



Poor Neighborhoods: Safe Playgrounds

Elizabeth C. Powell, Erin J. Ambardekar*,
and Karen M. Sheehan

ABSTRACT *Although unstructured physical play is helpful to child development and physical activity is important to obesity prevention, up-to-date information about playgrounds and playground hazards in urban areas is limited. Local data are needed to identify problems and target interventions. The aim of this study was to describe the hazards in playgrounds located in low-income (median \$28,728–38,915) and very low-income (median \$18,266–18,955) Chicago neighborhoods. Using a standardized on-site survey (National Program for Playground Safety), two investigators reviewed seventy-eight public playgrounds for hazards related to playground design, safe surfaces, supervision, and equipment design and maintenance. The design of 56 playgrounds (72%) posed no hazards. One playground lacked protection from motor vehicles, and 21 had minor flaws. One playground had an asphalt surface; all others had protective surfaces, usually wood chips. The chips were too thin in many places, and in 15 playgrounds (19%), at least one concrete footing was exposed. Trash was a common surface hazard (68%). Although most equipment was safe (swings of soft materials and appropriate platform barriers), many pieces needed repairs. Equipment maintenance hazards included gaps (44%) and missing (38%) or broken parts (35%). In 13 of 39 playgrounds (33%) where children were observed playing, one or more were unsupervised. Playgrounds in very low-income neighborhoods more often had trash in the fall zone and exposed footings ($P < .01$ for each); there were no differences between low and very low-income neighborhoods in playground design or equipment maintenance. We conclude that playgrounds in low-income Chicago neighborhoods are of good design and have appropriate surfaces. Needed improvements include attention to wood chip depth, the removal of trash from the fall zone, and equipment repairs. Greater adult supervision is warranted.*

KEYWORDS *Playground, Poverty, Urban.*

INTRODUCTION

Unstructured play, an active form of learning for children, is a critical component of healthy child development. Through play, children learn about objects and social relationships. Play enables children to develop physical and problem-solving skills.¹ Children today appear to have fewer opportunities for unstructured play. Many schools have eliminated physical education and recess to spend more time on academic pursuits. Working parents are often not available to supervise their children

*Present address: The Children's Hospital, 1056 East 19th Ave., Denver, CO 80218.

Drs. Powell, Ambardekar, and Sheehan are with the Division of Pediatric Emergency Medicine, Children's Memorial Hospital, Chicago, Illinois; Drs. Powell, Ambardekar, and Sheehan are also with the Department of Pediatrics, Northwestern University's Feinberg School of Medicine, Chicago, Illinois.

Correspondence: Elizabeth C. Powell, Division of Pediatric Emergency Medicine, Box 62, Children's Memorial Hospital, 2300 Children's Plaza, Chicago, IL 60614. (E-mail: epowell@northwestern.edu)

in outdoor play after school, and children's choices are limited to watching television or playing computer games. Loss of unstructured playtime and less physical activity is believed to have contributed to childhood obesity: over 15% of US children 6–11 years old are overweight.²

In a recent position statement about prevention of pediatric overweight, the American Academy of Pediatrics advocated that children have regular access to unstructured play.³ Unfortunately, children living in urban areas, many of whom are at high risk for obesity, often have limited private outdoor play space.

In urban environments, public neighborhood playgrounds provide needed play space for large numbers of children. In a conceptual framework recently presented for understanding the connections between the built environment and health, particular emphasis was directed to the intermediate factors, including public parks and play areas, as they were described as factors potentially affected by policy manipulation with the aim of improved population health.⁴ Because public play areas in urban areas are available for use by many children, it is important that they are safe. Of all injuries associated with playground use, 75% occur on public playgrounds.⁵ Efforts to prevent playground injuries have been initiated both locally and nationally.^{6–9} The U.S. Consumer Product Safety Commission, the federal agency charged with oversight of playground safety, has published guidelines for the design and construction of outdoor play equipment intended for public use.¹⁰ The National Program for Playground Safety was established in 1995 at the University of Northern Iowa through a grant from the Centers for Disease Control and Prevention for the purposes of raising awareness of playground safety and injury prevention.⁶

Investigators in New York observed that playgrounds in low-income neighborhoods had more total hazards as well as equipment maintenance hazards.¹¹ Our objective was to assess playgrounds in poor communities in Chicago, another large urban area with a significant number of low-income neighborhoods.

METHODS

We selected for survey 78 playgrounds from six community areas representing the south, west, and north sides of Chicago. All playgrounds had been developed and were maintained by either the Chicago Park District or the Chicago Public Schools. They were identified through website review and included all public playgrounds in each community area. We used the National Playground Risk Factor Survey, a standardized survey developed by investigators at the National Program for Playground Safety at the University of Northern Iowa, to evaluate each playground.⁶ The survey focuses on six areas: general playground design, four risk factors for injury supervision, age appropriateness, falls to safe surfaces, equipment and surfacing maintenance, and specific equipment components. An investigator (E.J.A.) or one research assistant visited each playground during the summer of 2001 and completed the survey on site.

The median income of the community area (an established grouping of census tracts) where each playground was located was obtained from the 2000 Census of Population and Housing.¹² The annual median incomes of the six community areas included in the study ranged from \$18,266 to \$38,915; we designated the two community areas with median incomes of \$18,266 and \$18,955 to be very low income. For comparison, the median income for the city of Chicago was \$38,625.

We report descriptive summary information collected in the surveys by topic area: general playground design, supervision, age-appropriate equipment, falls to safe surfaces, equipment and surfacing maintenance, and specific equipment. For some analyses we compared playgrounds in low-income neighborhoods to those in very low-income neighborhoods. This study was approved by the Institutional Review Board at Children's Memorial Hospital, Chicago, Illinois.

RESULTS

Survey information was collected at 78 play areas, 20 of which were associated with a school but available for public use. A third of the playgrounds (26) were located in very low-income communities. Most play areas had both stand alone and composite equipment in the play environment. Each play area had at least one slide: other common pieces included horizontal ladders (83%), swings (76%), or sliding poles (69%).

General Design of Play Areas

In 72% of the play areas, the physical layout of play structures was appropriate. Specifically, it was found that there was (1) protection from motorized hazards, (2) a buffer area between equipment and other play zones, (3) moving or swinging equipment placed at the edges of the playground, and (4) a use zone of 6 feet present around each play structure. Only one playground had insufficient protection from motorized hazards, and one lacked a buffer area between the play structures and other play zones. Although all equipment had a minimum use zone of 6 feet, in 18 playgrounds (23%), this provided too little space around the swings. Among playgrounds located in very low-income communities, 81% had no problems with physical layout (vs. 67% in low-income communities, $P = .21$).

Risk Factors for Injury

Supervision There were children playing on the equipment in half ($n = 39$) of the play areas during the time when the survey was completed. In 13 of these areas they lacked supervision (33%). Limited data precluded comparisons about supervision between playgrounds located in very low-income communities and those in low-income communities.

Age Appropriate Design There were no observed blind spots in any play area. On elevated platforms higher than 3 feet, 78% had appropriate barriers to prevent falling or jumping off. However, the design of 50% of equipment pieces/supporting structures allowed children to easily climb on the outside of the equipment to heights over 3 feet. There were no significant differences between playgrounds located in very low-income neighborhoods and those located in low-income neighborhoods in age appropriate design.

Fall Surfacing We observed use of protective surfacing materials (wood chips or mulch, synthetic surfacing, or sand) in all but one playground, which had an asphalt surface. In those play areas with wood chips as the surface material ($n = 61$), there was much depth variation (from 0 to 10 inches) related to equipment use patterns, and in 87% the depth was insufficient around/under at least one piece of equipment. In 19% of play areas one or more concrete footings were exposed. The playgrounds in very low-income neighborhoods more often

had exposed footings than those in low-income neighborhoods (35% vs. 12%, $P < .01$).

In 75% of playgrounds the surface where children were likely to fall (use zone) had foreign objects such as trash or other debris. In nine playgrounds (12%), debris included glass, nails, or rocks. Playgrounds in very low-income neighborhoods less often had clear use zones (8% vs. 35%, $P < .01$).

Equipment Maintenance Equipment maintenance problems included rusted equipment, missing and broken parts, and protruding bolts (Table). Equipment gaps, that could potentially catch clothing drawstrings or entrap body parts, were present in many play areas. Splinters were a concern in 50% of playgrounds with wooden equipment. There were no significant differences between playgrounds in low-income and in very low-income communities in equipment maintenance needs.

Common Equipment Components Found in Play Areas

All playgrounds had at least one slide, and most areas had two or more slides. Each slide provided adequate space at the top to allow a child to change direction. In half of slides taller than 4 feet, the distance between the end of the slide and the surface material was improper, either greater or shorter than the recommended 7–15 inches. For all but three slides, the use zone was appropriate to the height of the slide.

Swings were also common, present in 59 playgrounds. Forty percent of playgrounds with swings had the recommended two swings per bay; no play area exceeded three swings per bay. A similar fraction of playgrounds in very low-income versus low-income neighborhoods had two swings per bay. All swing seats were made of rubber or plastic. After accounting for swing height, in eighteen playgrounds (30%) the amount of free space around the swings was inadequate. (Appropriate free space is defined as 6 feet on the sides of the swing equipment and twice the height of the swing beam in front and back of the swing set.)

Climbing equipment commonly observed included horizontal ladders (83% of playgrounds), sliding poles (69%), cargo nets (54%), spiral climbers (49%), arch climbers (46%), and chinning bars (40%). Most playgrounds (81% overall) had two or more pieces of climbing equipment. To note, among playgrounds with horizontal ladders, 17% lacked the requisite 6 feet use zone around the structure.

Other common equipment pieces included bridges (62% of playgrounds), vertical ladders (49%), and spring rockers (44%). Seesaws were present in nine playgrounds: in 8 of 9 locations they had spring centering devices. There were no merry-go-rounds. Ten play areas had water sprayers. When playgrounds in low-income

TABLE. Playground equipment maintenance

	n (%) (N = 78)
Rust	55 (71)
Missing parts	30 (38)
Broken parts	27 (35)
Protrusions	27 (35)
Holes/cracks	15 (19)
Graffiti	15 (19)
Platform gaps	18 (23)
Slide gaps	9 (12)
Other gaps	34 (44)

and very low-income communities were compared to each other, specific pieces of equipment and rates of associated hazards were similar.

DISCUSSION

The condition of playgrounds in low-income neighborhoods in Chicago is encouraging: most are well designed and have safe equipment and protective surfacing. However, the lack of depth of loose fill surfacing and equipment maintenance, with particular attention to gaps, must be addressed; failure to do so is likely to contribute to injuries. We observed hazards in playgrounds in very low-income neighborhoods to be quite similar to those in low-income areas.

Appropriate design is a critical starting point in creating safe play areas for children in all communities. We observed only one play area that lacked appropriate distance and fencing from motor vehicles. This is particularly important in urban areas, where traffic density can be high. We also observed that swinging equipment was placed at the edges of the playground and out of the main traffic flow. This placement helps reduce the likelihood of a child being struck by a swing in motion.

Although adult supervision would appear important to preventing injury, specific information that addresses the efficacy of supervision is limited. It is likely the most well designed playgrounds could be hazardous if adults are not present and actively involved in their child's play. The data we collected about supervision in each playground occurred only during the single site survey. However, in one third of playgrounds where children were observed playing, they were unsupervised. Moreover, even in playgrounds where equipment designed for preschool and school aged children is clearly separated, younger children walk in front of moving swings as well as gravitate to the equipment for older children. Under these circumstances, close supervision is critical so that children avoid injuries and are guided to equipment designed for their age.

Falls, usually to the ground surface below equipment, account for 70% of injuries as well as for the most severe injuries related to public playgrounds.¹³⁻¹⁵ Use of safe surfacing (wood chips, rubber products, and sand or unitary surfaces such as poured in place rubber or rubber tiles) can reduce the frequency and severity of equipment fall-related injuries.¹⁶⁻¹⁸ Surfaces that are unacceptable in and around playground equipment include paved (concrete or asphalt) or grass and dirt surfaces; we observed an unacceptable surface in only one playground. Although the surfaces of playgrounds in poor neighborhoods were found to be acceptable, there is need for improvement. Most playgrounds we surveyed had wood chips, and they were less deep than the recommended 9-12 inches in parts of most playgrounds. At lesser depths, these loose surface materials lose their ability to absorb impact and are thus less effective.¹⁷ Moreover, they give the perception of being safe. The inadequate depth of surface materials likely contributed to footing exposure, hazards in areas where children might fall.

Seventy-five percent of playgrounds had trash or other debris in the fall zone. Although paper and plastic trash are unsightly, they are less of a hazard than the glass, nails, or rocks that were present in some areas. The lack of a clear use zone was more common in playgrounds in very low-income areas. A review of playground hazards in New York City also suggests glass and other dangerous debris tends to be more common in playgrounds located in low-income areas.¹¹ Although it is likely that potential solutions are community specific, possible interventions include simple measures such as providing more trash receptacles distributed

around the playground and routine trash removal. In addition, a regular surface maintenance program should be established and followed.

The equipment specific use zone dimensions we observed in the playgrounds we visited were acceptable for most equipment pieces: in 13 of 52 playgrounds with horizontal ladders and in 18 of 59 playgrounds with swings, the use zone dimensions around these specific pieces of equipment were inadequate. This is unlike the observations reported from New York, where a majority of play areas had use zone dimensions that were too small.¹¹ The difference may be a result of improved awareness of safe use zone dimensions for playground equipment.

Not surprisingly, higher climbing equipment is associated with more injuries from falls.^{14,15,19} Protective barriers on platforms are placed to reduce this risk. We noted that 78% of platforms over 3 feet had barriers to prevent falling or jumping off. Slides were common in the playgrounds we surveyed, as each playground had at least one, and many had two or more. Each slide provided adequate space at the top to allow a child to change direction.

Equipment maintenance is critical to improving the safety of the playgrounds we surveyed. Missing or broken parts and equipment gaps were present in many playgrounds. Equipment disrepair contributes to minor injuries including avulsions and lacerations. Equipment gaps are particularly critical, because they are associated with strangulation incidents, as well as more minor entrapment injuries. Clothing, scarves, jacket strings, and jacket hoods can become entangled in narrow gaps; this mechanism has been implicated in strangulation deaths.⁴ In addition to repairs of equipment gaps, children should not wear scarves or jackets with hood strings around playground equipment.

Although we used a standard survey tool, information directly related to the (1) playground survey performance and (2) injuries at those sites are lacking. This work is limited by the inherent difficulties in determining the depth of loose surfacing materials in and around all pieces of equipment, and in appropriately measuring the use zones. Although each piece of equipment was carefully examined, it is possible that splinters or gaps were missed. Although the presence of trash and other debris is likely related to trash removal schedules, the day a playground in a specific community was surveyed was random, thus this does not explain the differences we observed between the playgrounds in low and very low-income communities.

In summary, playgrounds in both low and very low-income communities need attention to safe surfaces and the depths of surface materials. Attention to trash and debris removal, as well as to the distribution of loose surface materials is needed. The design and layout of the equipment would appear to reduce fall injuries: most pieces had adequate barriers and an appropriate use zone, except for swings. Equipment maintenance needs attention in all play areas. Although work is needed to repair these playgrounds, the findings of our study are encouraging. If community or neighborhood organizations adopted local playgrounds, a pool of volunteers would be available to regularly rake the loose surface materials and pick up trash. Equipment maintenance would require greater resources, but the costs for repairs of most of the hazards identified by our survey would be relatively modest.

This study of playgrounds in low-income Chicago neighborhoods allowed us to become more aware of a related issue of broader scope: the lack of public play space for children living in Chicago's poorer neighborhoods. Although the public areas along the lakefront provide numerous recreational opportunities for Chicagoans, these areas are inconvenient for routine use by most families. Families need play spaces that are easily accessible in their own communities.⁴ Current recommendations

suggest that major metropolitan areas have 10 acres of parks per 1,000 people; the city of Chicago has 2 acres of parks per 1,000 people.²⁰ To comply with the American Academy of Pediatrics recommendation for increased unstructured outdoor play, as well as a potential impact on child health, public policy decisions must address this unmet need for public play space.

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