-informed strategies to address health disparities and to promote equitable genomics-informed health care will help ensure the full benefits of genomic health care for all. Nurses need to understand the nature, extent, and range of preexisting nursing strategies that address health disparities within the context of genomics-informed care. From there, nurses can understand the issues, build evidence to support monitoring and evaluation, work with individuals and communities, create partnerships within the health sector and beyond, and engage in advocacy.[26] Identifying strategies can help nurses engage in practices and champion initiatives that contribute to enhanced patient experience, provider satisfaction, cost-effectiveness, improved population health outcomes, and health equity.[27]

While there is ample literature about the importance of nurses responding to equity issues arising from the introduction of genomic health care to date, there has been no knowledge synthesis of key strategies that nurses can implement to reduce health disparity. A preliminary search of PROSPERO, MEDLINE, the Cochrane Database of Systematic Reviews, and *JBI Evidence Synthesis* was conducted and no current or in-progress scoping reviews or systematic reviews on the topic were identified. Our goals in this scoping review were to map the available global evidence on strategies that nurses can use to facilitate genomics-informed health care to address health disparities, and to inform the creation of an action and research agenda to address health disparities issues associated with genomics-informed nursing practices. We chose to conduct a scoping review as this methodology is well suited for examining emerging evidence when it is still unclear.[28]

Review question

What is the available evidence on strategies that nurses can use to facilitate genomics-informed health care to address health disparities?

Inclusion criteria

Participants

This review considered studies that included nurses of all designations, including registered nurses, registered/licensed practical nurses (referred to as enrolled nurses in some jurisdictions), registered psychiatric nurses, nurse practitioners, and nurse-midwives. We included nurses in all domains of practice (clinical practice, education, research, policy, administration) and specialty areas. We included papers that discussed nurse-midwives and papers including all health care professionals as well as nurses to capture

all relevant strategies; however, we extracted data focused specifically on nurses.

Concept

This review considered studies that explored strategies that nurses can use to address health disparities, including the potential root causes of health disparities. We defined strategies as any methods, processes, interventions, and tools used by nurses to address and mitigate health disparities in the provision of genomics-informed health care. For example, this involved providing education, collecting and interpreting a family health history, and making referrals. We defined health disparities as the "systematic differences in health status or in the distribution of health resources between different population groups, arising from the social conditions in which people are born, grow, live, work and age."[29(para.4)]

Context

This review considered studies from all geographic locations that examined strategies that enable nurses to engage in genomics-informed health care to address health disparities. We included a broad geographical context since nurses practice in various settings within health systems and much can be learned across jurisdictions.

Types of sources

This scoping review considered quantitative, qualitative, and mixed methods study designs for inclusion. In addition, systematic and literature reviews, and text and opinion papers were considered for inclusion. The initial protocol only specified systematic reviews, and the final search was more inclusive of other types of articles. We searched for gray literature using international nursing genomics organizations, specifically the International Society of Nursing in Genetics and the Global Genomics Nursing Alliance (G2NA). Theses and books were excluded, as were any studies that did not have a full-text article available.

Methods

This scoping review was conducted in accordance with the JBI methodology for scoping reviews,[30] and was reported in line with the Preferred Reporting Items for Systematic Reviews and Meta-Analyses extension for Scoping Reviews (PRISMA-ScR).[31] This review followed an a priori protocol.[32]

Search strategy

The search strategy aimed to locate both published and unpublished primary studies and reviews, and text and opinion papers. An initial limited search using MEDLINE (Ovid) was undertaken to identify articles on the topic. The text words contained in the titles and abstracts of relevant articles and index terms supported the development of a full search. The search strategy, including all identified keywords and index terms, was adapted for each included information source, and a second search was undertaken on May 25, 2023. The full search strategies are provided in Appendix I. The reference lists of the articles selected for full-text review were screened for additional papers.

Papers published in languages other than English were included if they could be translated with artificial intelligence (AI) technology (eg, Google Translate). Due to resource limitations, papers that could not be translated using AI were excluded. Papers identified by searching MEDLINE (Ovid), Embase, Cochrane Library (Ovid), APA PsycINFO (EBSCOhost), and CINAHL (EBSCOhost) from 2013 to May 25, 2023, were included, as our focus was on seeking the most up-to-date evidence in accordance with the grant funding requirements. Sources of unpublished papers and gray literature included the International Society of Nurses in Genetics and the G2NA.

Study selection

Following the search, all identified records were collated and uploaded into Covidence (Veritas Health Innovation, Melbourne, Australia) and duplicates were removed. Following a pilot test using 10% of the abstracts from studies obtained from the final database searches, titles and abstracts were screened by 2 independent reviewers (TW and BZ) for assessment against the inclusion criteria for the review. Potentially relevant papers were retrieved in full text and their citation details were imported into Covidence. Full-text studies that did not meet the inclusion criteria were excluded, and reasons for their exclusion are provided in Appendix II. Any disagreements that arose between the reviewers were resolved through discussion or with a third reviewer (JL or RP). We uploaded citations of included studies into Mendeley v.2.76.0 (Mendeley Ltd., Elsevier, Netherlands).

Data extraction

Data were extracted from papers included in the scoping review by 2 independent reviewers (TW and BZ) using a data extraction tool (Appendix III) developed by the reviewers.[31] The data extracted included specific details about the participants (nurses), concept (genomics-informed nursing strategies), context (all geographic locations and studies focused on health disparities), study methods, and key findings relevant to the review question. Any disagreements between the reviewers were resolved through discussion or with a third reviewer (JL or RP). It was not necessary to contact authors of papers for missing or additional data. The team met 3 times: once to ensure alignment with inclusion and exclusion criteria, once to address any disagreements, and once to review data extraction strategies.

Data analysis and presentation

We summarized results using descriptive statistics and evidence tables to present findings in a clear and structured format. We used conventional content analysis to inductively categorize health disparities and genomics-informed nursing strategies. Conventional content analysis is an appropriate analytical method, as it enables the development of broader categories based on coded data.[33] We also provide a narrative summary of extracted content and describe how the results relate to the review objective and question.

Results

Study inclusion

We identified 818 records from database searches and, after removing duplications, 664 title and abstracts were screened for relevance. One paper in a language other than English was considered potentially relevant during title and abstract screening using Google Translate; however, when the full text was retrieved, its format was not compatible with the use of AI for translation and the paper was excluded. We retrieved 78 reports for full-text screening against a priori inclusion criteria. A total of 52 reports were excluded after full-text screening (see reasons for exclusion in Appendix II), resulting in 26 reports included from database searches. Searches of other sources, such as websites and citations of included studies, resulted in an additional 5 records meeting the inclusion criteria for the scoping review (Figure 1).

Characteristics of included studies

The full characteristics of the 31 included studies[6,34–63] are reported in Appendix IV. Twelve papers (39%) were published before 2019, with the remainder published as follows: 2019 (n = 5, 16%), 2020 (n = 5, 16%), 2021 (n = 5, 16%), 2022 (n = 3, 10%), and 2023 (n = 1, 3%). There were no clear trends about the frequency of publications over the past decade. Most papers came from the United States (n = 25, 81%), followed by the Netherlands (n = 3, 10%), United Kingdom (n = 1, 3%), and Tanzania (n = 1, 3%); 1 paper applied to multiple countries. The majority of the included publications were in the form of discussion papers (n = 17, 55%), followed by qualitative studies (n = 5, 16%), quantitative studies (n = 4, 13%), literature reviews (n = 3, 10%), and mixed methods studies (n = 2, 6%). The population of nurses was characterized by race/ethnicity, domain of practice, specialty, or level of training (Table 1). We noted significant heterogeneity in the reporting of the concept of disparities; for example, when disparities were discussed, they were characterized by race or ethnicity, genetic condition, and/or the experience of social determinants of health of the patient population.

Nearly half of the papers discussed cancer-related conditions (n = 14, 45%), while many did not specify a disease or condition (n = 12, 39%). In terms of population, most were relevant to nurse clinicians (n = 16, 52%) followed by nurse researchers, scholars, or scientists (n = 8, 26%). The patient or community population varied significantly; African American patients or communities (n = 7, 23%) and racial or ethnic minorities (n = 6, 19%) were discussed the most frequently.

A considerable number of papers (n = 14, 45%) described inequitable access to genetic or genomics health services (eg, testing, counseling, referrals) among specific ethnic and racial groups.[6,34–45] Inequitable access was also identified among individuals with lower educational attainment or health literacy (n = 6, 19%),[46–51] those with lower socioeconomic status (n = 3, 10%),[45,50,51] migrants (n = 3, 10%),[47–49] individuals without insurance coverage (n = 2, 6%),[34,52] residents in rural or remote areas (n = 1, 3%),[53] and individuals of older age (n = 1, 3%).[44] One (n = 1, 3%) paper discussed

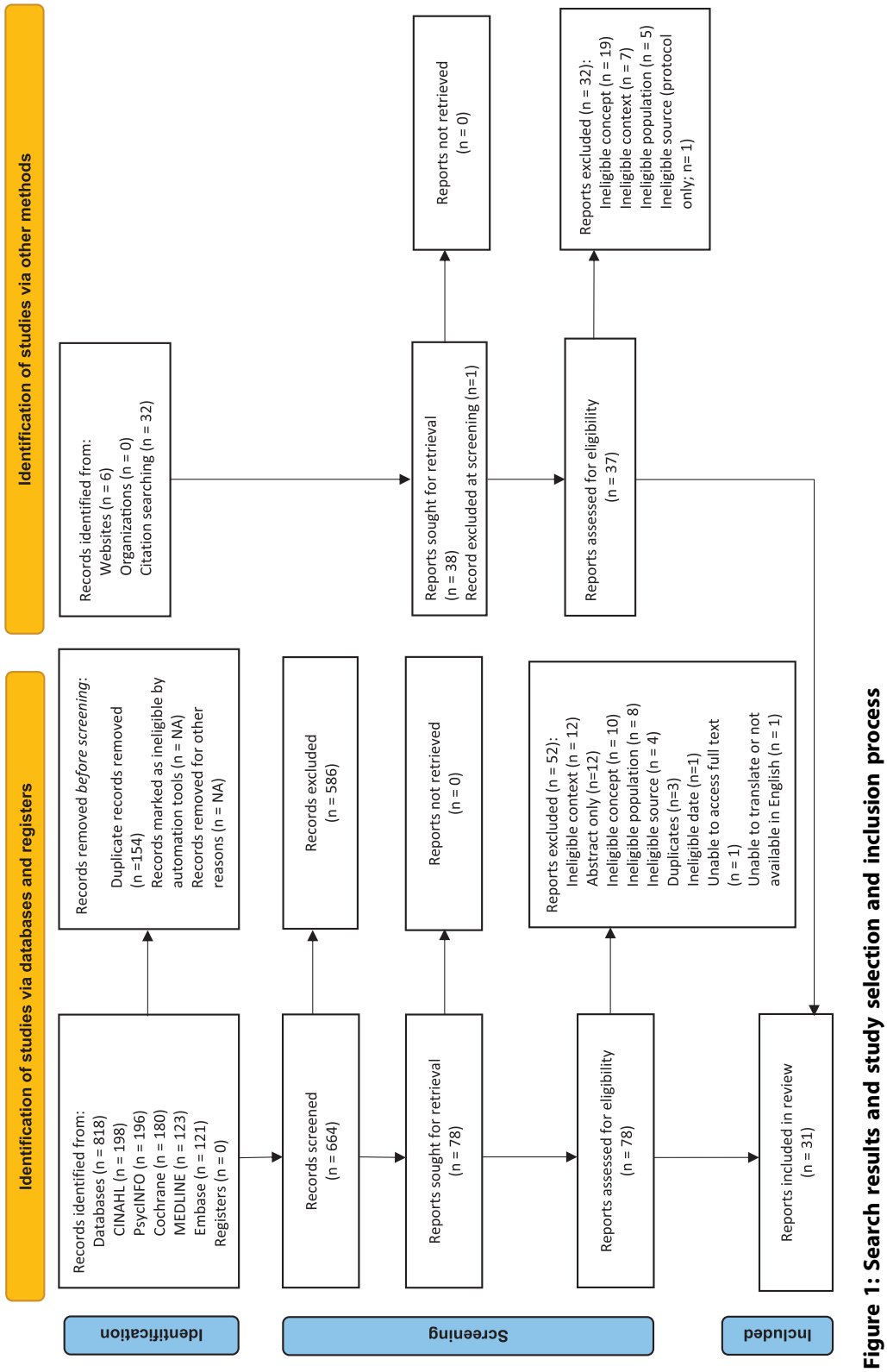

Figure 1: Search results and study selection and inclusion process

Table 1: Characteristics of included studies on nursing strategies to address health disparities in genomics-informed care

Characteristic	Categories	n (%)
Year	2013	1 (3%)
	2014	2 (6%)
	2015	2 (6%)
	2016	2 (6%)
	2017	2 (6%)
	2018	3 (10%)
	2019	5 (16%)
	2020	5 (16%)
	2021	5 (16%)
	2022	3 (10%)
	2023	1 (3%)
Country	United States	25 (81%)
	The Netherlands	3 (10%)
	United Kingdom	1 (3%)
	Tanzania	1 (3%)
	Multicountry	1 (3%)
Publication type	Discussion paper	17 (55%)
	Qualitative	5 (16%)
	Quantitative	4 (13%)
	Literature review	3 (10%)
	Mixed methods	2 (6%)
Inequities (number of times discussed in a paper) **Some papers included mention of multiple inequities and were counted as such.*	Inequitable access to genetic/genomic health services among:	
	- *specific ethnic/racial groups*	14 (45%)
	- *individuals with lower educational attainment or health literacy*	6 (19%)
	- *individuals with lower socioeconomic status*	3 (10%)
	- *migrants*	3 (10%)
	- *individuals with lack of insurance coverage*	2 (6%)
	- *individuals who live in rural or remote areas*	1 (3%)
	- *individuals of older age*	1 (3%)
	Inequitable representation and engagement of ethnic and racial minority groups in genomic research	4 (13%)
	Unspecified inequities	3 (10%)
	General inequities among minority groups/under-represented racial and ethnic groups	1 (3%)
	Differences in quality of care due to gender	1 (3%)
Population characteristics (nurses) in each paper **The population of interest in some papers included several characteristics and was counted as such.*	Nurse clinicians (includes different specialties and advanced practiced nurses)	16 (52%)
	Nurse researchers/scholars/scientists	8 (26%)
	Nurse leaders	2 (6%)
	Nurses (general)	3 (10%)
	Specific ethnicity/race	
	- *African American/Black nurses*	3 (10%)
	- *Ethnic minority nurses*	1 (3%)
	Nurse educators	1 (3%)
	Unspecified	2 (6%)

Table 1: (*continued*)

Characteristic	Categories	n (%)
Population characteristics (patients/clients/communities) **The population of interest in some papers included several characteristics and was counted as such.*	African American patients/communities	7 (23%)
	Racial or ethnic minorities	6 (19%)
	Unspecified minority populations	2 (6%)
	Latinx/Hispanic individuals	1 (3%)
	People experiencing racial inequities in cancer prevention	1 (3%)
	People living with breast cancer	3 (10%)
	People at risk of hereditary cancers	2 (6%)
	People living with ovarian cancer	1 (3%)
	People living with cancer (unspecified)	1 (3%)
	Families of children with sickle cell disease	1 (3%)
	People with sickle cell disease trait	1 (3%)
	People with low health literacy or education	4 (13%)
	Migrants	3 (10%)
	People of low socioeconomic status	2 (6%)
	Uninsured patients	1 (3%)
	People living in rural areas	1 (3%)
	People from medically underserved areas and populations	1 (3%)
	Unspecified	2 (6%)
Diseases/conditions	Cancer	14 (45%)
	Unspecified	12 (39%)
	Sickle cell disease	2 (6%)
	Cardiovascular disease	1 (3%)
	All conditions	1 (3%)
Number of papers that discussed strategies to prepare the nursing workforce to improve their skills around genomics-informed care	Education	16 (52%)
	Policy and advocacy	5 (16%)
	Research	3 (10%)
	Leadership	1 (3%)
	Clinical practice	1 (3%)
Number of papers that discussed strategies nurses can implement in practice to improve patient outcomes	Clinical practice	19 (61%)
	Research	14 (45%)
	Policy and advocacy	5 (16%)
	Education	2 (6%)
	Leadership	2 (6%)

differences in quality of care due to gender perceptions within the community.[54] Three papers (n = 3, 10%)[55–57] considered health disparities more broadly without mention of specific issues, and 1 (n = 1, 3%) [58] discussed health disparities experienced by minority groups and under-represented racial and ethnic groups in general. Beyond access to care, there was a focus on inequitable representation and engagement of ethnic and racial minority groups in genomic research (n = 4, 13%).[6,59,60,62]

Further, the root causes of these issues varied at the patient, provider, and system levels. In some papers, the reporting of root causes of health disparities was absent or unclear; however, the most common root causes cited were related to lack of financial resources,[34,37,43,45,51,58] low health literacy,[36,37,46–49,51] lack of knowledge and preparedness among the health workforce,[38,40,42,45,47,52,53,61] under-representation of minority groups in genomics research,[6,39,50,55,60] and medical distrust.[34,36,43,48–50,59,62]

Review findings

We identified several strategies to address health disparities and grouped them as those focused on preparing nurses to improve their skills around genomics-informed care and those that nurses can implement in practice to improve patient outcomes. We further categorized these strategies by domains of practice commonly used in nursing, including education, research, policy and advocacy, leadership, and clinical practice.[64] The purpose of categorizing strategies by domain was to inform our understanding of the nature of strategies and the gaps that exist to develop a research and action agenda.

Strategies to prepare the nursing workforce

Education

Of the 31 included papers, 16 (52%) included strategies that were geared towards improving education for nurses and health care providers.[34,38–41,44,47–52,55,56,61,62] Some focused on increasing the accessibility and availability of education and training to increase nurses' awareness about their role in genomic health care to better educate the public and at-risk populations[34,38,44]; other strategies included how to engage in communication with patients in a culturally safe and sensitive manner[47–49]; and lessons on when to refer at-risk patients.[40,41] The importance of increasing access to clinically relevant and up-to-date information[51,52] and expanding education about genomics and precision medicine at all levels (undergraduate extending to continuing professional education)[40,44,52,56,62] were also noted in some papers. Other strategies included ensuring nurses participate in ongoing self-reflection of implicit biases, personal attitudes, and beliefs that might impact equitable referral[38,40]; and enhancing cultural competency by understanding the interplay between genetic, cultural, and social factors.[44] One paper discussed the importance of educating nurses to ensure the appropriate and effective use of race in clinical education.[61] The importance of creating a more ethnically diverse nursing workforce and attending to the education needs of nurses who belong to racialized groups were identified as a key strategy to address disparities.[35,50,51,55,56]

Policy and advocacy

Five papers (16%) included strategies that were related to policy and advocacy, including encouraging nurses to engage in advocacy to support appropriate access to genomics-informed health services, diversifying the nursing workforce, and staying informed about best practices and legislation.[34,40,52,56,63]

Research

Three papers (10%) captured the requirement for more research by nurses and health care professionals.[51,52,60] Specifically, 1 paper noted the need to increase nurses' engagement in research to improve genomics-informed care[51]; 1 paper discussed the need to increase the training and representation of minority nurse scientists in -omics research (eg, the study of the genome, epigenome, or metabolome)[60]; and the third paper spoke of the necessity of research to improve care for patients undergoing pharmacogenetics.[52]

Leadership

One paper (3%) mentioned the importance of fostering the leadership of professional nursing associations to support genomics education and advocacy for genomic services within communities.[59]

Clinical practice

One paper (3%) mentioned the importance of increasing nurses' engagement in primary prevention in relation to sickle cell disease.[46]

Strategies nurses can implement in practice

Clinical practice

Nineteen (61%) papers identified actions or recommendations that nurses can implement or consider in clinical practice.[6,34,36–38,41–43,45,47–54,59,63] Some were focused on increasing the level of support to enable nurses to provide greater access to genomic services; for example, increasing nurses' skills to conduct comprehensive histories and assessments that identify patients who could benefit from genetic/genomic services,[6,42,43] engaging in primary prevention,[46] using tools to trigger referrals,[6] intentionally referring all eligible patients to genetics services,[38] and creating accessible genomic clinical decision resources to support practice in diverse health care settings.[51]

Other papers included a focus on community engagement and patient education. Specifically, community engagement strategies included working with community leaders and conducting outreach with vulnerable/at-risk/under-represented populations to

assess and address needs, provide education, and increase awareness of testing[34,35,37,50,59,63]; and identifying the experts, such as family members and primary care providers, who patients preferred to engage with on these topics.[50] Strategies to improve patient education included standardizing communications for returning results of pathology and tumor genetic markers,[52] and delivering post-test counseling and education to increase understanding of test results[37] and genetic risks.[41] Other strategies included improving communication and education of patients by considering social and cultural beliefs; using plain language, interpreters, teach-back methods, and gender consciousness[36,41,47–51,54]; and developing and evaluating genomic health literacy resources.[51]

Additionally, articles focusing on strategies for clinical practice were related to the innovation and the expansion of models of care to increase equitable access. Some focused on using technology to increase accessibility; for example, one paper discussed working with informaticians to develop tools to enable the timely translation of genomics knowledge into practice and leveraging technology to increase access to education and care in communities.[6] Another article highlighted the importance of considering the benefits and risks of virtual technology vs on-site service delivery based on context.[42] Other articles described strategies that used advanced practice nurses to fill gaps in the medical genetics specialist workforce. Strategies were also noted such as using patient navigation or telehealth programs to support care coordination[6,36,43,45,50]; exploring local resources to help support access in situations where the cost of genomic services is of concern[43]; increasing access to genetic counseling through nurse practitioner-led programs[53]; enabling patient self-referrals[63]; and partnering with the interprofessional team to reduce referral steps that often require time, travel, and money.[50]

Research

Fourteen papers (45%) identified strategies related to research that focused on actions nurses can take to help diversify research participants and increase trust among under-represented populations.[6,36,39,41,43,45,50–52,55,56,58,60,62] These included understanding social and contextual influences that affect research participation[55] and championing studies that aim to reduce disparities[6,41]; intentionally increasing participation and enrollment of under-represented groups in studies[36,41,43,52,55,56,60]; working with community leaders to identify strategies to overcome concerns about genomic research and disseminating best practices around engagement to accelerate participation of under-represented communities[6,39,50,51,62]; fostering collaboration with the interdisciplinary team[51,60,62]; and addressing concerns around privacy and educating patients on risks, safeguards, and opportunities.[6,62]

Of these 14 papers, 4 described actions that researchers can take to adequately understand the complexities of intersecting factors that influence disparities by examining how the concept of race can be appropriately applied in research on health disparities[58]; recognizing between-group and within-group heterogeneity of patient populations experiencing diseases[56]; and measuring and stratifying quality metrics to build the evidence base to document outcome-related inequities.[45,50] Two papers included strategies related to research mobilization and dissemination, such as developing a wide range of treatment modalities to ensure coverage across patient populations,[56] and using diverse evidence-based communication strategies for outreach and dissemination to increase the accessibility of innovations.[55,56]

Policy and advocacy

Five papers (16%) discussed strategies related to policy and advocacy.[36,43,45,50,51] These included establishing institutional policies to reduce implicit bias[45]; engaging in advocacy to support equitable access to genomics health care services nationally and globally[36,43,51]; engaging in advocacy to address ethical and societal issues related to data sharing[51]; and ensuring researchers/clinicians are embedded into communities to build and maintain trust, which must also include recruitment and retention of visible minority nurses.[50]

Education

Two papers (6%) discussed strategies related to community engagement for evaluating the best approaches to assessing needs, communication, and education,[59] and delivering patient-centered education to increase underserved patients' understanding of the accessibility, availability, and affordability of testing and results.[37]

Leadership

Two papers (6%) discussed strategies that leaders can take at an organization and systems level.[51,57]

These included improving the use of resources and systems that combine genomic information with other health care data[51]; engaging nursing leadership to inform the development of information systems that can organize, store, and share omics-based data (eg, use of electronic health records to collect data, registries)[51]; and embedding equity and inclusivity considerations into implementation plans for integrating genomics into nursing by drawing on frameworks such as ConNECT.[57]

Discussion

Our review provides a comprehensive overview of the state of evidence and scholarship focused on strategies to prepare the nursing workforce and strategies that nurses can implement to support equitable genomics-informed health care. We explore the gaps in the literature, provide readers with key considerations for advancing genomics-informed nursing practice, and create a research agenda.

Gaps in the existing literature

We noted several gaps in the extant research. First, there was a notable lack of intervention and evaluation studies exploring the feasibility and impact of strategies on health and health disparity outcomes. Most of the scholarship was descriptive and in the form of discussion papers. As such, the strategies identified in this review were broad claims and recommendations. Only 4 included papers evaluated specific strategies. One explored the feasibility of in-person vs telehealth services,[42] while 3 explored the feasibility of an education program for health care professionals.[47–49] We were surprised by these results, given the normative calls by nursing leaders to implement evidence-informed strategies to address health equity.

Second, the majority of the papers did not include a definition of the disparities or inequities under investigation, creating a lack of clarity on how scholars defined the concept. In some instances, inequities were mentioned briefly and broadly. Given this situation, and to help characterize health disparities and equity issues for our scoping review, we categorized them based on our interpretation of factors identified in each paper. The disparities and inequities were mostly related to differences in access to genomic services and participation in research among populations of specific ethnicities, races, socioeconomic status, migration status, and literacy levels. Similar categories exist in other research on disparities in genomics and precision medicine that have reported inequities in testing, treatment, and outcomes among individuals with differing levels of insurance coverage (eg, private vs public); socioeconomic status, race, and ethnicity; geographic location; gender; and age.[1–9] Given that inequities can manifest differently depending on a variety of intersections, there is a need for scholars to identify the context and the interplay of different inequities that they are addressing to ensure strategies are targeted and actionable.

Conceptualizing the type of genomics-informed strategies

Our results show that scholars have identified a variety of ways to reduce health disparities during the integration of genomics-informed health care. We grouped these strategies into 2 key categories. The first group included strategies geared towards preparing nurses for genomics-informed practices, such as education. The second group included strategies that nurses could implement while practicing with individuals and communities to increase awareness of and access to genetic testing, build trust and increase involvement in research, and provide culturally appropriate patient education. We further categorized these strategies by domains of practice: education, research, policy and advocacy, leadership, and clinical practice. These conceptualizations aligned with existing taxonomies for interventions and tactics aimed at reducing racial and ethnic disparities; for example, Clarke *et al.*[65] and Schuster *et al.*[66] categorized interventions based on those aimed at the patient, provider, microsystem (eg, care team), organization, community, and policy level. Conceptualizing strategies and interventions by practice domains, populations, or levels within the health system (eg, micro, macro) using existing or new frameworks can be a useful way to inform researchers about the current state of interventions; what gaps exist; and what works in what context and how. Careful consideration of collaboration across the domains of practice is considered an important strategy to accelerate implementation efforts,[67] which also supports our approach.

Building a research and action agenda for equitable genomics-informed nursing care

While the scoping review provides useful information to guide equitable genomics-informed care, more research is needed to better understand the impact of strategies on health outcomes in different populations and contexts. This type of research can help pinpoint promising practices that can be spread and scaled across health systems. Within the context of disparity research, scholars have advocated for studies that evaluate evidence-based interventions, suggesting that describing disparities alone is insufficient to improve outcomes.[65,68,69] Scholars working to advance nursing and genomics have also highlighted the urgent need to design and implement the most effective and evidence-based nursing strategies to improve patient and population health outcomes and health equity.[67,70] Given the concerns with widening health disparities, nurses require knowledge beyond biomedical sciences. Attention to the structural and social determinants of health that contribute to disparities is needed to ensure that nurses can advocate for and implement equitable public policies and health care practices.

The calls for nursing action to address health disparities within the context of genomics began in 1962.[71] More recently, in 2012, nurses in the United States developed the Genomics Nursing State of the Science Advisory Panel and created a research blueprint for genomics nursing sciences. The National Institutes of Nursing Research 2022–2026 strategic plan also identifies health equity and the social determinants of health as core research lenses. Several research topics related to health disparities were included in this agenda, such as exploring racial, ethnic, socioeconomic, and cultural influences on disease occurrence and response to disease treatment; genomic health equity; diseases that disproportionately affect specific groups; and overcoming misinformation and genomic myths.[72] To continue building the evidence base to guide nursing practice in the different domains, we identified several considerations for practice, education research, policy, and advocacy.

Implications for practice and education

Many of the practice strategies identified in our review focused on enhancing the knowledge, skills, competencies, and self-reflection to address implicit bias for conducting comprehensive assessments, identifying individuals who are at risk of genetic conditions or diseases, and delivering culturally appropriate education. Education can equip nurses with genomic literacy and enhance their ability to answer questions, assist patients in navigating the health system, and support decisions around testing and subsequent actions based on test results. Resources and practical advice that facilitate decision-making and family communication about genetic risk and test results are needed.[73,74] Researchers are exploring these interventions,[75–77] and these studies can provide design ideas for similar intervention studies that specifically address health disparity.

Developing skills on how to talk about and collect a family health history while thinking genomically is a good starting point. The family history is considered a first-line, cost-effective, and clinically relevant way to assess genetic risk for Mendelian and multifactorial genetic disorders, such as cancer predisposition syndromes.[78] Nurses are the primary point of care in many rural and remote communities and, thus, are the access point for genetic testing for many people. Nurses are embedded in communities and can work with high-risk families to communicate test results and disease risks. Through relational practices, nurses can explore the meaning and significance of disease and heredity patterns, and explore the biological, social, and genomic basis of treatment decisions with patients and families.[79] Nurses require education and leadership support to develop strategies to actively consider how equity, health disparity, and access to the social determinants of health intersect with genomics. Concrete evidence-based tools and strategies to help nurses map clinical pathways would accelerate nursing practice and education.

As reported in the literature, another consideration is the development and evaluation of pedagogically sound genomic interventions.[80] The Reporting Item Standards for Education and its Evaluation (RISE 2) in Genomics can offer a meaningful framework to guide educators in building the evidence base necessary to support genomics-informed nursing practice. The RISE 2 Genomics tool identifies standards to support the development of evidence-based genomics education by encouraging the identification of learning outcomes and evaluation of interventions to support the replicability of educational strategies. Using standardized tools can assist in evaluating how education contributes to changes

in nurses' knowledge, attitudes, skills, and competencies related to addressing inequities in genomics-informed care.

Many strategies in our review refer to the need to develop nurses' foundational knowledge; however, this alone is insufficient. An awareness of biases, cultural safety, individual and family preferences, and the ethical and equity issues intersecting with genomics is necessary for the safe and effective delivery of care. Educators must ensure that content is purposely delivered within an equity and anti-discriminatory lens to avoid exacerbating inequities in genomics care and perpetuating harmful misinformation.[81] Moreover, providing accurate information and not overinflating the benefits of genomics are crucial for building patient and community trust in genomics.[66] Setting clear expectations for educational and licensure requirements is a pragmatic way to support the integration of strategies to support equitable genomics-informed health care.[72]

Genomics-informed practices are not neutral, and real harms can arise from an underprepared workforce.[82,83] Educational institutions and employers must provide ongoing education to undergraduate and graduate students and continuing professional development for practicing nurses. This will help address the reported low levels of genomic literacy and confidence using genomic technologies.[78,84–86] A commonly cited challenge to implementing educational strategies is that educators lack foundational knowledge to teach genomics.[87,88] Therefore, developing evidence-based education and resources for educators can help to diffuse genomic knowledge into the nursing workforce.

Health systems funders (eg, government), educators, and employers must support more nurses to engage with genomics and to take on innovative roles in genomic care delivery.[89] Nurses can assist in diversifying the genomics workforce, increase access, and expand coordinated genomics services.[47,53,90] By working with historically under-represented and excluded communities, nurses can build trust and awareness of genomics services and precision medicine,[90] and evaluate services to ensure the benefits and investment in genomics positively affect health outcomes for all.[91] By supporting decision-making for genomic testing, and providing education on test results, risk assessments, and risk modification strategies, nurses can address the unique needs of communities.[92] While some of this care needs to be provided collaboratively with specialists, such as genetic counselors, nurses can provide mainstream services to enhance patient experience and access.[93] Another important consideration in the diversification of the genomics workforce is to ensure nurses from historically under-represented communities remain in the workforce. The lack of ethnic minority nurse scientists in primary investigator roles, and the diversification of nurse researchers also require urgent attention.[2,12] As such, strategies that address structural racism and working conditions that promote recruitment and retention to the genomics workforce are needed.[2]

Implications for research

Nurses have a long history of engaging under-represented communities in research.[60,94] Our findings captured nursing strategies that focused on community engagement as a means to increase awareness of research opportunities; develop culturally appropriate approaches to communicate and disseminate findings; appropriately apply concepts such as race and ancestry; and recognize the heterogeneity within and across patient populations experiencing diseases. Additionally, it was clear that equity and health disparities considerations must be embedded across the research cycle, from the design, implementation, evaluation, and publication of research studies.

There are known barriers to equity in genomics services that stem from knowledge production and research. Nurses' holistic approach to client care situates them to lead and contribute to genomics research to address health disparity.[60] One area where nurses can contribute is the recruitment of participants using culturally safe and equitable means.[95] Diversity of participants in genomic research studies and databases is crucial to establishing equity. Currently, the under-representation of individuals of non-European ancestry has significant implications on the generalizability of research findings, leading to barriers to advancing treatment options and precision health care.[1,70,96,97] For example, in the context of hereditary genetic testing, variants of uncertain significance (VUS) occur more frequently in Asians and patients of African ancestry than patients of European descent.[98] A VUS result is problematic as there are insufficient data available to determine clinical significance or to conclude that the variant is (or is not) associated with disease, and a VUS does not have corresponding treatments.[99] Research that considers

the intersection of -omics; social determinants, such as racism; and structural factors that give rise to inequities is required to avoid perpetuating disparities.[100,101]

This scoping review revealed gaps in the literature and identified the need for research that explores specific competencies and practices that address health equity and health disparities with those who are historically marginalized. Scholars have outlined opportunities for nurses to engage in genomics research that can identify practices to promote patient safety and health outcomes.[60,72] Nursing research, such as the study exploring DNA methylation patterns in disease-associated genes in African Americans who experienced racism[60] and studies to measure the impact of nursing interventions on outcomes, would advance practice.[102,103] Research is also required to investigate the impact of different models of care on patient outcomes. For example, through the scoping review, we found mention of innovative models where nurses in advanced practice roles had championed and implemented patient navigation or telehealth programs. Additional research is needed to assess the feasibility of spreading and scaling these innovations and how these strategies impact health outcomes.

Frameworks exist to support research and practice change. A recent framework to promote diversity, inclusion, and equity in research can be used to design research that enhances participation and the clinical utility of findings.[104] The Consolidated Framework for Implementation Research is useful for the implementation and evaluation of innovations and shows promise for addressing health disparity.[5] The ACCESS framework was developed by an international consortium of nurses in genomics research, and provides a guide for nurses in overcoming disparities in genomics health care.[105] ACCESS provides a structure for considering equity and diversity during program development that includes advocacy for accessible services, effective communication, cascade screening, and ongoing surveillance.

Implications for policy, advocacy, and leadership

While nurses can implement strategies on an individual level, equitable access to genomics services requires support from the government and health systems to ensure that the people who are most vulnerable in society (such as those in poverty, living with disability or disease, or with a lack of access to transportation or internet) have equal access.[96] Through the scoping review, we found mention of broad strategies to advocate for policy, best practices, and legislation; however, there is a need to identify more targeted strategies at local and national levels from a policy, advocacy, and leadership perspective. Nurses can advocate for policies that address health disparities and social injustices.

In jurisdictions without publicly funded health care, access to basic genomic services remains a challenge for those without sufficient insurance coverage, which is furthering health disparity.[106] Advocacy is needed to ensure that political drive and investment in genomic technology, training of health care providers, and collective disease prevention and health promotion remain accessible to all. Additionally, with the popularity of direct-to-consumer testing and the emphasis on early identification of risk and risk mitigation strategies, there can be a shift in responsibility to the individual without fully considering other important factors, such as access to the social determinants of health. While direct-to-consumer testing can increase access to care, it is likely only accessible to those who can afford it, and greater testing may lead to an increase in unnecessary medical services, reducing the level of resources for those who are most vulnerable.[96] Policy recommendations that acknowledge the society and health benefits of genomics can guide nurses in policy positions to advance health care initiatives that address health disparity.[107]

The proliferation of biobanks and genomics data sharing are important parts of genomic research as well, yet these also introduce risks of misuse and the potential for discrimination. Nurses can implement and advocate for strategies to help ensure a balance between privacy and control of data and their appropriate use to advance health care options. The need for genetic research and biobanking that include diverse communities and samples is crucial to address the challenges with VUS findings that are more common in non-European populations.

Policy development within the profession is needed to support nurses in contributing to policy, research, practice, education, and leadership. The development of a strong policy infrastructure to guide practice and education through scope of practice documents, standards of practice, education frameworks, and position statements will form the foundation of nurses' role in genomics. In countries such as Canada, where

this vital infrastructure is lacking, nurses struggle to gain traction for strategic initiatives and to link their efforts to other national efforts.[108] This is essential to ensure that nurses consolidate their unique and overlapping roles within the genomics landscape.[109] Specifically, attention must be placed on the roles and responsibilities of nurses in addressing health disparities. Policy infrastructure guides nurses and offers meaningful direction for health service organizations to identify models and approaches to care that address equity concerns with implementing genomics into health care. These considerations can be used as the basis for a research and action agenda to expand upon evidence-informed strategies that nurses can implement, advocate for, and promote equitable genomics-informed health care.

Global nursing organizations, such as the G2NA, have developed tools to accelerate the integration of genomics, and these acknowledge the importance of centering approaches on equity; for example, Tonkin *et al.*[57] developed a roadmap to guide the acceleration of genomics across nursing to support the common goal of genomics improving health care for all. The roadmap is guided by the Consolidated Framework for Implementation Research,[110] and encourages nurses to consider how implementation plans address equity and inclusivity. The roadmap draws on the ConNECT framework, which is a model for fostering health equity in behavioral sciences.[111] Further, the Assessment of Strategic Integration of Genomics Across Nursing Maturity Matrix tool outlines several critical success factors mapped against enablers and outcome indicators.[89] One key outcome indicator is that genomic tests and services are equitable, meaning that strategies are in place to ensure equal availability and accessibility to all. These tools provide important guidance for nurses engaging in the integration of genomics to ensure health for all.

The heterogeneity of papers and the lack of geographic representation outside of the United States hindered the generalizability of the findings. Additionally, the lack of clear reporting as it relates to disparities, strategies, and populations required a level of interpretation by the authors, specifically when identifying the characteristics of papers. The lack of empirical studies did not enable the identification of promising or evidence-based strategies. Despite these limitations, our analysis of the available evidence provides a useful framework for understanding the current state of scholarship focused on nursing strategies that can promote equitable, genomics-informed health care and the research gaps that exist.

Conclusions

Our scoping review has identified and summarized the available literature on nursing strategies that address health disparities arising from the integration of genomics. Strategies were grouped into 2 categories: those to prepare the nursing workforce with genomic literacy and those that can be implemented in nursing practice. While we identified several knowledge gaps, our findings provide a useful foundation to explore and test strategies that can address unique equity and health disparities within the context of genomics.

Education aimed at enhancing genomic literacy should include a focus on equity and, specifically, address bias, racism, and the unique needs of communities. Nurses with genomic literacy and an awareness of equity can engage in clinical practices that clarify patient/family/community values and priorities related to genetic testing, collect family health histories to identify risk, and enhance community engagement and fair participation in research. Nurses in policy and administration can implement strategies that enhance diversity in the workforce, and support nurses to move into new roles and interdisciplinary practice. Nurses in research can design and conduct studies that enhance recruitment and cultural safety, and generate knowledge with and for historically under-represented communities. Future research guided by implementation science and program evaluation can provide evidence of the impact of nursing practice and education on outcomes, such as health disparities.

Ensuring that all nurses have the foundational knowledge in genomics and equity will enable them to use their unique disciplinary perspective and fully participate in the health system transformation, interprofessional practice, care coordination, and the design and implementation of new care pathways that address health disparity. Addressing equity concerns related to the integration of genomics in health care will be a priority as scientific advancements continue to ensure that these discoveries benefit all. Designing and implementing strategies will require multi-sectoral and interprofessional

collaboration and leadership. While the existing literature provides a good starting point to consider actions that nurses can implement, the lack of empirical evidence exploring effectiveness and nursing strategies limits our ability to draw conclusions about which strategies can be implemented in education, practice, and policy. Specifically, greater interventional and evaluative research is required to legitimize claims that nurses are critical for the promotion of equity in the integration of genomics.

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Author contributions

JL led the research and writing team. PC, RP, AP, and DD contributed to the research protocol, conduct of the research, and writing of the review. TW and BZ assisted with screening articles for inclusion/exclusion, data extraction, and writing the findings section. LC contributed subject matter expertise and to the writing. JM developed the search strategy.

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Appendix I: Search strategy

MEDLINE (Ovid)

Search conducted: May 25, 2023

#	Query	Records retrieved
1	nurs*.tw,kf.	530,217
2	("genomics informed health care" or "genomics informed healthcare" or "genomics informed" or genomic* or genetic* or hereditary or "family history" or "family health" or "precision health" or "precision medicine" or "cascade screening" or "cascade testing").tw,kf.	1,613,278
3	(genetic* adj5 (test* or screen* or service*)).tw,kf.	72,688
4	(equalit* or disparit* or inequalit* or equit* or inequit*).tw,kf.	196,210
5	((Health or healthcare or "health care") adj5 (disparit* or inequit* or equalit* or status or equit* or inequalit*)).tw,kf.	155,710
6	Nurse's Role/ or exp Nurses/	131,940
7	Genomics/ or Genetic Testing/	107,609
8	Healthcare Disparities/ or Health Status Disparities/ or Health Equity/	41,202
9	1 or 6	577,938
10	2 or 3 or 7	1,638,692
11	4 or 5 or 8	297,101
12	9 and 10 and 11	199
13	limit 12 to yr = "2013 -Current"	123

CINAHL (EBSCOhost)

Search conducted: May 25, 2023

#	Query	Limiters/expanders	Last run via	Records retrieved
S13	S9 AND S10 AND S11	Limiters - Published Date: 20130101- Search modes - Boolean/Phrase	Interface - EBSCOhost Research Databases Search Screen - Advanced Search Database - CINAHL Complete	198
S12	S9 AND S10 AND S11	Search modes - Boolean/Phrase	Interface - EBSCOhost Research Databases Search Screen - Advanced Search Database - CINAHL Complete	351
S11	S4 OR S5 OR S8	Search modes - Boolean/Phrase	Interface - EBSCOhost Research Databases Search Screen - Advanced Search Database - CINAHL Complete	198,202
S10	S2 OR S3 OR S7	Search modes - Boolean/Phrase	Interface - EBSCOhost Research Databases Search Screen - Advanced Search Database - CINAHL Complete	241,207
S9	S1 OR S6	Search modes - Boolean/Phrase	Interface - EBSCOhost Research Databases Search Screen - Advanced Search Database - CINAHL Complete	1,004,728

(*Continued*)

#	Query	Limiters/expanders	Last run via	Records retrieved
S8	(MH "Healthcare Disparities") OR (MH "Health Status Disparities+")	Search modes - Boolean/Phrase	Interface - EBSCOhost Research Databases Search Screen - Advanced Search Database - CINAHL Complete	27,256
S7	(MH "Genomics") OR (MH "Genetic Screening+")	Search modes - Boolean/Phrase	Interface - EBSCOhost Research Databases Search Screen - Advanced Search Database - CINAHL Complete	25,319
S6	(MH "Nurses+") OR (MH "Nursing Role")	Search modes - Boolean/Phrase	Interface - EBSCOhost Research Databases Search Screen - Advanced Search Database - CINAHL Complete	271,314
S5	(Health or healthcare or "health care") N5 (disparit* or inequit* or equalit* or status or equit* or inequalit*)	Search modes - Boolean/Phrase	Interface - EBSCOhost Research Databases Search Screen - Advanced Search Database - CINAHL Complete	150,020
S4	equalit* or disparit* or inequalit* or equit* or inequit*	Search modes - Boolean/Phrase	Interface - EBSCOhost Research Databases Search Screen - Advanced Search Database - CINAHL Complete	104,182
S3	genetic* N5 (test* or screen* or service*)	Search modes - Boolean/Phrase	Interface - EBSCOhost Research Databases Search Screen - Advanced Search Database - CINAHL Complete	24,718
S2	"genomics informed health care" or "genomics informed healthcare" or "genomics informed" or genomic* or genetic* or hereditary or "family history" or "family health" or "precision health" or "precision medicine" or "cascade screening" or "cascade testing"	Search modes - Boolean/Phrase	Interface - EBSCOhost Research Databases Search Screen - Advanced Search Database - CINAHL Complete	241,207
S1	nurs*	Search modes - Boolean/Phrase	Interface - EBSCOhost Research Databases Search Screen - Advanced Search Database - CINAHL Complete	1,004,140

APA PsycINFO (EBSCOhost)

Search conducted: May 25, 2023

#	Query	Limiters/expanders	Last run via	Records retrieved
S13	S9 AND S10 AND S11	Limiters - Published Date: 20130101- Search modes - Boolean/Phrase	Interface - EBSCOhost Research Databases Search Screen - Advanced Search Database - APA PsycInfo	196
S12	S9 AND S10 AND S11	Search modes - Boolean/Phrase	Interface - EBSCOhost Research Databases Search Screen - Advanced Search Database - APA PsycInfo	376
S11	S4 OR S5 OR S8	Search modes - Boolean/Phrase	Interface - EBSCOhost Research Databases Search Screen - Advanced Search Database - APA PsycInfo	161,906
S10	S2 OR S3 OR S7	Search modes - Boolean/Phrase	Interface - EBSCOhost Research Databases Search Screen - Advanced Search Database - APA PsycInfo	208,098

(*Continued*)

#	Query	Limiters/expanders	Last run via	Records retrieved
S9	S1 OR S6	Search modes - Boolean/Phrase	Interface - EBSCOhost Research Databases Search Screen - Advanced Search Database - APA PsycInfo	201,399
S8	DE "Health Disparities"	Search modes - Boolean/Phrase	Interface - EBSCOhost Research Databases Search Screen - Advanced Search Database - APA PsycInfo	10,972
S7	DE "Genomics"	Search modes - Boolean/Phrase	Interface - EBSCOhost Research Databases Search Screen - Advanced Search Database - APA PsycInfo	1633
S6	DE "Nurses"	Search modes - Boolean/Phrase	Interface - EBSCOhost Research Databases Search Screen - Advanced Search Database - APA PsycInfo	33,774
S5	(Health or healthcare or "health care") N5 (disparit* or inequit* or equalit* or status or equit* or inequalit*)	Search modes - Boolean/Phrase	Interface - EBSCOhost Research Databases Search Screen - Advanced Search Database - APA PsycInfo	81,114
S4	equalit* or disparit* or inequalit* or equit* or inequit*	Search modes - Boolean/Phrase	Interface - EBSCOhost Research Databases Search Screen - Advanced Search Database - APA PsycInfo	116,068
S3	genetic* N5 (test* or screen* or service*)	Search modes - Boolean/Phrase	Interface - EBSCOhost Research Databases Search Screen - Advanced Search Database - APA PsycInfo	14,592
S2	"genomics informed health care" or "genomics informed healthcare" or "genomics informed" or genomic* or genetic* or hereditary or "family history" or "family health" or "precision health" or "precision medicine" or "cascade screening" or "cascade testing"	Search modes - Boolean/Phrase	Interface - EBSCOhost Research Databases Search Screen - Advanced Search Database - APA PsycInfo	208,098
S1	nurs*	Search modes - Boolean/Phrase	Interface - EBSCOhost Research Databases Search Screen - Advanced Search Database - APA PsycInfo	201,399

Cochrane Library (Ovid)

Search conducted: May 25, 2023

#	Query	Records retrieved
1	nurs*.tw,kf.	54,877
2	("genomics informed health care" or "genomics informed healthcare" or "genomics informed" or genomic* or genetic* or hereditary or "family history" or "family health" or "precision health" or "precision medicine" or "cascade screening" or "cascade testing").tw,kf.	31,620
3	(genetic* adj5 (test* or screen* or service*)).tw,kf.	2693
4	(equalit* or disparit* or inequalit* or equit* or inequit*).tw,kf.	8506
5	((Health or healthcare or "health care") adj5 (disparit* or inequit* or equalit* or status or equit* or inequalit*)).tw,kf.	17,593

(*Continued*)		
#	**Query**	**Records retrieved**
6	2 or 3	31,620
7	4 or 5	23,325
8	1 and 6 and 7	180

Embase

Search conducted: May 25, 2023

No.	**Query**	**Records retrieved**
#1	nurs*:ti,ab,kw	637,197
#2	'genomics informed health care':ti,ab,kw OR 'genomics informed healthcare':ti,ab,kw OR 'genomics informed':ti,ab,kw OR genomics:ti,ab,kw OR genetics:ti,ab,kw OR hereditary:ti,ab,kw OR 'family history':ti,ab,kw OR 'precision health':ti,ab,kw OR 'precision medicine':ti,ab,kw OR 'cascade screening':ti,ab,kw OR 'cascade testing':ti,ab,kw	539,689
#3	(genetic* NEAR/5 (test* OR screen* OR service*)):ti,ab,kw	112,258
#4	equalit*:ti,ab,kw OR disparit*:ti,ab,kw OR inequalit*:ti,ab,kw OR equit*:ti,ab,kw OR inequit*:ti,ab,kw	243,148
#5	((health OR healthcare OR 'health care') NEAR/5 (disparit* OR inequit* OR equalit* OR status OR equit* OR inequit*)):ti,ab,kw	180,866
#6	'nurse'/exp	216,882
#7	'genomics'/exp OR 'genetic screening'/de	251,892
#8	'health care disparity'/de OR 'health disparity'/de OR 'health equity'/de	59,975
#9	#1 OR #6	688,560
#10	#2 OR #3 OR #7	751,578
#11	#4 OR #5 OR #8	375,798
#12	#9 AND #10 AND #11	168
#13	#9 AND #10 AND #11 AND [2013-2023]/py	121

Gray literature and website searches

Search conducted: August 18, 2023

Source	**Records retrieved**
International Society of Nursing in Genomics	2
Global Genomics Nursing Alliance	4

Appendix II: Studies ineligible following full-text review

1. Andsoy II, Tastan S, Iyigun E, Kopp LR. Knowledge and attitudes towards cardiovascular disease in a Population of north western Turkey: a cross-sectional survey. Int J Caring Sci. 2015;8(1):115-24.

Reason for exclusion: Ineligible population

2. Baars JE, van Dulmen AM, Velthuizen ME, van Riel E, Ausems MGEM. Breast cancer genetic counseling among Dutch patients from Turkish and Moroccan descent: participation determinants and perspectives of patients and healthcare professionals. J Community Genet. 2017;8(2):97-108.

Reason for exclusion: Ineligible population

3. Baumbusch J, Mayer S, Sloan-Yip I. Alone in a crowd? Parents of children with rare diseases' experiences of navigating the healthcare system. J Genet Couns. 2019;28(1):80-90.

Reason for exclusion: Ineligible context

4. Bayard S, Fasano G, Gillot T, Bratton B, Ibala R, Taylor Fortson K *et al*. Breast cancer disparities and the digital divide. Curr Breast Cancer Rep. 2022;14(4):205-12.

Reason for exclusion: Ineligible source

5. Benjamin CM, Thomas LH, Skirton H, Gustafson S, Coupe J, Patch C, *et al*. Interventions to improve patient access to and utilisation of genetic and genomic counselling services. Cochrane Database Syst Rev. 2015;(11):CD011873.

Reason for exclusion: Ineligible source (protocol only)

6. Blee SM, Dixon MD, Master VA, Pentz RD. Dissemination of validated health literacy videos: a tailored approach. J Clin Oncol. 2021;39(15 SUPPL).

Reason for exclusion: Ineligible context

7. Blizinsky KD, Bonham VL. Leveraging the learning health care model to improve equity in the age of genomic medicine. Learn Health Syst. 2018;2(1):e10046.

Reason for exclusion: Ineligible population

8. Boothe E, Waldrop JM, Kirmse B. eP480: Project ECHO for pediatric genetics in Mississippi: expanding access to the clinical genetics workup for autism and intellectual disability. Genet Med. 2022;24(3):S306.

Reason for exclusion: Ineligible source (abstract only)

9. Calizzani G, Menichini I, Candura F, O'Mahoney B, Giangrande P, Makris M. A European certification system for haemophilia centres. J Thromb Haemost. 2013;11:797.

Reason for exclusion: Ineligible concept

10. Calzone KA, Jenkins J, Culp S, Badzek L. Hospital nursing leadership-led interventions increased genomic awareness and educational intent in Magnet settings. Nurs Outlook. 2018;66(3):244-53.

Reason for exclusion: Ineligible context

11. Calzone KA, Kirk M, Tonkin E, Badzek L, Benjamin C, Middleton A. Increasing nursing capacity in genomics: overview of existing global genomics resources. Nurs Educ Today. 2018;69:53-9.

Reason for exclusion: Ineligible context

12. Calzone KA, Kirk M, Tonkin E, Badzek L, Benjamin C, Middleton A. The global landscape of nursing and genomics: global genomic landscape. J Nurs Scholarsh. 2018;50(3):249-56.

Reason for exclusion: Ineligible context

13. Carlsson L, Limoges J. Canadian nursing and genomics: an engagement initiative. Can Oncol Nurs J. 2022;32(4):559-70.

Reason for exclusion: Ineligible concept

14. Centre for Reviews and Dissemination. Genetic nurse counsellors can be an acceptable and cost-effective alternative to clinical geneticists for breast cancer risk genetic counselling: evidence from two parallel randomised controlled equivalence trials (Structured abstract). NHS Economic Evaluation Database (NHSEED). 2006(2015 Issue 2).

Reason for exclusion: Ineligible context

15. Cheek DJ, Howington L. Patient care in the dawn of the genomic age. Am Nurse Today. 2017;12(3): 16-22.

Reason for exclusion: Ineligible concept

16. ClinicalTrials.gov. Bethesda (MD): National Library of Medicine (US). 2000 Feb 29. Identifier NCT05603663, High polygenic risk and health behavior. Genes and health behavior: the impact of awareness of high polygenic risk for cardiovascular disease on health behavior among young overweight adults [internet]. ClinicalTrials.gov; 2022. Available from: https://clinicaltrials.gov/study/NCT05603663.

Reason for exclusion: Ineligible source

17. Cohn EG, Henderson GE, Appelbaum PS, for the Working Group on Representation and Inclusion in Precision Medicine Studies. Distributive justice, diversity, and inclusion in precision medicine: what will success look like? Genet Med. 2017;19(2):157-9.

Reason for exclusion: Ineligible concept

18. Connor AE, Dibble KE. Disparities in perceived healthcare discrimination among BRCA1/2-positive women from disadvantaged health populations. Cancer Epidemiol Biomarkers Prev. 2022;31(1 SUPPL).

Reason for exclusion: Ineligible population

19. Connors L, Schorn M. Genetics and genomics content in nursing education: a national imperative. J Prof Nurs. 2018;34(4):235-7.

Reason for exclusion: Ineligible concept

20. de Vries J, Landouré G, Wonkam A. Stigma in African genomics research: gendered blame, polygamy, ancestry and disease causal beliefs impact on the risk of harm. Soc Sci Med. 2020;258:113091.

Reason for exclusion: Ineligible concept

21. DeGuzman PB, Schminkey DL. Influencing genomic change and cancer disparities through neighborhood chronic toxic stress exposure: a research framework. Public Health Nurs. 2016;33(6):547-57.

Reason for exclusion: Ineligible concept

22. Dodson C. Attitudes of oncology nurses concerning pharmacogenomics. Per Med. 2015;12(6):559-62.

Reason for exclusion: Duplicate

23. Dorcy KS, Richard A. Ethical considerations of precision medicine for oncology nurses. Cancer Nurs. 2017;40(6):E16-E7.

Reason for exclusion: Ineligible source (abstract only)

24. Douma KFL, Smets EMA, Allain DC. Non-genetic health professionals' attitude towards, knowledge of and skills in discussing and ordering genetic testing for hereditary cancer. Fam Cancer. 2016;15(2):341-50.

Reason for exclusion: Ineligible concept

25. Edwards R, Townsend D, Gingell R, Haralambos K, Datta BN, McDowell IFW, *et al.* Implementation of a multidisciplinary approach to diagnosis and management of familial hypercholesterolaemia (FH) in Wales: the role of the FH specialist nurse. Atherosclerosis. 2013;231(2):e7.

Reason for exclusion: Ineligible source (abstract only)

26. Fouad MN, Acemgil A, Bae S, Forero A, Lisovicz N, Martin MY, *et al.* Patient navigation as a model to increase participation of African Americans in cancer clinical trials. J Oncol Pract. 2016;12(6):556-63.

Reason for exclusion: Ineligible population

27. Genomic Nursing State of the Science Advisory Panel, Calzone KA, Jenkins J, Bakos AD, Cashion AK, Donaldson N, *et al.* A blueprint for genomic nursing science. J Nurs Scholarsh. 2013;45(1):96-104.

Reason for exclusion: Ineligible concept

28. Gentry S. Oncology patient navigation overview. J Radiol Nurs. 2023;42(3):275-8.

Reason for exclusion: Ineligible concept

29. George S, Duran N, Norris K. A systematic review of barriers and facilitators to minority research participation among African Americans, Latinos, Asian Americans, and Pacific Islanders. Am J Public Health. 2014;104(2):e16-31.

Reason for exclusion: Ineligible concept

30. Gitzinger S, Taylor B, Carranza V, Fowler J, Hall J, Sherr V. Effects of CNE education on nurse confidence, knowledge, and performance in biomarker testing and treatment of NSCLC. 47th Annual Oncology Nursing Society Congress, April 27–May 1, 2022, Anaheim, CA. Oncol Nurs Forum. 2022;49(2): E76-E7.

Reason for exclusion: Ineligible source (abstract only)

31. Goldberg AE, Allen KR. "I'm not just the nonbiological parent": encountering, strategizing, and resisting asymmetry and invalidation in genetic/gestational parent status among LGBTQ parents. J Fam Nurs. 2022;28(4):381-95.

Reason for exclusion: Ineligible context

32. Goldfeld S, Bryson H, Mensah F, Price A, Gold L, Orsini F, *et al.* Nurse home visiting to improve child and maternal outcomes: 5-year follow-up of an Australian randomised controlled trial. J Paediatr Child Health. 2022;58(SUPPL 2):36.

Reason for exclusion: Duplicate

33. Hammer MJ. Informed consent: The case of "-omics" literacy. Oncol Nurs Forum. 2017;44(1):28-30.

Reason for exclusion: Ineligible concept

34. Haverty CE, Muzzey D. Avoiding unnecessary disparities in care: evaluating noninvasive prenatal screening performance via whole genome sequencing across classes of obesity...American College of Nurse-Midwives' 64th Annual Meeting & Exhibition, May 18-22, 2019, National Harbor. J Midwif Women Health. 2019;64(5):675-76.

Reason for exclusion: Ineligible population

35. Hershberger PE, Gallo AM, Molokie R, Thompson AA, Suarez ML, Yao Y, *et al.* Toward understanding family-related characteristics of young adults with sickle-cell disease or sickle-cell trait in the USA. J Clin Nurs. 2016;25(11-12):1587-97.

Reason for exclusion: Ineligible population

36. Hickey KT, Bakken S, Byrne MW, Bailey DE, Demiris G, Docherty SL, *et al.* Precision health: advancing symptom and self-management science. Nurs Outlook. 2019;67(4):462-75.

Reason for exclusion: Ineligible context

37. Ho SSM, Choi KC, Wong CL, Chan CWH, Chan HYL, Tang WPY, *et al.* Uptake of breast screening and associated factors among Hong Kong women aged $\geq$50 years: a population-based survey. Public Health. 2014;128(11):1009-16.

Reason for exclusion: Ineligible context

38. Hurtado-de-Mendoza A, Graves K, Gómez-Trillos S, Anderson L, Campos C, Evans C, *et al.* Provider's perceptions of barriers and facilitators for Latinas to participate in genetic cancer risk assessment for hereditary breast and ovarian cancer. Healthcare. 2018;6(3):1-18.

Reason for exclusion: Ineligible population

39. Jabaley T, Underhill-Blazey ML, Berry DL. Development and testing of a decision aid for unaffected women with a BRCA1 or BRCA2 mutation. J Cancer Educ. 2020;35(2):339-44.

Reason for exclusion: Ineligible context

40. Jevitt CM. Obesity and socioeconomic disparities: rethinking causes and perinatal care. J. Perinat Neonatal Nurs. 2019;33(2):126-34.

Reason for exclusion: Ineligible context

41. Jull J, Kopke S, Smith M, Carley M, Finderup J, Rahn AC, *et al.* Decision coaching for people making healthcare decisions. Cochrane Database Syst Rev. 2021;11(11):CD013385.

Reason for exclusion: Ineligible context

42. Kelly PA. Next generation sequencing and multi-gene panel testing: implications for the oncology nurse. Semin Oncol Nurs. 2017;33(2):208-18.

Reason for exclusion: Ineligible context

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Reason for exclusion: Ineligible concept

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Reason for exclusion: Ineligible context

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Reason for exclusion: Ineligible concept

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Reason for exclusion: Ineligible concept

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Reason for exclusion: Ineligible concept

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Reason for exclusion: Ineligible concept

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Reason for exclusion: Ineligible date

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Reason for exclusion: Ineligible concept

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Reason for exclusion: Ineligible context

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Reason for exclusion: Ineligible population

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Reason for exclusion: Ineligible concept

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Reason for exclusion: Ineligible context

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Reason for exclusion: Duplicate

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Reason for exclusion: Ineligible context

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Reason for exclusion: Unable to translate or not available in English

Appendix III: Data extraction instrument

Extraction category	Details
Author	
Title	
Year	
Country	
Publication type	
Purpose	
Equity issues	Specify type of disparity, root causes, outcomes
Was disparity defined?	If yes, specify definition
Population (nurses)	Licensed practical nurse, registered psychiatric nurse, registered nurse, nurse practitioner, specify other
Population (patients)	
Disease/conditions	For example, hereditary cancer (eg, HBOC, Lynch), hypercholesterolemia
Genomic strategy	For example, education, family health history, referrals
Domain of strategy	Policy, education, leadership, research, clinical practice
Recommendations	

HBOC, hereditary breast and ovarian cancer

Appendix IV: Characteristics of included studies

Allford *et al.*, 2014[63]	
Purpose	To inform service development related to access to cancer genetic services among minority ethnic communities by exploring the barriers and facilitators to access
Focus of disparities	Issues: Ethnic disparities in people who access cancer genetic services; disparities in referral to cancer screening and genetic counseling. Root causes: Cultural variations in beliefs about cancer, and inheritance; level of awareness of risk and accessing assessment; challenges with cross-cultural communication.
Description of strategies	Strategies to prepare the nursing workforce: • Increase comprehensive understanding of barriers to access at the community, cancer care, and genetic service levels *(Domain: policy and advocacy)* Strategies nurses can implement in practice: • Introduce culturally sensitive provider and counseling initiatives *(Domain: clinical practice)* • Enable patient self-referral *(Domain: clinical practice)*
Intended/potential outcomes of strategies	Increasing understanding of the barriers and facilitators of access to genetic cancer services among minority ethnic populations can help identify promising facilitators.

Allen,[34] 2018	
Purpose	To highlight advances in oncology nursing care and the importance of genomic screening in minority populations to help reduce disparities in cancer care and survivorship.
Focus of disparities	Issue: Racial disparities in cancer screening among African American, Hispanic, Black Women, and uninsured patients. Root causes: Lack of access to health care (uninsured or underinsured; limited health care availability); less engagement in screening or cancer-prevention services; inadequate treatment being offered; and hesitation in diverse cultural, racial, ethnic populations to engage in genetic care or testing.
Description of strategies	Strategies to prepare the nursing workforce: • Oncology nurses should keep up-to-date with genetics and genomic advances and their impact on care to educate the public and "at risk" populations *(Domain: education)* • Advocate for appropriate treatment strategies including personalized medicine *(Domain: policy and advocacy)* Strategies nurses can implement in practice: • Oncology nurses should work with at-risk, vulnerable, under-represented, and underinsured populations within their communities to hear concerns and act as advocates *(Domain: clinical practice)* • Provide preventive strategies that "disadvantaged communities" can implement respecting their cultural priorities (eg, connecting nurse navigators with community lay leaders to provide risk assessment and genetic testing that incorporates community values and meaning into public education *(Domain: clinical practice)*
Intended/potential outcomes of strategies	Improve health outcomes, including survivorship (screening and early detection; education around prevention strategies).

Arhin,[46] 2019	
Purpose	To highlight gaps in knowledge regarding sickle cell disease (SCD) trait status, implications of this knowledge deficit, and describe how registered nurses can affect primary prevention of SCD through effective case management and patient education.
Focus of disparities	Issue: Only 16% of people with sickle cell traits know their status despite universal newborn screening. SCD occurs in 1 in 365 Black or African American births and about 1 in 16,300 Hispanic Americans. Root causes: Knowledge deficits that adversely affect primary prevention strategies.
Description of strategies	Strategies to prepare the nursing workforce: • Increasing nurses' engagement in primary prevention of SCD to enable effective reporting of newborns who have sickle cell traits (education and case management) and follow-up care of newborns diagnosed with SCD (*Domain: clinical practice)*

(*Continued*)	
Arhin,[46] 2019	
Intended/potential outcomes of strategies	Increase patients' awareness of their status to inform engagement in genetic counseling and pre-marital screening, as appropriate.

Bukini *et al.*,[54] 2021	
Purpose	To analyze the role of gender norms before and after newborn screening for SCD and assess how they influence quality of care for children with SCD.
Focus of disparities	Issue: Care for children with SCD is gendered and disproportionately the responsibility of the mother. Root causes: Systemic (eg, in some settings, SCD inheritance is blamed on the mother, resulting in stigmatization that can negatively impact relationship with partners).
Description of strategies	Strategies nurses can implement in practice: • Genetic counseling to improve community understanding of genetic disease *(Domain: clinical practice)*
Intended/potential outcomes of strategies	Studying the social implications of SCD is valuable to improving quality of care for patients in Africa. Gender-conscious health education and genetics counseling will improve community understanding of genetic disease and reduce gender-related inequality in SCD care.

Coleman *et al.*,[35] 2014	
Purpose	To determine minority nurses' beliefs, practices, and competency in integrating genetics/genomics information into practice.
Focus of disparities	Issue: Health disparities in people with chronic diseases mediated by genetic factors (cancer, cardiovascular, diabetes), especially in ethnic minority populations. Root causes: Not specified.
Description of strategies	Strategies to prepare the nursing workforce: • Targeted genomics education to prepare ethnic minority nurses to use genetics/genomics in clinical practice *(Domain: education)* Strategies nurses can implement in practice: • Establish trusting relationships by using culturally competent communication that supports patient engagement of the value of genetic and genomic information in a patient's care *(Domain: clinical practice)*
Intended/potential outcomes of strategies	Nurses who have trusting relationships can help support people experiencing health disparities to engage with genetic/genomic information.

Coleman *et al.*,[59] 2018	
Purpose	To describe the perspectives of African American nurses' views about factors that impede, support, and/or promote genetics and genomics knowledge in practice and participation in research.
Focus of disparities	Issue: Inequitable representation of ancestral minorities in genetic testing and research that could inform the disproportionate burden of disease experienced by these populations. Root causes: Distrust of health care providers, the medical and scientific communities; concerns about potential misuse and/or abuse of genetics and genomic information among African Americans.
Description of strategies	Strategies to prepare the nursing workforce: • Determine baseline knowledge of genetics and genomics among African American nurses and provide education with emphasis on how engaging would result in more equitable care *(Domain: education)* • Foster leadership within professional nursing associations to enable advocacy and education with communities *(Domains: leadership)* Strategies nurses can implement in practice: • Community engagement to determine best approach to assessing needs, communication and education *(Domains: education)*

(*Continued*)	
Coleman *et al.*,[59] 2018	
Intended/potential outcomes of strategies	Knowledge and competence in genetics and genomics among African American Nurses can encourage African American participation in research.

Daly & Olopade,[36] 2015	
Purpose	To explore factors that may contribute to racial survival disparity in African American women with breast cancer and review interventions to close the disparity gap.
Focus of disparities	Issue: African Americans are less likely to be diagnosed with breast cancer and more likely to die from it compared with white women. Root causes: Differences in tumor biology; lack of engagement in genetic counseling; lack of education regarding genomic/genetic counseling; differences in patterns of care; lower uptake in mammography screening; delays in treatment; inappropriate therapy; underuse of treatment; treatment discontinuation and treatment delays during breast cancer clinical trials; comorbidities.
Description of strategies	Strategies nurses can implement in practice: • Advocate for insurance coverage among minority patients *(Domain: policy and advocacy)* • Provide patient education and enhance provider communication *(Domain: clinical practice)* • Explore patient navigation programs: Patient navigation to enhance communication and education and remove barriers to timely care *(Domain: clinical practice)* • Advocate for system-wide changes (beyond the individual patient level) *(Domain: policy and advocacy)* • Advocate for delivery system reform (such as accountable care organizations, accountable for the quality of care; institute best practices/clinical protocols) *(Domain: policy and advocacy)* • Increase engagement of minority patients in clinical trials to enable precision medicine for all *(Domain: research)*
Intended/potential outcomes of strategies	Understanding barriers that African American women face accessing breast cancer screening and treatment will help to decrease racial survival disparity.

Dodson,[52] 2017	
Purpose	To describe oncology nurses' attitudes toward pharmacogenomics.
Focus of disparities	Issue: Access to care among the uninsured remains a challenge, and managing genomics information can highlight problems related to discrimination, which can heighten disparity of care. Root causes: Under-representation of racial and minorities and older patients in genomics; inadequate workforce to deliver care.
Description of strategies	Strategies to prepare the nursing workforce: • Increase access to clinically relevant, up-to-date information *(Domain: education)* • Increase education for nurses about pharmacogenetics *(Domain: education)* • Engage in advocacy and research to improve care for patients undergoing pharmacogenetics *(Domain: research, policy and advocacy)* Strategies nurses can implement in practice: • Enroll patients in research earlier in their disease process to allow for greater patient access and useable information to address disparity among uninsured *(Domain: research)* • Standardize communication to providers and patients from pathology and tumor genetic markers to provide standardized care *(Domain: clinical practice)*
Intended/potential outcomes of strategies	Understanding attitudes will improve nurse engagement with genomics.

Douglas *et al.*,[37] 2022	
Purpose	To describe key challenges and possible solutions for hereditary cancer panel testing in the Latinx population.
Focus of disparities	Issue: Latinx patients are less likely to receive genetic counseling education, referrals, testing and have less awareness of testing for hereditary breast and ovarian cancer. Root causes: Financial burden of health care provider testing in the Latinx community limits uptake of testing. Providers may also lack understanding of elevated risk for hereditary breast and ovarian cancer among the Latinx community.
Description of strategies	Strategies nurses can implement in practice: • Increase outreach to underserved patients of Latinx descent to increase awareness of test availability and affordability *(Domain: clinical practice, education)* • Patient-centered educational material that addresses free and no-cost testing programs in native language and English *(Domain: clinical practice, education)* • Delivery post-test counseling/education by health care providers to increase understanding of results *(Domain: clinical practice, education)*
Intended/potential outcomes of strategies	Increased offering and uptake of testing among individuals in Latinx communities.

Fasaye *et al.*,[38] 2021	
Purpose	To describe the role of nurses in achieving health equity in clinical cancer genetics.
Focus of disparities	Issue: Racial inequity in genetics and cancer care. Root causes: Provider lack of education and implicit bias.
Description of strategies	Strategies to prepare the nursing workforce: • Increase awareness among nurses about their role in genetic health care *(Domain: education)* • Engage in continuing cancer genetics education to identify patients at increased risk of developing cancer *(Domain: education)* • Participate in ongoing self-awareness of implicit biases (*Domain: education)* Strategies nurses can implement in practice: • Be intentional about referring all eligible patients to genetics services *(Domain: clinical practice)*
Intended/potential outcomes of strategies	Increased equity across the screening to treatment continuum.

Hendricks-Sturrup *et al.*,[39] 2020	
Purpose	To describe Southern Nevada Black Nurses Association member perspectives or concerns about engaging in genomic medicine research and how themes align with those in the literature and remarks made during a National Academies of Sciences, Engineering, Medicine event.
Focus of disparities	Issue: Disparities in diagnosis and treatment of genetic health conditions among African American communities (eg, transthyretin-related hereditary cardiac amyloidosis). Root causes: Under-representation of African Americans in genomic research.
Description of strategies	Strategies nurses can implement in practice: • Engage with African American health community leaders to determine strategies to overcome community concerns about genomic research and mitigate health disparities experienced by African Americans. Openly disseminate best practices and engagement strategies to support accelerated engagement among the larger African American community in genomic medicine research. *(Domain: research)*
Intended/potential outcomes of strategies	Increased engagement of African Americans in genomic research.

Hendricks-Sturrup *et al.*,[62] 2021	
Purpose	To describe strategies that African American nurses can use to better engage African American communities in genomic medicine research.
Focus of disparities	Issue: Lack of ethnic diversity in clinical research affects understanding of gene-disease relationships in these populations, including European bias in risk prediction of genetic disease and other genomic applications in medicine. Root causes: Ethical concerns in research, such as confidentiality and trust based on historical events.
Description of strategies	Strategies to prepare the nursing workforce: • Include educational curricula on precision medicine and race; make education on precision medicine part of continuing education units, foundational courses, and licensing curricula *(Domain: education)* Strategies nurses can implement in practice: • Increase engagement, support, and information dissemination using a variety of tools and strategies such as engaging influencers and advocates, providing tailored education resources, and articulating the risks benefits (*Domain, research*) • Address language barriers and work towards culturally competency to foster trust and participation (*Domain: research*) • Address research implementation barriers (*Domain: research*) • Foster a culture of collaboration between nurses and physician colleagues (*Domains: research*) • Address privacy concerns and educate patients on risks, safeguards, and opportunities (*Domains: research*)
Intended/potential outcomes of strategies	Encouraging greater inclusion of diverse populations in genomic research will mitigate the bias in risk prediction and genomic application.

Jaja *et al.*,[58] 2013	
Purpose	To describe how nurse scholars can engage in promoting an equitable genomic medicine paradigm.
Focus of disparities	Issue: Unspecified health disparities experienced by racial and ethnic minority populations in the US. Root causes: Genetics and social determinants of health (eg, socioeconomic status, environment).
Description of strategies	Strategies nurses can implement in practice: • Examine how race is used as a variable in scientific research and use knowledge brokering to delineate how race variables that imply human ancestry could be utilized in genomic research pragmatically in the context of health disparities *(Domain: research)*
Intended/potential outcomes of strategies	Genomic medicine has the potential to either exacerbate or mitigate existing health disparities among minority populations.

Jenkins,[40] 2019	
Purpose	To describe expert perspectives of genomic health care and what is needed for nursing to prepare for the present and future.
Focus of disparities	Issue: Inequitable referral and testing in minority groups. Root causes: Provider bias.
Description of disparities	Strategies to prepare the nursing workforce: • Keep informed about best practices and legislation, and share patient stories about the risks and benefits of using genomic information *(Domain: policy and advocacy)* • Recognize and address implicit bias, personal attitudes, and beliefs that lead to inequitable referral and recommendations in practice *(Domain: education)* • Address current curriculum for nurses and increase health care provider education and competency in genomics using an interprofessional education model (*Domain: education)* • Increase nurses' knowledge of when to refer patients *(Domain: education)*
Intended/potential outcomes of strategies	Education and awareness will improve bias and mitigate disparity in referral

Jones *et al.*,[41] 2015	
Purpose	To synthesize the evidence about breast cancer screening and use of cancer genetic services in African American women under 50, and describe factors that influence mammography screening, genetic counseling, and testing in these women.
Focus of disparities	Issue: African American women are more likely to die from breast cancer than their White counterparts. Root causes: African American women are less likely to be referred for genetic testing when appropriate.
Description of strategies	Strategies to prepare the nursing workforce: • Nurse clinicians need to be aware of at-risk minority women and employ judgment about breast cancer screening based on personal and family history with appropriate risk assessment and referral for genetic testing when indicated *(Domain: education)* Strategies nurses can implement in practice: • Champion studies that aim to reduce health disparities to breast cancer in minority populations. This should focus on increase participation of younger African American women at increased risk of breast cancer and explore factors related to the uptake of genetic testing *(Domain: research)* • Communicate with young African American women about their risks, as many lack knowledge about genetic testing *(Domain: clinical practice)*
Intended/potential outcomes of strategies	Improving genetic testing rates will allow African American women to benefit from medical genetics and optimize management of their cancer.

Keeton,[61] 2020	
Purpose	To describe the historical background behind the misuse of race in case-based clinical education and to identify the factors that contribute to this problem.
Focus of disparities	Issue: Misuse of race in case-based clinical education may reinforce stereotypes and misinformation about racial groups. Root causes: Conflation of race, ethnicity, and culture as interchangeable constructs.
Description of strategies	Strategies to prepare the nursing workforce: • Promote the appropriate and effective incorporation of race into case-based clinical education *(Domain: education)*
Intended/potential outcomes of strategies	Appropriate use of race can help students understand the social context of race to avoid misinterpretation that it is solely a biological construct.

Menon *et al.*,[56] 2019	
Purpose	To discuss the 5 ConNECT principles in the context of precision health and describe strategies to achieve health equity in precision health.
Focus of disparities	Issue: Unspecified equities in accessing precision health. Root causes: Lack of data from diverse populations including historically underserved and under-represented populations.
Description of strategies	Strategies to prepare the nursing workforce: • Diversify the workforce to mirror the full representation of population diversity *(Domain: policy and advocacy)* Strategies nurses can implement in practice: • Recognize between-group and within-group heterogeneity of patient populations experiencing the disease *(Domain: research)* • Collect adequate samples of biospecimens from diverse patient populations *(Domain: research)* • Develop multiple treatments and treatment modalities to ensure coverage across patient populations *(Domain: research)* • Employ multiple evidence-based appropriate communication strategies for outreach and dissemination *(Domain: research)* • Provide training to providers on understanding, recruiting, intervening with, and disseminating to affected populations (*Domain: research)*
Intended/potential outcomes of strategies	Increase access and benefit of precision health research studies and treatments, especially among diverse and historically under-represented populations; support policies for precision health advance to reach underserved and medically vulnerable populations; maximize inclusion in study population and appropriate diversity representation in research to reflect disparate burden of disease or inequities under study.

Menon *et al.*,[55] 2019	
Purpose	To discuss the principles of the ConNECT Framework as they may apply to nursing science research.
Focus of disparities	Issue: Unspecified health inequities.
Description of strategies	Strategies to prepare the nursing workforce: • Provide formalized training in precision health science from undergraduate education and up, extending into continuing professional education. Training should target ethnic minority nurses to optimize care for these patients and develop ethnic minority nurse leaders in areas of practice, education, research, and health policy *(Domain: education)* Strategies nurses can implement in practice: • Understand the larger social and contextual influences affected research participation *(Domain: research)* • Intentionally include groups usually left out of research to foster a norm of inclusion *(Domain: research)* • Deliberately disseminate findings that are accessible to all to ensure equitable diffusion of innovations to all *(Domain: research)* • Use technological innovations in ways that do not create more disparity (*Domain: research)*
Intended/potential outcomes of strategies	Incorporating the principles of CoNECT can help researchers to address health equity in precision health by nurse scientists.

Scott *et al.*,[6] 2022	
Purpose	To summarize the genetic/genomic advances that inform precision health and implications for cardiovascular disparities in African American adults.
Focus of disparities	Issue: Cardiovascular health morbidity and mortality disproportionately affects African Americans. Inequities in access to high quality or technologically advanced care available. Root causes: Multifactorial, including health behavior, social influences, and genetic risk. Poor representation in genomics research among African Americans contributes to a higher likelihood of being given false results from genetic tests or not benefitting from genomics-enhanced risk assessment and prescribing algorithms.
Description of strategies	Strategies nurses can implement in practice: • Engage African American participants in genomics research and provide information about risks, benefits, capabilities, limits of research *(Domain: research)* • Incorporate genomics and epigenomics measures into research to personalize interventions and health care delivery for different populations *(Domain: research)* • Investigate innovative and ethical approaches for recruiting and consenting African Americans and other minorities into research and develop best practices for working with communities in research *(Domain: research)* • Prioritize intervention studies on telehealth for outreach with African Americans who have limited access to health care *(Domain: research)* • Engage in research about implicit bias and strategies for increasing patient trust with providers not met in person *(Domain: research)* • Investigate outcomes, best practices, and cost-effectiveness of interventions like navigators *(Domain: research)* • Clinical nurses can partner with nurse informaticians to design tools for the electronic health record that promote timely and equitable translation of genomics knowledge into practice *(Domain: clinical practice)* • Nurses should be trained to conduct comprehensive family histories and learn to use clinical decision support tools to trigger referrals (*Domain: clinical practice)* • Nurse navigators can assist with care coordination of counseling referrals, respond to patient concerns, and facilitate discussions about research (*Domain: clinical practice)* • Leverage technology (eg, telehealth) to extend care to communities that may be missed to advance equitable provision of genomic-based health care. Nurses could use telehealth to provide genetics informed care and health education *(Domain: clinical practice)*
Intended/potential outcomes of strategies	Reduced disparities in cardiovascular health among African American adults.

Shevach *et al.*,[42] 2023	
Purpose	To evaluate the impact of an on-site nurse-led cancer genetics service compared with telegenetics on likelihood of genetic testing completion
Focus of disparities	Issue: Access to guideline-recommended cancer genetic testing is not equitably distributed to all races and ethnicities. Telehealth may widen racial and ethnic disparities with respect to genetic testing and evaluation. Root causes: Operational barriers (eg, clinic workflow, time constraints, lack of access to services and critical shortage of genetics service providers), which are magnified among racial minorities.
Description of strategies	Strategies nurses can implement in practice: • Advanced practice nurses can identify patients who would benefit from genetic evaluation and conduct thorough consultation (discussing the benefits and limitations of testing, different types of test results, and risk of psychological impact of test results with patients prior to testing) by drawing on guidelines and the expertise of other professionals *(Domain: clinical practice)* • Consider virtual vs on-site genetic consults. On-site genetics consults may be a better method of delivery for consults due to their complexity and the importance of ensuring follow-up. Embedded clinics may facilitate attendance and follow-up since consult and testing can be done together, removing time delays. In-person clinics may also mitigate potential trust concerns from patients who prefer to hear about testing from providers that they know and trust *(Domain: clinical practice)*
Intended/potential outcomes of strategies	An on-site, nurse-led cancer genetics service embedded in a Veterans Affairs medical clinic oncology practice was associated with higher likelihood of germline genetic testing completion than a telegenetics service among self-identified Black veterans.

Taylor *et al.*,[60] 2018	
Purpose	To provide an overview of nurse scientists in -omics-based research (genomics, epigenomics, proteomics, metabolomics, etc.) and discuss the conduct of -omics-based research with minority communities.
Focus of disparities	Issue: Racial and ethnic minorities are often under-represented in research studies. Root causes: Mistrust of researchers, lack of resources/transportation, and lack of interest.
Description of strategies	Strategies to prepare the nursing workforce: • Nurse researchers need to understand the factors that contribute to disparity to develop interventions that address it *(Domain: research)* • Improve representation of nurse faculty/researchers *(Domain: research)* • Increase the utilization of training programs in -omics at all levels of nursing education to foster a new generation of nurse scientists who have the required experience, training, and knowledge to lead -omics-related studies *(Domain: research)* Strategies nurses can implement in practice: • Advocate for the inclusion of members of minority communities in genomics research *(Domain: research)* • Take an inclusive approach to diversity in nursing and omics research (*Domain: research)* • Encourage collaboration between nursing and other disciplines to formulate comprehensive and patient-centered research that recruits and protects minorities *(Domain: research)*
Intended/potential outcomes of strategies	By taking an inclusive approach to diversity in nursing and omics research, nurses will help to lead initiatives to reduce health disparities in research, practice, and education

Temkin *et al.*,[45] 2022	
Purpose	To identify key components in the provision of high-quality care delivery for patients with ovarian cancer and to develop recommendations that serve as a resource for multidisciplinary ovarian cancer practices and providers in the United States.
Focus of disparities	Issue: Disparities in access to and receipt of guideline-adherent, high-quality ovarian cancer care among patients from historically under-represented racial and ethnic groups and those with lower socioeconomic status that results in overall survival disadvantage in these communities. Root causes: Limited access to health insurance and care for under-represented racial and ethnic groups, implicit bias among health care providers in racially discordant interactions contribute to inequity.
Description of strategies	Strategies nurses can implement in practice: • Ensure peer or nursing navigation for all patients with ovarian cancer *(Domain: clinical practice)*

(*Continued*)	
Temkin *et al.*,[45] 2022	
	• Establish institutional policies to reduce implicit bias *(Domain: policy and advocacy)* • Measure and stratify quality metrics by self-described race to track goals around inequity *(Domain: research)*
Intended/potential outcomes of strategies	Reduction in health inequities among historically under-represented racial and ethnic groups and those with lower socioeconomic status.

Tonkin *et al.*,[57] 2020	
Purpose	To present a roadmap for nursing leadership to guide integration of genomics across nursing based on the outputs of a research program.
Focus of disparities	Issue: Unspecified—focused on integrating genomics into nursing with a focus on equity. Root causes: Unspecified.
Description of strategies	Strategies nurses can implement in practice: • Leaders involved in implementation plans for integrating genomics into nursing should address equity and inclusivity by drawing on frameworks such as ConNECT *(Domain: leadership)*
Intended/potential outcomes of strategies	Promote inclusivity and equity in genomic integration in health care

Underhill *et al.*,[43] 2016	
Purpose	Unspecified
Focus of disparities	Issue: Disparities in cancer prevention and early detection among certain races and ethnic groups. Root causes: Inequities in genetic risk assessment, screening, and testing among racial and ethnic groups due to patient (eg, age, gender, family history), provider (eg, limited knowledge about genetics), and health system–level factors (eg, lack of health insurance, cost).
Description of strategies	Strategies nurses can implement in practice: • Be informed and aware of risk factors for hereditary cancer syndromes, including red flags, by referring to clinical guidelines *(Domain: clinical practice)* • Incorporate risk assessment for all cancer syndromes as part of the family history assessment *(Domain: clinical practice)* • Take detailed personal and family history for all patients *(Domain: clinical practice)* • Assist with obtaining appropriate genetic care; nurse navigators in genetics can help those who are underserved access care *(Domain: clinical practice)* • If cost is a concern, investigate and become familiar with local resources to assist (eg, local department of health or local advocacy groups) *(Domain: clinical practice)* • Advocate for evidence-based payer coverage of genetic testing at the public level to address the cost of testing (*Domain: policy and advocacy)* • Engage high-risk and racially or ethnically diverse persons in genetic services or research to enlarge the genetic data collected for these groups to better understand significance of test results (eg, discuss enrolling in registries with patients) *(Domain: research)*
Intended/potential outcomes of strategies	Nurses who are genomics-aware will mitigate the disparities in genetic assessment and testing.

van der Giessen *et al.*,[48] 2020	
Purpose	To develop and evaluate a training program for health care professionals to increase effective communication about referral to breast cancer genetic counseling with patients who have limited health literacy or a migrant background.
Focus of disparities	Issue: Underuse of genetic services among persons with less education or migrant background. Root causes: Limited health literacy and cultural barriers resulting in poor understanding of the benefits, limits, risks of genetic testing and poor communication with health care professionals.

(*Continued*)	
van der Giessen *et al.*,[48] 2020	
Description of strategies	Strategies to prepare the nursing workforce: • Explore blended learning intervention, consisting of online module followed by multidisciplinary group training of limited duration (*Domain: education)* • Explore the utility of education using role play, plain language, teach-back method, and culturally sensitive communication to improve self-efficacy in communication *(Domain: education)* Strategies that nurses can implement in practice: • Increase communication with patients, taking into consideration social and cultural beliefs and use of an interpreter (*Domain: clinical practice)*
Intended/potential outcomes of strategies	Improving health provider comfort with low-health-literacy persons will improve their likelihood of communicating with these persons about genetic counseling

van der Giessen *et al.*,[49] 2021	
Purpose	To measure the effect of a health literacy training program for surgical oncologists and specialized nurses on disparities in referral to genetic testing in breast cancer patients.
Focus of disparities	Issue: Underuse of genetic testing in breast cancer patients with lower levels of education, limited health literacy, or migrant background. Root causes: Patient concerns about cost, misuse of testing, privacy and confidentiality issues, lack of physician recommendation, and ineffective communication.
Description of strategies	Strategies to prepare the nursing workforce: • Increase training opportunities to better improve communication about referrals *(Domain: education)* Strategies that nurses can implement in practice: • Improve communication by using methods such as plain language and using the teach-back method *(Domain: clinical practice)*
Intended/potential outcomes of strategies	Improving health provider comfort with low-health literacy, migrant, or lower education persons will improve their likelihood of communicating with these persons about genetic counseling.

van der Giessen *et al.*,[47] 2021	
Purpose	To study the effectiveness of a blended training program developed by the researchers that examines health care professionals' awareness, knowledge, and self-efficacy toward communication about genetic counseling for people with a limited health literacy or a migrant background.
Focus of disparities	Issue: Unequal access to cancer genetic testing in people with lower education levels and people with a migrant background. Root causes: Absence of surgeon recommendations; lack of discussion around referrals (specifically in people with lower health literacy and who have a migrant background); ineffective communication; lacking adequate awareness, knowledge, and skills to identify patients with limited health literacy.
Description of strategies	Strategies to prepare the nursing workforce: • Increase training opportunities to better improve communication about referrals *(Domain: education)* • Provide communication skills training to increase self-efficacy of health care professionals and improve their awareness of health literacy of vulnerable populations *(Domain: education)* Strategies that nurses can implement in practice: • Improve communication with vulnerable people to increase referrals to genetic counseling and testing *(Domain: clinical practice)*
Intended/potential outcomes of strategies	Improving training among health care providers can optimize access to genetic care and increase referrals to genetic counseling.

Williams *et al.*,[50] 2019	
Purpose	To summarize the barriers and potential actions to reduce genomic health care disparities.
Focus of disparities	Issue: Access to genomic services is not easily obtained for those without financial, educational, and social resources. Root causes: Language barriers, racism, medical distrust, lack of diversity in research, and lack of guidance through genetic services process.
Description of strategies	Strategies to prepare the nursing workforce: • Engage in education to recognize risks of societal harm from interpretation of genomic information and to understand the implications of race categories in the context of genomic research by developing a strong foundation of knowledge about genetic ancestry, population genetics, role of race, and perceived racism in clinical decision-making *(Domain: education)* Strategies that nurses can implement in practice: • Engage culturally appropriate communication to ensure patients/public understands medical terms *(Domain: clinical practice)* • Involve experts preferred by the patient or at-risk community member (eg, family, advocacy organization member, primary care provider) *(Domain: clinical practice)* • Use culturally appropriate genomic health educational materials *(Domain: clinical practice)* • Partner genomic specialists with health care providers at the point of care to limit multiple referral steps that can involve time, travel, money *(Domain: clinical practice)* • Engage community leaders in addressing gaps in quality care and determine outcomes that matter to underserved communities, health systems, payer *(Domain: clinical practice)* • Engage with community partners and leaders early in research and emphasize service reciprocity and disseminate findings back to the community *(Domain: research)* • Embed researchers/clinicians in communities that they serve to build and maintain trust *(Domain: policy and advocacy)* • Evaluate the utility of different models of care (eg, navigator model, mobile health, telehealth, research van options) to minimize barriers to genomic health care *(Domain: research)* • Develop or apply existing measurement instruments as common data elements to build evidence base to document outcomes *(Domain: research)*
Intended/potential outcomes of strategies	Lack of access to genomic services results in discoveries with little benefit to the underserved; improving access will provide genomic services equitably to the under-resourced.

Williams *et al.*,[51] 2016	
Purpose	To identify opportunities for action to increase advanced practice nursing and research contributions towards improving genomic health for all individuals and populations, through the perspective of the members of the Genetics Expert Panel.
Focus of disparities	Issue: Inequities in accessing genomics care. Root causes: Barriers to accessing genomic services by people with lower socioeconomic status, limited education, who live in areas with lack of access to specialists, and belong to underserved populations who experience health disparities.
Description of strategies	Strategies to prepare the nursing workforce: • Bolstering genomic-focused advanced practice registered nurses' practice, research, education and ensure that education and competencies includes genomic knowledge and skills (eg, risk assessment, screening, clinical decision-making) (*Domain: education)* • Expand doctoral training for nurse scientists and clinicians to prepare an ethnically diverse nursing workforce prepared to implement genomics-based health care *(Domain: education)* • Obtain new knowledge about disease biology, risk assessment, treatment efficacy, drug safety, self-management (*Domain: education)* • Increase nursing research emphasis on promoting health of individuals and families in a wide variety of clinical care and research settings based on personalized genomic health information (*Domain: research)* Strategies that nurses can implement in practice: • Advocate for patient and family benefits and equitable access to genomic health care resources by informing legislators and health care organizations and by developing policy measures; and actively participating in international, national, and institutional committees that formulate policies regarding health care knowledge systems *(Domain: policy and advocacy)* • Improve the use of resources and systems that combine genomic information with other health care data (*Domain: leadership)* • Create and evaluate easy-to-use, accessible genomic clinical decision resources and enable access to these resources by advanced practice registered nurses and other health care providers across diverse health care settings *(Domain: clinical practice)* • Engage nursing leadership to inform the development of information systems that have capacity to organize, store, share -omic-based data (eg, use of electronic health record to collect data, registries) *(Domain: leadership)*

(*Continued*)	
Williams *et al.*,[51] 2016	
	• Create and evaluate genomic health literacy resources for members of the public that are appropriate for diverse socioeconomic, educational, health literacy, or cultural backgrounds *(Domain: leadership)* • Advocate for ethical and societal issues in data sharing and promoting "big data science" that serves specific populations *(Domain: policy and advocacy)* • Advocate for recruitment, consent, and access to personal genomic health information that is consistent with each person's preferences *(Domain: policy and advocacy)* • Lead research teams to ensure that implementation research with diverse populations is emphasized. Resources that include -omics educational opportunities, funding, research resources, and collaborative research opportunities are vital to sustaining genomic nursing research to improve health outcomes through precision medicine *(Domain: research)*
Intended/potential outcomes of strategies	Improving community access to genomics will help reduce health disparities.

Woods *et al.*,[44] 2017	
Purpose	To explain how age-related changes and genetic differences influence variations in drug responses among older adults in unique "ethnocultural groups."
Focus of disparities	Issue: Differences in medication adherence in older clients from ethnically diverse groups and increased vulnerability to polypharmacy and hospitalization. Root causes: Genetic differences ("ethnopharmacology"; "race-specific therapy"), social determinants of health.
Description of strategies	Strategies to prepare the nursing workforce: • Enhance culturally competency by understanding the interplay genetic, cultural, and social factors that may create differential drug responses *(Domain: education)* • Regularly consult literature on ethnopharmacology to increase knowledge about ethnic differences and stay up to date with research *(Domain: education)*
Intended/potential outcomes of strategies	Increasing nursing knowledge on genetic differences that affect drug responses can promote appropriate medication prescription, and prevention of adverse drug events, thus averting costly hospitalization.

Yoes & Thomas,[53] 2020	
Purpose	To report on the process of implementing nurse practitioner–led hereditary cancer genetic risk assessment program to help increase access to people in rural communities in Texas, USA, and report outcomes from the program evaluation.
Focus of disparities	Issue: Cancer care (including genetic testing and counseling for hereditary cancers) for people who live in rural areas is more difficult to access compared with people who live in urban areas. Root causes: Lack of certified genetic counselors creates barriers to accessing timely cancer care. Certified genetic counselors are localized to urban areas, leading to people traveling substantial distances for treatment; comprehensive cancer genetic care in rural settings limited.
Description of strategies	Strategies that nurses can implement in practice: • Increase access to genetic testing and counseling through nurse practitioners *(Domain: clinical practice)*
Intended/potential outcomes of strategies	Nurse practitioner–led cancer risk assessment, genetic testing, and counseling can mitigate the risk of developing cancer and the cost of missed opportunities to patients and communities.

