

Review of Studies and Data on Playspace Equity for Children

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Executive Summary

Play is a critical part of childhood and essential to every child's ability to thrive and develop. However, historic inequities have left many children in low-resourced communities and communities of color with less access to quality playspaces, limiting their ability to fully experience the physical, social, and emotional health benefits of play.

This review is part of the project Mapping Playspace Inequity in three locally-focused Colorado communities funded by the Colorado Health Foundation and led by KABOOM!, which aims to achieve playspace equity in Colorado through a comprehensive, cross-system map of playspace inequities that exist within local communities in Colorado to illuminate gaps in access to safe, quality places to play. This project seeks to address the challenge of lack of access to, and a sense of belonging in, quality playspaces in low-income racial/ethnic minority communities that has resulted from the effects of historical and contemporary forms of systemic racism.

To provide baseline evidence of playspace inequity in Colorado and a framework for needed evaluation and interventions moving forward, this study reviewed grey and academic literature to identify and analyze existing studies and data regarding the access to and quality of playspace infrastructure available for youth across socioeconomic, racial, and ethnic groups in Colorado and nationwide. The objectives were to (1) explore the research trend over time and across place, (2) examine types of playspaces studied, (3) investigate how access and equity were measured for the analysis, and (4) summarize key findings and recommendations for both practice and research from the literature. This study reviewed thirty-three articles, which consisted of (1) fifteen grey literature reports from organizations and government agencies that focused on playspace-related work in Colorado and nationwide and (2) eighteen academic articles identified using key term searches from online databases.

Results demonstrate a growing trend in the number of studies on playspace inequity from 1997 to 2021, which suggests efforts have been made across government agencies, non-profit organizations, and university researchers to investigate and advocate for equitable access to playspaces in Colorado and nationwide. However, these efforts have been concentrated on urban areas, such as the City of Denver. Racial/ethnic and socioeconomic variations in access and quality of playspaces have been the primary focus in the literature while a few studies aimed to uncover disparities across rural and urban communities. Playspaces in parks and green spaces were the most studied in regards to access inequities, whereas a limited number of studies focused on general physical activity settings, playgrounds, and schoolyards. Presence, proximity, and quality were the main indicators used to evaluate access and quality of playspaces. However, the measures used for each indicator varied across studies.

A thematic analysis of the content from the study findings highlighted major themes, revealed current playspace inequity challenges, and outlined directions for future work. The four primary themes regarding equity in access and quality of playspaces available for youth in Colorado and nationwide are:

1. Lower socio-economic status (SES), racial and ethnic minorities, and rural populations appear to **have more limited access to playspaces** for children's play in neighborhoods, parks, and schools, compared to higher SES, non-Hispanic white, and urban groups.
2. In some communities, access distance to playspaces is equitable, but the **quality of facilities and amenities within playspaces is inequitable** and restricts opportunities for play.
3. Adverse physical and social conditions in some low-income and racial and ethnic **diverse neighborhoods may limit access to playspaces**, such as limited public and active transportation opportunities, personal safety concerns, lack of inclusion, and low public awareness.
4. Disparities in access and **quality of playspaces could result from historical and contemporary forms of systemic racism**, such as racially discriminatory land use and housing policies.

We identified three themes regarding implications and management recommendations:

1. **What should be done?**
 - Interventions in both playspace physical features and programming should be targeted to improve access and quality of outdoor play opportunities, especially for low-income racial and ethnic minority communities.
 - Physical access does not guarantee use of playspaces. Urban policies should be implemented to ensure child-friendly, well-maintained, and quality social and built neighborhood environments for outdoor play.
2. **Who should be involved?**
 - Strong partnerships across sectors are needed to gather resources and people power to achieve the goal of improving access and quality of playspace for all children, which involves collective efforts from governments, advocate coalitions, playspace-related agencies, and communities.
3. **Where to start?**
 - Evidence-based approaches are essential to pinpoint challenges and identify sufficient solutions, including evidence-based evaluations, mapping tools, and action frameworks.

Finally, we identified three research recommendation themes:

1. Uncovering “why” disparities in playspace access is a persistent issue.
2. Improvements in variables, study scopes, and data analysis of equity in access and quality of playspace.
3. Understanding use of playspaces and play in and with low-income communities of color can help develop interventions that ensure inclusion and meet the needs of all communities.

The present work summarizes recent investigations and results of playspace equity and provides an evidence-based approach to support and empower individuals, organizations, and governments to implement solutions that are needed to eradicate playspace inequities.

1. Introduction

Play is a critical part of childhood and essential to every child's ability to thrive. Research confirms that play is a primary vehicle for growth and fosters positive skills in all areas of child development (Ginsburg, Communications, Child, & Health, 2007). However, far too many kids lack access to quality places to play due to the ongoing effects of systemic racism. Social, economic, and environmental factors (often referred to as social determinants of health) are more pervasive in marginalized areas and have been closely linked to health disparities (Office of Disease Prevention and Health Promotion, 2022). For example, associations have been shown between access to urban parks and lower risk of obesity, cardiovascular disease, poor mental health, and other health-related concerns (Reuben, Rutherford, James, & Razani, 2020). Research suggests that access to playspaces such as parks and green space may alleviate health disparities observed in vulnerable populations (Rigolon, Browning, McAnirlin, & Yoon, 2021). Researchers have also shown that lack of quality parks and places to play where children live is correlated with lower levels of physical activity (PA) among children of color and kids from communities with lower socio-economic status (McKenzie, Moody, Carlson, Lopez, & Elder, 2013). Historic inequities have left communities of color with less access to playspaces than their white counterparts (Bruton & Floyd, 2014), limiting their ability to fully experience the physical, social, and emotional health benefits of play.

KABOOM! defines playspace inequity as a lack of access to, and a sense of belonging in, quality playspaces due to the effects of historical and contemporary forms of systemic racism. Belonging is defined as the state of “wholeness” where no person is left out of our circle of concern, and every person has a voice and the opportunity to participate in the design of political, social, and cultural structures. Our pursuit of achieving playspace equity depends on our ability to direct resources to address playspace inequity as well as centering racial equity in our work so communities can shape the process, playspace, and impact, thereby increasing a sense of belonging.

A first step to achieving playspace equity is to understand current access and quality of playspaces across the US and with this project, in Colorado, specifically. In winter 2021/2022, we conducted a review of white papers, grey literature, and academic literature to provide baseline evidence and a framework for needed evaluation, measures, and interventions moving forward.

Why Colorado?

“The population in Colorado has become more racially and ethnically diverse. The non-white population in Colorado is projected to increase to 45% by 2050. The fastest growing and largest minority groups — Hispanics — is estimated to make up 33% of the state's minority population by 2040” (Colorado Parks and Wildlife, 2020). The Colorado Health Foundation, funding partner for the current evaluation, believes in health as a basic human right and is committed to improving health equity, including through equitable access to quality playspaces.

This evidence review identified and analyzed existing studies and data regarding the access and quality of playspace infrastructure available for youth across socioeconomic, racial, and ethnic groups in Colorado as well as nationwide. The objectives are: (1) explore the research trend over time and across place; (2) summarize the main objectives addressed in identified studies; (3) investigate how 'access' and 'equity' were measured for the analysis; (4) summarize key findings from the literature.

2. Methodology¹

To gather evidence regarding equitable access and quality of playspaces in Colorado and across the US, we collected information from two primary sources: grey literature² and academic, peer-reviewed literature. Specific data collection strategies through various data sources were employed to search for the two types of literature. For the grey literature, we identified municipal reports, community engagement documentations, master plans, and reports from organizations and government agencies that focused on playspace-related work in Colorado and nationwide. To compile a comprehensive list during the data collection process, we contacted, or reviewed online materials from 53 organizations, government agencies, and university departments, such as the Trust for Public Land, Great Outdoor Colorado, National Recreation and Parks Association, GreenPlay, Kaiser Permanente Colorado, PlayCore, Colorado Public Health/Parks & Recreation Collaborative, University of Colorado, Colorado Department of Public Health and Environment, Children & Nature Network, and the US Forest Service. A systematic search for academic peer-reviewed literature was conducted using seven electronic databases: Web of Science, PubMed, APA PsycINFO, CAB Abstracts, CINAHL, MEDLINE, and SPORTDiscus. We searched for English papers that were published between 1900 and September 2021. The key terms used for the search consisted of five categories: population (i.e., youth), playspace, activity (including outdoor recreation and PA), equity, access (see Table 1).

1,190 unique academic articles and 24 grey literature reports regarding access and quality of playspaces in Colorado or the US were identified. Articles and reports were included in the review if they met the following inclusion criteria: (1) article type: academic articles (e.g., journal articles, conferences proceedings, and dissertation papers); grey literature (e.g., organizational/grant/municipal reports, community engagement summaries, and master plans), (2) studies regarding outdoor playspaces (both permanent and temporary) and other recreational assets, (3) studies examining the access or quality of playspaces, (4) studies conducted in the US or specific to Colorado, (5) full text availability. An initial screening was conducted to exclude studies not in Colorado or the US nationwide (i.e., studies

1. Researchers at NC State University and College of Charleston completed the enclosed review and evaluation. The process and draft results were shared with KABOOM! and The Colorado Health Foundation. The researchers maintained autonomy over the evidence and evaluation presented here.

2. For simplicity, we are referring to all provided, found, and reviewed non-peer reviewed research and evaluation as grey literature. This includes both traditional grey literature (e.g., reports, policies, working papers, grants) and white papers (e.g., municipal, state, and federal reports). Academic literature are those papers published in peer-reviewed journals.

specific to other states or countries were excluded), which resulted in 41 articles. Eleven articles remained after a second, full reading of each paper. Additionally, 7 new articles from the references were included. Fifteen grey literature reports remained after screening using the same criteria. The final literature and report dataset included 33 articles for data extraction.

Category	Search Terms
Population	child* OR preschool* OR youth OR adolescen* OR teen* OR “young people”
Playspace	playspace* OR “play space*” OR playground* OR “play area*” OR “play place*” OR “play structure*” OR “play component*” OR “play environment*” OR playscape* OR “sports facilit*” OR “sport facilit*” OR “recreational facilit*” OR “exercise facilit*” OR “park” OR “parks” OR “natural amenit*” OR “recreational resource*” OR playstreet* OR “play street*” OR “pop-up park*” OR openstreet* OR “open street*” OR “open space*” OR “recreational space*” OR “green space*” OR greenspace* OR “natural environment*”
Activity	recreation OR “outdoor activit*” OR “unstructured activit*” OR “structured activit*” OR “leisure time activit*” OR “leisure-time activit*” OR “physical activit*” OR exercise* OR “sport” OR sports
Equity	equity OR inequity OR inequities OR diversity OR diverse OR inclusion OR inclusive OR exclusion* OR justice OR equality OR inequality OR inequalities OR disparit* OR deprivation* OR disadvantage* OR segregation* OR vulnerable OR vulnerabilit* OR socioeconomic* OR “socio economic” OR “socio-economic” OR minority OR minorities OR low-income OR “low income” OR “lower income” OR race OR racial OR ethnic OR ethnicity OR “social class” OR poverty OR underprivileged OR under-privileged OR economic* OR marginal* OR “distressed communit*” OR underrepresented
Access	access OR accesses OR quality OR qualities OR accessibilit* OR availabilit*

TABLE 1.
Key terms used for the search

We used the following variables to record the content from each article and report: (1) geographic location, (2) dataset used, (3) sample size and study population, (4) demographic variations in the data, (5) type of playspaces (e.g., parks and schoolyards), (6) type of access and measurements (e.g., proximity and park size), (7) operationalization of playspace equity, (8) analysis methods, (9) key findings from the results, (10) recommendations for management, (11) recommendations for future evaluation or research. A thematic analysis was used to identify themes that emerged from results, recommendations for management (i.e., call to actions), and recommendations for future evaluation or research.

3. Findings

3.1 Descriptive Overview of Included Reports

Thirty-three reports and articles met the inclusion criteria for this review. There has been an increasing trend in relevant reports published from 1997 to 2021. Examining the number of reports by article type (i.e., academic papers and grey literature), this increasing trend from 2015 mainly results from the growing body of grey literature (n=15).

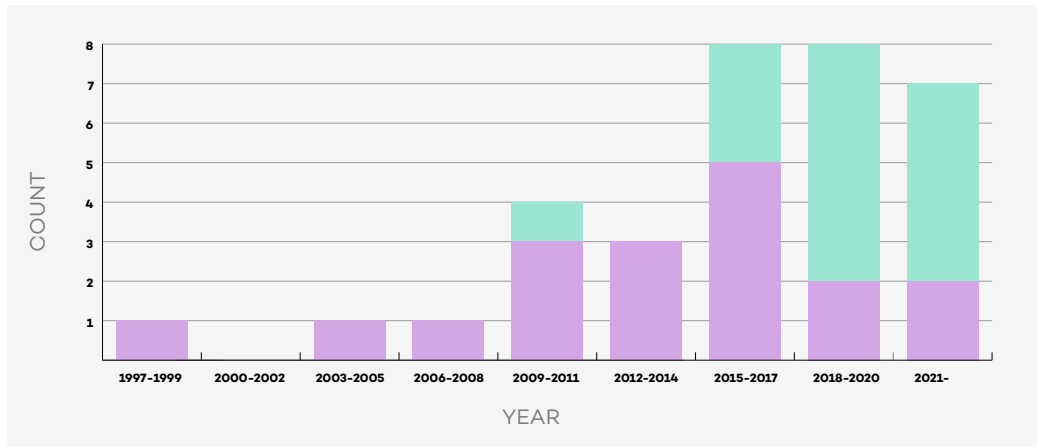


FIGURE 1.
Number of reports meeting inclusion criteria published from 1997 to 2021 by report type

- Academic paper
- Grey literature

Figure 2 illustrates the geography and number of studies conducted: Colorado cities and counties (n=11), Colorado statewide (n=4), regional US including CO (n=3), and nationwide (n=14). A few studies that investigated regions that did not cover Colorado are included, which are the 3 studies in the US Midwestern Metro area and 1 study in four cities in CA. The three studies occurring outside the Colorado or nationwide scope closely met inclusion criteria and were deemed important to include for the analysis.

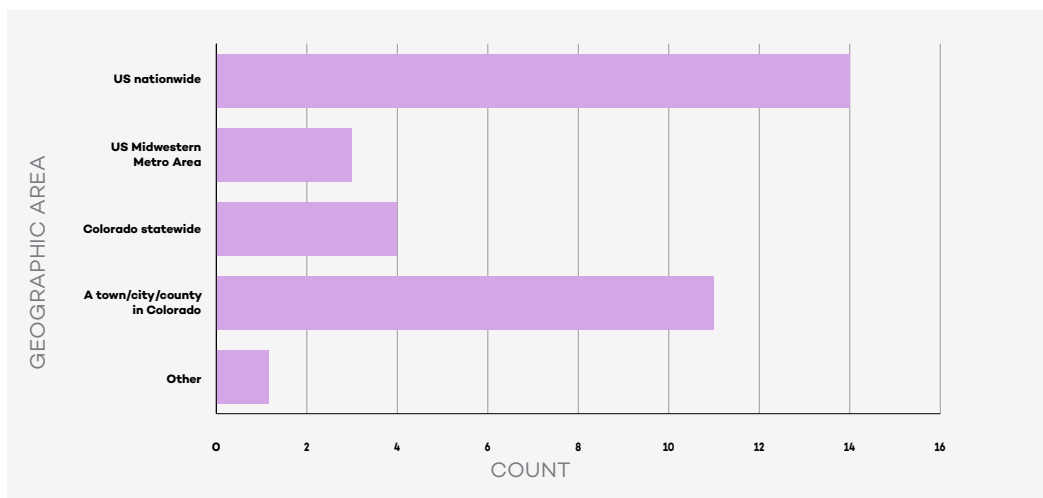


FIGURE 2.
Number of papers conducted by geographic region

Reports in this review investigated the gaps in access and quality of playspaces among specific populations. The most common demographic segmentations were based on race and ethnicity (n=24) and socioeconomic status (n=20). Nine of the 33 reports examined playspace access and quality across urban, suburban, and rural populations.

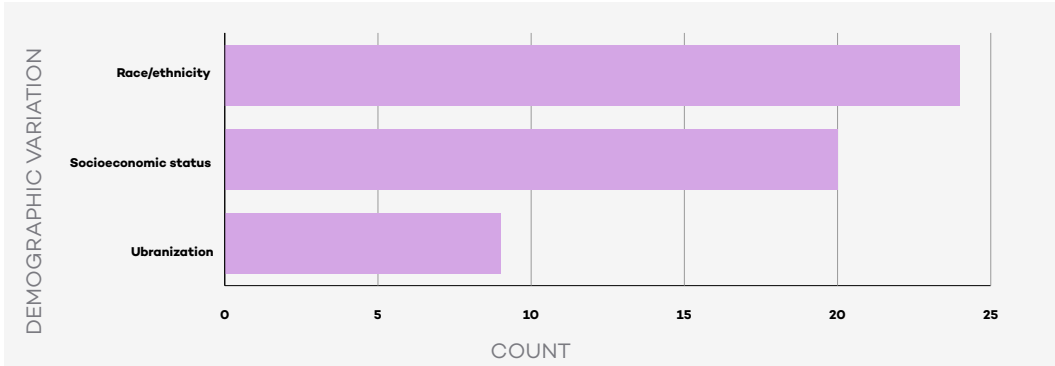


FIGURE 3.
Number of reports focused on specific demographic segmentation

Among the 33 studies, six types of playspaces were investigated. These types of playspaces are not mutually exclusive. Twenty-one studies examine parks and greenspaces that were publicly available vegetated lands, usually including facilities and amenities onsite. Five studies assessed recreation areas including indoor or outdoor settings. Four studies focused on play areas designated for children, such as playgrounds. Four studies examined all PA opportunities for youth, such as parks, playgrounds, school gyms, and pools. Two studies specifically looked at playgrounds and gym in schools. One study assessed shared streets, which provided open spaces and programs for children’s outdoor

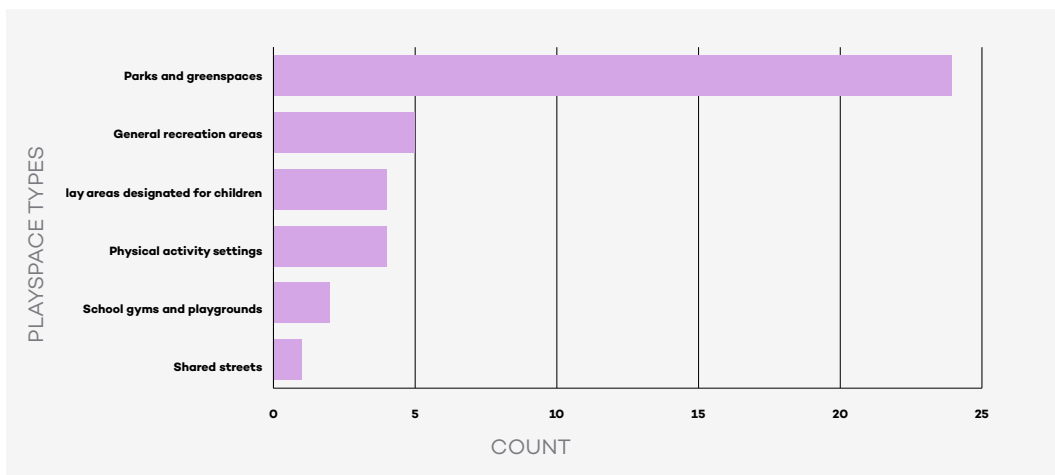


FIGURE 4.
Number of reports per playspace type

play.

3.2 Operationalization of Access to and Quality of Playspaces: Presence, Proximity, Quality, and Congestion

Previous studies have used various factors to examine access to and quality of playspaces. To capture different spatial features that influence the provision of playspaces, this review adopts an operational definition that conceptualizes

access and quality of playspaces through four indicators identified in the literature: presence, proximity, quality, and congestion (National Recreation and Parks Association, 2011; Rigolon, 2016, 2017; Scott, 2021). Presence defines the number or size of playspaces within a geographic unit or in a distance buffer of a geographic unit (Rigolon, 2016). Proximity describes access to a playspace or park via a short walk, a short driving distance, or a short commute (Rigolon, 2016). Quality is assessed based on park amenities, conditions, and neighborhood characteristics that may influence users' experiences (National Recreation and Parks Association, 2011; Rigolon, 2016). User congestion describes the potential user frequencies in a park based on the number of geographic units (e.g., residential blocks) that are in close proximity to the park lands (Scott, 2021).

Table 2 demonstrates the number of studies that applied each indicator. These counts are not mutually exclusive as some reports examined multiple indicators of access within the same analysis. Each access indicator was operationalized differently, and in varying combinations, across the reports.

Presence was the most common measure of access and evaluated using three approaches (n=14): (1) the presence (yes/no) of play facilities within a location (e.g., schools) (n=1) or in a buffer distance of a geographic unit or residential location (n=1); (2) the number of parks, facilities, and amenities within a geographic unit (e.g., census block groups) (n=3) or within a certain buffer distance of a geographic unit or a residential location (n=3); (3) acres of park land (per capita) within the boundaries of a geographic unit (n=5) or within a buffer distance of a geographic unit (n=3).

In total, 12 studies examined playspace proximity. Six unique proximity measurements were used across the studies. Proximity was mostly evaluated based on a distance from a residential location or a geographic unit to a park, physical activity facility, or any additional playspace designated for children (n=9). For example, whether residents live within 10-min walk or ½ mile to parks (n=3), the distance or travel time to the nearest parks (n=3), or percentage of residents in a census block group or city living in 10-min walk or ½ mile to parks (n=3). In addition to objective proximity measurements, three studies examined proximity as perceived by the study population (for example, self-reported distance to the nearest playspace).

For estimating both presence and proximity, some weighted procedures were used to measure distance to playspaces. A street-network distance was used in three studies to estimate distance given that radial distance may underestimate the actual travel distance (i.e., via sidewalks, paths, and streets versus “as the crow flies”) between two locations (Rigolon & Flohr, 2014; Scott, 2021; Talen, 1997). Two studies used weighted methods to account for the social or environmental context that may influence access beyond distance alone, such as walkability (Rigolon, 2017) and residential density in a geographic unit (Wen, Zhang, Harris, Holt, & Croft, 2013).

There were also multiple measures of the quality of a playspace. Five studies used measurement tools that consisted of the quantity, quality, and condition of the play features and amenities. One study included stakeholders and community

members' input to establish values that reflect the needs and preference of the community. Two studies developed quality measurements that included customized items to specifically assess children's needs and preferences. For example, one study examined the elements that children desire in a playspace while another considered whether diverse play structures are offered and included safety from crime. One recent study applied "congestion", an index to assess potential crowdedness in parks based on the number of surrounding residential blocks.

Overall, the four indicators — presence, proximity, quality, and congestion — have been used in studies of playgrounds, parks, and green space access using a variety of specific measures. As for assessing access to child-specific playspaces (e.g., playgrounds, PA settings for youth, and schoolyards), perceived access and the number of playspaces in neighborhoods were the main measures. Based on the reports reviewed, studies have not applied more advanced measures (e.g., considering street network distance and neighborhood walkability for youth) for specific child playspace access evaluation. That is, to date, rigorous studies of access within our defined geography are limited to parks as a whole and not playspaces specifically.

The items that were used to evaluate the quality of child-specific playspaces also varied. While one study simply asked school administrators if the facilities on campus were in adequate condition, another study used a comprehensive playground safety checklist that considered supervision, age-appropriate design, surface, and maintenance. One study aimed to identify child-friendly places by developing quality-related items based on children, parents, and teachers'

Access	Measurements	Playspaces
Presence (n = 14)	a) Presence of play facilities in a location indicated by school administrators (Fernandes & Sturm, 2010)	School facilities
	b) Presence of parks or facilities with in a buffer distance of a geographic unit or residential location where the distance was measured through street network analysis (Rigolon & Flohr, 2014)	Parks
	c) Number of parks, facilities or amenities in a geographic unit (e.g., a study-defined neighborhood) (Baldwin, 2020; Slater, Fitzgibbon, & Floyd, 2013; Suminski et al., 2011)	PA facilities and resources, Parks
	d) Number of facilities completely or partially within a certain buffer distance of a geographic unit or a residential location (Gordon-Larsen, Nelson, Page, & Popkin, 2006; Harris, Paul, Young, Zhang, & Fulton, 2015; Rigolon, Browning, & Jennings, 2018)	Parks
	e) Acres of park land (per capita) within the boundaries of a geographic unit (Baldwin, 2020; Design Concepts, 2015; Rigolon et al., 2018; Rigolon & Németh, 2021; Wen et al., 2013)	Parks
	f) Acres of park land per capita within a buffer distance of a geographic unit (Rigolon, 2017; The Trust for Public Land, 2021c)	Parks

TABLE 2.
Indicators of playspace access employed in the studies

	g) Acres of park land located within a buffer distance of a geographic unit calculated based on street network (Talen, 1997)	Parks
Proximity (n = 12)	a) Perceived access (Colorado Department of Public Health and Environment, 2018; Growing Up Boulder, 2019; Powell, Slater, & Chaloupka, 2004)	Parks, PA opportunity locations, any places designated for children
	b) Percentage of population in a geographic unit within a 10-min walk or ½ mile to a park (Rigolon et al., 2018; The Trust for Public Land, 2021c; Ussery et al., 2016)	Parks
	c) A certain distance to park lands from residential locations, such as a 10-min walk and ½ mile distance (Arapahoe County, 2021; Carlson, Brooks, Brown, & Buchner, 2010; Design Concepts, 2015)	Parks
	d) Distance to a nearest park land from a geographic unit weighted by walkability for youth (Rigolon, 2017)	Parks
	e) Distance to the closest seven parks from a geographic unit weighted by population characteristics (Wen et al., 2013)	Parks
	f) Travel time to a the nearest park with the 10-min walk-time from a geographic unit estimated by the Open Source Routing Machine that computes street network distance (OSRM) (Scott, 2021)	Parks
Quality (n = 9)	a) Whether or not a facility is in an adequate condition (Fernandes & Sturm, 2010)	Schools
	b) Quantity and quality of park features and neighborhood walkability (“the GRASP level of service”) (Design Concepts, 2015)	Parks
	c) Assess facility safety in supervision, age-appropriate design, fall surfacing, equipment maintenance (Suminski et al., 2015)	Playgrounds
	d) Quantity and quality of amenities in nature opportunity inventory (i.e., trail-centered activities, natural place-based experiences, educational programs, amenities that create inclusive access and encourage gathering, amenities for sports and recreation), weighted by stakeholder and community inputs (“the Nature-based recreation and ecological values”) (Arapahoe County, 2021)	Parks
	e) A list of desired elements that create enjoyable spaces for children: Community (social with friends/family, culture, informed staff), general play (active play, quiet play, nature play, play structures, electronic play, water play, exercise), nature (animals, wildlife), weather (winter sun, summer shade, seasons, comfortable/pleasant), non-play activities (shopping, food services, food permissible) (Growing Up Boulder, 2019)	Parks

	f) The Quality Index of Parks for Youth (QUINPY) score (Rigolon, 2017)	Parks
	g) ParkScore – the composite index to describe the quality of urban park systems consists of park coverage, park access, park spending per person, and number of facilities per capita (Rigolon et al., 2018)	Parks
	h) Ecosystem service components include provisioning (i.e., community gardens), Regulating (i.e., tree cover, wetlands/lakes/streams), Supporting (i.e., species richness), and Cultural (i.e., trails, users, user activities, cultural amenities) (Baldwin, 2020)	Parks
Congestion (n = 1)	a) A visit frequency computed as a count of residential blocks visiting a specific park area (Scott, 2021)	Parks

experiences and opinions.

3.3 Primary Report Themes:

In general, thematic analysis of the study results identified four primary themes regarding equity in access and quality of playspaces available for youth in Colorado and nationwide. The first two themes mainly emerged from studies that examined associations between playspace access and nearby demographic characteristics (see more details in appendix – table A). Theme 3 includes the environmental and social barriers that restrict access to playspaces, and Theme 4 includes systemic factors directly associated with racism and disparities in playspace access.

Theme 1: Lower socio-economic status (SES), racial and ethnic minorities, and rural populations appear to have more limited access to playspaces for children’s play in neighborhoods, parks, and schools, compared to higher SES, non-Hispanic white, and urban groups.

- Across the US, census block groups with lower socioeconomic status and a higher percentage of racial/ethnic minority population are more likely to **lack various PA settings**, such as sports areas, playgrounds, bike lanes, schools, YMCAs, youth organizations (Gordon-Larsen et al., 2006; Powell et al., 2004), and parks with amenities and facilities for play (Design Concepts, 2015; Rigolon & Flohr, 2014). For example, low-income, urban, Latino adolescence in the Midwestern US were more likely to perceive a shortage of opportunities for PA in their neighborhood environment (Slater et al., 2013).
- Regardless of race, ethnicity, and socioeconomic status, rural or isolated areas are associated with **fewer recreational settings** for PA (Powell et al., 2004) and **parks** within half-mile walking distance (Harris et al., 2015; Ussery et al., 2016), compared with areas with a higher degree of urbanization.

- Lower median household income and the percentage of Latino population are associated with **fewer playgrounds and basketball hoops in parks** across US cities (Rigolon et al., 2018).
- Studies conducted nationwide, as well as in Denver and Pueblo, Colorado, found low-income and predominantly racial/ethnic minority neighborhoods are more likely to have access to **smaller parks and green spaces**, compared to higher income and predominantly white neighborhoods (Rigolon, 2017; Talen, 1997; The Trust for Public Land, 2021c; Wen et al., 2013)
- A study conducted in Colorado indicated low-income minority groups tend to find the **objective park access** in the neighborhoods does not meet their expectation, compared with other groups (Colorado Department of Public Health and Environment, 2018).
- Across the US, children in communities of color are less likely to have access to **schools including a gymnasium and playground in adequate condition** than non-Hispanic white children (Fernandes & Sturm, 2010).

Theme 2: In some communities, access distance to playspaces is equitable, but the quality of facilities and amenities within playspaces is not equitable and restricts opportunities for play.

- Eight studies found that lower income level, lower education attainment, and racial/ethnic minority populations do not necessarily have poor access to parks, greenspaces (Baldwin, 2020; Carlson et al., 2010; Harris et al., 2015; Rigolon, 2017; Ussery et al., 2016; Wen et al., 2013) and PA opportunity locations (Suminski et al., 2011).
- Despite the proximity to the PA opportunity locations, Suminski et al. (2011) revealed that **lack of amenities** is the main issue concerning playground inequity in low-income neighborhoods across the Midwestern US.
- Across US cities, lower socioeconomic status and percentage of Latino and Black populations are associated with **lower quality of parks** (e.g., the ParkScore® based on acreage, walking access, facilities, programming; the Quality Index of Parks for Youth (QUINPY) including play structure diversity, presence of nature, park size, park maintenance, and safety) (Finkelstein, Petersen, & Schottenfeld, 2017; Rigolon, 2017; Rigolon et al., 2018; Rigolon & Németh, 2016; Suminski et al., 2015; The Trust for Public Land, 2021a). Similarly, in Colorado, Rigolon and Flohr (2014) found parks in low income neighborhoods tend to **lack amenities and facilities, natural elements for exploration, and spaces surrounded by vegetation, rocks, or built structures** where children like to play due to the provision of shelter and privacy.

Theme 3: Adverse physical and social conditions in low-income and racial and ethnic diverse neighborhoods may limit access to playspaces.

- Seven studies found that **transportation concerns** are a common barrier

to access, especially for youth in low-income rural minority communities, including lack of public transit and bike lanes, presence of pedestrian barriers (e.g., highways, creek and river, railroads), lack of regional and local trail connectivity to outdoor destinations, and lack of pedestrian-friendly streets (e.g., absence or poor condition of sidewalks and crosswalks) (Colorado Parks and Wildlife, 2020; Design Concepts, 2015; Finkelstein et al., 2017; Great Outdoors Colorado, 2015; Growing Up Boulder, 2019; National Wildlife Federation, 2021; San Luis Valley Inspire Coalition, 2016)

- Six studies identified concerns regarding **safety issues** in neighborhoods have kept youth and parents in low-income communities of color from visiting outdoor recreation spaces, including general personal safety concerns (Carlson et al., 2010; San Luis Valley Inspire Coalition, 2016), presence of gang members and transient populations (Design Concepts, 2015; Slater et al., 2013), exposure to unsafe or illicit activity (e.g., threatening, peer violence, and unleashed dogs) (Finkelstein et al., 2017), and alcohol and drug use (Design Concepts, 2015; Finkelstein et al., 2017; Growing Up Boulder, 2019).
- **Lack of inclusion** could discourage youth in communities of color from spending time outdoors, such as feelings of being unwelcome, racism, language barriers, age barriers, and wealth perceptions (Great Outdoors Colorado, 2015; Growing Up Boulder, 2019).
- **Low public awareness** could hinder the access to and use of playspaces, such as lack of outreach efforts about outdoor PA and related facilities and a general belief that the outdoors is inaccessible (Colorado Parks and Wildlife, 2020; Great Outdoors Colorado, 2015; National Wildlife Federation,

Theme 4: Disparities in access to and quality of playspaces could result from historical and contemporary forms of systemic racism.

- One study investigated the mechanisms that have caused the persistent uneven access to quality parks across communities of different races, ethnicities, and income levels in Denver since the 1940s, which include **racially discriminatory land use and housing policies** that confined disadvantaged groups to certain neighborhoods (Rigolon & Németh, 2021).
- Inequities in park access seem to have been lessened from the 1940s to 2010s. However, the change in disparities was most likely associated with parallel changes in **residential location dynamics driven by the choices of wealthy white residents** (“white flight”), and not proactive policies that advocate for park equity (Rigolon & Németh, 2021).
- Surveys of park and recreation professionals uncovered that park agencies found it difficult to ensure equity and inclusion in parks and recreation, due mainly to **insufficient funding, inadequate staffing and training, facility space, equipment supply shortages, lack of support from general public, and local government leaders** (National Recreation and Parks Association, 2018, 2021).

3.4. Implications and Recommendations from Reports

Three main themes (i.e., the “what”, “who” and “where”?) and associated subthemes emerged from recommendations for practice and research provided in 22 of the reports.

Theme 1: What should be done?

Interventions in both playspace physical features and programming should be targeted to improve access and quality of outdoor recreation opportunities, especially for low-income racial and ethnic minority communities.

- Investments should be made to provide **adequate and diversified facilities** that encourage play, PA and inspire connections with nature for youth in parks, public open spaces, schoolyards, nature centers, urban farms, and youth-centered locations (Finkelstein et al., 2017; Great Outdoors Colorado, 2015; Rigolon, 2017).
- Access to parks for disadvantaged communities can be improved by **developing creative placemaking strategies** that utilize existing resources to develop open spaces for structured or free play, such as linear parks, pocket parks set up by closing street segments, or repurposing underutilized greenspaces and greening vacant lots (Harris et al., 2015; Rigolon, 2017; Rigolon & Németh, 2021).
- In addition to establishing more playspaces, improvements should be made to increase the **quality of existing facilities and amenities**, such as maintenance and renovation, qualified and well-trained staff, and supervision (Design Concepts, 2015; Finkelstein et al., 2017; Harris et al., 2015; National Recreation and Parks Association, 2018).
- To increase playspace provision, **shared-use agreements** between school district partners and local municipalities can open outdoor recreation facilities in schools to the public after school hours and on weekends and holidays (California Pan-Ethnic Health Network, 2009; Fernandes & Sturm, 2010; Harris et al., 2015). For example, The Trust for Public Land (2021b) developed the Community Schoolyard Model that has renovated around 300 schoolyards and has created more functional spaces for play across the US in schoolyards where play equipment was previously lacking or in a deteriorated condition.
- **Free programs and activities** sponsored by local government or community organizations can provide fun activities and create a sense of community, which encourages use of playspaces, such as walking, biking, or park programs, afterschool outdoor/nature-based programs, and Kids in Gear (i.e., bicycle training and empowerment program) (Design Concepts, 2015; Finkelstein et al., 2017; Harris et al., 2015).
- **Public outreach campaigns** that educate low-income communities of

color about the health benefits of outdoor PA and how to access and enjoy outdoor experiences can raise public awareness and make residents believe getting outdoors and being active is achievable, such as the 10-minute walk campaign (Colorado Department of Public Health and Environment, 2018; Great Outdoors Colorado, 2015; National Wildlife Federation, 2021).

Physical access does not guarantee use of playspaces. Urban policies should be implemented to ensure child-friendly social and built neighborhood environments for outdoor play.

- To address disparities in **personal safety** in park and neighborhood environments in low-income communities of color, calls to action propose: “Establish or expand park ranger programs to patrol green space” (Rigolon, 2017), “organize neighborhood watches to promote trust among neighbors, limit the proximity of marijuana and liquor stores to parks or child-center spaces, ensure public spaces are free of garbage, graffiti, and drug paraphernalia, improve lighting at night, provide clean and safe restrooms, and station child care professionals at playspaces to supervise and facilitate play” (Finkelstein et al., 2017).
- Young people need **low-cost transportation** and safe routes to travel to playspaces. Suggested improvements include more well-maintain networks of trails, pathways, and green pockets/corridors connecting schools, neighborhoods, and outdoor recreation facilities (e.g., greenways developed along waterways, utility corridors, and wide underutilized streets in residential neighborhoods) (Great Outdoors Colorado, 2015; Rigolon, 2017), low-cost frequent bus services (e.g., school district sponsored buses), child-friendly streets (e.g., sidewalk and crosswalks improvements, traffic-calming features, and crossing guards near schools) (Finkelstein et al., 2017).

Theme 2: Who should be involved?

Strong partnerships across sectors are needed to gather resources and people power to achieve the goal of improving access and quality of playspace for all children, which involves collective efforts from governments, advocate coalitions, playspace-related agencies, and communities.

- **Governments** can play a key role in addressing disparities in playspace access through: (1) examining and exposing structural issues embodied in the laws and regulations (e.g., housing policies, land use planning) that have led to disparities in access to parks and greenspaces (Rigolon & Németh, 2021), (2) legislation to support playspace equity, and actions to redistribute funds to park and greenspace equity (Design Concepts, 2015; Eldridge, Burrowes, & Spauster, 2019; The Trust for Public Land, 2021c), (3) equity should be considered as an explicit aim in decision making and policy implementation (Scott, 2021), (4) partnerships that bring together multiple public and private sectors (e.g., land use planning, transportation, stormwater management, housing, and education) to ensure access and

quality of playspaces as well as safe neighborhoods (Colorado Parks and Wildlife, 2019; Rigolon & Németh, 2021).

- There is a need to continue to establish and enhance **advocacy coalitions** to raise awareness of playspace inequity issues, influence policy making, and make equitable playspaces the norm in society by implementing evaluation efforts, advocating for prioritizing the application of study recommendations, finding funds to support providers' efforts (Design Concepts, 2015), cultivating shared stewardship across sectors (Colorado Department of Public Health and Environment, 2018; National Wildlife Federation, 2021; The Trust for Public Land, 2021b), and facilitating community mobilization (Rigolon & Németh, 2021).
- As park agencies are the main workforce in ensuring all members of communities have access to playspaces at the local level, financial and technical support are needed for **smaller park agencies** (i.e., less than 50,000 residents) that serve low-income vulnerable and rural neighborhoods, through grants and training opportunities (National Recreation and Parks Association, 2021).
- It was highly recommended to use the bottom-up approach — **engaging communities, especially youth and low resourced communities** in the planning process (Design Concepts, 2015; Rigolon & Németh, 2021; The Trust for Public Land, 2018) — through brainstorming creative and inclusive ideas that form a sense of ownership (Eldridge et al., 2019; The Trust for Public Land, 2018), make sure playspaces meet the needs of communities, develop strategies that facilitate sustainable management (Eldridge et al., 2019), and inspire members' connections to nature (Great Outdoors Colorado, 2015). For example, the Trust for Public Land engaged local communities, including older adults and students (i.e., a formalized youth committee), in the master plan for Panorama Park in Colorado Springs, CO, and in projects that connected nearby schools and the park (The Trust for Public Land, 2018). Another example conducted by the Trust for Public Land obtained ideas about recreational facilities, programs and activities, and park staff recruitment in San Luis Valley, CO (San Luis Valley Inspire Coalition, 2016).

Theme 3: Where to start?

Evidence-based approaches are essential to pinpoint challenges and identify sufficient solutions.

- **Evidence-based approaches** help identify strategies about where to initiate equity and inclusion efforts (National Recreation and Parks Association, 2021), quantify impact, benefit, and current status of park provisions to inform decision making (Eldridge et al., 2019; Rigolon, 2017). For example, Rigolon (2017) assessed park proximity, acreage, and quality across census block groups with different demographic compositions (e.g., income levels, race and ethnicity) and revealed disparities in park access, which further identified the most underserved areas in need of investments. Using the same approach, Rigolon et al. (2018), assessed park provision across US

cities to uncover deficiencies in park systems by comparing cities with similar physical environment characteristics and demographic composition to inform cities in decision making about park provision improvements.

- **Mapping tools** that reveal whether the distribution of park provision varies by neighborhood can demonstrate underserved communities that need enhancement (e.g., to be prioritized for funds or interventions) and help track playspace equity over time (National Wildlife Federation, 2021). For example, the National Environmental Public Health Tracking Network Access to Parks Indicator (NEPHTN API) demonstrates residential park proximity across geographic areas (i.e., county, state, national) and how park proximity may vary by age, racial and ethnic groups, and rural/urban populations (Ussery et al., 2016); (2) the child-friendly city map in Boulder, CO, may help uncover inequity issues in places for children to play by raising awareness of locations with and without play through the city (Growing Up Boulder, 2019).
- One study proposed an **action framework** implemented by local universities can guide evidence-based city-wide or community-wide actions supported by collective efforts across multiple sectors. This process outlined four steps: “(1) problem recognition, (2) meetings between communities, city planners, developers, (3) the creation of sub-community plans or the modifications of form-based codes, (4) new parks or refurbished parks with new play opportunities” (Rigolon & Flohr, 2014).

3.5. Research Recommendations from the Literature

Three main themes emerged from the recommendation for future research across 17 reports.

Theme 1: Uncovering “why” disparities in playspace access is a persistent issue.

- The most frequently mentioned recommendation for future research is to investigate **“what” has led to such disparities in playspace access**, such as land use, housing, park planning (Rigolon, 2017) or some higher level political, social, or ecological considerations (Wen et al., 2013), through policy document analysis or investment analysis (Rigolon & Flohr, 2014). For instance, Scott (2021) implied examining internal processes in decision making within the city could reveal whether and how shared streets in Denver supported the improvement of the disparities in park access across local communities.
- As disparities tend to develop over time, Suminski et al. (2011) and Suminski et al. (2015) proposed using a **longitudinal approach** to investigate PA opportunities over time to uncover factors that led to disparities. Rigolon et al. (2018) suggested using historical census data to investigate disparities in park quality that resulted from decades of investment or disinvestment.
- **Comparative analysis** was also proposed to examine the potential causes

of inequity: why some cities perform better than other cities? Rigolon et al. (2018) and Baldwin (2020) suggested analyzing park inequities across cities with differing sociopolitical systems.

Theme 2: Improvements in variables, study scopes, and data analysis of equity in access and quality of playspace.

- In addition to race, ethnicity, and socioeconomic status, **urban-rural classification** should be considered as one of the population variations to better understand how park access is distributed (Harris et al., 2015; Wen et al., 2013).
- As proximity appears to be considered as the most important determinant of access, studies emphasizing **“quality”** as an additional critical indicator highly associated with “access” should be considered in the equation (Baldwin, 2020; Gordon-Larsen et al., 2006; Ussery et al., 2016). For example, a study published in 1997 has recognized both the number of facilities available and cleanliness in parks as factors in park accessibility (Talen, 1997).
- Other than access and quality, future studies should also incorporate variables in relation to **physical, social, and cultural contexts** as a factor in the accessibility of parks and other PA opportunity locations (Wen et al., 2013), including neighborhood built environment measurements (e.g., walkability, land use, urban form, street-level pedestrian network conditions, and residential mobility and public transportation) (Gordon-Larsen et al., 2006; Slater et al., 2013; Talen, 1997) and safety and social capital in parks as well as in neighborhoods (Rigolon & Flohr, 2014).
- Access to playspaces can vary across different geographic and social contexts. Evaluations with different **geographic scopes** are imperative for state health departments, park and recreation departments, community planners, and public health professionals to develop context-specific strategies that address inequity issues. For example, studies at different geographic scopes can discover city-level inequities to help prioritize communities for grants and neighborhood-level interventions to target underserved communities (Harris et al., 2015; Rigolon et al., 2018; Rigolon & Flohr, 2014). Rigolon (2017) investigated park inequity in Denver and suggested future work at the metropolitan scale provide a more comprehensive understanding of access to parks in as it is very likely to be shaped by both “inner-city gentrification” and “suburbanization of poverty” in Denver and adjacent regions.
- Two studies raised concerns about **uncertainty in the estimated neighborhood-level data** that are frequently used in equity analyses (Powell et al., 2004; Rigolon, 2017). Powell et al. (2004) suggested that future researchers consider using individual-level data to estimate perceived availability of community-level PA settings to account for individual and family-level differences across communities.
- Researchers should be critical about the **data available and use for playspace access estimation**. Rigolon et al. (2018) highlighted some city-owned green vacant lands were excluded from ParkScore® metrics although

these greenspaces could be spaces for recreational use. Many datasets, including ParkScore® have limitations on the quality of parks and park-based amenities.

- Researchers should consider **customizing evaluation tools** to study populations to increase data validity. Rigolon (2017) suggested research include recreation preferences and needs of various racial and ethnic groups to the QQuality INdex of Parks for Youth (QUINPY) to better assess if the study population is appropriately served and included.

Theme 3: Understanding use of playspaces and play in low-income communities of color can help develop interventions that meet the needs of these groups.

- **Investigating children’s needs, preferences about play opportunities**, and how specific facilities, environmental features, and environmental barriers are associated with use patterns and play across racial and ethnic groups will help develop appropriate recommendations (Carlson et al., 2010; Gordon-Larsen et al., 2006; Powell et al., 2004; Slater et al., 2013; Wen et al., 2013).
- To develop strategies for opening schoolyards to the community, Fernandes and Sturm (2010) suggested investigating **how school facilities encourage or shape children’s play and PA**. It is also important to continue evaluating existing shared-use interventions, programs, and how these interventions impact play (Slater et al., 2013).

4. Summary

Systematically collecting and synthesizing recent investigations of playspace inequity in Colorado and the United States is the first key step in taking action steps to achieve playspace equity. This review examined studies investigating access and quality of playspaces and other recreational assets for children within Colorado and across the United States. Fifteen grey literature reports and 18 academic peer-reviewed articles published between 1997 and 2021 were analyzed to describe the status of existing research (i.e., trends over time and across geographic areas, demographic variations, types of playspace studies, and access indicators), research themes, major findings, recommendations for practice, and future evaluation.

Overall, we observed a growing trend in the number of studies on playspace inequity from 1997-2021. The increasing number of organizational and government reports, as well as academic research articles, implies efforts have been made across government agencies, non-profit organizations, and university researchers to investigate and advocate for equitable access to playspaces in Colorado and nationwide. However, among the studies conducted in Colorado, these efforts have been concentrated on urban areas, such as the City of Denver. Racial/ethnic and socioeconomic variations in access and quality of playspaces

have been the primary focus in the literature while only a few studies aimed to uncover disparities across rural and urban areas. Overwhelmingly, playspaces in parks and green spaces were the most studied in regards to access inequities, whereas a limited number of studies focused on more general PA settings, playgrounds, and schoolyards. Among the four indicators (i.e., proximity, size, quality, and congestion) used to evaluate access and quality of playspaces, “proximity” and “quality” were the most used. However, various measurements were used within each indicator, including customized quality and access measurements for several efforts (i.e., walkable and safe neighborhoods for youth and value items weighted by stakeholders and community members).

Results confirm disparities in access to playspaces by socioeconomic status, race/ethnicity, and between urban and rural areas. Playspace access may be constrained by the lack of quality facilities and amenities across communities. Other than the quantity and quality of playspaces, the characteristics of surrounding neighborhoods also play a key role in shaping access to playspaces. For example, the shortage of public transportation and safe routes were identified as key barriers to accessing playspaces. While the majority of studies discovered injustice in playspace access, only a few studies explored the underlying sociopolitical mechanisms that could potentially lead to playspace inequity, such as racially discriminatory land use and housing policies.

The suggested “calls-to-action” include (1) interventions through improvement on the quality of physical features, shared-use agreements to utilize open spaces for play, and programming for youth, and (2) policies that build child-friendly social and built neighborhood environments for outdoor play. Actions should be accomplished through collaborative efforts across multiple sectors, including governments, organizations, advocacy coalitions, park agencies, and most importantly, local communities. These recommendations are also supported by a recent National Academies of Sciences Engineering and Medicine report on Implementing Strategies to Enhance Public Health Surveillance of Physical Activity in the United States (National Academies of Sciences & Medicine, 2019). Specifically, Strategy 18 calls to “Identify and compile GIS-based data sources and methods to facilitate national surveillance of community supports for physical activity” and Strategy 21 calls to “Identify a brief set of prioritized constructs and methods that could be assessed using audits (observations) of streets, parks, and other relevant public spaces.” Evaluation of equitable playspaces that are tailored to children’s needs and preferences across different geographic scopes should continue and be used to identify challenges and inform policy making. **More effort should be made to uncover the sociopolitical processes and ecological considerations that underlie the inequitable distribution of playspace access across different areas through historical and contextual investigation with a qualitative approach. Such an effort can ensure inequities are not repeated.**

5. Conclusion

Play is an essential element that helps children grow, develop, and flourish through physical, social, and emotional wellbeing. In order to play, all youth must have access to quality playspaces, and current disparities in playspace access and quality are contributing to overarching racial/ethnic, socioeconomic, and urban-rural health disparities. The present work summarizes recent investigations and results of playspace equity and provides an evidence-based approach to support and empower individuals, organizations, and governments to implement solutions that are needed to eradicate playspace inequities. Playspace focused strategies such as those proposed by and implemented by KABOOM! are a much-needed part of this solution.

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	Socioeconomic Status		% minority		Urbanization	
	Correlation	Variables/ Locations	Correlation	Variables, Location	Correlation	Variables, Location
Parks and greenspaces						
park proximity	+	(income, Pueblo)* [1]	x	(minority, US) [6]	+	(urban, US) [2]
	-	(education, US) [2]	+	(minority, US)*[7, 8]	+	(metros with larger population, US) [7]
-proximity satisfaction	x	(income, US)[2]	+	(minority, Denver) [3, 4]	+	(non-metro high urbanized, US) [7]
	-	(income, Denver) [3, 4]				
	+	(income, CO) [5]	-	(Latino & black, CO) [5]		
-park facility proximity						
-basketball hoops	+	(income, US) [9]	-	(Latino, US) [9]		
-playgrounds			-	(Latino, US) [9]		
park acreage	+	(income, US) [8, 10]	-	(minority, US) [8, 10]		
	+	(income, Denver) [3]	-	(Latino, Pueblo) [11]		
park quality	+	(income, Pueblo) [11]				
	+	(income, Denver, US) [3, 9]	-	(minority, Denver, US) [3, 9]		
-safety in parks			-	(Black, US) [9]		
-amenities	+	(income, Denver) [3]	-	(minority, Denver) [3]		
-natural elements	+	(Income, CO) [12]				
-higher intimacy	+	(Income, CO) [12]				
	+	(Income, CO) [12]				
Physical activity settings						
# PA facilities and resources	+	(education, US) [11]	-	(Latino, MW US) [15]	+	(urban & suburban, US) [13]
	+	(income, US) [13]	-	(minority, US) [13]		
	-	(income, ME US) [14]				
	-	(poverty, US) [13]				
Playgrounds						
playground quality						
-safety	+	(education, MW US) [16]				
Schools						
having gyms	+	(income, US) [17]	-	(Latino & black, US) [17]		
adequate playgrounds			-	(minority, US) [17]		

Appendix

Note.

***no statistical significance**

[#] stands for the study

1. Design Concepts, Plug in to Nature – Finding connections to the outdoors for youth and families in Pueblo, CO. 2015.
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