The Joint Commission Journal on Quality and Patient Safety 2024; 50:49–58

REVIEW ARTICLE

Embedding Equity into the Hospital Incident Command System: A Narrative Review

Rachel Moyal-Smith, DrPH, MS, PA-C; Daniel J. Barnett, MD, MPH; Eric S. Toner, MD; Jill A. Marsteller, PhD, MPP; Christina T. Yuan, PhD, MPH

Background: Disasters exacerbate health inequities, with historically marginalized populations experiencing unjust differences in health care access and outcomes. Health systems plan and respond to disasters using the Hospital Incident Command System (HICS), an organizational structure that centralizes communication and decision-making. The HICS does not have an equity role or considerations built into its standard structure. The authors conducted a narrative review to identify and summarize approaches to embedding equity into the HICS.

Methods: The peer-reviewed (PubMed, SCOPUS) and gray literature was searched for articles from high-income countries that referenced the HICS or Incident Command System (ICS) and equity, disparities, or populations that experience inequities in disasters. The primary focus of the search strategy was health care, but the research also included governmental and public health system articles. Two authors used inductive thematic analysis to assess commonalities and refined the themes based on feedback from all authors.

Results: The database search identified 479 unique abstracts; 76 articles underwent full-text review, and 11 were included in the final analysis. The authors found 5 articles through cited reference searching and 13 from the gray literature search, which included websites, organizations, and non-indexed journal articles. Three themes from the articles were identified: including equity specialists in the HICS, modifying systems to promote equity, and sensitivity to the local community.

Conclusion: Several efforts to embed equity into the HICS and disaster preparedness and response were discovered. This review provides practical strategies health system leaders can include in their HICS and emergency preparedness plans to promote equity in their disaster response.

Disasters have disproportionately affected historically marginalized populations, with consistent inequities in morbidity,[1,2] mortality,[3] and access to health care facilities and services.[4] Historically marginalized populations are groups that are excluded due to unequal power dynamics based on race, gender identity, culture, country of origin, physical ability, and many other characteristics.[5] Existing inequities are exacerbated for these groups during disasters, in part due to systemic barriers to obtaining or accessing resources, structural racism, limited mobility, and physical or social isolation.[6]

The National Incident Management System (NIMS) developed by the Federal Emergency Management Agency (FEMA) provides guidance for public agencies to use during all four phases of emergency management: mitigation, preparedness, response, and recovery.[7,8] The Incident Command System (ICS) is a significant component of NIMS and provides a standardized hierarchical structure to facilitate seamless communication between sectors.[7,9] The fundamental principles of the ICS are a clear chain of command with designated team roles and a flexible, scalable structure.[9] Central to the ICS is its command team, with several officers led by the incident commander. The ICS is a key component of preparing and responding to incidents and coordinating efforts across organizations. The Hospital Incident Command System (HICS) is a NIMS–compliant ICS structure customized for health care, fulfilling related accreditation standards and the requirements to receive federal funding through the Hospital Preparedness Program in the United States.[10,11]

The HICS was activated in health systems across the United States in March 2020 to coordinate their COVID-19 response.[12] Health inequities became evident early in the pandemic, with disparities in infection rates, hospitalizations, and deaths in historically marginalized populations.[13–15] The prolonged activation of the HICS and heightened public awareness of systemic racism prompted some organizations to examine and improve their response to advance health equity.[16]

There are no explicit requirements for the ICS or HICS to include equity, and ideally the command team members would include equity principles in their decision-making.[17] However, prior studies have found that people are more

1553-7250/$-see front matter

https://doi.org/10.1016/j.jcjq.2023.10.011

likely to rely on stereotypes and have increased implicit bias in times of cognitive stress.[18,19] Implicit bias is pervasive in the United States, with most health care providers having some degree of positive implicit bias toward white people and a negative bias toward people of color.[20] Disasters require health care leaders to make rapid, cognitively complex decisions, which makes the HICS a critical point for amplifying or diminishing inequities during a disaster.

To our knowledge, there is no summary and synthesis of strategies used to embed health equity into the ICS or HICS. Examining strategies to embed equity into the ICS/HICS can uncover scalable approaches that organizations can build into their emergency preparedness plans. We conducted a narrative review to identify and synthesize approaches to embed equity into the ICS or HICS. Here we describe three themes we found in our review that provide actionable insights for health care leaders to integrate equity into their HICS and disaster preparedness planning.

METHODS

Data Sources and Search Strategy

We conducted a literature review starting with PubMed and SCOPUS using a combination of the following search terms: *hospital*, *hospital incident command system*, *incident command*, *emergency response*, *emergency preparedness*, *disaster response*, *disaster preparedness* AND *disparity, disparities*, *equity*, *inequity*, *equitable* (Appendix 1, available in online article). Due to the recent nature of this topic and the desire to identify novel approaches, we searched for gray literature using an iterative approach. We used a combination of the search terms to identify relevant websites and online reports and searched targeted policy and disaster resources. We also reviewed reference lists of included articles for additional resources.

Inclusion and Exclusion Criteria

The inclusion criteria were resources (for example, articles, reports, tools, and memorandums) that referenced the ICS or HICS and equity, disparities, or populations affected by inequity in a disaster. We also included tools or approaches overseen by the HICS, such as triage tools and plans. In addition, high-income countries were part of the inclusion criteria because of the potential for significant differences in contextual elements, such as resource availability, health system structure, and structural inequities. We did not set time parameters because of the limited research on this topic, but the search concluded in June 2022.

We excluded reports that only described or defined the problem of inequities in the disaster response or were conceptual because of our focus on solutions and approaches to embedding equity in the HICS, not on defining and describing existing inequities. In addition, we excluded reports that did not occur in a disaster setting, were from low- or middle-income countries, or were in a language other than English.

Data Extraction and Synthesis

One researcher [R.M.S.] conducted the literature review using the Covidence platform (Veritas Health Innova-

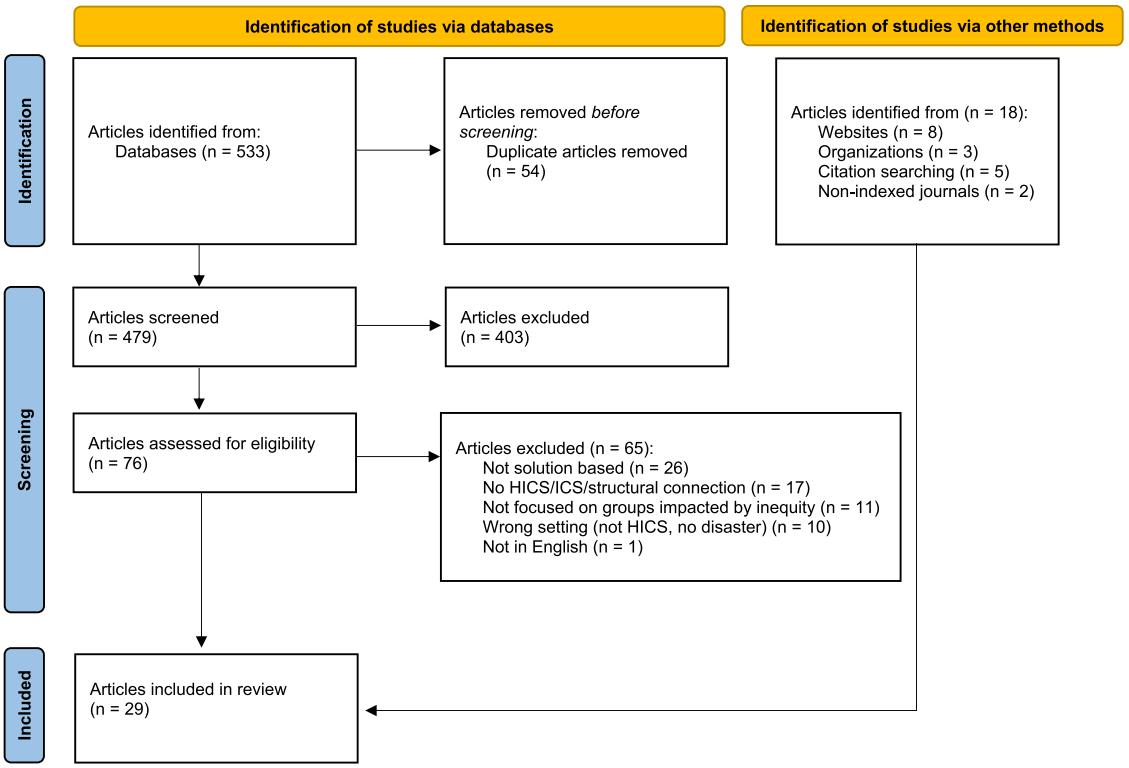

Figure 1: Shown here is the Preferred Reporting Items for Systematic Reviews and Meta-Analyses (PRISMA) flowchart of included articles. HICS, Hospital Incident Command System; ICS, Incident Command System.

tion, Melbourne, Australia) to screen articles retrieved from databases and to keep a record of the search and screening process that could be referenced by the study team. A shared spreadsheet was used for data extraction. The table included general information about the article, key findings, and the location, setting, and disaster. Two authors [R.M.S., C.T.Y.] used inductive thematic analysis to assess commonalities in the approaches to incorporate equity into the ICS or HICS. Themes were refined based on feedback from all authors, with disagreements resolved through discussion and group consensus.

RESULTS

The database search yielded 533 results. After removing duplicates, we screened 479 abstracts; 76 articles underwent full-text review, and 11 were included in the final analysis. We found 5 articles through cited reference searching and 13 from the gray literature search, which included websites, organizations, and non-indexed journal articles. The Preferred Reporting Items for Systematic Reviews and Meta-Analyses (PRISMA)[21] diagram is illustrated in Figure 1.

Of the 29 included articles, 14 were case studies, 7 were opinion-based, 2 were reports, and there was a retrospective cohort study, a systematic review, a qualitative study, an implementation pilot, a tool, and a memorandum (Table 1[17,22–49]). Nineteen of the identified articles were focused on COVID-19, and the setting varied between health care systems, public health departments, and governmental agencies. We categorized the articles into three major themes. The themes are not exclusive, and some articles described using multiple approaches to maximize impact.

Including Equity Specialists in the HICS

An approach described in 13 articles was directly adding a specialist who promoted equity into the ICS or HICS structure and its daily operations. Two health systems described this approach: Brigham and Women's Hospital and Vanderbilt University Medical Center.[17,25,27,33] Both organizations embedded a leader from their existing health equity departments into the HICS as an equity representative. The equity representative provided subject matter expertise, advocated for historically marginalized populations, and led several COVID-19 equity workgroups composed of content experts in various workstreams (Figure 2).[27,33] The workstreams included testing, risk communication, health care access and treatment, data visualization, community outreach, and public advocacy.

The equity representative at both systems led the development of a robust data infrastructure to identify and monitor for disparities. The equity representatives were stewards of these data, and the workgroups they led reviewed stratified measures on new dashboards for COVID-19 testing, inpatient and ICU census, death rates, and discharges.[32,33] They stratified data by race, ethnicity, language, sex, insurance status, geographic location, and health worker status, and filters helped assess the intersectionality of multiple identifiers. Brigham and Women's Hospital also used data from electronic safety event reporting to identify equity issues directly from staff by flagging events that referenced COVID-19, with equity as one category of reports; these issues were routed to the equity representative.[26]

The addition of equity specialists led to several distinct actions by the HICS, such as the expansion of translation services, improved accessibility of information, and community outreach events that provided COVID-19 testing, basic necessities, and assistance with voter registration.[25,33] Because of these improvements, leaders at Brigham and Women's Hospital have called for a national change to the current HICS requirements, advocating for the addition of an equity officer to the central command team and health equity specialists embedded in each section of the command.[17,23] The equity officer and specialists would have defined responsibilities at each stage of the disaster response and would be included in all core decisions.

Local public health and governmental agencies used a similar approach. Seattle and King County Public Health has been a leader in equitable disaster response, with its equity infrastructure firmly established before the COVID-19 pandemic.[31] They have added an equity officer and equity technical advisor into their ICS with a corresponding Job Action Sheet for their equity officer and an equity impact assessment that allows for rapid identification of the needs of historically marginalized groups.[29] Several other organizations implemented a similar model to address the inequities that became evident months into the COVID-19 pandemic.[22,24,28,30] Similar to Brigham and Women's Hospital and Vanderbilt University Medical Center, these agencies used equity-related data to track their response and aid decision-making. One report summarizing several health departments' efforts commented, "all the jurisdictions we highlight mobilized and responded more equitably because equity staff were embedded into the emergency response structure."[22(p. 3)]

Modifying Systems to Promote Equity

The HICS structure is only one part of emergency management, with several other processes working together within the system. These processes include hospital emergency preparedness plans and procedures to allocate scarce resources. Embedding equity into these processes is essential across all the emergency management phases to ensure equitable access to resources.

Three articles described considerations for historically marginalized populations in the emergency preparedness plans as a method to promote equity in the disaster response.[36,41,43] An example of this approach is Johns Hopkins Medicine, which created an operational framework in their COVID-19 response plan using the National Consensus Panel on Emergency Preparedness and Cultural Diversity recommendations.[36,50] The framework contains four overarching categories: (1) institutional policy devel-

Table 1. Characteristics of Included Articles by Theme

Author, Date	Title	Article Type or Study Design	Location, Setting, Disaster
Theme: Including Equity Specialists in the HICS			
Bay Area Regional Health Inequities Initiative and Public Health Alliance of Southern California, 2020[22]	Embedding Equity into Emergency Operations: Strategies for Local Health Departments for COVID-19 & Beyond	Case study	California, Public health, COVID-19
Burks et al., 2020[23]	COVID-19, Disparities, and Opportunities for Equity in Otolaryngology—Unequal America	Opinion	United States, Health care system, COVID-19
Chute et al., 2022[24]	Structuring Equity into Minnesota's COVID-19 Response: Lessons Learned and Future Investments	Case study	Minnesota, Public health, COVID-19
Clark et al., 2020[25]	Centering Equity in Hospital Incident Command Systems	Case study	Massachusetts, Academic medical center, COVID-19
Desai et al., 2020[26]	Rapid-Cycle Improvement During the COVID-19 Pandemic: Using Safety Reports to Inform Incident Command	Case study	Massachusetts, Academic medical center, COVID-19
Duong and Sivashanker, 2020[27]	How to Address Equity as Part of COVID-19 Incident Command	Case study	Massachusetts, Academic medical center, COVID-19
Goralnick et al., 2021[17]	Equity and Disasters: Reframing Incident Command Systems	Opinion	United States, Health care system, Nonspecific
Haldar et al., 2021[28]	A Case Study of the Virginia COVID-19 Equity Leadership Task Force and Health Equity Working Group	Case study	Virginia, Government, COVID-19
Los Angeles County Department of Health, 2017[29]	Strategies for Inclusive Planning in Emergency Response	Report	California, Public health, Nonspecific
Myint et al., 2022[30]	Embedding Equity in a Local Government's Response to COVID-19	Case study	Oregon, Government, COVID-19
Seattle and King County Health Department, 2019[31]	Seattle King County Equity Response Annex	Report	Washington, Public health, Nonspecific
Sivashanker et al., 2020[32]	A Data-Driven Approach to Addressing Racial Disparities in Health Care Outcomes	Case study	Massachusetts, Academic medical center, COVID-19
Wilkins et al., 2020[33]	A Systems Approach to Addressing COVID-19 Health Inequities	Case study	Tennessee, Academic medical center, COVID-19
Theme: Modifying Systems to Promote Equity			
Ashana et al., 2021[34]	Equitably Allocating Resources During Crises: Racial Differences in Mortality Prediction Models	Retrospective cohort study	United States, Health care system, Nonspecific
Cleveland Manchanda et al., 2020[35]	Inequity in Crisis Standards of Care	Opinion	United States, Health care system, Nonspecific
Golden et al., 2021[36]	Approaching the COVID-19 Pandemic Response with a Health Equity Lens: A Framework for Academic Health Systems	Case study	Maryland, Academic medical center, COVID-19
Hick et al., 2021[37]	Crisis Standards of Care and COVID-19: What Did We Learn? How Do We Ensure Equity? What Should We Do?	Opinion	United States, Health care system, COVID-19
Kuschner et al., 2007[38]	Ethical Triage and Scarce Resource Allocation During Public Health Emergencies: Tenets and Procedures	Opinion	United States, Health care system, Nonspecific
Leider et al., 2017[39]	Ethical Guidance for Disaster Response, Specifically Around Crisis Standards of Care: A Systematic Review	Systematic review	United States, Health care system, Nonspecific
Milliken et al., 2020[40]	Addressing Challenges Associated with Operationalizing a Crisis Standards of Care Protocol for the COVID-19 Pandemic	Case study	Massachusetts, Academic medical center, COVID-19
Ndumbe-Eyoh et al., 2021[41]	'Back to better': Amplifying Health Equity, and Determinants of Health Perspectives During the COVID-19 Pandemic	Qualitative study	Canada, Public health, COVID-19
Pennsylvania Department of Health, n.d.[42]	Ethical Allocation Framework for Emerging Treatments of COVID-19	Tool	Pennsylvania, Public health, COVID-19
Phillips et al., 2020[43]	Addressing the Disproportionate Impacts of the COVID-19 Pandemic on Sexual and Gender Minority Populations in the United States: Actions Toward Equity	Opinion	United States, Health care system, COVID-19

(*continued on next page*)

Table 1. (*continued*)

Author, Date	Title	Article Type or Study Design	Location, Setting, Disaster
White et al., 2021[44]	Mitigating Inequities and Saving Lives with ICU Triage During the COVID-19 Pandemic	Opinion	United States, Health care system, COVID-19
Theme: Sensitivity to the Local Community			
Central Health Equity Policy Council—Pandemic Equity Committee, 2021[45]	Memorandum: Recommendations for Identifying and Addressing Inequities in Disaster Preparedness, Disaster Response and Post-Disaster Community Healing and Recovery	Memorandum	Texas, Government, COVID-19
Kreisberg et al., 2016[46]	Vulnerable Populations in Hospital and Health Care Emergency Preparedness Planning: A Comprehensive Framework for Inclusion	Framework and implementation pilot	Colorado, Health care system, Nonspecific
McDermott et al., 2016[47]	Disaster Response for People with Disability	Case study	South Carolina, Government, Flood
Nitkin, 2020[48]	Johns Hopkins Takes COVID-19 Care to the Community	Case study	Maryland, Academic medical center, COVID-19
Rajotte et al., 2013[49]	The Rhode Island Special Needs Emergency Registry—An Opportunity for Expanding the Healthcare Provider's Role in Health Equity	Case study	Rhode Island, Public health, Nonspecific

HICS, Hospital Incident Command System.

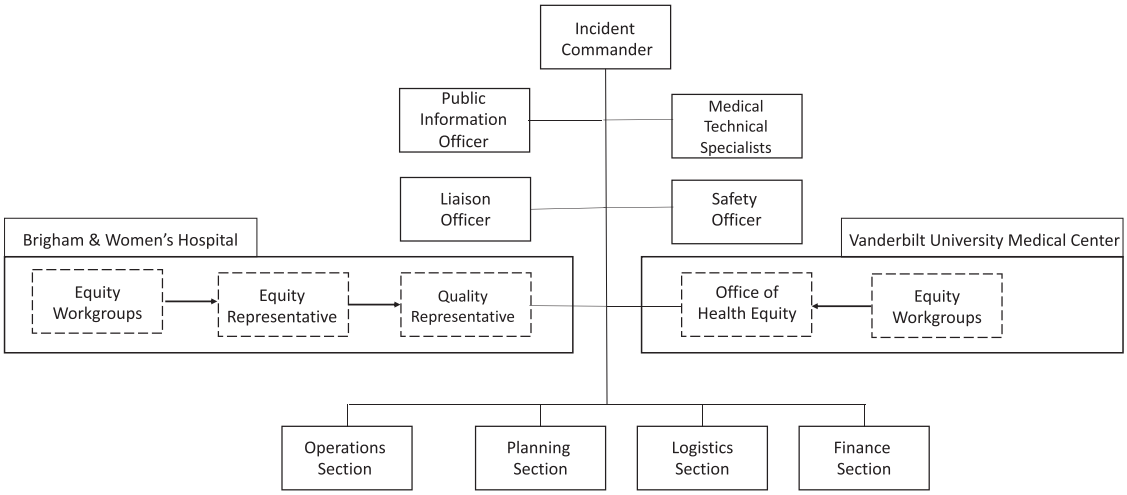

Figure 2: This diagram shows strategies used by hospitals to embed equity into the structure of the Hospital Incident Command System (HICS). Boxes with solid lines represent the standard HICS template.
Approaches Used by Hospitals to Embed Equity into the Hospital Incident Command Structure*.
*Boxes with dotted lines represent specific approaches used by two health systems that were added to the standard HICS structure.

opment, (2) public health and patient communication, (3) staff and community support and engagement, and (4) data collection, monitoring, and evaluation. These categories guided the inclusion of equity on multiple layers using various modalities. Examples include reviewing policies for equity, creating a scarce allocation guidance document that minimizes bias, and increasing community engagement with regular community briefings.

Four articles described approaches related to the crisis standards of care (CSC), which are protocols that outline best practices for clinical resource allocations in a crisis. The CSC aim to provide objective guidance beyond a "first-come, first-served approach" and to maximize the number of life years saved.[35] The "color-blind" approach of the CSC does not account for structural racism, ageism, ableism, and other discriminatory practices.[37] All four articles recommended that health equity experts should review and revise the CSC, considering historically marginalized populations and the expectations around a culturally sensitive response.[37,39,40] Cleveland Manchanda et al. also recommend training staff on implicit bias and properly using the protocols to promote the equitable allocation of re-

sources.[35] Hick et al. stress the need for clear communication about the CSC to prevent ad hoc triage and decision-making by frontline staff, which may be influenced by their own biases.[37] This ad hoc decision-making happened during the COVID-19 pandemic, with a disconnect between decision-makers in the HICS and the clinicians at the bedside.[37]

We found five articles that discussed triage tools and teams, which may be part of the CSC or protocols used by the HICS. Triage teams decide on the allocation of resources and can promote equitable decisions through review and discussion. Kuschner et al. recommend that the triage teams be preestablished and developed thoughtfully, with representatives from various departments in the hospital, including ethics.[38] Another approach recommended by White and Lo is to blind triage teams to irrelevant patient identifiers and provide training on health equity and implicit bias before a disaster.[44]

Triage tools to predict mortality can promote bias, even while trying to be objective.[34] Ashana et al. point out that the miscalibration built into these tools may divert resources away from Black people in a crisis.[34] Removing or revising these tools to eliminate bias can promote an equitable disaster response that doesn't penalize those affected by structural inequities. In addition, some triage tools suggest including factors to account for structural inequities, such as an ICU triage framework proposed by White and Lo that considers the population and principles of social justice.[44] Another triage framework developed in response to the limited supply of remdesivir uses a weighted lottery system with higher priority given to individuals from low-resource areas.[42]

Sensitivity to the Local Community

We found five articles that referenced the importance of engaging and understanding the needs of the local community in preparedness to promote an equitable disaster response. Kreisberg et al.[46] created a framework for whole community–integrated disaster preparedness, which centers on including historically marginalized populations in emergency preparedness planning. The framework stresses the importance of integration among public health agencies, health systems, and the community and cites hospital emergency planners as essential in engaging with the local community. Another model that integrates public health with health care is the Rhode Island Special Needs Emergency Registry, which aids state agencies and health systems in emergency planning by providing an avenue for community members to flag themselves as needing additional assistance in a disaster.[49]

Johns Hopkins Medicine developed a structured community engagement strategy in response to the COVID-19 pandemic. The COVID-19 Anchor Strategy Work Group was developed by senior leadership in the HICS to connect with the community to understand their needs.[48] The group identifies, develops, and implements programs in coordination with state, local, and community agencies to bring information and resources to underresourced communities. They have successfully implemented several programs, including regular community briefings to support bidirectional communication, setting up testing centers in hot spots, and providing resources to the local community.[36,48]

Connecting the community directly to the ICS was found in approaches used or proposed by public health and governmental agencies. In Austin, Texas, the Central Health Equity Council suggested directly embedding a community member on the ICS. They recommended a community voice representative of the Black, Indigenous, and people of color population in Texas to be on the command staff as part of the COVID-19 response.[45] A similar approach is the ICS partnering with community-based organizations to connect them with the community and improve coordination and communication. It is a model used by Seattle and King County Public Health, where they have the Community Communication Network, which is a preassembled community coalition that is embedded in the emergency preparedness plans and has a direct connection to the ICS.[31] Oregon and South Carolina created formal partnerships with the ICS and organizations specializing in advocacy and community convenings.[30,47]

DISCUSSION

This review identified several approaches that health systems, public health, and governmental agencies used to embed equity into their ICS or HICS and disaster preparedness and response. We found commonalities in the approaches, with the themes centering on adding equity specialists to the HICS, improving systems, and sensitivity to the needs of the local community. Health care leaders and emergency planners can incorporate these three pillars: specialists, systems, and sensitivity into their emergency preparedness plans, ideally adapting components from each theme to their local context.

Adding equity specialists into the HICS structure is one method that requires few resources but can be a critical way to include equity in the hospital's core decisions.[17] It creates a high-reliability process to ensure that the needs of the few and vulnerable are represented in any disaster and may be particularly crucial in the response and recovery phases of a disaster.[17] Others used this model in conjunction with a robust data collection and monitoring plan to respond quickly to inequities in care. The equity specialists would need to be selected carefully and ideally would be someone in touch with the local community with training in diversity, equity, inclusion, implicit bias, ethics, and emergency management principles. The Administration for Strategic Preparedness and Response developed a Health Equity, Diversity, Inclusion Technical Specialist Job Action Sheet for

Table 2. National Consensus Panel on Emergency Preparedness and Cultural Diversity Guiding Principles[50] and Examples from Included Articles

Principle	Examples of Strategies from Included Articles
1. Community Needs and Assets	Conducting a statewide vulnerability assessment in whole community disaster preparedness[42] Completing an equity impact assessment to identify needs[31] Identifying individuals that need additional assistance in a disaster[46]
2. Community Partnerships	Holding weekly community briefings with members of the ICS/HICS[49] The ICS/HICS connecting to a community-based organization[30,31,45] Community outreach led by equity representative in the HICS[33]
3. Risk Communication	Increasing the accessibility of information for community efforts led by equity representative on the HICS[25,33] Communicating important information in different formats and levels to staff and the community[43]
4. Training and Education	Training triage teams on implicit bias[38,50] Including equity specialists and community stakeholders in HICS training exercises[29] Developing scarce allocation protocols that focus on equitable access[43]
5. Capacity Building for Culturally and Linguistically Appropriate Services	Expanding translation services in the hospital and at community events[25,33] Training staff on cultural responsiveness[41] Adding community representation to the ICS/HICS[48]
6. Measurement and Evaluation	Collecting and monitoring data to assess for inequities[32,33] Training for staff on accurate collection of patient demographic data[32,33]
7. Information Coordination	Communicating clearly with staff on equitable triage and allocation of scarce resources[35] Including several organizations in whole community disaster preparedness[42]
8. Funding and Program Development	Public-private partnerships providing support[43] Planning to sustain equity representative role in the ICS/HICS[17,22,31]

ICS, incident command structure; HICS, hospital incident command structure.

organizations interested in adding a similar role to their HICS.[51]

Reviewing and revising systems, particularly ones that focus on triaging scarce resources, is critical to an ethical response that considers the principles of social justice.[52] Hospitals need to evaluate their triage systems and emergency plans to assess for elements that perpetuate structural inequities and build in mechanisms to minimize implicit bias in decision-making.[52] Equity and justice need to be woven into all aspects of emergency preparedness plans so they can be seamlessly and rapidly implemented in a disaster.[36]

Closing the gap between health care systems and the community is a recognized strategy to reduce health disparities.[53] Engaging with the local community during the preparedness phase is essential in ensuring an equitable disaster response. Hospitals should include the community in the emergency preparedness planning process and have preestablished lines of communication with community coalitions and other community-based organizations. Creating a committee of community advocates that can regularly review the emergency plans and rapidly assemble during a disaster to provide oversight and guidance includes the community's voice and perspectives in emergency planning and response.

Our findings align with the guiding principles of the National Consensus Panel on Emergency Preparedness and Cultural Diversity (Table 2[17,22,25,29–33,35,38,41–43,45,46,48–50]). However, Principle 6, Measurement and Evaluation, remains an area of weakness in emergency management.[54] Equity measures face challenges with incomplete fields[55] and lack of reporting requirements from payers[56] and have yet to be defined and tested for disaster settings.[54] Although stratified data helped inform the response of several organizations, it is not known if they conducted a formal program evaluation to assess the effectiveness of the strategies they implemented. In the future, organizations should prioritize evaluating these strategies through all phases of emergency management and share the data so effective strategies can be adopted nationally.

The lack of quantitative data in evaluating the effectiveness of the strategies described makes it difficult to postulate whether one of the identified themes is more effective than another at advancing health equity. There is also the possibility that none of the strategies identified were effective. In the absence of this information, health system leaders would still benefit from reviewing components from each theme and adopting and implementing the best strategies within their context. Health systems should consider their resources, experience in health equity, and interconnectedness with other organizations when modifying their HICS and emergency preparedness plans to include equity.

Limitations

We chose a narrative review format to synthesize the limited literature in the context it was presented; however, this presented a risk of bias in how we synthesized and presented

our findings. Although we took a systematic approach in reviewing the literature, we may have missed relevant resources from other databases or websites and relevant articles published after we concluded our search in June 2022. In addition, there were likely several strategies implemented by others and unique perspectives that were not published.

Due to the recency of this topic we included gray literature, which has limitations in methodological rigor but can reduce publication bias.[57] Our review had the potential for bias due to the type and design of the articles we included. Many of the articles are case studies or perspectives, which may overemphasize the positive aspects of the case or items that strengthen the argument presented. They also included varying levels of detail, so some strategies may have been missed if they were not described. Also, the screening, extraction, and synthesis were primarily conducted by one researcher, which introduces the potential for bias in resource selection. Our findings may have limited generalizability outside high-income countries or anywhere that does not use a HICS. In addition, many articles focused on the COVID-19 pandemic, which was an unusually prolonged activation of the HICS. It may be difficult to implement the approaches described during shorter activations.

The major limitation of the approaches identified in this review is that they did not report any quantitative evidence for their effectiveness. The articles cited qualitative evidence of their effectiveness,[22,25,28,43] and some gave absolute numbers of their impact (for example, number of vaccines given, number of community outreach events),[28,32,33] but there was no comparison of what these numbers would have been without implementing strategies to promote equity. Standard measures on equity in general and in disaster response is an area that warrants further research to identify effective approaches. Even without measures, it simply makes sense to have equity principles embedded into a hospital's disaster response, and it aligns with the best practices outlined by the National Consensus Panel on Emergency Preparedness and Cultural Diversity,[50] as discussed above.

CONCLUSION

This is a critical time to embed equity into the HICS, given the predicted increase in natural disasters due to climate change, most of which will disproportionately affect historically marginalized populations.[58,59] The strategies described offer a starting point for organizations to focus on embedding equity into their emergency preparedness plans. We must invest in not only identifying and employing these strategies but measuring their effectiveness to further our ability to break the cycle of health care inequity in a disaster.

Conflicts of Interest. All authors report no conflicts of interest.

SUPPLEMENTARY MATERIALS

Supplementary material associated with this article can be found, in the online version, at doi:10.1016/j.jcjq.2023.10.011.

Rachel Moyal-Smith, DrPH, MS, PA-C, is Senior Clinical Implementation Specialist, Ariadne Labs, Brigham and Women's Hospital, Harvard T.H. Chan School of Public Health, Boston. **Daniel J. Barnett, MD, MPH**, is Professor, Department of Environmental Health and Engineering, Johns Hopkins Bloomberg School of Public Health, Baltimore. **Eric S. Toner, MD**, is Senior Scientist, Department of Environmental Health and Engineering, Johns Hopkins Bloomberg School of Public Health. **Jill A. Marsteller, PhD, MPP**, is Professor, Department of Health Policy and Management, Johns Hopkins Bloomberg School of Public Health. **Christina T. Yuan, PhD, MPH**, is Associate Scientist, Department of Health Policy and Management, Johns Hopkins Bloomberg School of Public Health. Please address correspondence to Rachel Moyal-Smith, rsmith@ariadnelabs.org.

REFERENCES

1. Fonseca VA, et al. Impact of a natural disaster on diabetes: exacerbation of disparities and long-term consequences. Diabetes Care. 2009;32:1632–1638.
2. Mack D, et al. Using appendiceal perforation rates to measure impact of a disaster on healthcare system effectiveness. South Med J. 2013;106:82–88.
3. National Council on Disability. The Impact of Hurricanes Katrina and Rita on People with Disabilities: A Look Back and Remaining Challenges, Aug 3, 2006. Accessed Nov 6, 2023 https://ncd.gov/publications/2006/Aug072006#population.
4. DeBruin D, Liaschenko J, Marshall MF. Social justice in pandemic preparedness. Am J Public Health. 2012;102:586–591.
5. Sevelius JM, et al. Research with marginalized communities: challenges to continuity during the COVID-19 pandemic. AIDS Behav. 2020;24:2009–2012.
6. King County Department of Health. Considerations for Groups Impacted by Inequity. Accessed Nov 6, 2023. https://kingcounty.gov/depts/health/emergency-preparedness/Community-Resilience-Equity/integration.aspx.
7. Federal Emergency Management Agency. National Incident Management System, Oct 24, 2023. Updated: Accessed Nov 6, 2023 https://www.fema.gov/emergency-managers/nims.
8. Congressional Research Service. Federal Emergency Management: A Brief Introduction, Nov 30, 2012. Accessed Nov 6, 2023 https://sgp.fas.org/crs/homesec/R42845.pdf.
9. California Emergency Medical Services Authority. Hospital Incident Command System Current Guidebook and Appendices, 2014. Accessed Nov 6, 2023 https://emsa.ca.gov/disaster-medical-services-division-hospital-incident-command-system/.
10. The Joint Commission. Hospitals: Emergency Management (EM), Jan 2019. Accessed Nov 6, 2023 https://store.jcrinc.com/assets/1/7/cc_hap_em.pdf.
11. Administration for Strategic Preparedness and Response. NIMS Implementation for Healthcare Organizations Guidance, Jan 2015. Accessed Nov 6, 2023 https://www.phe.gov/preparedness/planning/hpp/reports/documents/nims-implementation-guide-jan2015.pdf.
12. Mathews KS, et al. Variation in initial U.S. hospital responses to the coronavirus disease 2019 pandemic. Crit Care Med. 2021 Jul 1;49:1038–1048.

13. Khanijahani A, et al. A systematic review of racial/ethnic and socioeconomic disparities in COVID-19. Int J Equity Health. 2021 Nov 24;20:248.
14. Maness SB, et al. Social determinants of health and health disparities: COVID-19 exposures and mortality among African American people in the United States. Public Health Rep. 2021;136:18–22.
15. Williams A, Blanco AWashington Post. How the coronavirus exposed health disparities in communities of color, May 26, 2020. Accessed Nov 6, 2023 https://www.washingtonpost.com/graphics/2020/investigations/coronavirus-race-data-map.
16. Administration for Strategic Preparedness and Response. The Effect of COVID-19 on the Healthcare Incident Command System, Sep 2021. Accessed Nov 6, 2023 https://files.asprtracie.hhs.gov/documents/aspr-tracie-the-effect-of-covid-19-on-the-healthcare-ics.pdf.
17. Goralnick E, Serino R, Clark CR. Equity and disasters: reframing incident command systems. Am J Public Health. 2021;111:844–848.
18. Wigboldus DHJ, et al. Capacity and comprehension: spontaneous stereotyping under cognitive load. Soc Cogn. 2004;22:292–309.
19. Johnson TJ, et al. The impact of cognitive stressors in the emergency department on physician implicit racial bias. Acad Emerg Med. 2016;23:297–305.
20. Hall WJ, et al. Implicit racial/ethnic bias among health care professionals and its influence on health care outcomes: a systematic review. Am J Public Health. 2015;105:e60–e76.
21. Page MJ, et al. The PRISMA 2020 statement: an updated guideline for reporting systematic reviews. Syst Rev. 2021 Mar 29;10:89.
22. Public Health Alliance of Southern California. Embedding Equity into Emergency Operations: Strategies for Local Health Departments During COVID-19 & Beyond, Jul 2020. Accessed Nov 6, 2023 https://phasocal.org/wp-content/uploads/2020/07/Embedding_Equity_Into_Emergency_Ops_Brief.pdf.
23. Burks CA, Ortega G, Bergmark RW. COVID-19, disparities, and opportunities for equity in otolaryngology—unequal America. JAMA Otolaryngol Head Neck Surg. 2020;146:995–996 No 1.
24. Chute S, et al. Structuring equity into Minnesota's COVID-19 response: lessons learned and future investments. J Public Health Manag Pract. 2022;28:S159–S165.
25. Clark C, Eappen S, Goralnick E. Centering Equity in Hospital Incident Command Systems. Boston: Institute for Healthcare Improvement, 2020.
26. Desai S, et al. Rapid-cycle improvement during the COVID-19 pandemic: using safety reports to inform incident command. Jt Comm J Qual Patient Saf. 2020;46:715–718.
27. Duong T, Sivashanker K. How to Address Equity as Part of COVID-19 Incident Command. Institute for Healthcare Improvement, 2020 May 6. EpubAccessed Nov 6, 2023 http://www.ihi.org/communities/blogs/how-to-address-equity-as-part-of-covid-19-incident-command.
28. Haldar S, et al. A Case Study of the Virginia COVID-19 Equity Leadership Task Force and Health Equity Working Group, Washington, DC: Duke-Margolis Center for Health Policy and National Governors Association Cneter for Best Practices, 2021. Accessed Nov 6, 2023 https://www.nga.org/center/publications/a-case-study-of-the-virginia-covid-19-equity-leadership-task-force-and-health-equity-working-group/.
29. Los Angeles County Department of Health. Strategies for Inclusive Planning In Emergency Response, 2017. Accessed Nov 6, 2023 http://publichealth.lacounty.gov/eprp/documents/Strategies%20for%20Inclusive%20Planning%20in%20Emergency%20Response_FINAL.pdf.
30. Myint P, et al. Embedding equity in a local government's response to COVID-19. J Public Health Manag Pract. 2022;28:S54–S57.
31. Seattle and King County Public Health. Equity Response Annex, ver. 5, Aug 2019. Accessed Nov 6, 2023 https://phasocal.org/wp-content/uploads/2020/07/Seattle-King-County_Equity-Response-Annex.pdf.
32. Sivashanker K, et al. A Data-Driven Approach to Addressing Racial Disparities in Health Care Outcomes. Harv Bus Rev. Epub. 2020 Jul 21. Accessed Nov 6, 2023 https://hbr.org/2020/07/a-data-driven-approach-to-addressing-racial-disparities-in-health-care-outcomes.
33. Wilkins CH, et al. A systems approach to addressing COVID-19 health inequities, 2020 Dec 16. NEJM Catal Innov Care DelivEpubAccessed Nov 6, 2023 https://catalyst.nejm.org/doi/full/10.1056/CAT.20.0374 .
34. Ashana DC, et al. Equitably allocating resources during crises: racial differences in mortality prediction models. Am J Respir Crit Care Med. 2021 Jul 15;204:178–186.
35. Cleveland Manchanda E, Couillard C, Sivashanker K. Inequity in crisis standards of care. N Engl J Med. 2020 Jul 23;383:e16.
36. Golden SH, et al. Approaching the COVID-19 pandemic response with a health equity lens: a framework for academic health systems. Acad Med. 2021 Nov 1;96:1546–1552.
37. Hick JL, et al. Crisis standards of care and COVID-19: what did we learn? How do we ensure equity? What should we do? NAM Perspect. 2021 Aug 30;2021:10.31478/202108e.
38. Kuschner WG, Pollard JB, Ezeji-Okoye SC. Ethical triage and scarce resource allocation during public health emergencies: tenets and procedures. Hosp Top. 2007;85(3):16–25.
39. Leider JP, et al. Ethical guidance for disaster response, specifically around crisis standards of care: a systematic review. Am J Public Health. 2017;107(9):e1–e9.
40. Milliken A, et al. Addressing challenges associated with operationalizing a crisis standards of care protocol for the COVID-19 pandemic. NEJM Catalyst. Epub 2020 Aug 12. Accessed Nov 6, 2023. https://catalyst.nejm.org/doi/full/10.1056/CAT.20.0384.
41. Ndumbe-Eyoh S, et al. Back to better': amplifying health equity, and determinants of health perspectives during the COVID-19 pandemic. Glob Health Promot. 2021;28(2):7–16.
42. Pennsylvania Department of Health. Ethical Allocation Framework for Emerging Treatments of COVID-19. Accessed Nov 6, 2023. https://www.health.pa.gov/topics/disease/coronavirus/Pages/Guidance/Ethical-Allocation-Framework.aspx.
43. Phillips Ii G, et al. Addressing the disproportionate impacts of the COVID-19 pandemic on sexual and gender minority populations in the United States: actions toward equity. LGBT Health. 2020;7:279–282.
44. White DB, Lo B. Mitigating inequities and saving lives with ICU triage during the COVID-19 pandemic. Am J Respir Crit Care Med. 2021 Feb 1;203:287–295.
45. Central Health Equity Policy Council—Pandemic Equity Committee. Memorandum: Recommendations for Identifying and Addressing Inequities in Disaster Preparedness, Disaster Response and Post-Disaster Community Healing and Recovery, 2021 Aug 9. Epub Accessed

Nov 6, 2023 https://www.centralhealth.net/wp-content/uploads/2021/10/FINAL_Pandemic-Equity-Committee_City-Council-Memo_080621-1.pdf.
46. Kreisberg D, et al. Vulnerable populations in hospital and health care emergency preparedness planning: a comprehensive framework for inclusion. Prehosp Disaster Med. 2016;31:211–219.
47. McDermott S, Martin K, Gardner JD. Disaster response for people with disability. Disabil Health J. 2016;9:183–185.
48. Nitkin K. Johns Hopkins Takes COVID-19 Care to the Community, 2020 Jul 27. EpubAccessed Nov 6, 2023 https://www.hopkinsmedicine.org/news/articles/with-pandemic-anchor-strategy-johns-hopkins-takes-covid-19-care-to-the-community.
49. Rajotte JC, et al. The Rhode Island Special Needs Emergency Registry—an opportunity for expanding the healthcare provider's role in health equity. R I Med J. 2013;99(3):41–44 2016 Mar 1.
50. US Department of Health and Human Services, Office of Minority Health. Guidance for Integrating Culturally Diverse Communities into Planning for and Responding to Emergencies: A Toolkit, Feb 2011. Accessed Nov 6, 2023 https://www.aha.org/system/files/content/11/OMHDiversityPreparednesToolkit.pdf.
51. Administration for Strategic Preparedness and Response. Health Equity, Diversity, Inclusion Technical Specialist Job Action Sheet, Mar 22, 2022. Accessed Nov 6, 2023 https://files.asprtracie.hhs.gov/documents/aspr-tracie-ta---health-equity-diversity-inclusion-job-action-sheet---3-22-2022.pdf.
52. Stone JR. Social justice, triage, and COVID-19: ignore life-years saved. Med Care. 2020 Jul;58:579–581.
53. Purnell TS, et al. Achieving health equity: closing the gaps in health care disparities, interventions, and research. Health Aff (Millwood). 2016 Aug 1;35:1410–1415.
54. Finucane ML, Warren May L, Chang JRAND Corporation. A Scoping Literature Review on Indicators and Metrics for Assessing Racial Equity in Disaster Preparation, Response, and Recovery, 2021. Accessed Nov 6, 2023 https://www.rand.org/content/dam/rand/pubs/research_reports/RRA1000/RRA1083-1/RAND_RRA1083-1.pdf.
55. Audet AMUnited Hospital Fund. To Advance Health Equity, We Must Bridge Gaps in Health Data and Measurement, Dec 16, 2020. Accessed Nov 6, 2023 https://uhfnyc.org/publications/publication/advance-health-equity-we-must-bridge-gaps-health-data-and-measurement/.
56. Sandu S, et al.Health Affairs Forefront Health Equity Should Be a Key Value in Value-Based Payment and Delivery Reform, Nov 25, 2020. Accessed Nov 6, 2023 https://www.healthaffairs.org/do/10.1377/hblog20201119.836369/full/.
57. Hoffecker L. Grey literature searching for systematic reviews in the health sciences. Ser Libr. 2020;79:252–260.
58. National Wildlife Federation. Climate Change, Natural Disasters, and Wildlife, Nov 2019. Accessed Nov 6, 2023 https://www.nwf.org/-/media/Documents/PDFs/Environmental-Threats/Climate-Change-Natural-Disasters-fact-sheet.ashx.
59. Marani M, et al. Intensity and frequency of extreme novel epidemics. Proc Natl Acad Sci U S A. 2021 Aug 31;118:e2105482118.