

ADVANCING HEALTH EQUITY THROUGH INCLUSIVE DESIGN

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INTRODUCTION

Health equity is a burgeoning area of interest in the discipline of architecture, as is evident by the recent launch of the WELL Health Equity Committee, a global initiative aimed at bringing an equity lens to healthy buildings.¹ Inclusive Design, an approach for creating safe, equitable, and accommodating environments for a diversity of building users, is primed for informing future health equity strategies – both within the context of the built environment and beyond to include systems, policies, and programming. This investigative paper synthesizes literature to understand better how Inclusive Design informs health equity using the five Social Determinants of Health (SDOH) as a guiding framework: *Economic Stability, Education Access and Quality, Health Care Access and Quality, Social and Community Context, and Neighborhood and Built Environment*. Gaps in literature will be addressed with proposed opportunities for advancing health equity through Inclusive Design of the built environment. Audiences for these findings include practitioners, architectural researchers, public health experts, policymakers, and other building professionals interested in strengthening health equity initiatives through design.

While health equity is a broad and complex topic, it can be defined simply as having a “fair and just opportunity to be as healthy as possible.”² Health equity initiatives are surging globally, particularly as the COVID-19 pandemic continues to ravage the world’s most vulnerable populations.³ Key public health experts have surmised that providing opportunities to health is not enough to address systemic health inequities. Rather, “health equity entails focused societal efforts to address avoidable inequalities by equalizing the conditions for health for all groups, especially for those who have experienced socioeconomic disadvantage or historical injustices.”⁴ Put differently, to truly address health equity it is necessary to recognize that people start from different vantage points when it comes to achieving health.⁵ Inclusive Design, an interdisciplinary approach used widely across the fields of architecture, industrial engineering, technology, healthcare, and others, similarly espouses the value of applying an equity lens to arrive at crosscutting solutions that work for people of varying abilities, backgrounds, and personal identities.⁶ Despite the pressing need to advance health equity, scholarship that explores the relationship between the design of the built environment and health equity is just emerging. Inclusive Design is one approach of many that can serve to bolster health equity initiatives. There is ample debate over the nuances between Inclusive Design and similar approaches such as Universal Design, Human Centered Design, and Barrier Free Design, among others. This paper adopts the well-established strategy of using an umbrella term to facilitate a discussion across

likeminded efforts.⁷ *Inclusive Design* is used here as key terminology, however literature focused on Universal Design and Human Centered Design will also be referenced and noted accordingly. While originally intended to benefit people with disabilities, today Inclusive Design has expanded to address issues of social justice, equity, and broader inclusion across diverse populations.⁸ Furthermore, Inclusive Design principles are used to inform systems, programs, policies, processes, and design of products and built environments, and other applications.⁹ This paper seeks to further inform the ongoing evolution of Inclusive Design by exploring how the approach may be applied to advance health equity.

METHODOLOGY

Efforts to weave together vast amounts of literature on the linkages between Inclusive Design and health equity have not been previously undertaken. A literature review was conducted to identify relevant sources for review by a variety of methods: Avery was used as the primary database to obtain peer-reviewed literature and other academic texts; while general web searches produced policy documents, industry design standards, practitioner-based resources, and case studies. Keywords were used in combination to search the sources, including: Inclusive Design, Universal Design, architecture, justice, health, health equity, inclusion, diversity, and built environment, among others. Ultimately, forty-four sources were selected for this review that range in focus; specific design approaches (i.e., Universal vs. Inclusive Design) are specified as needed.

CONNECTING THE SOCIAL DETERMINANTS OF HEALTH AND INCLUSIVE DESIGN

The Social Determinants of Health (SDOH) is a critical framework for exploring health equity across five key factors – *Economic Stability, Education Access and Quality, Health Care Access and Quality, Neighborhood and Built Environment, and Social and Community Context*. Issued by the Centers for Disease Control and Prevention (CDC), the determinants are estimated to affect a wide range of health risks and quality of life outcomes,¹⁰ and as such are critical to ensuring health equity across diverse populations. Limited research exists to explore the relationship between Inclusive Design and health equity. Findings from literature to be further explored in this paper, however, show linkages between Inclusive Design and each of the five SDOH. These connections suggest that Inclusive Design plays a role in impacting critical aspects of both health and health equity. The following sections outline examples from scholarship and praxis connecting Inclusive Design with each SDOH. By exploring Inclusive Design in this capacity, this paper paves a foundation for continued conversations about the role Inclusive Design can play in addressing health inequities across systems, programs, policies, and the built environment.

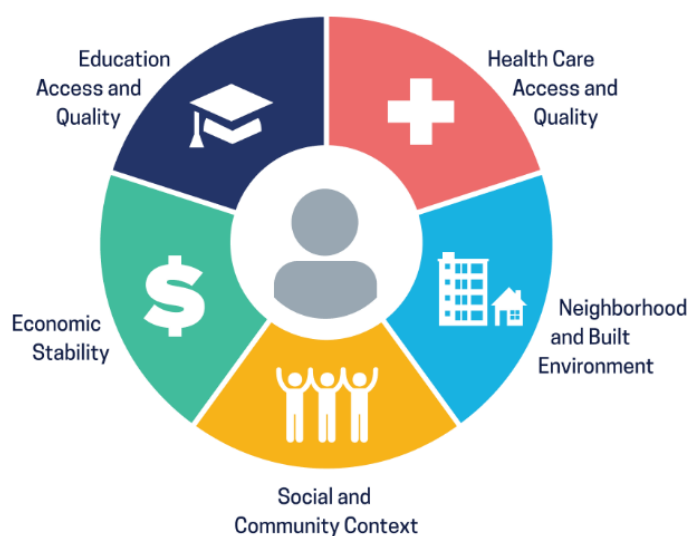


Figure 6. The five Social Determinants of Health adapted from CDC Healthy People 2020.¹¹

Economic Stability

Economic stability sets a critical foundation for building a healthy life, both in terms of finding and maintaining steady employment. In the United States, Black workers are twice as likely to experience unemployment than White workers (6.4% vs 3.1%)¹² and people with disabilities experience double the unemployment rates of people without disabilities (12.6% vs 7.9%).¹³ The application of Inclusive Design can facilitate more equitable processes of securing and maintaining employment. As an example, the U.S. Department of Labor cites the utility of Universal Design in the development of workplace communications, practices, and systems in the interviewing process to acknowledge differences in ability, skill levels, and personal backgrounds.¹⁴ In the book *Building for Everyone: Expand Your Market with Design Practices from Google's Product Inclusion Team* author Annie Jean-Baptiste provides insight into Google's recent adoption of Inclusive Design principles across human resources programs and employee development pathways.¹⁵ Microsoft has similarly committed to elevating Inclusive Design as a product development method that lauds employee diversity as a "resource for better designs."¹⁶ In these examples, employee differences are not only accommodated but celebrated, demonstrating how applications of Inclusive Design can improve not just job security but also job quality, an emerging trend in workforce development.¹⁷ As the United States and the rest of the world continue to rebuild labor and employment opportunities in the wake of COVID-19, Inclusive Design can help to create environments that truly support a diverse workforce, and in turn advance health equity.

Education Access and Quality

Access to quality education is a fundamental pillar of life; yet the United States continues to struggle with significant and systemic educational inequality.¹⁸ One of the more notable applications of Inclusive Design to address inequities in education is Universal Design for Learning. First developed in the 1990s, Universal Design for Learning (UDL) is an education framework that accounts for variances in cognitive abilities, languages, and learning styles, among other student differences. The UDL Guidelines reflect principles of Inclusive Design that are centered on guiding practices that can be adopted across disciplines through a transparent, community-oriented process.¹⁹ UDL has been shown to promote excitement in learning, foster ownership in learning, and encourage deeper learning for both students with and without disabilities.²⁰ Research also suggests that UDL supports both

academic learning and social/emotional aspects of learning for English Language Learners.²¹ Effective pedagogies rooted in Inclusive Design are one factor that can support access to quality education to ensure a bright and healthy future for all students.

Health Care Access and Quality

Expanding access to quality health care is undoubtedly an important step for addressing health disparities. Health communication, or the delivery of clear messaging and services to patients, is a key objective for ensuring health equity, particularly for marginalized populations.²² Inclusive Design has played a critical role in informing the development of healthcare programs and systems to improve health communication. As an example, Universal Design was used to develop inclusive Consumer Assessment of Health Plans Study (CHPS) surveys in the United States to more effectively assess patient healthcare experiences across ailment and disability.²³ More recently, Universal Design was used in the development of an assessment tool for healthcare facilities to ensure usability, well-being, and social inclusion for all patients.²⁴ Beyond application to systems and programs, Inclusive Design has also been proposed as a solution to strengthen direct patient services for traditionally underrepresented groups. Such challenges facing healthcare services for LGBTQ+ older adults were further researched in Ireland, finding that inclusive, person-centered approaches would more effectively address the needs of this population.²⁵ Both in terms of systems and direct patient care, Inclusive Design has a critical role in advancing health care access and quality for all.

Social and Community Context

Social and Community Context prioritizes people's relationships, sense of safety, and sense of belonging as a key component to overall health and wellness.²⁶ While initially rooted in accessible design, newer schools of thought have positioned Inclusive Design to promote equitable, healthy, and usable environments for all. To illustrate this point, the IDEA Center at the University at Buffalo recently issued an updated definition of Universal Design as, "a process that enables and empowers a diverse population by improving human performance, health and wellness, and social participation."²⁷ This broadening in scope has paved the way for the application of Inclusive Design approaches across disability, culture, religion, gender, language, homelessness, and other personal identities.²⁸ Specifically, tenets of both Universal Design and Inclusive Design have been explored to address LGBTQ+ inclusion²⁹ and "collective access" across intersectional identities of gender, disability, and race.³⁰ While still an emerging trend, the broadening of Inclusive Design to create environments where everyone feels safe, welcome, and productive will be pivotal in the pursuit of greater health equity.

Neighborhood and Built Environment

While Inclusive Design of policies, programs, and systems has helped to influence the SDOH including *Economic Stability, Education Access and Quality, Health Care Access, and Social and Community Context*, arguably the most seemingly aligned opportunity to apply Inclusive Design is in the context of *Neighborhood and Built Environment*. Inclusive Design has a long history in the field of architecture; arguably one of the most proliferated Inclusive Design documents – the Universal Design Guidelines – was developed in 1997 by a consortium of architects and design professionals at the Center for Universal Design at North Carolina State University.³¹ Inclusive Design has played a critical role in advancing accessible and usable environments, programming, and products for people with disabilities in the United States and worldwide.³² Additionally, Inclusive Design processes can serve to address "a broad range of users, including children, older adults, people with disabilities,

people of atypical size or shape, people who are ill or injured, and people inconvenienced by circumstance.”³³

Though *Neighborhood and Built Environment* serves as a SDOH, there is little information on how equity ties into factors of the built environment. Illustrating this point, none of the baseline goals or objectives outlined by the CDC to “create neighborhoods and environments that promote health and safety” include Inclusive Design strategies.³⁴ There is a missed opportunity to inform design strategies of our buildings, spaces, and communities with greater equity embedded within them through Inclusive Design. In turn, an increased adoption of Inclusive Design can further support pathways to greater health equity. The following section identifies opportunities and outlines recommendations for addressing health equity through Inclusive Design of the built environment.

OPPORTUNITIES FOR ADVANCING HEALTH EQUITY THROUGH INCLUSIVE DESIGN OF THE BUILT ENVIRONMENT

There are many pathways for advancing health equity through Inclusive Design of the built environment. Based on the literature reviewed, four key opportunities are shared for consideration.

Opportunity #1: Inclusive Design informs integrative design processes.

One key strategy to achieving successful health equity initiatives is to ensure they are community-driven.³⁵ In the context of the built environment, community-centered projects – often referred to as participatory design – are gaining traction but can be fraught with challenges. Participatory design has been criticized for failing to truly reflect a diverse range of perspectives and lived experiences.³⁶ Furthermore, research suggests that power imbalances often exist between designers – who are typically seen as “leaders” of the process – and community members, who often must relent to preconceived ideas driven from a top-down approach.³⁷ Inclusive Design can enrich participatory design processes both by ensuring a wide representation of voices and perspectives, and by leveraging all forms of human diversity to inform design.³⁸ Examples of participatory design processes that reflect philosophical tenets of Inclusive Design include the LGBTQ Futures Projects, which aimed to explore how LGBTQ people experience community and technology in rural places;³⁹ and the involvement of First Nation communities in Canada to develop culturally appropriate housing portfolios.⁴⁰ As integrative design processes continue to grow in popularity, Inclusive Design can inform equitable and meaningful engagement to ensure the development of products, buildings, and spaces are truly beneficial and healthy to all.

Opportunity #2: Inclusive Design brings an equity lens to healthy and sustainable building strategies.

Just because a building is healthy or sustainable, does not mean it is also inclusive. Currently, building rating standards such as LEED, WELL Building, and Living Building Challenge reference Inclusive Design as (most often) optional strategies to consider in the pursuit of healthy and sustainable buildings. This short-sighted approach relegates Inclusive Design as an afterthought in achieving building performance and diminishes the importance of inclusive environments. Rather, Inclusive Design can be adopted as a paradigm that brings an equity lens to healthy and sustainable building strategies. Case study research conducted on the intersectionality between these approaches found that, in certain instances, following Universal Design principles led project teams to crosscutting solutions that achieved both accessibility and sustainability goals.⁴¹ Exploring built environments through Inclusive Design will also highlight that not all healthy and sustainable building strategies will impact users equally. As an example, ample lighting fixtures meant to address mental

health and wellness in most populations may prove challenging for those with seizure disorders or autism.⁴² Adopting an Inclusive Design paradigm will ensure that competing priorities and needs of all users are sufficiently addressed in the pursuit of healthier and more sustainability buildings.

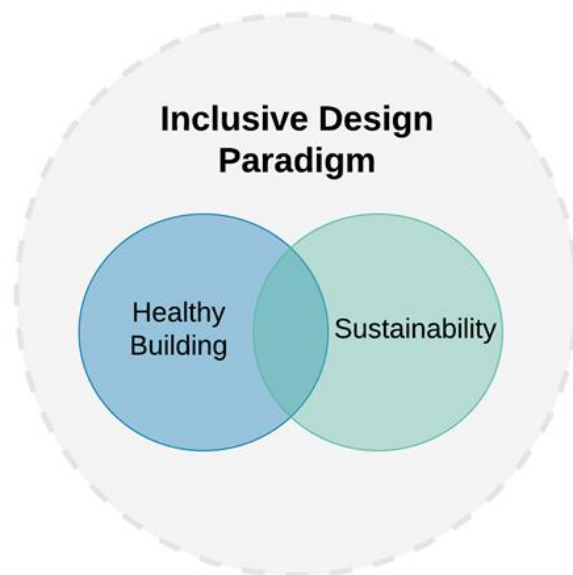


Figure 7. Adopting an Inclusive Design paradigm brings an equity lens to healthy building and sustainability strategies. Source: Authors.

Opportunity #3: Inclusive Design supports urban planning initiatives.

Thoughtfully designed urban places can improve healthy behaviors and social engagement, increase access to food markets, and improve walkability, along with other outcomes that can critically impact health equity.⁴³ Inclusive Design is an emerging trend in the fields of urban planning and landscape architecture. In 2018, the American Society of Landscape Architects (ASLA) introduced Universal Design principles to ensure safe and usable neighborhoods, streets, parks and plazas, playgrounds, and gardens. The guidelines underscore the importance of Inclusive Design: “If we want everyone to participate in public life, we must design and build an inclusive public realm that is accessible to all. Public life can’t just be available to the abled, young, or healthy.”⁴⁴ Furthermore, Inclusive Design

strategies have been projected to help reduce barriers in the built environment and to positively impact performance, health and wellness, and social participation in an effort to create more vibrant and cohesive communities.⁴⁵ As urban planning efforts continue to expand, Inclusive Design can continue to help reduce barriers in urban environments and places of public access, to in turn promote health equity.

Opportunity #4: Inclusive Design informs safety and disease prevention efforts.

Disease reduction and prevention is critical to addressing health inequalities, particularly as people return to workplaces and places of public accommodation post-COVID-19. The application of Inclusive Design has long-promoted safe and navigable spaces that in turn reduce injury and illness.⁴⁶ As health and wellness emerge as a priority across Inclusive Design initiatives, so too do design strategies that seek to promote active design, prevent obesity, and support general healthy behaviors. This initiative is exemplified in the *Universal Design Guidelines New York 2*, a city-issued resource that puts forth design recommendations that support physical engagement for all as an aspect of Universal Design – including access to recreation facilities, fitness equipment, and sports programming.⁴⁷ Additionally, Universal Design has been used to inform the development of Universal Safety Design principles and guidelines as a way to bring basic safety standards to all workers.⁴⁸ Universal Design has also been cited as a key strategy for creating equitable and healthy environments post COVID-19 for its capacity to address emerging areas of critical interest including neurodiversity, mental health, technology, and transportation.⁴⁹ Inclusive Design can inform approaches that reduce disease and promote safety, two critical components of health equity.

DISCUSSION AND CONCLUSION

This paper aims to elevate awareness of Inclusive Design’s applicability across the five Social Determinants of Health, with a specific focus on its role in advancing health equity through the design of the built environment. Overlooking Inclusive Design as a key strategy for addressing health equity in the context of buildings, spaces, and communities is a missed opportunity; and yet, Inclusive Design has not achieved mainstream status as has sustainability or healthy building.⁵⁰ This is particularly salient in the United States where Inclusive Design is not legislated, unlike accessible design, and practitioners erroneously see the approach as burdensome, costly, and unattractive.⁵¹ While efforts are burgeoning to elevate Inclusive Design in line with building performance through the adoption of new standards in LEED, WELL Building, and the Living Building Challenge, such efforts are often optional offering little incentive for adoption. This paper raises four opportunities for consideration to underscore the important connection between Inclusive Design and health equity. Specifically, the opportunities explored here included Inclusive Design’s role in 1) informing more integrative design processes; 2) bringing an equity lens to healthy and sustainable building strategies; 3) inspiring more equitable urban planning initiatives; and 4) informing safety and disease prevention efforts. Findings from this exploratory paper are intended to serve as a foundation to support future research efforts and practical applications of Inclusive Design to advance health equity.

NOTES

- ¹ “IWBI Launches Global Network of Advisors to Advance Health Equity Worldwide,” International WELL Building Institute, accessed November 15, 2020, <https://resources.wellcertified.com/press-releases/iwbi-launches-global-network-of-advisors-to-advance-health-equity-worldwide/>.
- ² Paula Braveman et al., *What Is Health Equity? And What Difference Does a Definition Make*, (Princeton: Robert Wood Johnson Foundation, 2017), accessed October 12, 2021, <https://www.rwjf.org/en/library/research/2017/05/what-is-health-equity-.html>.
- ³ Reehana Raza, James Ladi Williams, and Sara McTarnaghan, *Emerging Lessons from the COVID-19 Pandemic for Building Urban Health Equity, 5 Pathways for Cross-Sector Action*, (Washington, DC: Urban Institute, 2021), accessed October 12, 2021, <https://www.urban.org/research/publication/emerging-lessons-covid-19-pandemic-building-urban-health-equity>.
- ⁴ “Health Equity: Definition,” Virginia Department of Health, accessed November 15, 2021, <https://www.vdh.virginia.gov/health-equity/definitions/#:%7E:text=Health%20equity%20entails%20focused%20societal,injustices.%2D%20From%20Healthy%20People%202020>.
- ⁵ Chiquita Brooks-LaSure et al., *State Strategies for Overcoming Barriers to Advance Health Equity*, (State Health and Value Strategies (SHVS) and Manatt Health, 2020), accessed November 15, 2021, <https://www.shvs.org/wp-content/uploads/2020/11/State-Strategies-for-Overcoming-Barriers-to-Advance-Health-Equity.pdf>.
- ⁶ Edward Steinfeld and Jordana Maisel, *Universal Design: Creating Inclusive Environments*, (Hoboken: John Wiley & Sons, Inc., 2012), 27-63.
- ⁷ Matteo Bianchin and Ann Heylighen, “Fair by Design: Addressing the Paradox of Inclusive Design Approaches,” *The Design Journal* 20, no.1 (2017): S3162-S3170, doi:10.1080/14606925.2017.1352822; Hans Persson, Henrik Åhman, Alexander Arvei Yngling, and Jan Gulliksen, “Universal Design, Inclusive Design, Accessible Design, Design for All: Different Concepts—One Goal? On the Concept of Accessibility—Historical, Methodological and Philosophical Aspects,” *Univ Access Inf Soc* 14 (2015): 505–526, doi: 10.1007/s10209-014-0358-z.
- ⁸ John Salmen, “The Environment is Political: Universal Design and Social Sustainability with Leslie Kanes Weisman,” *Universal Design Newsletter* 12, no. 2 (April 2012): 1-8; Steinfeld and Maisel, *Universal Design*, 36-48.
- ⁹ Howard Fletcher, *The Principles of Inclusive Design. (They Include You)*, (The Commission for Architecture and the Built Environment (CABE), 2006), accessed January 12, 2022; “Inclusive Design Toolkit: What is Inclusive Design,” University of Cambridge, accessed November 15, 2021, <http://www.inclusivedesigntoolkit.com/whatis/whatis.html>.
- ¹⁰ “What are Social Determinants of Health?” *Healthy People 2030*, U.S. Department of Health and Human Services, Office of Disease Prevention and Health Promotion, accessed November 15, 2021, <https://health.gov/healthypeople/objectives-and-data/social-determinants-health>.
- ¹¹ “What are Social Determinants of Health,” *Healthy People 2030*.
- ¹² Jhacova Williams and Valeria Wilson, *Black Workers Endure Persistent Racial Disparities in Employment Outcomes*, (Economic Policy Institute, 2019), accessed October 20, 2021, <https://www.epi.org/publication/labor-day-2019-racial-disparities-in-employment/>.
- ¹³ “Persons with a Disability: Labor Force Characteristics Summary,” U.S. Bureau of Labor Statistics, Economic News Release 2021, accessed November 15, 2021, <https://www.bls.gov/news.release/disabl.nr0.htm>.
- ¹⁴ “Universal Design,” U.S. Department of Labor, Office of Disability Employment Policy, accessed November 2, 2021, <https://www.dol.gov/agencies/odep/program-areas/employment-supports/universal-design>.
- ¹⁵ Annie Jean-Baptiste, *Building for Everyone: Expand Your Market with Design Practices from Google’s Product Inclusion Team* (Hoboken: John Wiley & Sons, Inc., 2020).
- ¹⁶ Albert Shum et al., *Inclusive Design Toolkit*, (Microsoft, 2016), accessed November 15, 2021, <https://www.microsoft.com/design/inclusive/>.
- ¹⁷ Jonathan F. Haris and Livia Lam, “Is There a Right to Job Quality? Reenvisioning Workforce Development,” *California Law Review Online* 11, no. 339 (2020): 339-348, <https://dx.doi.org/10.2139/ssrn.3644346>.
- ¹⁸ Adam Gamoran, *The Future of Educational Inequality in the United States: What Went Wrong and How Can We Fix It?* (William T. Grant Foundation, 2015), accessed November 15, 2021, <http://wtgrantfoundation.org/resource/the-future-of-educational-inequality-what-went-wrong-and-how-can-we-fix-it>.

¹⁹ CAST, *Universal Design for Learning Guidelines Version 2.2*. (CAST, 2018), accessed November 15, 2021, <https://udlguidelines.cast.org>.

²⁰ Gabrielle Rappolt-Schlichtmann et al. "Universal Design for Learning and Elementary School Science: Exploring the Efficacy, Use, and Perceptions of a Web-Based Science Notebook," *Journal of Educational Psychology* 105, no. 4 (2013): 1210–1225, <https://doi.org/10.1037/a0033217>.

²¹ Kavita Rao and Caroline Torres, "Supporting Academic and Affective Learning Processes for English Language Learners with Universal Design for Learning," *TESOL Quarterly* 51, no. 2 (2017): 460-472, <https://doi-org.prox.lib.ncsu.edu/10.1002/tesq.342>.

²² "Access to Health Services," Healthy People 2030, U.S. Department of Health and Human Services, Office of Disease Prevention and Health Promotion, accessed November 15, 2021, <https://www.healthypeople.gov/2020/topics-objectives/topic/social-determinants-health/interventions-resources/access-to-health>.

²³ Lisa Iezzoni, "Toward Universal Design in Assessing Health Care Experiences," *Medical Care* 40, no. 9 (2002): 725-728, https://journals.lww.com/lww-medicalcare/Citation/2002/09000/Toward_Universal_Design_in_Assessing_Health_Care.1.aspx.

²⁴ Eric Isa Mosca, Edward Steinfeld, and S. Capolongo, "Universal Design Assessment Tool to Promote Well-being and Inclusion in Healthcare Environment," *European Journal of Public Health* 30, no. 5 (2020): v219, <https://doi.org/10.1093/eurpub/ckaa165.589>.

²⁵ Lorna Roe et al., "To live and age as who we really are: Perspectives from Older LGBT+ People in Ireland," *HRB Open Res* 3, no. 6 (2020), doi: 10.12688/hrbopenres.12990.2.

²⁶ "Social and Community Context," Healthy People 2030, U.S. Department of Health and Human Services, Office of Disease Prevention and Health Promotion, accessed November 15, 2021, <https://health.gov/healthypeople/objectives-and-data/browse-objectives/social-and-community-context>.

²⁷ Steinfeld and Maisel, 2012.

²⁸ Salmen, 2012; Steinfeld and Maisel, 2012.

²⁹ Mihaela Vorvoreanu et al., "From Gender Biases to Gender-Inclusive Design: An Empirical Investigation," Proceedings of the 2019 CHI Conference on Human Factors in Computing Systems, New York, New York, May 2019, <https://doi.org/10.1145/3290605.3300283>; Jennifer R. Daniels and Tracy J. Geiger, "Universal Design and LGBTQ (Lesbian, Gay, Transgender, Bisexual, and Queer) Issues: Creating Equal Access and Opportunities for Success," Paper presented at the annual meeting of The Association for the Study of Higher Education, 2010.

³⁰ Aimi Hamraie, "Designing Collective Access: A Feminist Disability Theory of Universal Design," *Disability Studies Quarterly* 33, no. 4 (2013), <https://dsq-sds.org/article/view/3871/3411>; Mia Mingus, "Changing the Framework: Disability Justice," *RESIST Newsletter*, 2010, accessed January 3, 2022, <https://leavingevidence.wordpress.com/2011/02/12/changing-the-framework-disability-justice/>

³¹ Bettye Rose Connell et al. *The Principles of Universal Design Version 2.0*. (North Carolina State University: The Center for Universal Design, 1997), accessed November 15, 2021, https://projects.ncsu.edu/ncsu/design/cud/about_ud/udprinciplestext.htm.

³² Evastina Björk, "A Nordic Charter for Universal Design," *Scand J Public Health* 42, no. 1 (2014):1-6, doi: 10.1177/1403494813500860; P. John Clarkson and Roger Coleman, "History of Inclusive Design in the UK," *Applied Ergonomics* 46, Part B (2015): 235-247, <https://doi.org/10.1016/j.apergo.2013.03.002>.

³³ Molly Follette Story, James L. Mueller, and Ronald L. Mace, *The Universal Design File: Designing for People of All Ages and Abilities*, (North Carolina State University: The Center for Universal Design, 1998), https://projects.ncsu.edu/ncsu/design/cud/pubs_p/pudfiletoc.htm.

³⁴ "Neighborhood and Built Environment," Healthy People 2030, U.S. Department of Health and Human Services, Office of Disease Prevention and Health Promotion, accessed November 15, 2021, <https://health.gov/healthypeople/objectives-and-data/browse-objectives/neighborhood-and-built-environment>.

³⁵ Chiquita Brooks-LaSure et al., 2020.

³⁶ "Is Participatory Design Really That Inclusive? Exploring Practitioner's Perspectives on Barriers to Inclusion in Participatory Design," Medium, accessed on November 15, 2021, <https://medium.com/hcil-at-umd/is-participatory-design-really-that-inclusive-73922b899d4e>.

³⁷ Gabriel Arboleda, "Beyond Participation: Rethinking Social Design," *Journal of Architectural Education* 74, no. 1 (2020): 15-25, <https://doi.org/10.1080/10464883.2020.1693817>; Yanru Guo and Dion Goh, "We Want to Hear Your Voice: Power Relations in Participatory Design," Proceedings of the 11th International Conference on Information Technology: New Generations, 2014, 561-566. Doi: 10.1109/ITNG.2014.9.

- ³⁸ “Inclusive Design Principles,” Centre for Inclusive Design, accessed on November 19, 2021, <https://centreforinclusivedesign.org.au/index.php/resources/inclusive-design/>.
- ³⁹ Jean Hardy and Stefani Vargas, “Participatory Design and the Future of Rural LGBTQ Communities,” In *Companion Publication of the Designing Interactive Systems Conference*, New York, New York, 2019, <https://doi.org/10.1145/3301019.3323894>.
- ⁴⁰ Tracey MacTavish et al., “A Participatory Process for the Design of Housing for a First Nations Community,” *J Hous and the Built Environ* 27 (2012): 207-224, DOI 10.1007/s10901-011-9253-6.
- ⁴¹ Andrea Gossett et al., “Beyond Access: A Case Study on the Intersection between Accessibility, Sustainability, and Universal Design,” *Disability and Rehabilitation: Assistive Technology* 4, no. 6 (2009): 439-450, DOI: 10.3109/17483100903100301.
- ⁴² Gosset et al., 2009.
- ⁴³ Steinfeld and Maisel, 2012.
- ⁴⁴ Ian Dillon and Jaren Green, “Professional Practice: Universal Design,” American Society of Landscape Architects, 2020, accessed November 15, 2021, <https://www.asla.org/universaldesign.aspx>.
- ⁴⁵ Steinfeld and Maisel, 2012.
- ⁴⁶ Steinfeld and Maisel, 2012.
- ⁴⁷ Danise Levine, *Universal Design New York 2*, (New York: City of New York Department of Design and Construction in partnership with The Mayor’s Office for People with Disabilities, 2003).
- ⁴⁸ Jun Sik Kim and Byung Yong Jeong, “Universal Safety and Design: Transition from Universal Design to a New Philosophy,” *Work* 67, no 1 (2020):157-164. doi: 10.3233/WOR-203261.
- ⁴⁹ Victoria Lanteigne and Mei-Yee Oram, “Universal Design: A Tool for Creating Equitable Spaces after COVID-19,” *International WELL Building Institute* (2020), accessed November 15, 2021, <https://resources.wellcertified.com/articles/universal-design-a-tool-for-creating-equitable-spaces-after-covid-19/>
- ⁵⁰ Steinfeld and Maisel, 2012.
- ⁵¹ Story, Mueller, and Mace, 1998.

BIBLIOGRAPHY

- Bianchin, Matteo and Ann Heylighen. “Fair by Design: Addressing the Paradox of Inclusive Design Approaches.” *The Design Journal* 20, no. 1sup (2017): S3162-S3170. doi:10.1080/14606925.2017.1352822.
- Björk, Evastina. “A Nordic Charter for Universal Design.” *Scand J Public Health* 42, no. 1 (2014):1-6. doi: 10.1177/1403494813500860.
- Braveman, Paula, Elaine Arkin, Tracy Orleans, Dwayne Proctor, and Alonzo Plough. *What Is Health Equity? And What Difference Does a Definition Make?* Princeton: Robert Wood Johnson Foundation, 2017. Accessed October 12, 2021. <https://www.rwjf.org/en/library/research/2017/05/what-is-health-equity-.html>.
- Brooks-LaSure, Chiquita, Patti Boozang, Kaylee O’Connor, and Alisha Reginal. *State Strategies for Overcoming Barriers to Advance Health Equity*. State Health and Value Strategies (SHVS) and Manatt Health, 2020. Accessed November 15, 2021. <https://www.shvs.org/wp-content/uploads/2020/11/State-Strategies-for-Overcoming-Barriers-to-Advance-Health-Equity.pdf>.
- CAST. *Universal Design for Learning Guidelines Version 2.2*. CAST, 2018. Accessed November 15, 2021. <https://udlguidelines.cast.org>.
- Centre for Inclusive Design *Inclusive Design Principles*. Accessed on November 19, 2021, <https://centreforinclusivedesign.org.au/index.php/resources/inclusive-design/>.
- Clarkson, John P. and Roger Coleman. “History of Inclusive Design in the UK.” *Applied Ergonomics* 46, Part B (2015): 235-247. <https://doi.org/10.1016/j.apergo.2013.03.002>.
- Connell, Bettye Rose, Mike Jones, Ron Mace, Jim Mueller, Abir Mullick, Elaine Ostroff, Jon Sanford, Ed Steinfeld, Molly Story, and Gregg Vanderheiden. *The Principles of Universal Design Version 2.0*. North Carolina State University: The Center for Universal Design, 1997. Accessed November 15, 2021. https://projects.ncsu.edu/ncsu/design/cud/about_ud/udprinciplestext.htm.
- Daniels, Jennifer R. and Tracy J. Geiger. “Universal Design and LGBTQ (Lesbian, Gay, Transgender, Bisexual, and Queer) Issues: Creating Equal Access and Opportunities for Success.” Paper presented at the annual meeting of The Association for the Study of Higher Education, 2010.

- Dillon, Ian and Jaren Green. "Professional Practice: Universal Design." American Society of Landscape Architects, 2020. Accessed November 15, 2021. <https://www.asla.org/universaldesign.aspx>.
- Gamoran, Adam. *The Future of Educational Inequality in the United States: What Went Wrong and How Can We Fix It?* William T. Grant Foundation, 2015. Accessed November 15, 2021. <http://wtgrantfoundation.org/resource/the-future-of-educational-inequality-what-went-wrong-and-how-can-we-fix-it>.
- Gossett, Andrea, Mansha Mirza, Ann Kathleen Barnds, and Daisy Feidt. "Beyond Access: A Case Study on the Intersection between Accessibility, Sustainability, and Universal Design." *Disability and Rehabilitation: Assistive Technology* 4, no. 6 (2009): 439-450. DOI: 10.3109/17483100903100301.
- Guo, Yanru and Dion Goh, "We Want to Hear Your Voice: Power Relations in Participatory Design," Proceedings of the 11th International Conference on Information Technology: New Generations, 2014, 561-566. Doi: 10.1109/ITNG.2014.9.
- Hardy, Jean and Stefani Vargas. "Participatory Design and the Future of Rural LGBTQ Communities." In *Companion Publication of the Designing Interactive Systems Conference*, New York, New York, 2019. <https://doi.org/10.1145/3301019.3323894>.
- Jean-Baptiste, Annie. *Building for Everyone: Expand Your Market with Design Practices from Google's Product Inclusion Team*. Hoboken: John Wiley & Sons, Inc., 2020.
- Hamraie, Aimi. "Designing Collective Access: A Feminist Disability Theory of Universal Design." *Disability Studies Quarterly* 33, no. 4 (2013). <https://dsq-sds.org/article/view/3871/3411>.
- Harris, Jonathan F. and Livia Lam. "Is There a Right to Job Quality? Reenvisioning Workforce Development." *California Law Review Online* 11, no. 339 (2020): 339-348. <https://dx.doi.org/10.2139/ssrn.3644346>.
- Healthy People 2030, U.S. Department of Health and Human Services, Office of Disease Prevention and Health Promotion. "Access to Health Services." Accessed November 15, 2021. <https://www.healthypeople.gov/2020/topics-objectives/topic/social-determinants-health/interventions-resources/access-to-health>.
- Healthy People 2030, U.S. Department of Health and Human Services, Office of Disease Prevention and Health Promotion. "Neighborhood and Built Environment." Accessed November 15, 2021. <https://health.gov/healthypeople/objectives-and-data/browse-objectives/neighborhood-and-built-environment>.
- Healthy People 2030, U.S. Department of Health and Human Services, Office of Disease Prevention and Health Promotion. "Social and Community Context." Accessed November 15, 2021.
- Healthy People 2030, U.S. Department of Health and Human Services, Office of Disease Prevention and Health Promotion. "What are Social Determinants of Health?" Accessed November 15, 2021. <https://health.gov/healthypeople/objectives-and-data/social-determinants-health>.
- <https://health.gov/healthypeople/objectives-and-data/browse-objectives/social-and-community-context>
- lezzoni, Lisa. "Toward Universal Design in Assessing Health Care Experiences." *Medical Care* 40, no. 9 (2002): 725-728. https://journals.lww.com/lww-medicalcare/Citation/2002/09000/Toward_Universal_Design_in_Assessing_Health_Care.1.aspx.
- International WELL Building Institute. "IWBI Launches Global Network of Advisors to Advance Health Equity Worldwide." Accessed November 15, 2021. <https://resources.wellcertified.com/press-releases/iwbi-launches-global-network-of-advisors-to-advance-health-equity-worldwide/>.
- Kim, Jun Sik and Byung Yong Jeong. "Universal Safety and Design: Transition from Universal Design to a New Philosophy." *Work* 67, no. 1 (2020):157-164. doi: 10.3233/WOR-203261.
- Lanteigne, Victoria and Mei-Yee Oram. "Universal Design: A Tool for Creating Equitable Spaces after COVID-19." International WELL Building Institute, 2020. Accessed November 15, 2021. <https://resources.wellcertified.com/articles/universal-design-a-tool-for-creating-equitable-spaces-after-covid-19/>.
- Levine, Danise. *Universal Design New York 2*. New York: City of New York Department of Design and Construction in partnership with The Mayor's Office for People with Disabilities. 2003.
- MacTavish, Tracey, Marie-Odile Marceau, Michael Optis, Kara Shaw, Peter Stephenson, and Peter Wild. "A Participatory Process for the Design of Housing for a First Nations Community." *J Hous and the Built Environ* 27 (2012): 207-224. DOI 10.1007/s10901-011-9253-6.
- Mingus, Mia. "Changing the Framework: Disability Justice." *RESIST Newsletter*, 2010. Accessed January 3, 2022. <https://leavingevidence.wordpress.com/2011/02/12/changing-the-framework-disability-justice/>.
- Mosca, Eric Isa, Edward Steinfeld, and S. Capolongo. "Universal Design Assessment Tool to Promote Well-being and Inclusion in Healthcare Environment." *European Journal of Public Health* 30, no. 5 (2020): v219. <https://doi.org/10.1093/eurpub/ckaa165.589>.

- Persson, Hans, Henrik Åhman, Alexander Arvei Yngling, and Jan Gulliksen. "Universal Design, Inclusive Design, Accessible Design, Design for All: Different Concepts—One Goal? On the Concept of Accessibility—Historical, Methodological and Philosophical Aspects." *Universal Access in the Information Society* 14 (2015): 505–526. doi: 10.1007/s10209-014-0358-z.
- Rao, Kavita and Caroline Torres. "Supporting Academic and Affective Learning Processes for English Language Learners with Universal Design for Learning." *TESOL Quarterly* 51, no. 2 (2017): 460-472. <https://doi-org.prox.lib.ncsu.edu/10.1002/tesq.342>.
- Rappolt-Schlichtmann, Gabrielle, Samantha G. Daley, Seoin Lim, Scott Lapinski, Kristin H. Robinson, Mindy Johnson. "Universal Design for Learning and Elementary School Science: Exploring the Efficacy, Use, and Perceptions of a Web-Based Science Notebook." *Journal of Educational Psychology* 105, no. 4 (2013): 1210–1225. <https://doi.org/10.1037/a0033217>.
- Raza, Reehana, James Ladi Williams, and Sara McTarnaghan. *Emerging Lessons from the COVID-19 Pandemic for Building Urban Health Equity, 5 Pathways for Cross-Sector Action*. Washington, DC: Urban Institute, 2021. Accessed October 12, 2021. <https://www.urban.org/research/publication/emerging-lessons-covid-19-pandemic-building-urban-health-equity>.
- Roe, Lorna, Miriam Galvin, Laura Booi, Lenisa Brandao, Jorge Leon Salas, Eimear McGlinchey, and Dana Walrath. "To live and age as who we really are: Perspectives from Older LGBT+ People in Ireland." *HRB Open Res* 3, no. 6 (2020). doi: 10.12688/hrbopenres.12990.2.
- Salma. "Is Participatory Design Really That Inclusive? Exploring Practitioner's Perspectives on Barriers to Inclusion in Participatory Design." Medium. Accessed on November 15, 2021, <https://medium.com/hcil-at-umd/is-participatory-design-really-that-inclusive-73922b899d4e>.
- Shum, A., Kat Holmes, Kris Woolery, Margaret Price, Doug Kim, Elena Dvorkina, Derek Dietrich-Muller, Nathan Kile, Sarah Morris, Joyce Chou, Sogol Malekzadeh, Sogol Malekzadeh. *Inclusive Design Toolkit*. Microsoft, 2016. Accessed November 15, 2021. <https://www.microsoft.com/design/inclusive/>.
- Steinfeld, Edward and Jordana Maisel. *Universal Design: Creating Inclusive Environments*. Hoboken: John Wiley & Sons, Inc., 2012.
- Story, Molly Follette, James L. Mueller, and Ronald L. Mace. *The Universal Design File: Designing for People of All Ages and Abilities*. North Carolina State University: The Center for Universal Design, 1998: 10. https://projects.ncsu.edu/ncsu/design/cud/pubs_p/pudfiletoc.htm.
- University of Cambridge. "Inclusive Design Toolkit: What is Inclusive Design." Accessed November 15, 2021. <http://www.inclusivedesigntoolkit.com/whatis/whatis.html>.
- U.S. Bureau of Labor Statistics. "Persons with a Disability: Labor Force Characteristics Summary." Economic News Release, 2021. Accessed November 15, 2021. <https://www.bls.gov/news.release/disabl.nr0.htm>.
- U.S. Department of Labor, Office of Disability Employment Policy. "Universal Design." Accessed November 2, 2021. <https://www.dol.gov/agencies/odep/program-areas/employment-supports/universal-design>.
- Vorvoreanu, Mihaela, Lingyi Zhang, Yun-Han Huang, Claudia Hilderbrand, Zoe Steine-Hanson, and Margaret Burnett. "From Gender Biases to Gender-Inclusive Design: An Empirical Investigation." Proceedings of the 2019 CHI Conference on Human Factors in Computing Systems, New York, New York, May 2019, <https://doi.org/10.1145/3290605.3300283>.
- Williams, Jhacova and Valeria Wilson. *Black Workers Endure Persistent Racial Disparities in Employment Outcomes*. Economic Policy Institute, 2019. Accessed October 20, 2021. <https://www.epi.org/publication/labor-day-2019-racial-disparities-in-employment/>.
- Virginia Department of Health. "Health Equity: Definition." Accessed November 15, 2021. <https://www.vdh.virginia.gov/health-equity/definitions/#:%7E:text=Health%20equity%20entails%20focused%20societal,injustices.%2D%20From%20Healthy%20People%202020>.