Review of Health Equity in Chicago, 2021

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Center for Community Health Equity
The Center for Community Health Equity was founded by DePaul University and Rush University in 2015 with the goal of improving community health outcomes and contributing to the elimination of health inequities in Chicago. To learn more about the center, please visit us at www.healthequitychicago.org.

Annual Review
Our Annual Review offers a concise summary of peer-reviewed health equity research in Chicago. Our aim is to document, on an annual basis, the extent to which research in this city is focused on problem-focused or solution-focused work. These annual reviews, conducted since 2016, can be accessed here:
https://healthequitychicago.org/our-work/annual-review-of-health-equity-research/

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Abstract

Introduction: Chicago has long served as an important setting for documenting health disparities and evaluating efforts to address health inequities and to improve the health of marginalized populations. Comprehensive annual summaries of health equity research in Chicago have been developed in the last ten years to build knowledge of themes and keywords that consistently come up in health equity research in Chicago, as well as what topics are missing. This review builds upon prior work by providing a systematic overview of Chicago-based or Chicago-focused health equity research published in 2021, including research influenced by the COVID-19 pandemic.

Methods: We conducted a structured search of PubMed and Scopus bibliographic datasets to identify peer-reviewed research articles published in 2021 using the keyword “Chicago” in the title or abstract. Eligible articles were categorized by study design, dimension of inequity (e.g., race, age, socioeconomic status, gender), and whether they were problem-focused (describing disparities) or solution-focused (evaluating interventions or strategies).

Results: In total,146 original research studies met our inclusion criteria. Most articles were authored by researchers affiliated with academic institutions. The majority of the studies were problem-focused (n=121), while fewer examined solutions (n=25). While the majority of articles had more than one theme, the most common themes included race (n=127), age (n=44), sex (n=44), and sexual orientation (n=31). Other themes included color, pregnancy, national origin, disability, and transgender status. COVID-19 was a prominent topic across themes, with studies focusing on vaccination methods, disparities, and community-level impacts.

Discussion: Health equity research in Chicago remains largely focused on describing disparities rather than testing solutions. Race continues to be the most frequently examined theme, with increasing attention to age, sex, and sexual orientation studies. The prominence of COVID-19 related research reflects its substantial impact on health inequities in 2021 and potentially beyond. Future research should prioritize intervention-based approaches to advance solutions and reduce persistent health disparities in Chicago.

Introduction

Health inequities have long disproportionately affected marginalized populations in the United States, with Chicago serving as an important setting for documenting disparities and evaluating efforts to address them. Since 2016, the Center for Community Health Equity (www.healthequitychicago.org) has conducted an annual review to summarize health equity research in Chicago and assess trends in the field. Building on prior work, this review not only continues to highlight current problems and possible strategies to advance equity in Chicago, but also offers new insights and solutions for these inequities in the context of the COVID-19 pandemic. The articles were categorized by study design (descriptive, hypothesis testing/analytical, and interventional) and themes (race, color, sexual orientation, pregnancy, age (over 40), national origin,disability, sex, and transgender status) to highlight specific commonalities in health inequities in 2021. This review aims to identify gaps in the current literature to inform future efforts to advance health equity in Chicago.

Methods

A comprehensive scoping review was developed by the authors, which included articles published from January 1, 2021 until December 31, 2021. PubMed and Scopus bibliographic databases were searched. The PubMed query was: (chicago[Title/Abstract]) AND (("2021/01/01"[Date - Publication] : "2021/12/31"[Date - Publication]). The Scopus query was: (TITLE-ABS-KEY ("Chicago")) AND PUBYEAR = 2021). Covidence was used as the software to organize the process of reviewing articles and extracting data. A standard process was followed of uploading the citation files identified by the searches in PubMed and Scopus. Covidence software then removed duplicate citations. One author (RCS) reviewed the citation information (i.e. title and abstract) to exclude articles that were not original research, were pre-prints, did not involve data from participants and/or communities in Chicago, and did not seem to address a health equity or minority health issue. For the remaining citations, RCS obtained full article information and uploaded the articles into Covidence. Two authors (RCS and SL) reviewed the full articles to remove any articles that did not fit criteria regarding setting, timing, study population, and health outcomes. Conflicts concerning article inclusion were decided among the authors (SL, MK, RCS, RS) though scheduled weekly meetings.

The included articles underwent data extraction using a template developed in Covidence. From each article, metadata regarding the title of the article, the lead author name and contact information, the lead and additional author institution characteristics, and the study funding sources were collected. Then, the study was characterized as being problem or solution focused, the type of study (descriptive, hypothesis testing/analytic, interventional) was determined, and the study design type was categorized. Key protected groups studied in the paper and the keywords for the paper were determined. The key question/aim of study was determined and information for the PICOT framework [1] (population, independent variable/intervention, comparator, outcome measure, timing, and setting) was summarized along with the key results and takeaway message.

A primary reviewer conducted the extraction (SL, MK, RS) and a secondary checker confirmed the information extracted. For items that could not be abstracted or that had questions, a second author attempted to locate the information. The data extraction tool information was then downloaded into a Microsoft Excel file and organized as a table. The authors double-checked all missing elements and made adjustments in the original data to enable standardized formatting. A final extraction table was utilized for analyses.

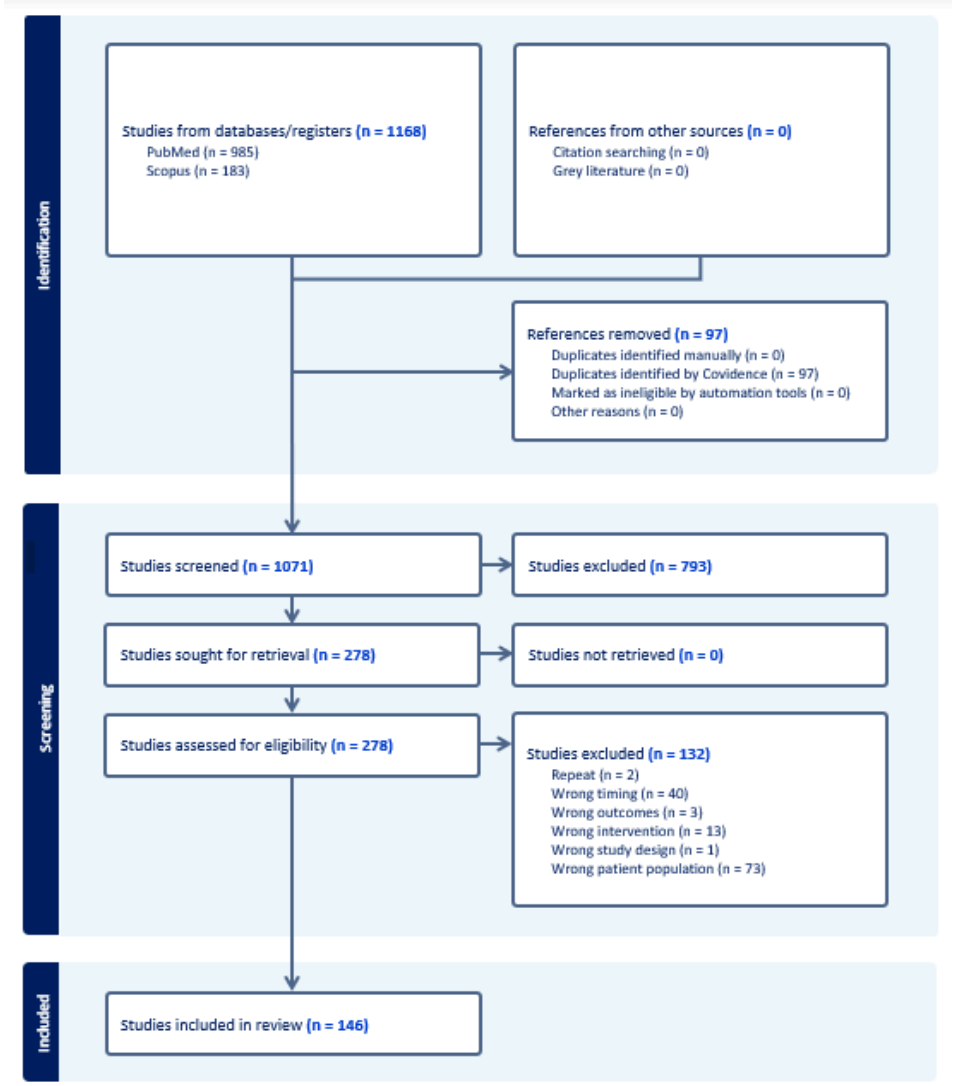
Themes were determined by assessing the overall subject matter and objective of the study. Themes were categorized based on protected group categories in federal anti-discrimination legislation.[2] Articles that had themes that were unclear were discussed and a decision regarding the primary theme was made by the authors. Once the articles were categorized, they were summarized. One article was highlighted per theme based on the quality of the methodology, as well as its ability to add to the knowledge about inequities. Themes were grouped together and were utilized to assess keywords within the primary themes. A word frequency tool was utilized to see what keywords were most common within each theme.

This year, we implemented health equity categories using the Healthy People 2030 social determinants of health groupings. [3] These areas describe the structural factors that may affect many parts of an individual's or a community's holistic health. These categories based on Healthy People 2030 included: Social and Community Context, Healthcare Access and Use, Neighborhood and Physical Environment, Education, Income and Wealth Gaps, and Workplace Conditions. The reviewers categorized each article with as many health equity categories as they deemed were relevant to the article.

Results

The PRISMA flow diagram for articles identified for data extraction is shown in Figure 1. Originally, 1,168 article citations were identified by the search in PubMed (n=985) and in Scopus (n=183). Duplicates (n=97) were then removed by Covidence software. Next, 1,071 articles were reviewed and triaged based on data available in the title and abstract and only articles mentioning health equity and Chicago were kept. As a result, 793 articles were removed. Through obtaining open access articles, articles available in the Rush Medical Library journal collection, and interlibrary loan services, the full text of all 278 remaining articles were retrieved. With full text review, 132 articles were excluded with the most common reasons being the wrong patient population (n=73) or the wrong timing (n=40). Designation of wrong patient population was most likely due to data not being collected from people or communities based in Chicago and wrong timing was commonly due to entry of the electronic publication date rather than the actual journal publication date. Data extracted from the remaining 146 articles are analyzed.

Figure 1. PRISMA Flow Diagram for Article Selection



ARTICLE METRICS

Author and Institutional Characteristics

All of the major academic institutions in Chicago were represented in this analysis. The three most frequently represented academic institutions were University of Chicago (n=26), University of Illinois at Chicago (n=21), and Northwestern University (n=13). Sinai Urban Health Institute (n=4), contributed to this review as did several other non-academic institutions such as Sinai Urban Health Institute, Howard Brown Health, and the Chicago Department of Public Health.

While the majority of the articles were from authors based in Chicago, articles also came from academic institutions, nonprofit groups, and hospitals outside of the Chicagoland region. For instance, included studies were authored by researchers from Harvard University, Brown

University, and New York University. Additionally, several federal institutions such as National Defense Medical Center and Centers for Disease Control and Prevention contributed articles included in this analysis. In addition, one organization outside of the United States had an article in this review (Ateneo de Manila University, The Philippines).

Problem- vs. Solution-Focused

Each article was evaluated to determine if the research was directed at analyzing current problems in the context of health disparities as well as articles offering potential solutions to close these health outcome gaps. For 2021 studies,121 of the 146 articles (83%) were problem-focused and 25 were solution-focused. Next, articles were categorized into descriptive (n=61), hypothesis testing/analytical (n=65), and interventional (n=20). One problem-focused and one solution-focused article was chosen to be highlighted in Box 1 and Box 2, respectively.

Box 1. Problem-Focused Article Example: "Association of Vitamin D Levels, Race/Ethnicity, and Clinical Characteristics With COVID-19 Test Results." **[doi: 10.1530/ey.18.14.1] [4]**

This study examined whether COVID-19 test results are associated with vitamin D levels, and whether these associations differ between White and Black individuals. The population for the study was 4,638 individuals (mean age 52.8; 69% women; 49% Black, 43% White) with a prior vitamin D level, tested for COVID-19. The results showed that among Black individuals, lower vitamin D levels were strongly associated with higher risk of COVID-19 positivity. Compared to levels above 40 ng/mL, the incidence rate ratio (IRR) for a positive COVID-19 test was 2.55 for levels <20 ng/mL and 2.64 for levels 30-<40 ng/mL. Each 1 ng/mL increase in vitamin D above 30 ng/mL was associated with a 5% decrease in risk (IRR 0.95). No statistically significant associations were found between vitamin D levels and COVID-19 risk in White individuals. Overall, vitamin D deficiency (<20 ng/mL) was more common in Black (36%) than White (16%) individuals.

Box 2. Solutions-Focused Article Example: "Impact of an Educational Comic to Enhance Patient-Physician-Electronic Health Record Engagement: Prospective Observational Study" **[doi: 10.2196/25054**] [5]

This paper posed the question: How does the use of an educational comic improve patient-physician-electronic health record (EHR) interactions? Fifty participants each from the adult patient and pediatric parent cohorts were selected at random for follow-up telephone interviews which were a mean of 8 months [range: 3 to 12 months] after their in-person visit and initial review of the comic. Overall, 71.0% (115/162) of adult patients and 71.6% (224/313) of pediatric parents agreed the comic encouraged EHR involvement. African American and Hispanic participants were more likely to ask to see the screen and become involved in EHR use when provided with the comic.

Themes

While most articles had more than one theme (defined as engaging and/or analyzing data from protected groups in US federal anti-discrimination law), the most common themes included race (n=127), age (n=44), sex (n=44), and sexual orientation (n=31). COVID-19 was a prominent topic across themes, particularly in studies that focused on vaccination methods, disparities, and community-level impacts.

Key Word Analysis

Keywords were curated for each theme. A word frequencer tool was used to count the total number of keywords to see how often they were repeated (see Table 1). This year, key words were common amongst all five themes, which was an interesting difference from past years.

Table 1. Keywords within Each Overarching Theme.

Race (n=127)	Age (n=44)	Sexual Orientation (n=44)	Sex (n=31)
Health	Health	Sexual	Health
Disparities	COVID-19	Health	Social
COVID-19	Sexual	Men	Violence
Social	Disparities	Minority	HIV
Men	Social	HIV	Men

Select Exemplar Articles

Next, we selected exemplar articles for each of the themes (see Table 2). These articles showcase the high variability of the health outcomes. In addition, there was a mix of cohorts being solely from Chicago or Chicago participants were incorporated with other groups from around the country. There were articles addressing health disparities along with articles focused on minority health. Finally, various analytic methodologies were used. The articles also point to the intersectionality of themes. For instance, in the article listed for the race theme, the cohort was Black and White breast cancer patients, women were implicitly involved to capture gender and older versus younger age was examined as a mediator of the health outcomes.

Table 2. Exemplar Articles for Common Themes.

Theme	Article Title	Article Synopsis
Race	Impact of post-diagnosis weight change on survival outcomes in Black and White breast cancer patients. [doi: 10.1186/s13058-021-01397-9] [6]	The article evaluated weight change patterns over time following the diagnosis of breast cancer and examined the association of post-diagnosis weight change and survival outcomes in Black and White patients. At diagnosis, most patients were overweight or obese with a mean BMI of 27.5 kg/m2 and 31.5 kg/m2 for Blacks and Whites, respectively. Notably, about 45% of the patients had cachexia before death and substantial weight loss started about 30 months before death. In multivariable-adjusted analyses, compared to stable weight, BMI loss showed greater than 2-fold increased risk in overall survival, breast cancer-specific survival, and disease-free survival. The associations were not modified by race, age at diagnosis, and pre-diagnostic weight.
Age	Neighborhood Socioeconomic Resources and Crime-Related Psychosocial Hazards, Stroke Risk, and Cognition in Older Adults. [doi: 10.3390/ijerph18105122] [7]	This article examined the association of neighborhood socioeconomic resources and crime-related psychosocial hazards on stroke risk and cognition, and tested whether cardiovascular health mediates the relationship between neighborhood environment and cognition. The article found that neighborhood violent crime is associated with individual-level stroke risk, which in turn is linked to poorer attention and information processing in older adults, independent of neighborhood socioeconomic resources.
Sexual Orientation	The Co-evolution of online social networks and syphilis incidence among young black men who have sex with men [doi: 10.1016/j.socscimed.2021.113764] [8]	The study posed the question: What is the co-evaluation of online social networks and syphilis incidence among black men who have sex with men? Results showed that young black men who have sex with men (YBMSM) tended to form Facebook friendships with other YBMSM who had similar syphilis and HIV status profiles, and the hazard of contracting syphilis was likewise influenced by their Facebook friendships, albeit subtly, by being connected to infectious network members.
Sex	A Qualitative Exploration of Women's Interest in Long-Acting Injectable Antiretroviral Therapy Across Six Cities in the Women's Interagency HIV Study: Intersections with Current and Past Injectable Medication and Substance Use [doi: 10.1089/apc.2020.0164] [9]	The study asked the question: What is women's interest in long-acting injectable antiretroviral therapy across six cities? The results showed that four primary categories of women emerged; those who (1) received episodic injections and had few LAI-related concerns; (2) required frequent injections and would refuse additional injections; (3) had a history of injection drug use, of whom some feared LAI might trigger a recurrence, while others had few LAI-related concerns; and (4) were currently injecting drugs and had few LAI-related concerns

Healthy People 2030 Social Determinants of Health Factors

As shown in Table 3, at least one article addressed each of the social determinants of health factors as identified in Health People 2030. Most articles that were reviewed had more than one category covered, as health is complicated and intersectional. The most frequent category was social and community context (n=131). The least frequent category in the review was workplace conditions (n=7).

Table 3. Frequency of Healthy People 2030 Health Equity Factors in 2021 Articles

Health Equity Factor	Number of Articles*
Social and Community Context	130
Healthcare Access and Use	90
Neighborhood and Physical Environment	59
Education	25
Income and Wealth Gaps	41
Workplace Conditions	7

*Note: Total number of articles is greater than articles extracted as more than one health equity factor could be selected for each article.

Discussion

This review continues the analysis conducted in previous years by the Annual Review of Health Equity Research through the Center for Community Health Equity. It summarizes the health equity research about Chicago-based populations published in 2021. Most papers reviewed were problem-focused, meaning they described health disparities rather than tested interventions to advance equity. The 146 articles identified explored a wide variety of themes, including race, age, sex, and sexual orientation. Keywords were extracted from each theme to gain further insight into overarching themes in the growing field of health equity research in the city of Chicago.

This review included more articles than the 2020 review (124 in 2020 vs. 146 in 2021). Both Scopus and Pubmed were used in the initial phase of this year's review. The top themes explored in last year's review were race (n=31), place (n=28), gender/sexuality (n=19), socioeconomic status (n=14), and personal characteristics (n=13). The primary categories of this year's research articles were race (n=127), age (n=44), sex (n=44), and sexual orientation (n=31). While most of these categories remained priorities in research this year, age was a top category this year. Included keywords in this theme were "cognition," "Alzheimer's disease," and "older than 40." It is unclear if this finding is an anomaly associated with the COVID-19 pandemic differentially impacting older adults, with older adult cohorts having collected more data on conditions such as social isolation which became more important for society to understand, or if this represented these research groups having more time to generate and send articles in for publication as recruitment and in-person data collection efforts slowed. As in 2020, this year's review also contained information on the continued development of the COVID-19 pandemic, specifically beginning from the US outbreak in March 2020. The word "COVID-19" appeared often in keywords that became the subthemes of this paper.

This year's review also showed different trends to last year in the number of articles describing a problem (107 in 2020 vs. 121 in 2021) and solution (15 in 2020 vs. 25 in 2021). The percentage of problem articles in 2021 was 83% as compared to 88% in 2020. While it is always anticipated that problem defining articles will outnumber solution-testing articles, further analyses may be of benefit to determine if solution articles align with problems articles for particular health conditions or if there are disconnects where problem articles and solution articles are not aligned in the Chicago region. Such future analyses may help to predict health conditions in which more resources devoted to intervention research is needed.

We also found this year that the most frequent health equity category was social and community context. The least frequent category in the review was workplace conditions. In future years, it will be interesting to see if social and community context continues to be the most frequently used health equity category, as this was the first year this characteristic was determined.

There are limitations to our work and the limitation of the literature at large. A large proportion of the articles under consideration were focused on problems. We believe that our search methodology is unbiased and is appropriately coded to capture solution-based papers. We might have found more papers by examining non-peer reviewed sources but we have not developed a consistent and reliable method to do so. In addition, another major limitation we faced was that only articles published in major journals were included in the search, effectively excluding any local research being conducted by smaller, local agencies. This is a potential reason why the articles reviewed continue to be largely problem focused.

Health inequity in Chicago continues to be an issue that impacts its residents across place, race, gender, sexuality, religion, and socioeconomic status, and many of those disparities have increased due to the COVID-19 pandemic and the strain that it has placed on all aspects of society. Topics like gender and sexuality remain major areas of academic interest, and we may see a shift to addressing solutions to these disparities in the coming years.

As problems are defined, they can ideally be solved. To properly address these health inequities, more research will need to be done to examine solutions in the city of Chicago, possibly with the aid of smaller, community-based coalitions and agencies who can more effectively address the needs of the people who live there.

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