

ABSTRACT

Title of Thesis: CUTTING EDGE INJURY PREVENTION

Margaret Boland, Master of Architecture, 2024

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The growing childcare crisis in the United States leaves many families without access to quality, affordable care. This crisis is not just a matter of statistics but a deeply emotional experience for those who find themselves torn between professional responsibilities to sustain their households and proper care for their children. This thesis explores the design of physically and emotionally safe spaces for children and their caregivers that catalyze a positive transformation in the country's childcare infrastructure. Focused on the relationship between architecture and childhood development, this work explores innovative design solutions that consider functionality, the scale of a child, and the well-being of both children and their caregivers. Through a synthesis of research, case studies, and innovative design solutions, this work aspires to create architectural spaces that consider the unique needs of children. In doing so, it promotes a new narrative where the American dream encompasses not just economic success but also the well-being of children, the most significant investment in the nation's future.

SECURING THE FOUNDATION: A NEW STANDARD FOR CHILDCARE
DESIGN AT MCMILLAN RESERVOIR

by

Margaret Boland

Thesis submitted to the Faculty of the Graduate School of the
University of Maryland, College Park, in partial fulfillment
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Dedication

To my mom,

You are the inspiration for this thesis, as words could never express how grateful I am for the sacrifices you've made for me.

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Chapter 1: Introduction

The United States is a nation of unequalled wealth and opportunity, yet beneath the surface of economic prosperity lies a concerning reality: many families in the United States struggle to access quality, affordable childcare. In low-income areas, parents face a devastating dilemma as they struggle with the impossible choice between putting food on the table and providing a safe space for their children. This is a historical problem that not only affects parents, but also their children, whose early education is tainted by the harsh realities of underfunded facilities and overworked caregivers. These children have a potential, which is restrained by a system that falls short of providing a nurturing environment that promotes natural development. The repercussions of inadequate early education perpetuate a cycle of poverty, as these children face an uphill battle in academic and professional pursuits. As such, the childcare crisis in low-income areas is not just an economic challenge, it is a manifestation of systemic inequality. It is a cruel paradox: the very families in dire need of reliable childcare are the ones suffering most from such an unforgiving system.

The effects of the childcare crisis extend far beyond individual families, as the issue is deeply rooted in the very infrastructure of our society. Beyond the conventional view of infrastructure as simply built structures, this thesis focuses on human, social, and natural infrastructure that shape the future of refined childcare. In doing so, it promotes the design of equitable, sustainable, and empowering



Figure 1. History of the Childcare Crisis (1950s New York City Protest).

environments for children to ensure they can thrive regardless of the circumstances in which they are born. As such, it is crucial to recognize the profound impact that the built environment can have on a child's physical and psychological well-being. Specific research will demonstrate that thoughtful design interventions can substantially mitigate the risks of accidents and injuries in childcare settings. For instance, studies published in the *Journal of Pediatric Nursing* highlight the positive correlation between well-designed play areas and reduced injury rates, emphasizing the pivotal role architects play in shaping safe spaces for children.¹ In this relationship between safety and architecture, there is an opportunity to re-envision the unique

¹ Dawn Lee Garzon, "Contributing factors to preschool unintentional injury," *Journal of Pediatric Nursing* 20, no. 6 (2005): 441-447.

needs of our youngest generation to address the multifaceted challenges of the childcare crisis.



Figure 2. 2022 New York City Childcare Protest.

Within the existing built environment there exists a realm often overlooked—one seen through the innocent eyes of children. The design of childcare spaces shapes a child's worldview and self-perception, which highlights the importance of designing architecture not just *for* children but *from* their vantage point. To design from a child's vantage point is to embrace empathy in both form and function. More so than just adjusting the physical scale, such design builds confidence in a world that can sometimes feel overwhelmingly large. Additionally, it invites parents and caregivers to step into the world of the child and elevate their shared experiences. Such structures that accommodate a child's perspective communicate that their presence is

not just tolerated, but rather celebrated. In doing so, spaces are designed to fit a child's physical scale, while also understanding the unique needs and emotions that crowd their world. Just as a child's imagination, architectural design has the ability to transform the mundane into the extraordinary.

This thesis delves into the challenges of the childcare crisis in low-income areas and investigates how architectural design can play a pivotal role in alleviating such issues. The following research considers the context of the childcare crisis in the United States for low-income areas, specifically outlining the multifaceted challenges faced by families and the economic and social repercussions. This research considers the spatial and social characteristics of childcare spaces and their impact on the well-being of children, caregivers, families, and the broader community.

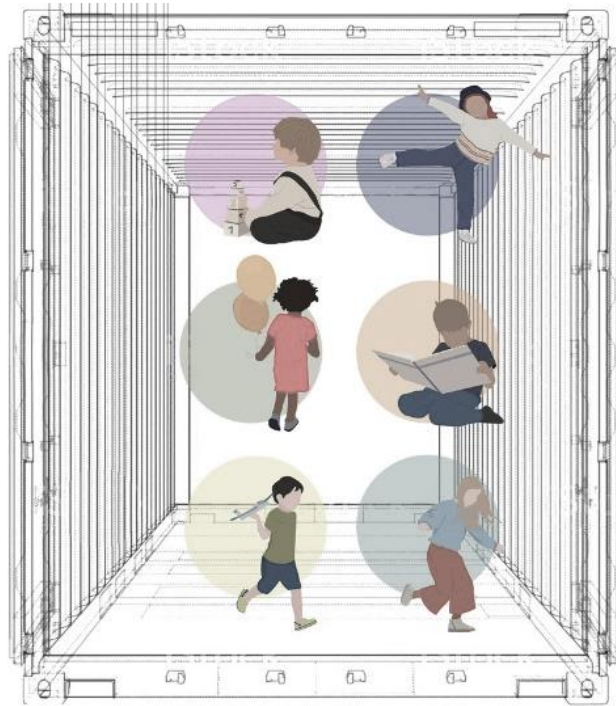


Figure 3. The design of architectural spaces for children.

This thesis promotes safety measures that reduce the risk of injuries inside a building, and it addresses the importance of providing nurturing and stimulating environments for early childhood development. It considers elements such as color,

texture, and form to construct childproof areas that guarantee the security of the children who inhabit the space, as well as promote creativity and inclusivity. Ultimately, the design proposal integrates these principles into a childproof space to help mitigate the childcare crisis in the United States and, in turn, foster healthy development of our nation's most precious resource: its children. This thesis is an investment in the future of the built environment that considers a multifaceted issue in even the smallest of details.

Chapter 2: The Low-Income Childcare Dilemma

Across the world, childcare serves two primary purposes: parental employment and proper early childhood education. In the United States, however, these goals remain out of reach. The United States is one of the only developed countries in the world that does not offer paid maternity leave as a federal mandate, and yet in 2018, the cost of childcare exceeded public university tuition in half the states.² Since then, the crisis has been exacerbated by the COVID-19 pandemic, which has caused many childcare centers to close or reduce capacity, resulting in even fewer options for parents. This lack of access to childcare has had a negative impact on children's development and has placed a greater financial burden on

Paid Leave for New Mothers

The United States is one of eight countries without paid maternity leave, and the average length for those that have it is 29 weeks.

0 weeks 4 weeks or less 4 to 12 weeks 12 to 24 weeks 24 weeks or more

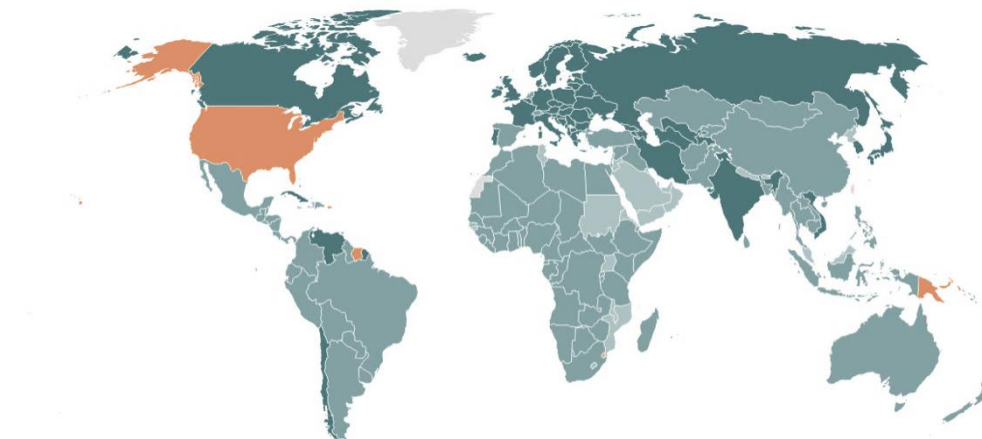


Figure 4. Global mandates for maternal leave vs. the United States lack thereof.

² Jane Johnson and Sarah Calvert, "Making the case for paid parental leave in the United States," *Brigham Young University Prelaw Review* 36, no. 1 (2022): 10.

countless families.³ These effects of the childcare crisis are felt far and wide. Low-income families are hit hardest, as they often can't afford the high costs of childcare and may not qualify for government assistance. As such, childcare is often not an option for many families, which forces many parents to choose between inadequate care or no care at all. This chapter will address the factors that contribute to disparities in access and quality of childcare in the United States. Specifically, the following research will explore the difficulties facing low-income areas in supplying and accessing quality childcare in the United States. In doing so, it will provide context for the basis of this thesis, which is to provide safe, quality, and affordable childcare to those who need it most.

Financial Challenges

The childcare crisis in the United States is not a uniform burden, instead it disproportionately impacts low-income areas and reveals a variety of financial challenges that hinder the well-being of families and the economic mobility of their surrounding communities. These families, already grappling with limited financial resources, often allocate a disproportionate share of their income to childcare expenses. According to the Economic Policy Institute, the average annual cost of full-time infant childcare can exceed \$14,000, surpassing the average cost of in-state

³ W. Jean Yeung, Miriam R. Linver, and Jeanne Brooks-Gunn, "How money matters for young children's development: Parental investment and family processes." *Child Development* 73, no. 6 (2002): 1861-1879.

college tuition in most states. This cost can exceed 25% of a family's income, often rivaling or surpassing rent or mortgage payments.⁴

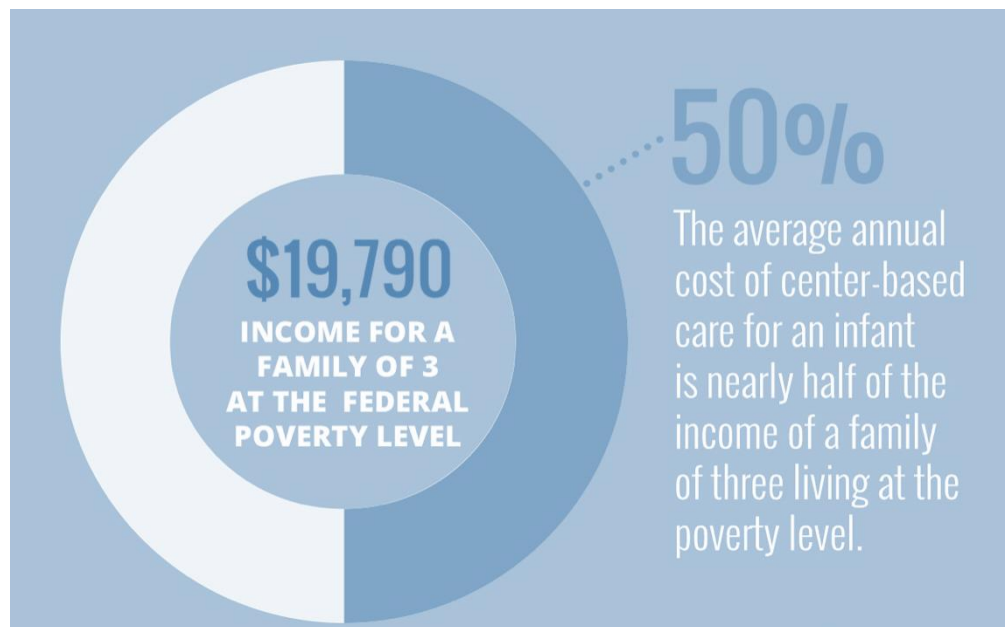


Figure 5. Average annual cost of childcare in the United States based on a report from Childcare Aware of America.

The financial burden is particularly pronounced in low-income areas, where the cost of living is already a substantial challenge for families. Then, when parents are unable to work or advance in their careers due to childcare cost barriers, it limits their contributions to the workforce and, consequently, the economy. This section delves further into the financial challenges associated with the complex childcare system, with particular focus on labor costs, insufficient regulation, and inadequate public funding of the industry.

Childcare providers in low-income areas face a harsh reality as they strive to provide quality care while struggling with the financial constraints of particularly low

⁴ "Childcare Costs in the United States," *Economic Policy Institute*, accessed October 5, 2023, <https://www.epi.org/child-care-costs-in-the-united-states/>.

wages. Childcare is a particularly labor-intensive industry, and oftentimes providers are not compensated for the level of responsibility and skill required of the job. Research from the Center for the Study of Childcare Employment reveals that a significant number of childcare workers in these areas earn wages near or below the poverty line. This not only impacts the well-being of the workforce, but also contributes to high turnover rates, as individuals seek more financially stable employment opportunities.⁵ In a similar way, the National Academies of Sciences, Engineering, and Medicine report that the inadequacy of wages makes it difficult for childcare centers to attract providers with the necessary education and training to deliver high-quality early childhood education. This perpetuates a cycle where low

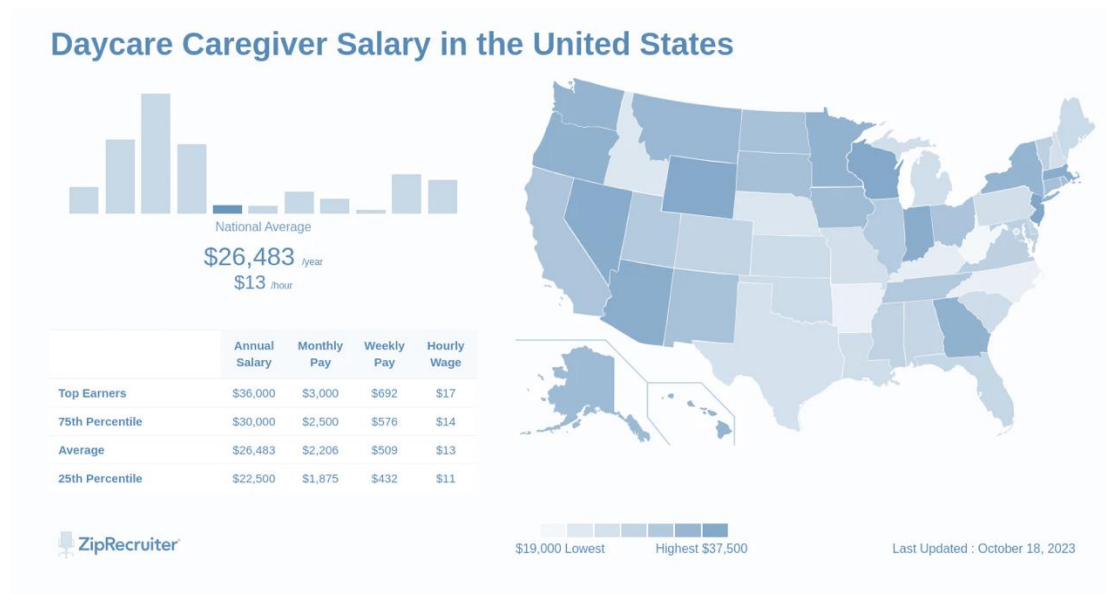


Figure 6. Caregiver salary by state in the US.

⁵ Deborah Phillips, Carollee Howes, and Marcy Whitebook, “Childcare as an adult work environment,” *Journal of Social Issues* 47, no. 2 (1991): 49-70.

wages contribute to a less qualified workforce, further compromising the quality of care.⁶

Licensed childcare centers must maintain a caregiver-to-child ratio to ensure children safety and quality of care.⁷ The younger the children, the higher the ratio. As such, infants and toddlers require a higher number of caregivers, increasing labor costs for these ages, a financial burden which is then placed on parents, as public funding allocated to childcare assistance programs has not kept pace with the rising costs. This intersection of low wages and high turnover rates has profound implications for the stability and quality of childcare in low-income areas, a considerable factor to be discussed in the next section, *Quality of Care*.

The lack of adequate support for low-income families in meeting childcare costs is a common reality faced by many. Safety and quality standards require licensed childcare centers to adhere to strict regulations, which can drive up operational expenses. Meeting regulatory standards can be costly, leading some providers to operate informally or outside the regulatory framework to minimize expenses. These regulations can limit the number of providers willing to serve low-income families, as the operational costs would typically be passed on to parents in the form of higher fees.⁸ In addition, the current public assistance programs typically

⁶ National Academies of Sciences, Engineering, and Medicine. "Transforming the financing of early care and education." (2018).

⁷ Joanna Kim Bogusky, "The basic components of quality childcare: a handbook for parents on choosing a quality childcare center," (1989).

⁸ Gina Adams and Monica Rohacek, "More than a work support? Issues around integrating child development goals into the childcare subsidy system," *Early Childhood Research Quarterly* 17, no. 4 (2002): 418-440.

fall short in providing sufficient financial support for childcare expenses. As such, waitlists are long, causing delays in accessing childcare services, even when a family's financial situation remains insecure. These economic repercussions extend beyond the immediate expenses, as they affect employment opportunities for parents in low-income areas. A report from the *Journal of Public Economics* conveys that the high costs of childcare often lead parents, predominantly mothers, to make difficult choices between participating in the workforce and providing adequate care for their children.⁹ This contributes to career interruptions, decreased earning potential, and a perpetuation of the cycle of economic struggles.

High labor costs, insufficient regulation, and inadequate public funding of the childcare system often translates into high childcare fees for parents. This can make quality childcare inaccessible for many, particularly low-income families. Parents may be forced to make career decisions based on childcare costs rather than their career aspirations or earning potential. Some may opt to leave the workforce, reducing their overall income and financial security. As such, the financial strain of childcare costs exacerbates income inequality, as low-income families struggle to access the same quality of care as their wealthier counterparts.¹⁰ The next section considers the relationship between these economic burdens and the quality of care to

⁹ Francesca Barigozzi, Helmuth Cremer, and Kerstin Roeder, "Women's career choices, social norms and childcare policies," *Journal of Public Economics* 168 (2018): 162-173.

¹⁰ Marcia K. Meyers, Dan Rosenbaum, Christopher Ruhm, and Jane Waldfogel. "Inequality in early childhood education and care: What do we know." *Social inequality* 223 (2004).

shed light on the challenges and potential solutions that lie at the intersection of these two critical factors.

Quality of Care

Childcare is not solely about supervision; is a critical component of the nation's economic and social infrastructure. It allows parents to work and support their families while promoting early childhood development. As such, access to affordable, high-quality childcare is a fundamental necessity for both parents and children. However, low-income families often encounter disparities in the quality of care their children receive. Research from the Economic Policy Institute highlights disparities in access to high-quality childcare, with low-income families often facing limited options.¹¹ The quality of care is also influenced by varying state regulations, which lead to inconsistencies in standards across the country. This section will examine the factors that influence quality of childcare services, such as the staff, curriculum, physical environment, and the availability of such care to families with limited financial resources.

Childcare centers often operate on thin profit margins, as most of their revenue goes toward labor expenses, and yet attracting and retaining qualified staff is a constant struggle due to low wages. This can make it challenging to invest in staff development and facility improvements, so childcare centers often have high staff

¹¹ Julia R. Henly and Gina Adams, "Increasing access to quality childcare for four priority populations," *The Urban Institute*. Retrieved from: <https://www.urban.org/research/publication/increasingaccess-quality-child-care-four-priority-populations> (2018).

turnover rates that negatively impact the stability and quality of care provided.¹² Yet, to control labor costs, some childcare facilities may reduce the number of staff per child, potentially compromising the quality of care and safety. The American Academy of Pediatrics recommends specific ratios based on age groups to ensure individualized attention, responsive interactions, and effective supervision.¹³ A study by the National Institute of Child Health and Human Development demonstrates that lower ratios are associated with better cognitive, emotional, and social development in children.¹⁴ These lower ratios allow caregivers to engage more meaningfully with each child, fostering a secure attachment and promoting optimal development. In contrast, higher ratios may lead to stress and decreased attention, compromising the quality of care. As such, these childcare centers in the United States struggle with a balance between caregiver-child ratios and the economic realities faced by childcare professionals.

The high demand for affordable childcare significantly outpaces the supply, leaving many parents with limited choices. In many cases, low-income families are forced to rely on informal, unregulated childcare arrangements, which may not provide the same level of safety and early education as licensed childcare centers. In low-income areas, inadequate wages may result in a less experienced and motivated

¹² KJ Morgan, "The "production" of childcare: How labor markets shape social policy and vice versa," *Social Politics: International Studies in Gender, State & Society*, 12(2), pp.243-263.

¹³ Elles J. De Schipper, Marianne Riksen-Walraven, and Sabine AE Geurts, "Effects of child-caregiver ratio on the interactions between caregivers and children in child-care centers: An experimental study," *Child Development* 77, no. 4 (2006): 861-874.

¹⁴ Laura Stout Sosinsky, Heather Lord, and Edward Zigler, "For-profit/nonprofit differences in center-based childcare quality: Results from the National Institute of Child Health and Human Development Study of Early Childcare and Youth Development," *Journal of Applied Developmental Psychology* 28, no. 5-6 (2007): 390-410.

workforce, which can affect the educational and developmental outcomes of children in care. In these areas, providers often receive less training and professional development opportunities, impacting their ability to deliver high-quality instruction. This inadequate childcare can perpetuate educational disparities, limiting a child's future development.¹⁵ The gap in educational outcomes between children from low-income and higher-income families is a significant concern in terms of the quality of care. Research from the Economic Policy Institute suggests that low-income childcare spaces often face challenges in providing high-quality educational experiences.¹⁶

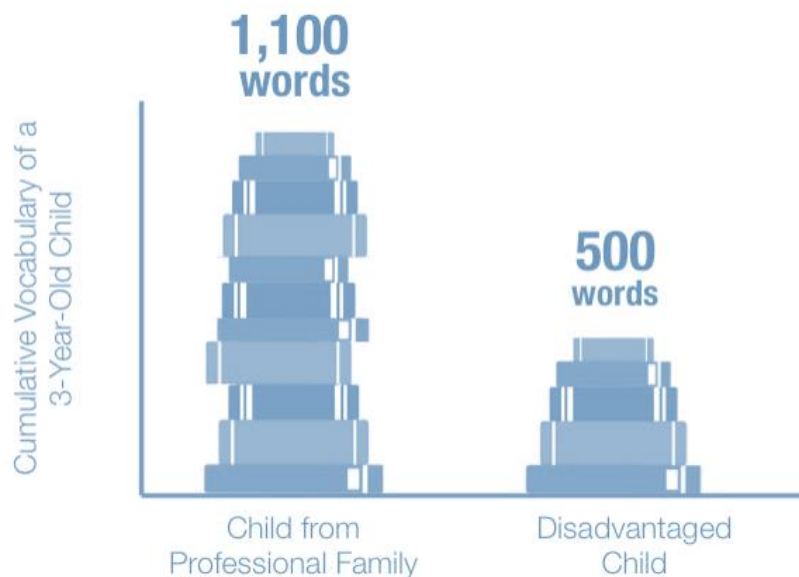


Figure 7. Educational gaps for low-income children.

A proper curriculum can serve as a powerful tool in offering all children, regardless of socioeconomic background, a strong foundation for future academic

¹⁵ Christine Johnson-Staub, "Equity Starts Early: Addressing Racial Inequities in Childcare and Early Education Policy." *Center for Law and Social Policy, Inc. (CLASP)* (2017).

¹⁶ "Childcare Costs in the United States," *Economic Policy Institute*, accessed October 5, 2023, <https://www.epi.org/child-care-costs-in-the-united-states/>.

success. However, many low-income childcare programs prioritize basic care and supervision over comprehensive early education, limiting the scope of learning experiences. As such, prioritizing age-appropriate curriculum in low-income childcare spaces is an essential step in ensuring that every child receives proper care to thrive.

Low-income providers often struggle with limited resources, resulting in inadequate facilities and materials. Such providers may lack the financial resources to invest in quality facilities, resulting in safety risks, unhygienic conditions, and less stimulating environments. Such facilities may not meet safety and sanitation standards, which puts children at risk. Specifically, many low-income childcare settings lack age-appropriate materials and outdoor play areas, which restricts children's opportunities for physical activity and exploration. The National Institute for Early Education Research emphasizes the significance of age-appropriate learning materials and educational tools in promoting cognitive, social, and emotional development.¹⁷ Improvement of such spaces is a critical factor in children's safety, development, and well-being. With the goal to improve quality in early childhood education, addressing resource disparities represents a critical step towards providing all children with the tools they need to thrive. Since the COVID-19 pandemic, new

¹⁷ Kristen A. Copeland, Susan N. Sherman, Cassandra A. Kendeigh, Heidi J. Kalkwarf, and Brian E. Saelens, "Societal values and policies may curtail preschool children's physical activity in childcare centers," *Pediatrics* 129, no. 2 (2012): 265-274.

complexities have been introduced in terms of the quality of childcare provided in low-income settings, as discussed in the next section.

Impact of COVID-19

The COVID-19 pandemic has intensified the challenges faced by low-income families in accessing affordable childcare. The closure of childcare centers during lockdowns left many parents without childcare options, while layoffs and reduced work hours exacerbated financial stress. This section will explore the unprecedented challenges faced by providers, parents, and children that the pandemic has imposed on an already vulnerable childcare system. Childcare providers in low-income areas were already operating with limited resources before the pandemic, it only made matters worse. Reduced enrollment, increased costs for cleaning and safety measures, and limited access to government relief programs placed a heavy financial burden on childcare providers. Staffing shortages and concerns over health and safety made it challenging for providers to maintain adequate child-staff ratios. As such, many childcare providers in low-income areas were forced to close temporarily or permanently, reducing available childcare options for working parents.

Parents in low-income areas have long grappled with limited access to affordable, quality childcare. The economic fallout of the pandemic led to job losses and financial instability for many low-income families, making it even more challenging to afford childcare services. Similarly, the reduced availability of childcare options forced parents to make difficult choices, often leading to inadequate childcare arrangements. Parents faced the dilemma of sending their children to

childcare centers during a pandemic, worrying about the potential health risks with remote work. As such, the COVID-19 pandemic illuminated the unique challenges that parents in low-income areas face within the childcare system.¹⁸ Many wealthy areas throughout the country encountered the same challenges that low-income families have faced for decades.



Figure 8. Childcare Center closures due to the COVID-19 pandemic.

Children from low-income families experienced disruptions in their social and cognitive development, potentially exacerbating disparities. Low-income families often lacked access to the technology required for remote experiences, making it difficult for children to engage in virtual activities. Understanding the educational gaps that have widened in low-income childcare settings informs targeted interventions aimed at mitigating these disparities. In addition, social distancing

¹⁸ Yavorsky, Jill E., Yue Qian, and Amanda C. Sargent. "The gendered pandemic: The implications of COVID-19 for work and family." In *Working in America*, pp. 305-317. Routledge, 2022.

measures and reduced access to childcare meant that children had fewer opportunities for social interactions, which may affect their social development.¹⁹ As such, the COVID-19 pandemic has brought unprecedented challenges to societies worldwide, with one of the most profoundly affected sectors being childcare. Particularly in low-income areas of the United States, the pandemic shed light on the vulnerabilities and the urgent need for support and reform within the childcare system. Designing effective strategies to address these challenges requires an understanding of the unique pressures faced by low-income families and childcare providers, as well as the systems currently in place. As such, the following Chapter, *Child Safety and Early Development in Low-Income Areas*, considers additional vulnerabilities for children in low-income areas, as well as the policies in place to help them.

¹⁹ Michael J. Green, Anna Pearce, Alison Parkes, Elaine Robertson, and S. Vittal Katikireddi. "Pre-school childcare and inequalities in child development." *SSM-Population Health* 14 (2021): 100776.

Chapter 3: Child Safety & Early Development in Low-Income Areas

Child safety and early development in low-income areas are not mere aspirations; they are fundamental rights critical to a child's natural growth. As such, childcare spaces must foster environments that encourage children to learn from experiences, such as challenging risks, while ensuring their safety and well-being. Within childcare spaces, risk refers not only to potential dangers in a child's physical environment, but also underlying factors that may interfere with this natural development.²⁰ As such, effective risk assessment in childcare spaces for those in the early child development phase is crucial. This chapter will consider the current risk assessment process in childcare spaces and evaluate its impact on the health, safety, and well-being of children and their caregivers. Specifically, it will address vulnerabilities of children in low-income areas and the impact of their surrounding environment on physical growth and cognitive development. In doing so, it will highlight the importance of a safe environment for promoting early development, as well as suggest areas for intervention.

Developmental Vulnerabilities

Children in low-income areas face a higher risk of developmental delays due to various factors, including potential health concerns, and environmental or

²⁰ Mariana Brussoni, Lise L. Olsen, Ian Pike, and David A. Sleet. "Risky play and children's safety: Balancing priorities for optimal child development." *International Journal of Environmental Research and Public Health* 9, no. 9 (2012): 3134-3148.

developmental risks.²¹ Risk assessment for early child development can be divided into two main categories: environmental and developmental, where environmental risk assessment involves looking at the physical environment, and developmental risk assessment looks at the child's developmental trajectory and the factors that may influence it, such as their health, nutrition, and access to educational services, such as childcare.²² As discussed in Chapter 1, financial stresses in low-income households can affect a parent's ability to provide a stable and safe environment for their children's growth. This section will consider additional developmental vulnerabilities for healthy child development in low-income areas, such as poor nutrition, inadequate healthcare, and lack of educational opportunities.

Children growing up in low-income areas often struggle to access proper nutrition, which has far-reaching consequences, affecting not only physical health but also cognitive, emotional, and social development. A lack of essential nutrients can lead to improper physical growth in children, as sufficient protein, vitamins, and minerals are necessary for proper development. Without adequate nutrition, children are more susceptible to infections and illnesses, and may experience stunted growth.²³ In addition, poor nutrition affects the development of fine and gross motor skills, as well as cognitive function, which may negatively affect a child's ability to learn, concentrate, and problem-solve. Similarly, chronic hunger can lead to increased stress

²¹ Heather J. Bachman and P. Lindsay Chase-Lansdale, "Custodial grandmothers' physical, mental, and economic well-being: Comparisons of primary caregivers from low-income neighborhoods." *Family Relations* 54, no. 4 (2005): 475-487.

²² Roderick Durkin, "The crisis in children's services: The dangers and opportunities for childcare workers." *Journal of Childcare* (1983).

²³ Mariana Chilton, Michelle Chyatte, and Jennifer Breaux, "The negative effects of poverty & food insecurity on child development," *Indian Journal of Medical Research* 126, no. 4 (2007): 262-272.

and anxiety levels that determine a child's overall emotional well-being and ability to cope with adversity. Unfortunately, these issues do not end with early development, as adults who experienced poor nutrition in childhood may face economic and social disadvantages, as the impact on their cognitive and physical development may limit their educational and career opportunities.

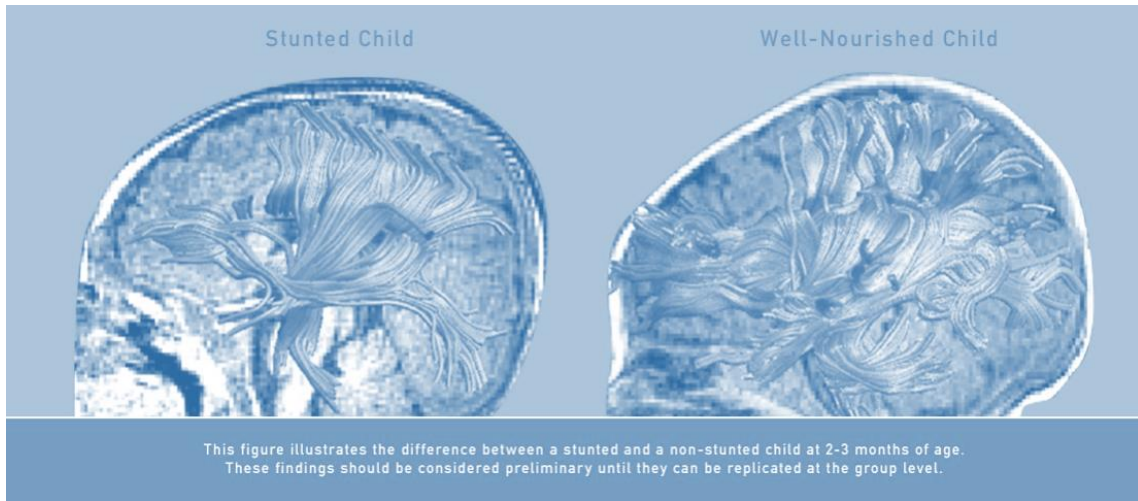


Figure 9. Nutrition's effect on the brain development of a child.

In a similar manner, children in low-income areas may face delays in their overall growth and development due to inadequate healthcare. The lack of access to healthcare in such areas can expose children to common illnesses, such as respiratory infections or untreated dental problems, which then may become more severe and lead to complications.²⁴ Health conditions that go untreated can lead to cognitive impairments, affecting memory and attention span, emotional regulation, and behavior. As such, inadequate healthcare can lead to chronic conditions or disabilities that may negatively affect a child's quality of life, as it promotes challenges for engaging in typical childhood experiences. These untreated health conditions or

²⁴ Matthew Ridley, Gautam Rao, Frank Schilbach, and Vikram Patel, "Poverty, depression, and anxiety: Causal evidence and mechanisms," *Science* 370, no. 6522 (2020).

developmental delays may persist into adulthood, resulting in chronic health issues and reduced life expectancy.²⁵

Education is a cornerstone of human development, however, children growing up in low-income areas often face significant disadvantages when it comes to accessing quality early education services, such as childcare. The absence of structured early education like childcare, where stimulation and social interaction are a part of a child's daily schedule, can lead to developmental gaps. Specifically, children in low-income areas may not have the same experiences as early, which places them behind their peers in terms of literacy, numeracy, and social skills. Childcare centers also expose children to diverse learning environments, where they can interact with other children from different backgrounds. Limited childcare options may result in a more homogenous and less enriching social environment for children.²⁶ With that being said, children in low-income areas may also experience separation anxiety, especially if their parents have no choice but to leave them in less-than-ideal care arrangements. As such, it is essential that children in low-income

²⁵ Mariana Chilton, Michelle Chyatte, and Jennifer Breaux, "The negative effects of poverty & food insecurity on child development." *Indian Journal of Medical Research* 126, no. 4 (2007): 262-272.

²⁶ Robert C. Pianta, Karen M. La Paro, Chris Payne, Martha J. Cox, and Robert Bradley, "The relation of kindergarten classroom environment to teacher, family, and school characteristics and child outcomes." *The Elementary School Journal* 102, no. 3 (2002): 225-238.

areas have access to quality childcare to ensure that they have the opportunity to reach their full potential.

The Childcare and Development Block Grant Act

The Childcare and Development Block Grant (CCDBG) Act is a federal initiative that provides funding to states for childcare assistance programs with the aim to make affordable and quality childcare services available to low-income families.²⁷ This Act is one of the most significant pieces of federal legislation in the United States, as it has a profound impact on childcare services for low-income families. Beyond its mission to increase access and affordability of childcare, the CCDBG Act places a strong emphasis on safety and child development. This section explores the key regulations outlined by the CCDBG Act concerning safety and child development and then considers the issues with the initiative, such as funding limitations, access disparities, and gaps in quality.

²⁷ Karen E. Lynch, “The childcare and development block grant: Background and funding,” *Congressional Research Service*, 2014.

The CCDBG Act prioritizes the safety and well-being of children in childcare settings by providing a set of safety standards for childcare providers. These regulations include safety requirements such as background checks for providers, emergency procedure training, and injury report protocols. More specifically, the CCDBG Act outlines specific child-to-staff ratios to ensure that there are enough caregivers to provide proper supervision based on age.²⁸ The Act emphasizes the need for childcare providers to meet educational qualifications and training that align with child development phases, ensuring that they can provide a stimulating and nurturing environment. The physical spaces are also subject to regular safety inspections to verify that they meet the safety standards regarding building safety, sanitation, and are free from potential hazards. The Act requires childcare providers to obtain licenses that ensure compliance with such safety regulations. By setting high

SLED Impact of Coronavirus Aid, Relief, and Economic Security (CARES) Act, 2020

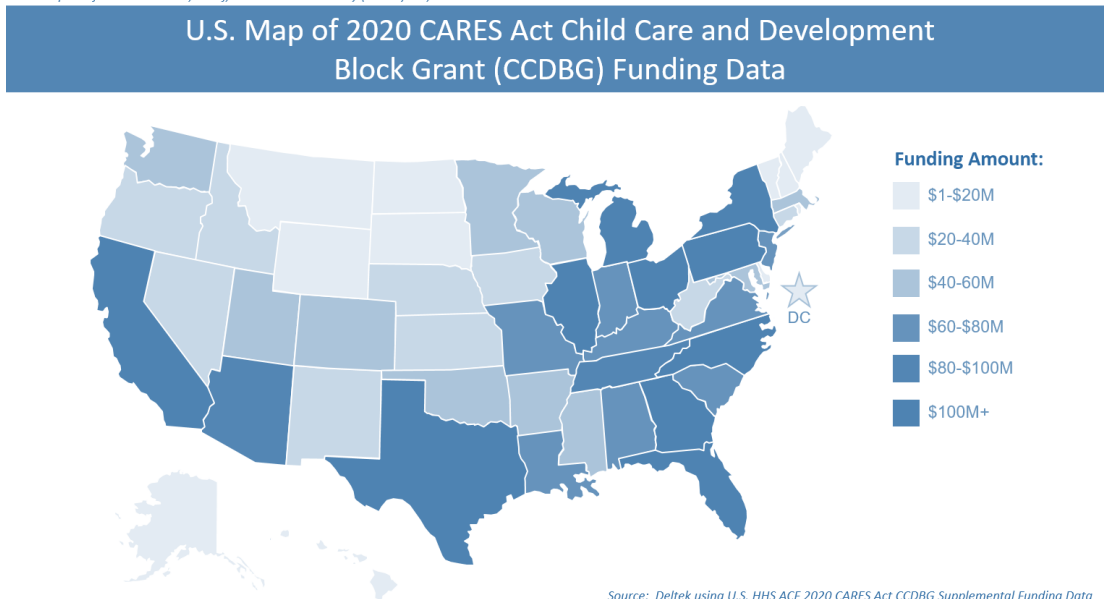


Figure 10. CCDBG Act Funding Data by state.

²⁸ Karen E. Lynch, “The childcare and development block grant: Background and funding,” *Congressional Research Service*, 2014.

standards, the Act promotes quality in childcare services, which, in turn, should contribute to better outcomes for children.

The CCDBG Act provides federal funding to states to subsidize childcare for low-income families, but this funding often falls short of meeting the actual needs.²⁹ This limited funding results in a lack of available childcare slots, forcing many low-income families to join waiting lists or seek alternative arrangements. Eligibility for CCDBG subsidies is often based on income, leaving many low-income families just above the threshold without access to financial support. These families on the edge face substantial barriers to accessing affordable childcare.³⁰ Additionally, the difference in funding levels and eligibility criteria varies from state to state, creating disparities in access and quality across the country.

Oftentimes, inadequate funding means low reimbursement rates for childcare providers. The costs associated with implementing the outlined safety regulations, such as maintaining childproof facilities and purchasing appropriate safety equipment, can be a financial burden for childcare providers, particularly in these areas. As a result, providers may opt to limit the number of subsidized children they serve or may leave the program altogether, impacting both availability and quality of these services. Those providers who fall under the CCDBG Act may have inconsistent access to training and professional development opportunities. Safety regulations primarily focus on initial training requirements, such as CPR and first aid,

²⁹ Gina Adams and Monica Rohacek. "More than a work support? Issues around integrating child development goals into the child care subsidy system." *Early Childhood Research Quarterly* 17, no. 4 (2002): 418-440.

³⁰ Susan Roll and Jean East. "Financially vulnerable families and the childcare cliff effect." *Journal of Poverty* 18, no. 2 (2014): 169-187.

however, ongoing professional development is often overlooked.³¹ As such, this may impact the safety and quality standards mentioned previously. If one looks even closer, state-level monitoring of childcare providers can vary as well, so it is clear the Act needs to establish consistent monitoring to ensure quality across the United States.

The Childcare and Development Block Grant Act reduces the risks and vulnerabilities for children in low-income areas by addressing inadequate care, however, it is not without its issues and limitations. Funding constraints, access disparities, and quality standard gaps challenge the effectiveness of the program. As such, addressing these issues is necessary to ensure the CCDBG Act fulfills its mission of providing safe, affordable, and high-quality childcare for all low-income families.

³¹ Josh Bivens, Emma Garcia, Elise Gould, Elaine Weiss, and Valerie Wilson. "It's Time for an Ambitious National Investment in America's Children: Investments in Early Childhood Care and Education Would Have Enormous Benefits for Children, Families, Society, and the Economy." *Economic Policy Institute* (2016).

Chapter 4: Accident Analysis in Low-Income Childcare Spaces

During early child development children spend a significant portion of their time in indoor spaces, including their homes and childcare facilities. To promote healthy physical development, it is necessary to consider the safety of the buildings they spend this time in. Specifically, low-income childcare facilities face unique challenges in ensuring the safety and well-being of the children they serve. Accidents can happen anywhere, but the risk factors are heightened in these settings.³² Accident analysis serves as a lens through which the unique risk factors in low-income childcare spaces can be understood. It is a proactive approach that not only responds

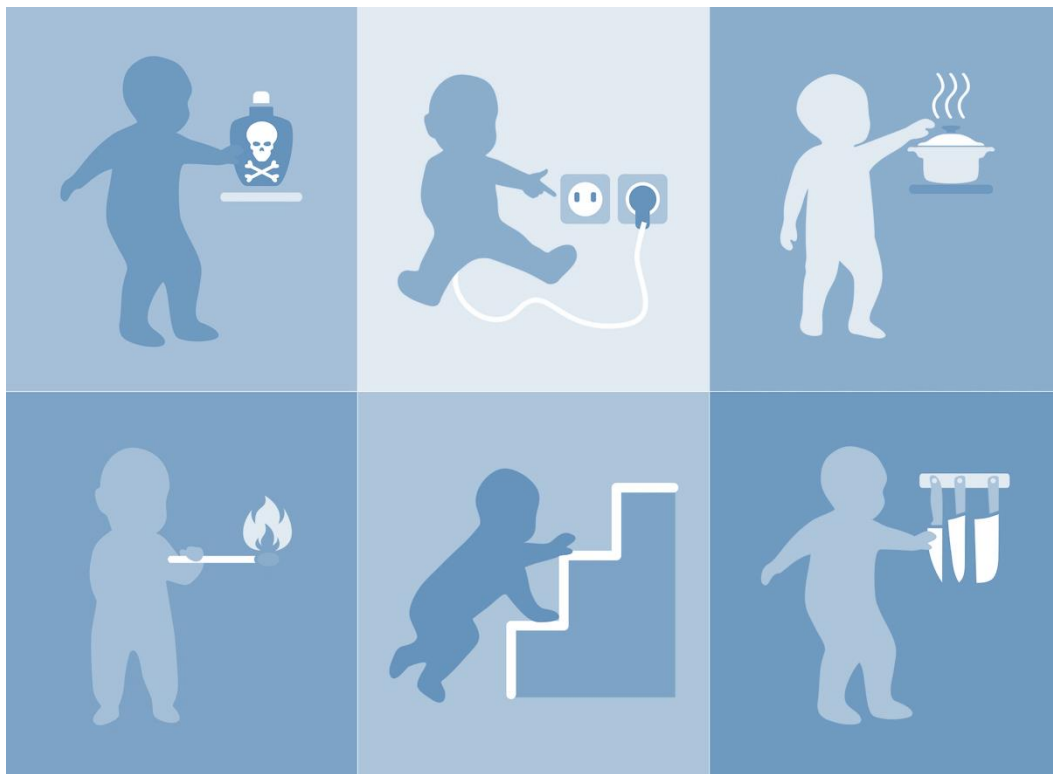


Figure 11. Common injuries, or accidents, in childcare spaces.

³² Anna Gromada; Richardson, Dominic; Rees, Gwyther (2020). Childcare in a Global Crisis: The Impact of COVID-19 on work and family life, *Innocenti Research Briefs*, no. 2020-18, UNICEF Office of Research - Innocenti, Florence.

to incidents but also actively works towards preventing future accidents. This chapter will assess the various types of accidents that affect early physical development in buildings and on playgrounds by identifying key risk factors. In addition, it will address a caregiver's perception of risk to highlight the importance of accident analysis in low-income childcare. In doing so, this chapter will highlight necessary considerations in mitigating these accidents while promoting the safety and development of young children.

Unintentional Injuries

A child's limited understanding of potential dangers along with their innate curiosity often leads to accidents. These accidents are considered unintentional injuries and are currently the leading cause of death and disease for children nationwide. The Center for Disease Control and Prevention, said such injuries are, "among the most under-recognized public health problems facing the United States."³³ The implications of these are far-reaching, affecting children's physical and emotional well-being, as well as resulting in unnecessary financial burdens for families. In addition, such incidents can damage trust in childcare facilities and deter parents from utilizing these services. This section explores the causes and types of unintentional injuries, and then addresses the implications of such injuries on the

³³ Andrew N. Hashikawa, Manya F. Newton, Rebecca M. Cunningham, and Martha W. Stevens. "Unintentional injuries in childcare centers in the United States: A systematic review." *Journal of Child Health Care* 19, no. 1 (2015): 93-105.

safety of children in low-income environments. In doing so, it provides insight into the causes and factors that contribute to such accidents.



Figure 12. Unintentional Injury as the leading cause of death for children.

Unintentional injuries encompass a wide range of incidents including falls, burns, traffic accidents, choking, poisoning, and drowning, among others. Falls are a primary cause of injury in children, particularly in younger age groups, as they have yet to develop proper balance.³⁴ Contributing factors include uneven surfaces, poor lighting, slippery conditions, impaired balance, and a lack of proper safety measures like handrails. In addition, burns result from contact with hot surfaces or liquids, an injury that is particularly common in children who explore their environment without understanding the dangers. These injuries can result in painful burns and long-term

³⁴ Christopher S. Davis, Sarah E. Godfrey, and Kristin M. Rankin. "Unintentional injury in early childhood: its relationship with childcare setting and provider." *Maternal and Child Health Journal* 17 (2013): 1541-1549.

scars.³⁵ In a similar way, accidents involving pedestrians, bicycles, or cars are often due to a lack of awareness about traffic rules and/or inadequate supervision. Such collisions can result in injuries ranging from minor scrapes to severe trauma. In addition, young children are prone to choking and suffocation, mainly due to their tendency to explore and put objects in their mouths. Small items can become lodged in a child's airway, leading to choking, whereas suffocation can occur from items like plastic bags or drawstrings.³⁶ Similarly, poisoning incidents in children typically occur when they ingest harmful substances, such as household cleaners, medicines, or chemicals. Inadequate storage, improper labeling, and a child's inability to distinguish between safe and harmful items contribute to these incidents.³⁷ Finally, drowning is a severe risk, particularly when children are near swimming pools, bathtubs, or natural water sources. Lack of supervision, inadequate swimming skills, and poorly secured pool areas are common contributors to drowning incidents.³⁸ It is necessary to understand these accidents to consider what the major causes are, and the ways to potentially prevent them.

Unintentional injuries are commonly caused by insufficient supervision, however, examining the physical space is important for avoiding accidents regardless of who's watching. One of the primary causes of unintentional injuries in low-income

³⁵ Sarah Stewart De Ramirez, Adnan A. Hyder, Hadley K. Herbert, and Kent Stevens. "Unintentional injuries: magnitude, prevention, and control." *Annual Review of Public Health* 33 (2012): 175-191.

³⁶ Sarah Stewart De Ramirez, Adnan A. Hyder, Hadley K. Herbert, and Kent Stevens. "Unintentional injuries: magnitude, prevention, and control." *Annual Review of Public Health* 33 (2012): 175-191.

³⁷ Juliana Pinto McKeen, "Mind the gap: Addressing childcare inequalities for children and caregivers." *Columbia Social Work Review* 19, no. 1 (2021): 44-61.

³⁸ Christopher S. Davis, Sarah E. Godfrey, and Kristin M. Rankin, "Unintentional injury in early childhood: its relationship with childcare setting and provider." *Maternal and Child Health Journal* 17 (2013): 1541-1549.

childcare spaces is often limited and inappropriate physical infrastructure. Studies conducted by the National Center for Children in Poverty highlights that inadequate play areas, poorly maintained equipment, and crowded areas can significantly increase the risk of injuries.³⁹ Interventions must address these structural deficiencies to create safer environments for children. Hazards in the child's environment, such as sharp edges, uneven playground surfaces, or exposed electrical outlets can lead to injuries. As such, proper childproofing can help mitigate these risks.⁴⁰ Failure to implement safety measures such as childproofing allows for a greater probability of such accidents. Childproofing includes mitigating risks throughout spaces children may inhabit, such as securing furniture, locking away hazardous substances, and using socket covers. By fostering a safety-oriented culture, children in low-income childcare environments may receive the protection they need to develop and thrive in a secure and nurturing setting, regardless of their socioeconomic background. To do so, it is crucial to examine the caregiver's perception of risk and how it aligns with the unintentional injuries discussed throughout this section.

The Caregiver's Perception of Risk

Unintentional injuries are directly related to a childcare center's approach to safety and its commitment to maintaining a safe environment. Within these spaces, caregivers serve as the primary line of defense. Their ability to identify and respond to potential risks is necessary in creating a secure childcare environment.

³⁹ Kyunghee Lee, "Effects of experimental center-based childcare on developmental outcomes of young children living in poverty." *Social Service Review* 79, no. 1 (2005): 158-180.

⁴⁰ Amy Dao and Juliet McMullin, "Unintentional injury, supervision, and discourses on childproofing devices." *Medical Anthropology* 38, no. 1 (2019): 15-29.

Understanding their perceptions of risk within childcare spaces is crucial for designing environments that balance safety with the necessary exploration and learning for proper development. This section delves into the complexities of caregivers' role in low-income childcare, examines the factors that influence their perceptions of risk, and explores strategies to enhance child safety while supporting their own health and wellness in such a demanding role.

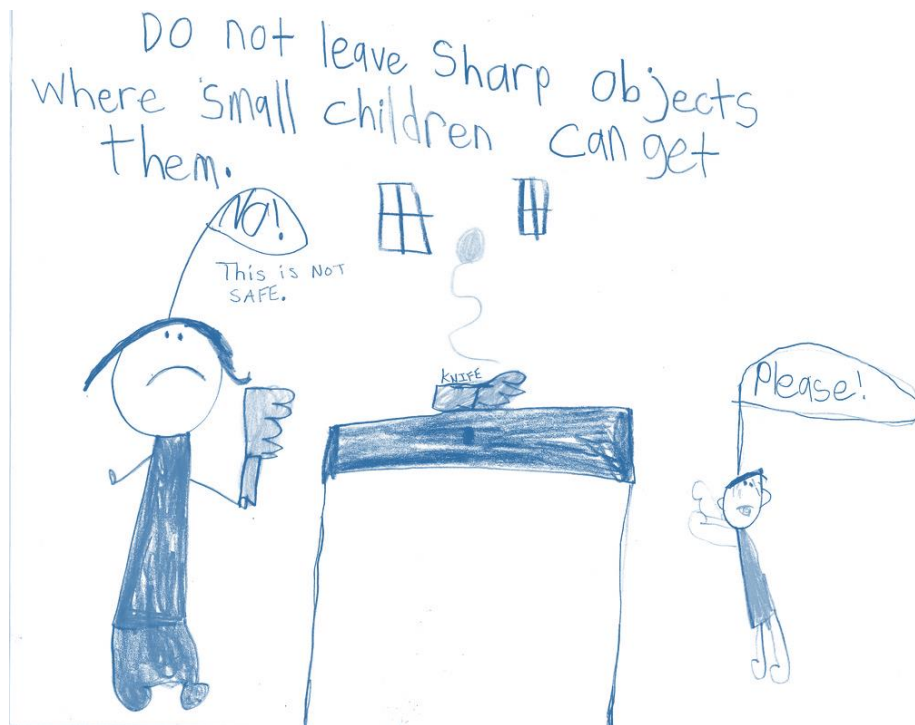


Figure 13. 2012 children's depiction of safety in the home.

Caregivers' perceptions of risk are subjective and influenced by a wide range of factors. A study by the National Association for the Education of Young Children highlights that individual experiences, cultural backgrounds, and personal biases contribute to the unique lens through which caregivers perceive and respond to

potential risks in childcare spaces.⁴¹ As such, recognizing the bias behind these perceptions is necessary to tailor interventions that resonate with diverse perspectives within caregiving communities. In a similar way, attitudes toward risk and safety vary across different communities. So, understanding the cultural context for a particular childcare center is fundamental to promoting effective risk management strategies that align with diverse values and beliefs. With that being said, implementing regulatory frameworks for safety are essential for consistent and informed risk prevention procedures across childcare spaces.

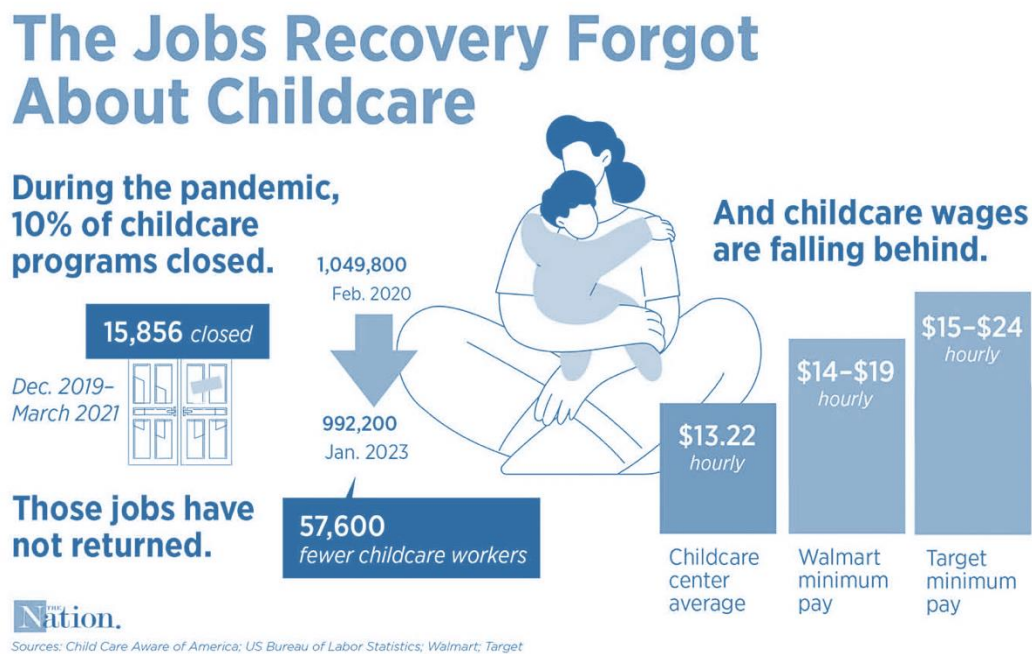


Figure 14. The effect of COVID-19 on childcare providers and their compensation.

Caregivers in low-income childcare environments face unique constraints in terms of staffing, equipment, and facility maintenance. These constraints often result in elevated stress levels due to challenging work conditions, which can affect a

⁴¹ Margaret R. Burchinal, Debby Cryer, Richard M. Clifford, and Carollee Howes. "Caregiver training and classroom quality in childcare centers." *Applied Developmental Science* 6, no. 1 (2002): 2-11.

caregiver's ability to remain vigilant and focus on safety. When caregivers feel overwhelmed or stressed, they may become more vigilant or, conversely, more lenient. Stress can skew their judgment, leading to either an overestimation or underestimation of risks.⁴² In addition, due to budgetary restrictions, providers may not receive comprehensive training in safety protocols, making it challenging to address risks appropriately. They often must work with outdated or inappropriate resources, affecting their ability to mitigate risks effectively. For instance, if they lack access to age-appropriate toys or safe play areas, they may adjust their standards for what is considered "safe."⁴³

The caregiver's perception of risk is a process influenced by various factors, including personal experience and knowledge, a child's age, environmental conditions, among others. First, a caregiver's personal experiences can shape their perception of risk. If a caregiver has had a prior experience with a child getting injured, they may become more cautious and perceive higher risks in similar situations. Conversely, a lack of experience with accidents may lead to a more relaxed attitude. Studies by the American Psychological Association convey that caregivers who have encountered accidents or challenging situations in the past may exhibit either heightened or permissive attitudes towards risk.⁴⁴ Similarly, the level of knowledge a caregiver possesses regarding safety measures and risk management is

⁴² Gitanjali Saluja, Ruth Brenner, Barbara A. Morrongiello, Denise Haynie, Michelle Rivera, and Tina L. Cheng. "The role of supervision in child injury risk: definition, conceptual and measurement issues." *Injury Control and Safety Promotion* 11, no. 1 (2004): 17-22.

⁴³ Rachel Cavalari, and Raymond G. Romanczyk. "Caregiver perspectives on unintentional injury risk in children with an autism spectrum disorder." *Journal of Pediatric Nursing* 27, no. 6 (2012): 632-641.

⁴⁴ Daphne B. Bugental, Jay Blue, and Michael Cruzcosa. "Perceived control over caregiving outcomes: Implications for child abuse." *Developmental Psychology* 25, no. 4 (1989): 532.

important to consider. Caregivers who are well-informed about potential hazards and best practices for safety may be more proactive in minimizing risks.⁴⁵ They are likely to have a more accurate perception of potential dangers, as opposed to those who are not as well informed.

The caregiver's perception of risk directly influences their caregiving practices and decision-making skills. When caregivers perceive higher risks, they are more likely to implement safety measures, such as supervising closely and setting stricter boundaries. Conversely, when caregivers perceive lower risks, they may adopt a more relaxed approach, allowing children more independence and freedom. The key, however, is to strike a balance in the perception of risk, considering the child's need for exploration, learning, and development while maintaining a safe environment. As such, implementing safety practices can help caregivers make informed decisions that promote children's well-being while allowing them to explore and grow. In doing so, caregivers can provide environments that balance safety with allowing a child's natural development, an important consideration in the playground atmosphere.

The Playground Atmosphere

In low-income childcare settings, ensuring child safety can be seemingly impossible, and the playground atmosphere is an important area of focus. Playgrounds provide essential opportunities for physical activity and social interaction, yet they are also where many accidents and injuries occur. Interactions on

⁴⁵ Gitanjali Saluja, Ruth Brenner, Barbara A. Morrongiello, Denise Haynie, Michelle Rivera, and Tina L. Cheng. "The role of supervision in child injury risk: definition, conceptual and measurement issues." *Injury Control and Safety Promotion* 11, no. 1 (2004): 17-22.

the playground foster the development of essential social skills such as cooperation, negotiation, and conflict resolution. This atmosphere shapes the quality of these interactions, influencing how children learn to navigate relationships and communicate effectively. Creating a safe and secure playground atmosphere is paramount for the well-being of children. As such, this section will assess the playground atmosphere's challenges in regulating safety, and the harm in too many restrictions.



Figure 15. 2000s New Yorker cartoon depicting an overly cautious approach to the playground atmosphere.

The playground atmosphere is supported by caregivers and educators who play a vital role in facilitating positive experiences. On average, 211,000 children per year receive medical care for an injury sustained on playground equipment, with 25%

being children ages 0 to 5.⁴⁶ Minimizing these accidents is a critical challenge faced by parents, caregivers, designers, and policymakers alike. With that being said, many playgrounds in low-income areas face constraints in terms of space and available funds. This can make it difficult to install the necessary equipment and safety features required to minimize accidents effectively. Over time, playground equipment can deteriorate, however, regular maintenance is costly and time-consuming. Similarly, evolving safety standards contribute to costly modifications required to maintain existing playgrounds.

Playgrounds often cater to children of varying age groups. Equipment designed for older children may pose a risk to younger ones, who lack the physical skills to navigate them safely.⁴⁷ Also, playgrounds are not always accessible to children with disabilities, limiting their ability to enjoy the benefits of outdoor play. This lack of inclusivity is a significant challenge in allowing all children to safely access and utilize playgrounds. As such, playgrounds must address age-appropriate

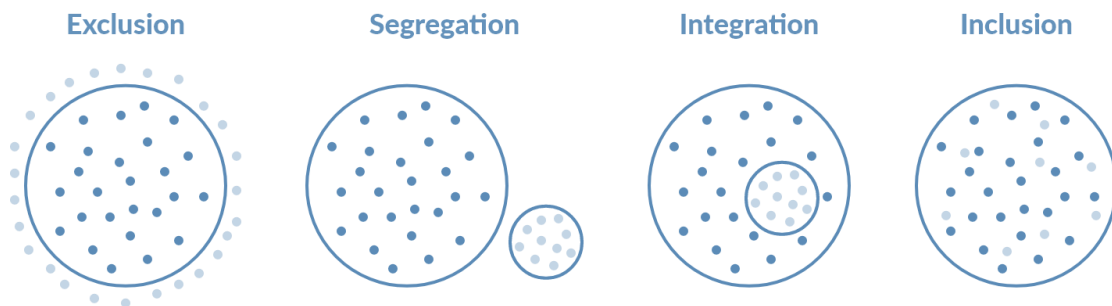


Figure 16. Exclusion vs. segregation vs. integration vs. inclusion (an important distinction in the design of playgrounds for children of all abilities).

⁴⁶ Andrew N. Hashikawa, Manya F. Newton, Rebecca M. Cunningham, and Martha W. Stevens. "Unintentional injuries in childcare centers in the United States: A systematic review." *Journal of Child Health Care* 19, no. 1 (2015): 93-105.

⁴⁷ Amina Khambalia, Pamela Joshi, Mariana Brussoni, Parminder Raina, B. Morrongiello, and Colin Macarthur. "Risk factors for unintentional injuries due to falls in children aged 0–6 years: a systematic review." *Injury Prevention* 12, no. 6 (2006): 378-381.

design, maintenance, inclusivity, supervision, and education without disrupting early child development.

While promoting safety in childcare spaces is necessary, there is a fine line between protection and restricting risk in early development. Restricting risk can deprive children of the opportunity to develop independence through resilience and problem-solving.⁴⁸ When children engage in activities where there is an element of uncertainty, they learn to assess, adapt, and make decisions, which is vital to their cognitive and intellectual development. These risk-taking opportunities often occur in social settings, such as the playground, where children interact with their peers and encounter stimulating situations. Overprotective environments that limit opportunities for these interactions have the ability to lead to social deficits later in life.⁴⁹ Unstructured play and physical risk-taking, like climbing, running, and engaging in sports, plays an important role in the development of motor skills and physical fitness. As such, striking a balance between safety and allowing children to explore and take age-appropriate risks is crucial.

While the safety of children in playgrounds is paramount, it is essential to acknowledge the risks associated with overly restrictive measures. A balanced approach that promotes their development, independence, and well-being will consider a particular level of supervision and proper safety precautions so that

⁴⁸ Mariana Brussoni, Lise L. Olsen, Ian Pike, and David A. Sleet. "Risky play and children's safety: Balancing priorities for optimal child development." *International Journal of Environmental Research and Public Health* 9, no. 9 (2012): 3134-3148.

⁴⁹ Mariana Brussoni, Lise L. Olsen, Ian Pike, and David A. Sleet. "Risky play and children's safety: Balancing priorities for optimal child development." *International Journal of Environmental Research and Public Health* 9, no. 9 (2012): 3134-3148.

children experience a sense of independence within a space that is designed specifically for them. While accidents can happen anywhere and childcare facilities are no exception, understanding the root causes of accidents and taking steps to prevent their recurrence is essential for the well-being of the children and the success of a childcare facility. The next chapter will consider current injury prevention methods in place and determine areas that could be improved.

Chapter 5: Current Injury Prevention Methods in Childcare Spaces

Current injury prevention methods in childcare spaces ensure that the surrounding physical environment is safe for children by identifying and eliminating potential hazards. Childproofing, vigilant supervision, sanitation practices, emergency response plans, and building codes are essential components of a current childcare's comprehensive safety plan. While these environments are not risk-free, these methods serve as critical safeguards to reduce the likelihood of accidents and injuries. The effectiveness of these injury prevention methods depends on the commitment of childcare providers, caregivers, and parents to prioritize safety in these spaces.⁵⁰ A core factor in understanding injury prevention in childcare revolves around identifying potential hazards, as discussed in Chapters 3 and 4. As such, this chapter will explore current injury prevention methods in childcare spaces by examining the measures in place and their effectiveness. In doing so, it will highlight areas where implementing new and innovative strategies have the potential to minimize risks and improve the quality of care for children.

Supervision

In childcare spaces, supervision is not just a duty; it is a commitment to the safety, well-being, and development of children. Its effectiveness lies in the vigilance and dedication of caregivers, and it stands as the fundamental factor for injury prevention in childcare spaces. Supervision involves constantly monitoring children's

⁵⁰ Joanna Gaines and David C. Schwebel, "Recognition of home injury risks by novice parents of toddlers." *Accident Analysis & Prevention* 41, no. 5 (2009): 1070-1074.

interactions and actions, regardless of the setting to quickly identify and mitigate potential hazards. Specifically in low-income childcare settings, where resources are often limited, supervision emerges as the most important and potentially effective injury prevention method.⁵¹ This section explores the critical role of supervision in preventing injuries and promoting a safe environment in childcare spaces, as well as addresses areas where improvement is needed.



Figure 17. Example of a mandatory supervision sign.

In low-income childcare settings, caregivers exhibit a heightened sense of supervision. The understanding that resources may be limited drives caregivers to be especially attentive, as they recognize the need to prevent accidents and injuries proactively. This includes addressing issues such as electrical outlets, broken furniture, or other hazards that could pose risks to children. This personalized approach allows caregivers to closely monitor children, regardless of the constraints they may face.⁵² In addition, supervision in low-income childcare spaces extends beyond the prevention of physical injuries. Caregivers are responsible for mediating conflicts and promoting peer support. It is important for them to create an environment where children can resolve disputes peacefully, reducing the risk of

⁵¹ Amy Damashek and Jennifer Kuhn. "Toddlers' unintentional injuries: the role of maternal-reported paternal and maternal supervision." *Journal of Pediatric Psychology* 38, no. 3 (2013): 265-275.

⁵² Mary Claire Heffron, "Reflective supervision in infant, toddler, and preschool work." *The Handbook of Training and Practice in Infant and Preschool Mental Health* (2005): 114-136.

emotional or physical harm.⁵³ Supervision in low-income areas emphasizes emergency preparedness. Caregivers typically receive training in basic first aid and emergency response in which they recognize that quick and effective action can make a significant difference in preventing serious injuries.⁵⁴ These caregivers understand that supervision, when combined with determination and ingenuity, can help create a secure and nurturing environment for children, regardless of economic constraints.

In low-income areas, childcare spaces serve as havens for children, offering not only a nurturing environment but also a source of support for families facing economic challenges. Supervision emerges as a critical component of injury prevention in these spaces. They empower parents and caregivers to extend injury prevention knowledge to the home and the community. Children require supervision no matter their environment, whether they are indoors or outdoors, and a space that minimizes the risk of accidents and injuries is important in protecting their safety and wellbeing.

Childproofing Indoors vs. Outdoors

This section will analyze childproofing measures for indoor and outdoor environments by highlighting the unique challenges and considerations for each setting. Childproofing indoors involves measures such as safety gates, outlet covers, and anchoring furniture, while outdoor childproofing requires fencing and play

⁵³ Tommy Garling, Anita Garling, Eva Mauritzon-Sandberg, and Ulf Bjornstig. "Child safety in the home: mothers' perception of dangers to young children." *Architecture and Behavior* 5 (1989): 293-303.

⁵⁴ Christopher S. Davis, Sarah E. Godfrey, and Kristin M. Rankin. "Unintentional injury in early childhood: its relationship with childcare setting and provider." *Maternal and Child Health Journal* 17 (2013): 1541-1549.

equipment safety. Regardless of the setting, however, the previous section on supervision remains essential to ensure the safety and well-being of children. Ultimately, childproofing tailored to the specific environment is an ongoing commitment to keeping children safe as they explore and learn in both indoor and outdoor spaces. Given the potential budget limitations in low-income settings, childproofing measures are essential to create a safe haven where children can develop without added risks. By reducing accidents, childproofing ensures that children receive the care they need while alleviating potential financial burdens on families.

Childproofing indoors is crucial because it serves to protect children from common hazards and accidents. Specifically, safety gates, electrical outlet covers, and anchoring furniture are among the most important.⁵⁵ Safety gates are essential for preventing access to staircases and specific areas within a space that may pose risks to children. They serve as a physical barrier, ensuring that children do not venture into hazardous spaces.⁵⁶ Similarly, electrical outlet covers provide a physical barrier between a child and a potential risk. Outlet covers or caps are used to prevent children from inserting objects or fingers into sockets, reducing the risk of electrical shock. In addition, children may climb or pull-on furniture, which can lead to tip-over accidents. Securing furniture to the wall with safety straps or brackets prevents these potentially serious accidents. Other safety measures include proper cord management,

⁵⁵ Tommy Garling, Anita Garling, Eva Mauritzon-Sandberg, and Ulf Bjornstig. "Child safety in the home: mothers' perception of dangers to young children." *Architecture and Behavior* 5 (1989): 293-303.

⁵⁶ Roberta Jiraschek, "Improving child safety in residential buildings via architectural design and technology integration." PhD diss., 2007.

securing cabinets and draws with locks or latches to prevent access by curious children, safety locks with doors to certain areas, safety covers or edge protectors, window locks, stove knob covers, oven locks, and toilet lid locks.⁵⁷ With that being said, childproofing measures are adaptable and can be tailored to the specific needs and hazards within a space. While they require an initial investment of time and resources, the long-term benefits of childproofing often outweigh the effort involved.

Childproofing the outdoor environment is as essential as childproofing indoors, especially in low-income childcare centers. Children's access to safe outdoor spaces is vital for their physical and cognitive development. These centers may cater to families facing financial challenges, making it even more crucial to provide a secure and enjoyable outdoor space for children. This section explores the importance and key aspects of childproofing outdoor spaces in low-income childcare, highlighting specific guidelines for providers to create a secure and stimulating environment while managing limited resources. Specific measures include fencing, safety surfacing, and secure play equipment, among others.⁵⁸ First and foremost, low-income childcare spaces should invest in sturdy fencing and barriers to create a safe outdoor play area. This prevents children from wandering into streets or other unsafe zones. Once the surrounding areas are fenced in, safety surfaces are necessary to cushion falls and reduce the risk of injuries. Low-income childcare centers can opt for cost-effective ground coverings such as rubber mats, pea gravel, or mulch. Regular

⁵⁷ Christopher S. Davis, Sarah E. Godfrey, and Kristin M. Rankin. "Unintentional injury in early childhood: its relationship with childcare setting and provider." *Maternal and Child Health Journal* 17 (2013): 1541-1549.

⁵⁸ Mariana Brussoni, Lise L. Olsen, Ian Pike, and David A. Sleet. "Risky play and children's safety: Balancing priorities for optimal child development." *International Journal of Environmental Research and Public Health* 9, no. 9 (2012): 3134-3148.

maintenance is essential to keep these surfaces in good condition.⁵⁹ Similarly, outdoor play equipment should be inspected regularly for safety, and any necessary repairs should be promptly addressed. Affordable play equipment can be secured to ensure it remains safe for children's use.



Figure 18. Common childproofing products and their associated costs.

Childproofing outdoors in low-income childcare centers is a crucial aspect of providing a safe and stimulating environment for children. It is a testament to the commitment of caregivers and providers to prioritize the safety and development of the children they serve. Childproofing measures can be adapted to suit limited resources, with cost-effective options available for each aspect of childproofing.⁶⁰ By creating a secure and enjoyable outdoor space, low-income childcare centers offer

⁵⁹ Roberta Jiraschek, "Improving child safety in residential buildings via architectural design and technology integration." PhD diss., 2007.

⁶⁰ Kidner, Camilla. "Residential Childcare." (2013): 117-120.

children the opportunity to explore, play, and learn in a protected environment, irrespective of budget constraints.

Building Codes and Regulations

Building codes and regulations are an indispensable part of child safety within built environments. They set clear and specific standards to protect children from various hazards, including fire, structural failures, accessibility issues, and playground injuries.⁶¹ The enforcement of building codes through inspections and compliance help create secure spaces where children can learn, play, and thrive without undue risks. This commitment to children's safety within built environments is a testament to the importance placed on their well-being and their right to grow and develop in secure surroundings. The establishment of building codes and regulations for childcare spaces in the United States has evolved in response to a growing understanding of the unique needs of young children. This section will explore how regulations have been refined over time to address safety concerns, ensure accessibility, and accommodate the developmental requirements of children in childcare settings.

Building codes outline specific requirements for the safety and structural integrity of childcare spaces. These codes include regulations on construction materials, fire safety measures, and guidelines for exiting the building. Compliance with these codes is necessary to ensure the safety of children and staff. These codes

⁶¹ Sarah Scott. Architecture for children. *Aust Council for Ed Research*, 2010.

outline space planning in childcare settings to promote age-appropriate learning environments for young children. A study by the National Association for the Education of Young Children explores the regulations that influence the layout, size, and design of childcare spaces to support activities that stimulate cognitive, social, and emotional development.⁶² Such guidelines include a minimum square footage

requirement per child, appropriate room sizes based on how many children will inhabit it, and the arrangement of spaces to facilitate supervision and age-appropriate activities. As such, adhering to these codes enhances the overall educational experience for children. In addition, childcare facilities are required to have robust emergency preparedness plans. Building codes detail safety measures, including the installation of emergency exits, fire alarms, and the implementation of evacuation procedures. Regular drills and staff training are often mandated to prepare a

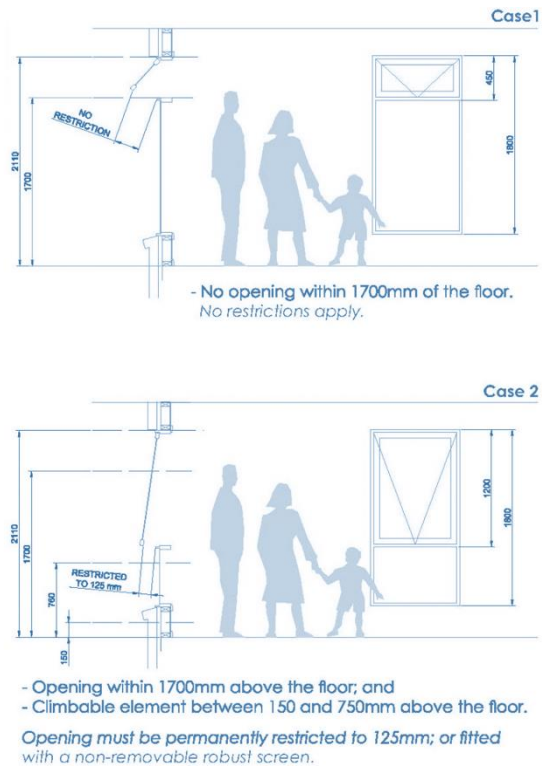


Figure 19. Example of a window design regulation according to the size of a child.

⁶² Dan Butin and Jennifer Woolums, "Early childhood centers." *National Clearinghouse for Educational Facilities* (2009).

coordinated response in case of emergencies. Other safety measures include surveillance cameras and secure fencing for the children within the facility.

Accessible and inclusive design is another aspect outlined in building codes and regulations. Such guidelines dictate the design of accessible playground equipment so that children of all abilities can engage in play. The aim is to ensure that children with mobility challenges can navigate the space independently. This emphasis in recreational spaces mirrors a commitment to social interaction and shared experiences. These building codes outline standards necessary for obtaining and maintaining a childcare license to ensure ongoing compliance with outlined standards, as they are subject to regular inspections.⁶³ These codes reflect a collective effort to create spaces that not only meet structural and safety standards but also prioritize the unique developmental needs of young children.

⁶³ Maria Prellwitz and Lisa Skär. "Usability of playgrounds for children with different abilities." *Occupational therapy international* 14, no. 3 (2007): 144-155.

Chapter 6: Children's Perception of Space

A child's perception of space is an evolving process deeply influenced by their scale, physical development, and cognitive growth. This chapter will study a child's vantage point and in doing so provide insights into their cognitive development, creativity, and understanding of the world around them. This is a developmental process in which children gradually make sense of their surroundings from the earliest moments of infancy, as they explore the world through their senses by touching, tasting, and listening. As toddlers, they start to grasp fundamental spatial concepts such as near and far, up and down, and in and out. Specifically, they also begin to differentiate between objects and spaces, developing a basic understanding of boundaries. This chapter will delve into the factors that shape a child's perception



Figure 20. Comparing the height of a grown man to an infant.

of space, how it evolves as they grow, and the implications of this perception on their physical, emotional, and cognitive development.

A Child's Vantage Point

Children experience the world from a unique vantage point, both physically and cognitively. Their scale and limited life experiences shape their understanding of architecture and space in distinctive ways. Children's perception of space begins to take shape in the early stages of development. Caregivers, family dynamics, and their surrounding cultural context contribute significantly to a child's initial understanding of space.⁶⁴ From the cozy confines of a home to boundless outdoor environments, these early influences serve as the foundation for spatial cognition. Young children inhabit a world designed for adults, where most architectural elements, furniture, and features are not tailored to their needs. Research published in *Psychological Science* highlights that children's judgments of distances and heights are influenced by their shorter stature. This leads to the perception of objects and architectural features as larger and more imposing than they appear to adults.⁶⁵ Similarly, a study published in *Child Development* demonstrates that even in their first months of life, infants show an ability to detect distance and depth through visual cues.⁶⁶ This early sensory

⁶⁴ David R. Olsen, "Children's recall of spatial orientation of objects." *The Journal of Genetic Psychology* 114, no. 2 (1969): 273-281.

⁶⁵ Dennis R. Proffitt, Jeanine Stefanucci, Tom Banton, and William Epstein. "The role of effort in perceiving distance." *Psychological Science* 14, no. 2 (2003): 106-112.

⁶⁶ Carl E. Granrud, Albert Yonas, Isabel M. Smith, Martha E. Arterberry, Marcia L. Glicksman, and Ann C. Sorknes. "Infants' sensitivity to accretion and deletion of texture as information for depth at an edge." *Child Development* (1984): 1630-1636.

information helps them differentiate between objects and spaces, allowing them to gradually develop an awareness of their surroundings.



Figure 21. A Child's Vantage Point.

Childhood experiences have a profound and lasting impact on an individual's development and well-being. The spaces in which children grow, learn, and play a crucial role in shaping these experiences. Architecture has the power to either nurture or hinder a child's physical, cognitive, and emotional growth. Piaget concluded that a child's perception of space evolves with age.⁶⁷ As cognitive abilities mature, children gain a more sophisticated understanding of space, allowing them to navigate and interact with their surroundings in increasingly complex ways. Infants and toddlers initially grasp basic spatial concepts such as proximity, containment, and boundaries. As children grow, they develop more sophisticated understandings of spatial relationships, including distance, perspective, and orientation. This development aligns with the cognitive growth that accompanies the transition from concrete to

⁶⁷ Yoshinobu Kato, "Development of spatial recognition in preschool children: On Piaget and Inhelder's hypothesis of topological space." *Perceptual and Motor Skills* 63, no. 2 (1986): 443-450.

formal operational thinking. A well-structured and aesthetically pleasing environment can contribute to a child's sense of safety, comfort, and well-being. In contrast, overcrowded or chaotic spaces may lead to emotional stress and anxiety.⁶⁸ Moreover, spatial thinking is vital for problem-solving, mathematical reasoning, and scientific exploration, demonstrating the cognitive benefits of a rich spatial experience.

The appropriate design of architectural structures for a child's vantage point impacts their learning and creativity. For instance, children exposed to stimulating architectural environments tend to develop better spatial skills and exhibit increased creativity in their problem-solving abilities.⁶⁹ Similarly, research published in *Environment and Behavior* highlights the impact of architectural design on children's experiences. Well-designed spaces that cater to a child's scale offer opportunities for exploration and can enhance a child's understanding of architectural elements.⁷⁰ The use of child-friendly materials, colors, and shapes can create environments that are not only developmentally appropriate but also foster a positive emotional connection with architecture.

Play & Space

Children view the world through a lens of boundless imagination. For them, a simple box can transform into a spaceship, and a tree branch can become a magical

⁶⁸ Gary T. Moore, "Effects of the spatial definition of behavior settings on children's behavior: A quasi-experimental field study." *Journal of Environmental Psychology* 6, no. 3 (1986): 205-231.

⁶⁹ Boudewijn Boon, Marco Rozendaal, Marry M. Van den Heuvel-Eibrink, Janjaap van der Net, and Pieter Jan Stappers. "Playscapes: A design perspective on young children's physical play." In *Proceedings of the 15th International Conference on Interaction Design and Children*, pp. 181-189. 2016.

⁷⁰ Louise Chawla and Debra Flanders Cushing, "Education for strategic environmental behavior." *Environmental Education Research* 13, no. 4 (2007): 437-452.

wand. This imaginative approach to the world has the potential to reshape architectural design. Playgrounds, for instance, exemplify this concept, as these structures are designed to encourage exploration, interaction, and imagination. This section will continue the discussion of considering architecture from a child's perspective, emphasizing how it can inspire innovative and inclusive design.

Play is a fundamental part of childhood, serving as a means of exploration, discovery, and socialization. Through play, children develop crucial cognitive, emotional, and physical skills. Play activities like building with blocks, drawing, or imaginative role-play provide children with opportunities to explore and experiment with spatial



Figure 22. Importance of play for children's natural development.

relationships. They begin to understand concepts of scale, volume, and spatial arrangement, all of which are fundamental to their cognitive development.⁷¹ These play spaces for children are not only for individual enjoyment; they also serve as communal areas that bring families and communities together. Playgrounds and parks provide a platform for social interaction, where children can bond with their peers and parents can engage with other caregivers. These spaces encourage social development, helping children learn to collaborate, share, and develop social skills

⁷¹ Fergus P. Hughes, *Children, Play, and Development*. SAGE publications, 2021.

that will benefit them throughout their lives. A study by Dasen (1994) reveals that children growing up in various cultural contexts may develop distinct spatial orientations and strategies.⁷² Environmental factors, such as living in urban or rural settings, influence how children interpret and navigate their spatial world. By designing with children's play in mind, architecture plays a vital role in shaping the way young people experience and interact with their environment. These spaces are not just physical structures; they are places where future generations will play, learn, and grow.

Children and architecture are intrinsically linked, and architects have a tremendous responsibility in shaping the spaces that influence the future of our society. Designing with children in mind is not just a matter of creating safe and functional structures; it's about crafting environments that inspire, nurture, and enrich the lives of young individuals. When architects prioritize the needs, safety, and well-being of children, they are investing in a future that is not only physically sound but also creative, inclusive, and socially harmonious. Architectural design for children must consider scale and proportion that resonate with their size and perspective and allow them to navigate and explore comfortably.

⁷² Pierre R. Dasen, "Culture and cognitive development." *Journal of Cross-Cultural Psychology* 53, no. 7-8 (2022): 789-816.

Chapter 7: Child-Oriented Design

Child-oriented architecture puts children's unique needs and experiences at the forefront of the design process. It is a design philosophy that acknowledges children are not just small adults but individuals with distinct physical, cognitive, emotional, and social needs. Playgrounds, parks, and community centers offer spaces for children to engage with their peers, make friends, and develop social skills. These spaces play a crucial role in building strong environments where children and families feel connected. Similarly, child-oriented design acknowledges that children come from diverse backgrounds and abilities, and architectural spaces should reflect this diversity. As such, the appropriate use of child-oriented design principles can lead to a more socially cohesive and inclusive society. By embracing technological advancements, offering flexible and adaptable spaces, prioritizing safety, sustainability, inclusivity, biophilic design, and ergonomics, child-oriented design



Figure 23. Designing public space for children.

reflects the ever-evolving understanding of children's unique needs and the desire to provide them with the best possible environments for growth and development.⁷³ This chapter will go further to explore innovative approaches to the design of architectural spaces for children and their impact on those who inhabit them, as well as the surrounding community.

The Protective Perimeter

The thoughtful design of childcare spaces provides an emotionally supportive and educationally stimulating environment for children in need. The architectural perimeter, which refers to the physical boundaries and features that define a space, is of paramount importance in ensuring the safety of a childcare environment. It distinguishes the space from its surroundings to protect children from external hazards and control access to the premises. It is through thoughtful design and attention to the architectural perimeter that childcare spaces can promote safety, stimulate learning, and create a nurturing atmosphere. Specifically, the architectural perimeter in low-income childcare spaces serves as a fundamental element for ensuring the safety and security of children, many of whom may live in neighborhoods with higher crime rates or unique safety concerns. This section

⁷³ Mina Khodadad, Seyyed Moein Moosavi Nadoshan, Solmaz Khodadad, and Mohsen Sanei. "Operative guidelines for sustainable designing of child-oriented architectural spaces." *Journal of Civil Engineering and Urbanism* 8, no. 1 (2018): 6-11.

explores the design of the architectural perimeter in children's spaces and how it contributes to the holistic growth of children.



Figure 24. The design of the perimeter in a child-friendly space in China.

Well-defined boundaries help children understand and navigate their environment more effectively, leading to better use of available space. Well-constructed fences and secure entrances are essential components that prevent unauthorized access and reduce the risk of accidents, keeping children safe from harm. The architectural perimeter provides a sense of privacy that can offer children an escape from the challenges they may face in their neighborhood environments. Designing sensory gardens and exploration zones within the perimeter allows children to interact with nature firsthand. These zones may include areas with textured surfaces and interactive installations that engage the senses. Such environments provide opportunities for sensory-rich experiences, promoting cognitive

and emotional development.⁷⁴ While the benefits are clear, integrating nature into childcare design presents challenges. Safety considerations, maintenance of natural elements, and regulatory compliance must be addressed. Balancing the desire for natural features with practical concerns is necessary to create sustainable care spaces, so finding alternative connections to natural environments is a beneficial consideration.

Designing outdoor play spaces that mimic natural environments is a key aspect of connecting nature and maintaining safety in childcare spaces. Incorporating elements like natural vegetation, water features, and sensory-rich landscapes not only provides opportunities for physical activity but also encourages exploration and imaginative play.⁷⁵ In a similar way, designing ample windows, skylights, and transparent dividers creates a connection with the outdoors, promoting a sense of openness and visual engagement. Low windows that offer glimpses to the natural world with smaller proportions in mind are crucial in creating these connections. As such, design of the architectural perimeter must encompass even the smallest details to enhance the child's experience.

Turning the Corner

Child-oriented design in architecture places the well-being and safety of children at the forefront of the design process. One of the key principles of child-oriented design is the use of rounded edges in architectural elements, such as

⁷⁴ Richard Louv. *Last child in the woods: Saving our children from nature-deficit disorder*. Algonquin books, 2008.

⁷⁵ Andrea Faber Taylor, Frances E. Kuo, and William C. Sullivan. "Coping with ADD: The surprising connection to green play settings." *Environment and Behavior* 33, no. 1 (2001): 54-77.

furniture, fixtures, and structural components. This design feature serves not only an aesthetic purpose but also, more importantly, plays a significant role in ensuring the safety and comfort of children. This section will explore the importance of rounded edges in child-oriented design and how they contribute to creating spaces that are nurturing, secure, and conducive to children's growth and development.

Historically, as awareness grew regarding the vulnerability of children to accidents and injuries, design principles began incorporating features aimed at reducing potential harm.⁷⁶ Of these, rounded edges resulted from a holistic view of associated benefits. Understanding the biomechanics of falls and impact is integral to designing safe spaces for children. Rounded edges distribute impact forces more evenly, reducing the risk of injury in case of a fall.⁷⁷ This consideration aligns with the developmental stage of children, who are prone to occasional falls as they navigate and explore their surroundings. In addition, rounded edges extend beyond physical safety to influence psychological understandings of space and relationships. Research in *Environmental Psychology* suggests that design elements impact emotional well-being.⁷⁸ Rounded edges create a softer, more inviting atmosphere, promoting a sense of comfort and trust in the environment for both children and caregivers. The integration of rounded edges in child-oriented design is a conscientious effort to create spaces that prioritize the safety, well-being, and holistic

⁷⁶ Michael J. Proulx, Orlin S. Todorov, Amanda Taylor Aiken, and Alexandra A. de Sousa. "Where am I? Who am I? The relation between spatial cognition, social cognition and individual differences in the built environment." *Frontiers in Psychology* (2016): 64.

⁷⁷ Amy S. Joh, and Karen E. Adolph. "Learning from falling." *Child Development* 77, no. 1 (2006): 89-102.

⁷⁸ Roger S. Ulrich, "Effects of interior design on wellness: theory and recent scientific research." In *Journal of HealthCare Interior Design: Proceedings from the... Symposium on Health Care Interior Design. Symposium on Health Care Interior Design*, vol. 3, pp. 97-109. 1991.

development of children. As architects and designers continue to refine child-oriented design principles, the inclusion of features like rounded edges represents attention to inherently safe details for children.

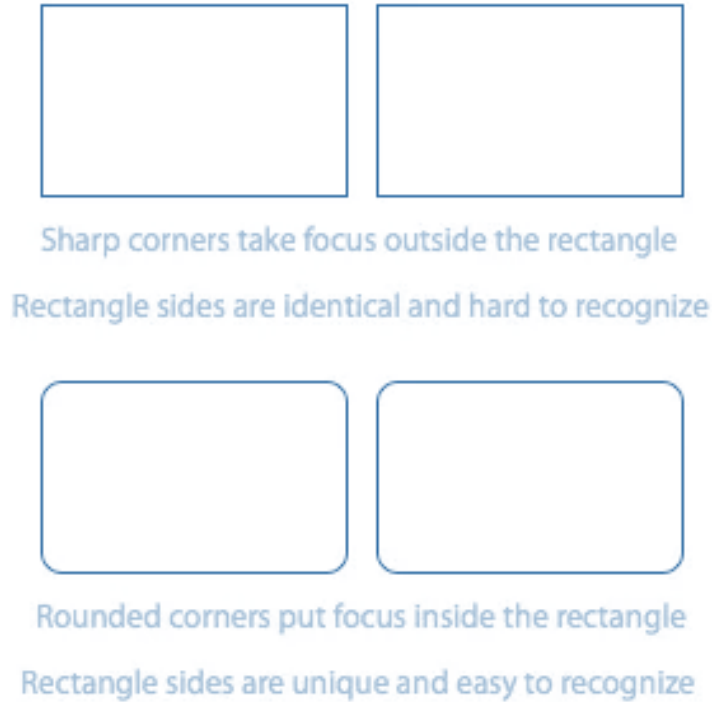


Figure 25. Sharp vs. Rounded Corners

Shaping the Future

Innovative child-oriented design promotes flexibility and adaptability in spatial arrangements. Modern educational settings are designed to be multifunctional, enabling the transformation of spaces to accommodate various learning activities. Movable walls, modular furniture, and flexible layouts offer the freedom to adapt the environment to the specific needs of different age groups and learning styles. Different age groups have distinct needs and developmental milestones. Designing spaces that can be easily adapted to accommodate various age groups fosters an inclusive and supportive environment for all children, ensuring that each child's unique requirements are met.⁷⁹ This adaptability also ensures that spaces can evolve with changing educational methods and technological advances.

⁷⁹ Christopher, Spencer and Mark Blades. *Children and Their Environments*. Cambridge: Cambridge University Press, 2006.

Flexible design encompasses considerations beyond physical space. The incorporation of adjustable lighting and acoustics allows for the creation of environments that meet the sensory needs of children. Lighting levels and soundscapes can enhance focus, relaxation, or play, contributing to a more comfortable and stimulating atmosphere.⁸⁰ Additionally, childcare spaces are not just for children; they are hubs for community engagement. Flexibility in design includes creating spaces that can accommodate community events, parent-teacher meetings, and collaborative activities. These spaces serve as connectors between the childcare facility and the broader community, fostering a sense of belonging and collaboration.⁸¹ Designing flexibility is a proactive response to the dynamic nature of child development, the diverse needs of children, and the evolving culture of educational practices. As discussed in both Chapters 5 and 6, child-oriented design begins with a deep understanding of the child's perspective. This empathetic approach considers that the designed spaces



Figure 26. Understanding a child's perspective (physically, emotionally, and mentally).

⁸⁰ Payam Dadvand, Mark J. Nieuwenhuijsen, Mikel Esnaola, Joan Forns, Xavier Basagaña, Mar Alvarez-Pedrerol, Ioar Rivas et al. "Green spaces and cognitive development in primary schoolchildren." *Proceedings of the National Academy of Sciences* 112, no. 26 (2015): 7937-7942.

⁸¹ Margaret Kernan. "Space and place as a source of belonging and participation in urban environments: Considering the role of early childhood education and care settings." *European Early Childhood Education Research Journal* 18, no. 2 (2010): 199-213.

resonate with the unique experiences of the children who inhabit them. By prioritizing scale, safety, playfulness, nature integration, flexibility, and inclusivity, designers have the ability to create spaces that go beyond mere functionality. As such, the following Chapter will review seemingly successful case studies to craft a unique program that caters to the evolving needs of children and their caregivers, families, and surrounding communities.

Chapter 8: Program Design

To achieve the goal of designing physically and emotionally safe childcare spaces for children of all abilities and their caregivers, the following program supports the exploration of childcare spaces that transcend traditional boundaries. The program focuses on the pivotal role architecture plays in promoting comprehensive child development, as well as supporting the health and wellness of those who care for these children. Dynamic learning environments engage children in age-appropriate development and educational activities. The architectural spaces prioritize cognitive, emotional, social, and physical growth, fostering a sense of community while supporting individual needs. Recognizing the diverse learning styles of young individuals, the program introduces flexible learning areas. These adaptable spaces cater to various activities, from collaborative play to individual reflection, which support learning styles for each child. Outdoor play areas, green spaces, and gardens create an interactive environment that promotes physical activity, creativity, and an appreciation for the outdoors.

The program places caregivers at the heart of the design, creating spaces that prioritize their comfort, well-being, and professional growth. Thoughtfully designed break areas, collaborative workspaces, and training rooms shape the caregiver hub. Adaptable offices, communal lounges, and quiet retreats offer spaces for work, collaborative discussions, and moments of relaxation, fostering a balanced and fulfilling work-life experience. Spaces are tailored to accommodate various caregiver roles, from educators to support staff to acknowledge that each role is valued, respected, and provided with space for professional growth. The program recognizes that the well-being of caregivers is linked to the overall success of the childcare

community. In addition, the program supports healthy family dynamics, as the built environment has the ability to support families facing economic challenges. The architectural design integrates communal areas, family lounges, and interactive zones for parents and caregivers to actively participate in their children's education. Community gardens and gathering spaces allow families to come together, as they provide opportunities for communal support beyond the childcare spaces. The program promotes spaces for early childhood development as well as provides support for families to overcome socio-economic challenges. The following program is committed to creating an inclusive environment where every child, caregiver, family, and community can thrive. The architectural spaces foster a culture of diversity and acceptance by not only meeting the immediate needs of children, but also serving as a catalyst for their lifelong development and community support.

Conceptual Zones

The following conceptual zones shaped the eventual design of the program for The Cutting-Edge Early Learning Center. These zones represent the needs of the building's users, including children, their caregivers, families, and surrounding community. In doing so, the eventual architectural space will specifically cater to those who inhabit the space and promote their health, wellness, and development. These zones include developmental stimulation, private rehabilitation, caregiver's health and wellness, and natural connection. These zones are a result of ongoing research in multidisciplinary fields. As such, they are a holistic representation of the Center's goal to re-envision the future of childcare spaces as safe and nurturing spaces for all who enter its doors. This section will consider each of the zones and the

research that led to their creation, highlighting specific studies that support their inclusion in the program outlined in a later section, *Spatial Programming*.

The developmental stimulation zone was created with the principles of early childhood development in mind, as these spaces invite children to explore, create, and learn. In, “Architecture and Children,” the authors provide examples of successful architectural designs that have been used to improve the learning environment of children. In doing so, they discover that designs tailored to individual age groups have been more beneficial to development.⁸² As such, the developmental

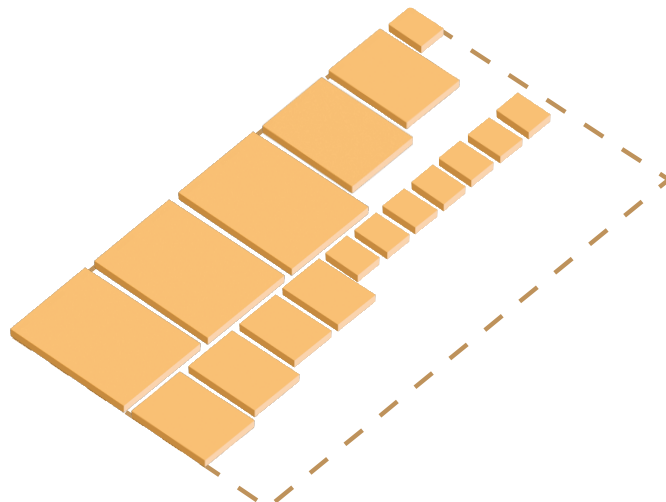


Figure 27. Developmental Stimulation Program Graphic

Developmental Stimulation			
Baby Activities	1	1200	1200
Toddler Activities (1-2)	1	1800	1800
3-Year-Old Activities	1	1800	1800
4-Year-Old Activities	1	1800	1800
All Age Library	1	600	600
All Age Studio (Multipurpose Room)	1	1000	1000
Art Studio	1	400	400
Science Lab	1	400	400
DS Support Spaces			
Baby Changing Area	2	100	200
Baby Feeding Area	2	100	200
All Age Lunchroom	1	1000	1000
Children's Restrooms	4	100	400
			10800

⁸² Taylor, Anne, and Leslie Campbell. "Architecture and Children." *Heritage Education Quarterly* 3, no. 2 (1988): 4-5.

stimulation zone is separated by age group in order to ensure each child receives proper care depending on their developmental stage.

The private rehabilitation zone offers individualized emotional support pods, rest areas, and meditation spaces to offer children a space to regulate their own emotions. In an article by Y.A. Sharonov called,

“Designing Children’s Spatial Environments,” the author emphasizes the importance of providing adequate space for children’s activities and emotional development. Sharonov highlights the need for spaces where children can self-regulate these emotions,

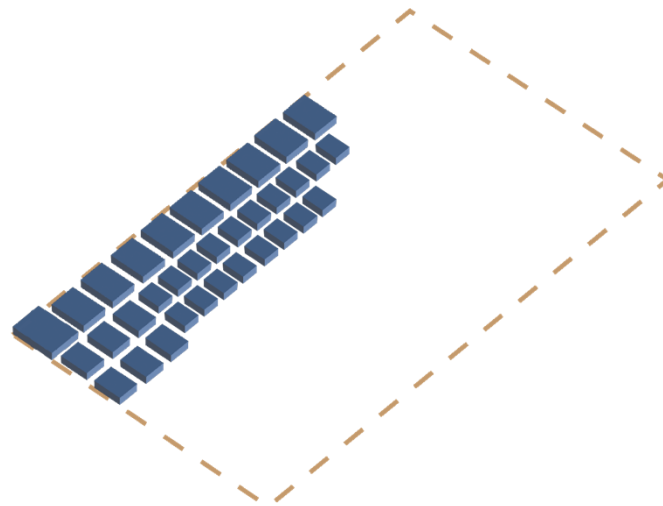


Figure 28. Private Rehabilitation Program Graphic.

Private Rehabilitation			
Baby Nap Area	6	80	480
Toddler Rest Areas	2	100	200
3 yo Rest Areas	2	100	200
4 yo Rest Areas	2	100	200
Destress Pods	8	50	400
Reading Nooks	8	50	400
Meditation Garden	1	200	200
Family Counseling	2	100	200
Caregiver Rest Areas	4	50	200
			2480

as it promotes independence and natural development.⁸³ As such, in the private rehabilitation zone, children receive the attention and care necessary for their individual needs, ensuring that every child, regardless of their challenges, can reach

⁸³ Y.A. Sharonov, “Designing Children’s Spatial Environments.” *Ekistics* 47, no. 281 (1980): 118–23. <http://www.jstor.org/stable/43620505>.

their full potential. For caregivers, this zone prioritizes privacy and a sense of security to recharge and gain valuable insights into the unique needs of their children.

The caregiver's hub offers spaces of respite for the invaluable contributors to the children's growth. Roderick Durkin's article published in the *Journal of Childcare* offers an in-depth analysis of the current problems in children's services through interviews with childcare workers and administrators.⁸⁴ Specifically, it examines the effects of this crisis on childcare workers, including the need for improved training and resources that promote professional growth. As such, this zone is a place where caregivers can connect with each other, share experiences, and access educational materials.

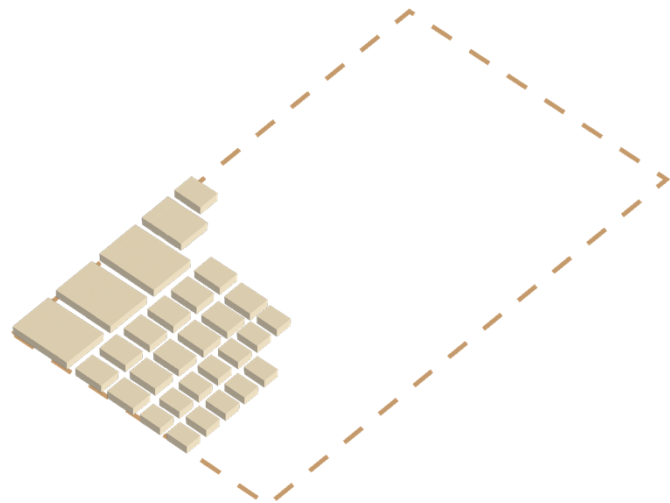


Figure 29. Caregiver's Hub Program Graphic.

Caregiver's Hub			
Workstations	10	75	750
Podcast Rooms	4	50	200
Resource Library	1	400	400
Training Simulation	1	400	400
CH Support Spaces			
Kitchen & Dining	1	400	400
Staff Restrooms	3	75	225
Family & Caregiver Collaboration	2	50	100
Family Waiting Area	1	200	200
Storage	6	50	300
			2975

This zone offers spaces for professional development and support, with training

⁸⁴ Roderick Durkin, "The crisis in children's services: The dangers and opportunities for childcare workers." *Journal of Childcare* (1983).

facilities, podcasts rooms, and countless resources for growth. The caregiver’s hub also offers spaces for family interaction and support to encourage parent-child engagement. This zone facilitates meaningful connections to create an environment where families feel supported, informed, and integral to the growth of their children.

The natural connection zone combines architectural design with the natural world to offer opportunities for play, learning, and relaxation. In this zone, indoor spaces seamlessly transition to outdoor areas,

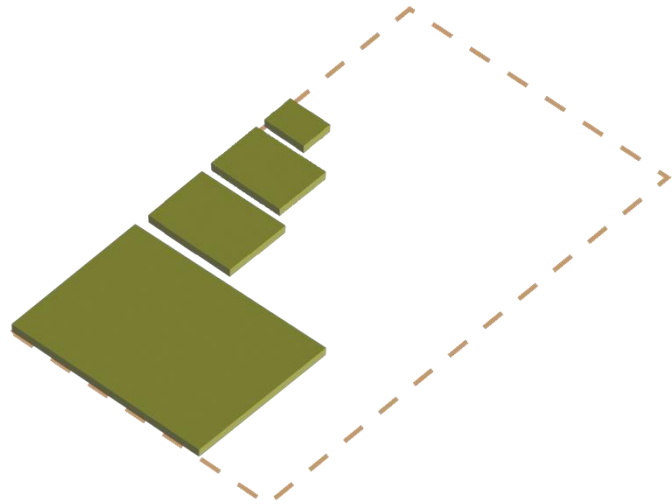


Figure 30. Natural Connections Program Graphic.

facilitating a continuous flow between the built environment and nature. A study by Muntazar Monsur from North Carolina State University provides an analysis of how the design of transitional spaces in childcare

Natural Connection			
Outdoor Play Areas	4-6	varies	5,000
Sport Court	1	800	800
Agricultural Education Garden	1	200	200
Sun / All Season Rooms	1	600	600
IE - Support Spaces			
Drop Off / Pick Up Spaces	depends	300	300
			6,900

environments provide opportunities for children to practice problem-solving skills, which can lead to improved communication and socialization. The study highlights the importance of providing children with adequate space to move freely as it can have a positive impact on their play and learning behavior. As such, this is more than a physical space; it is where children are able to develop a profound appreciation for

the environment.⁸⁵ These zones contribute to creating a place of learning, as well as a supportive community that values the growth and development of their children. The following section will discuss their role in shaping the spatial program for the Cutting-Edge Early Learning Center.

Case Studies

Architectural case studies around the world showcase the beneficial impact of thoughtful design on improving user experience within a space, regardless of the building's function. This section explores specific architectural case studies that demonstrate innovative approaches in the design of spaces for promoting development and safety. Through careful analysis, these case studies offer valuable insights into the role of architecture in creating environments that are conducive to the four zones of developmental stimulation, private rehabilitation, caregiver health and wellness, and natural connection. These case studies offer valuable insight into spatial relationships and programming, while also offering a better understanding of specific spaces.

⁸⁵ Muntazar Monsur, "Transitional Space and Preschool Children's Play & Learning Behavior in Childcare Environment." In *ARCC Conference Repository*. 2013.



Figure 31. Maggie Daley Park Playground (Chicago).

While not a traditional childcare center, the Maggie Daley Park Playground in Chicago is innovative in its design of an interactive and inclusive play area. Designed by landscape architects Michael Van Valkenburgh Associates and completed in 2015, the playground's architecture incorporates universally accessible features, diverse play zones, and sensory-rich elements for children of all abilities to engage in meaningful play experiences.⁸⁶ Each zone is strategically arranged to encourage children's exploration and movement to promote physical activity and motor skill development. The emphasis on inclusivity aligns with contemporary principles of designing spaces that align with diverse developmental needs. The structures are designed with vibrant colors, whimsical shapes, and dynamic forms that stimulate creativity and imagination. The architectural elements serve dual purposes, as they

⁸⁶ "Play Garden," *Maggie Daley Park*, accessed November 21, 2023, <https://maggiedaleypark.com/things-to-do-see/play-garden/>.

are aesthetically pleasing and provide opportunities for cognitive development through imaginative play.⁸⁷ The playground's design extends beyond individual play



Figure 32. Maggie Daley Park Playground Site Plan.

experiences to foster a sense of community. Gathering spaces, picnic areas, and shaded seating invite families to come together. The layout encourages social interaction and shared experiences, turning the playground into a communal space where relationships are forged, and a sense of community thrives. The Maggie Daley Park Playground is an example of how design can transform public spaces into vibrant, welcoming, and enriching environments for all. It is an inspiration for a playground design that prioritizes the needs of every child, irrespective of their abilities or challenges.

Located in Gundslev, Denmark, Storstrøm Prison is an example of how architecture can achieve a successful balance between safety, security, and comfort for its users, while ensuring that the needs of staff and visitors are also met. Designed by architect C.F. Møller and completed in 2017, the layout of the space includes a

⁸⁷ "Michael Van Valkenburgh Associates Inc," *Michael Van Valkenburgh Associates Inc*, accessed November 21, 2023, <https://www.mvvainc.com/projects/maggie-daley>.

cluster of buildings with their own streets and squares to bring humanity into a maximum-security space and function as a small community.⁸⁸ The main building is built with a curved form,



Figure 33. Storstrøm Prison aerial view.

which allows it to blend in with its rural surroundings and to provide a sense of warmth and security for inmates. The design focuses on rehabilitation rather than punishment, and the prison offers a range of educational and therapeutic services to its inmates. The prison is considered the “world’s most humane and socializing closed prison,” as its open, welcoming design has been praised for its ability to give visitors a sense of comfort and security.⁸⁹ The prison itself has reduced recidivism rates and



Figure 34. Storstrøm Prison Courtyard - note fence boundaries.

⁸⁸ Cristobal Rojas, Storstrøm Prison / C.F. Møller, ArchDaily, December 13, 2017, accessed November 21, 2023, <https://www.archdaily.com/885376/storstrom-prison-cf-moller>.

⁸⁹ “Storstrøm Prison,” C.F. Møller, accessed November 21, 2023, <https://www.cfmoller.com/p/Storstroem-Prison-i2730.html>.

improved inmate mental health rates. This precedent will inform the design of a safe childcare space, as the concept is rooted in the idea that a secure space with constant supervision can also promote independence and development. By emphasizing surveillance and visibility, implementing spatial zoning with controlled access to manage circulation, embracing flexibility, adopting inclusive design principles, providing secure outdoor spaces, and incorporating educational facilities, the design characteristics employed in Storstrøm Prison may be applied to a secure, stimulating environment for Cutting Edge Early Learning Center.



Figure 35. Kindergarten building in Guastalla, Italy by Mario Cucinella Architects.

Mario Cucinella Architects' Kindergarten building in Guastalla, Italy is designed to account for the spatial perception and early development of a child. Completed in 2015, the building has an irregular shape that follows the contours of the existing terrain, while the windows and doors are designed to provide plenty of natural light and ventilation. Designed to accommodate 120 boys and girls between the ages of 0 and 3, the structure blends interior and outdoor space to promote



Figure 36. Interior curves and structure in the kindergarten building in Guastalla, Italy.

development.⁹⁰ The building is designed to take advantage of the beautiful Italian landscape, with the main entrance facing a large lake. The classrooms are arranged around a central courtyard, designed to provide ample space for play, exploration, and learning. The building is a model for designing with the use of natural light, flexible classrooms, and sustainable materials that can be used to create an inspiring space for children.

Located in North Perth, Australia, the North Perth School of Learning, also known as SkyPlay, is designed around the idea that children can “play in the sky” and be grounded by the earth simultaneously.⁹¹ Designed by Tom Godden Architects &

⁹⁰ Karen Valenzuela, “Kindergarten in Guastalla / Mario Cucinella Architects,” *ArchDaily*, October 14, 2015, accessed November 21, 2023, <https://www.archdaily.com/775276/nido-dinfanzia-a-guastalla-mario-cucinella-architects>.

⁹¹ Pilar Caballero, “SkyPlay: North Perth School of Learning / Tom Godden Architects & Matthew Crawford Architects,” *ArchDaily*, October 6, 2018, accessed November 21, 2023, <https://www.archdaily.com/902953/skyplay-north-perth-school-of-learning-tom-godden-architects-and-matthew-crawford-architects>.



Figure 37. The North Perth School of Early Learning Aerial View.

Matthew Crawford Architects and completed in 2018, the design accommodates 114 children and “the physical environment is considered as much of a learning tool as the curriculum.”⁹² The site itself required an innovative solution to the design of an early learning center, as it only allowed for vertical expansion, which can be a difficult consideration in a space with young children. The vertical form did, however, allow for unique indoor spaces that seamlessly connect with outdoor play areas, facilitating continuous supervision. These sheltered outdoor zones provide play areas throughout the entire year and a double-height space is the central hub for collective gatherings. Internally, the incorporation of expansive glass windows and mezzanines set back from the main space encourages vertical interaction among children of varying age groups on different levels (as seen in Figure 38).

⁹² “Skyplay-North Perth School of Early Learning,” *Matthew Crawford Architects*, accessed November 21, 2023, <https://www.mcarchitects.com.au/skyplay-north-perth-school-of-early-learning>.

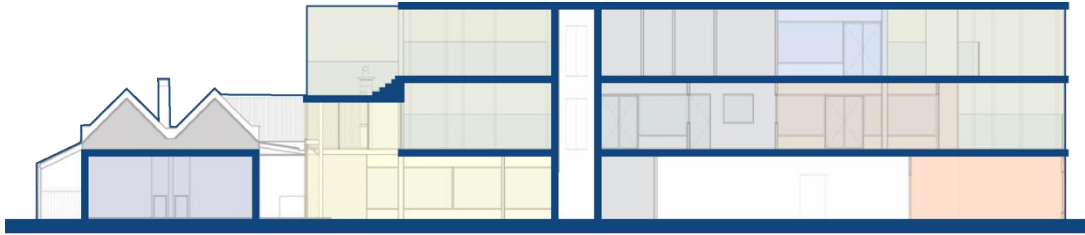


Figure 38. North Perth School of Early Learning Section.

The building's connection with nature is evident throughout the entire structure and strives to create community for the children that inhabit it, as seen in Figure 39. Rather than painting the walls bright colors typical of childcare facilities, the building uses natural materials to appeal to its users. Caregiver spaces are designed to increase efficiency and provide appropriate supervision. Interior glass walls are used to allow children to observe various age groups activity at different levels throughout the space. The outdoor spaces are designed to be safe and secure for children, incorporating soft landscaping, accessible pathways, and plenty of areas for children to play and explore.

Spatial Programming

Spatial programming discussed in this section involves the thoughtful allocation of physical space to various functions within the Cutting-Edge Early



Figure 39. Outdoor Space in the North Perth School of Early Learning.

Learning Center. It is an intentional strategy to create spaces that cater to the diverse

needs of children, their caregivers, families, and communities. Classrooms, play areas, nap spaces, and administrative zones must be carefully arranged to optimize circulation, functionality, and safety. This spatial programming begins with the four zones explained in an earlier section, *Conceptual Zones*, which include developmental stimulation, private rehabilitation, caregiver's health and wellness, and natural connection. These zones are a result of multidisciplinary research and aim to improve the user experience and quality of care within a space for children. After establishing these four zones, the following program was outlined to better understand the spatial connections they must have with one another.

It is important to note that 50 square feet of program space is necessary per infant and 35 square feet per toddler and child.⁹³ For financial reasons, a

⁹³ Judy Berman, Soumya Bhat, and Amber Rieke. "Solid footing: Reinforcing the early care and education economy for infants and toddlers in DC." *Washington, DC: DC Appleseed Center for Law and Justice and DC Fiscal Policy Institute* (2016).

developmental childcare space should support no less than 74 children and no more than 150, as any more would require additional institutional resources.⁹⁴ Figure 40 depicts a synthesis of the programmatic zones outlined in the previous section, *Conceptual Zones*. This synthesis may also be seen in graphic format in Figure 41, where relationships between the zones are organized according to function and size. In Figure 41, it is important to note that the developmental stimulation zone is split by age group, the caregiver's hub is evenly spread throughout to encourage supervision, and

Description	Quantity	Size	Total
Developmental Stimulation			
Baby Activities	1	1200	1200
Toddler Activities (1-2)	1	1800	1800
3 Year Old Activities	1	1800	1800
4 Year Old Activities	1	1800	1800
All Age Library	1	600	600
All Age Studio (Multipurpose Room)	1	1000	1000
Art Studio	1	400	400
Science Lab	1	400	400
DS Support Spaces			
Baby Changing Area	2	100	200
Baby Feeding Area	2	100	200
All Age Lunch Room	1	1000	1000
Children's Restrooms	4	100	400
			10800
Private Rehabilitation			
Baby Nap Area	6	80	480
Toddler Rest Areas	2	100	200
3 yo Rest Areas	2	100	200
4 yo Rest Areas	2	100	200
Destress Pods	8	50	400
Reading Nooks	8	50	400
Meditation Garden	1	200	200
Family Counseling	2	100	200
Caregiver Rest Areas	4	50	200
			2480
Caregiver's Hub			
Workstations	10	75	750
Podcast Rooms	4	50	200
Resource Library	1	400	400
Training Simulation	1	400	400
CH Support Spaces			
Kitchen & Dining	1	400	400
Staff Restrooms	3	75	225
Family & Caregiver Collaboration	2	50	100
Family Waiting Area	1	200	200
Storage	6	50	300
			2975
Natural Connection			
Outdoor Play Areas	4-6	varies	5,000
Sport Court	1	800	800
Agricultural Education Garden	1	200	200
Sun / All Season Rooms	1	600	600
IE - Support Spaces			
Drop Off / Pick Up Spaces	depends	300	300
			6,900
			23,155

Figure 40. Program Zones Synthesis Table.

⁹⁴ Joseph Moravec, "Childcare Center Design Guide," GSA Public Buildings Service (July 2003). <https://www.gsa.gov/system/files/designguidesmall.pdf> (not sure if this is cited correctly)

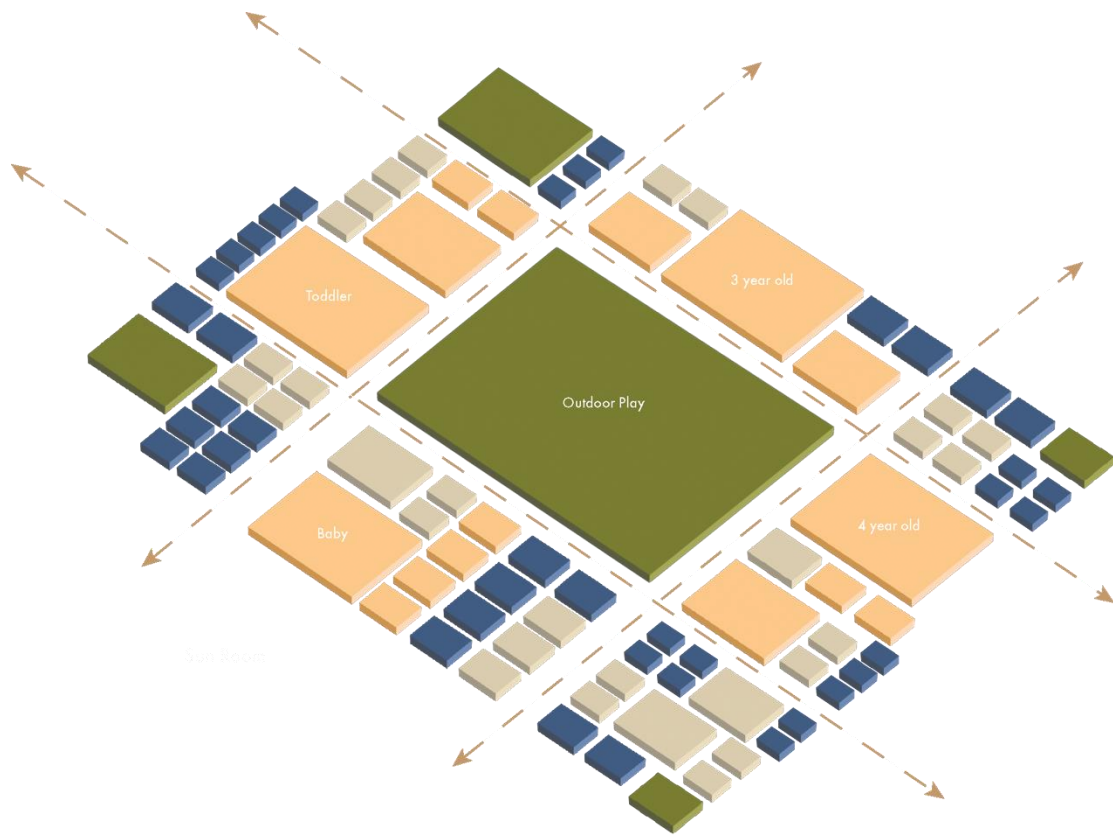


Figure 41. The spatial organization of the four primary conceptual zones.

the natural connection zone is the central element in the organization of surrounding space. A closer look at how the private rehabilitation zone is separated by areas with more noise can be seen in Figure 42. Here, it is important to note that “activity” space refers to a supervised classroom, whereas the outdoor play, loud areas are unrestricted playgrounds.

This childcare program represents an understanding of the developmental needs of children. These needs encompass physical, cognitive, social, and emotional considerations. By designing for these different aspects of development, activities may align with the age, abilities, and interests of the children inhabiting the space. The following chapter will discuss the site selection and eventually explore how this program may fit on a preferred site.

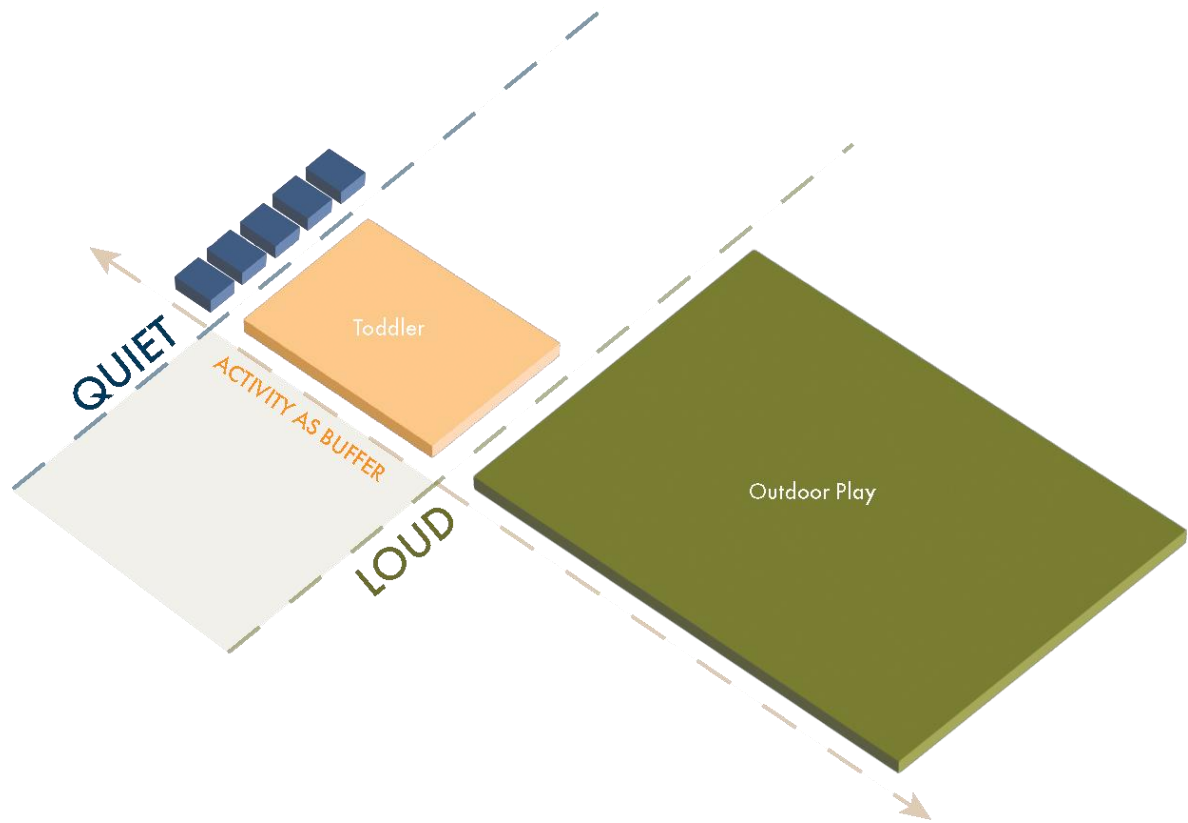


Figure 42. Separation of loud and quiet spaces with organized, supervised activity space.

Chapter 9: Site Selection & Analysis

Washington, D.C. is a symbol of the nation's ideals, democracy, and history.

The existing juxtaposition of landmarks with contemporary architectural projects in the city creates a compelling dialogue between tradition and innovation. The childcare crisis in Washington, D.C., specifically, represents a multifaceted challenge with far-reaching consequences for families, the economy, and society at large.

According to a report by the *Economic Policy Institute*, the lack of affordable childcare in Washington, D.C. has led to a substantial decline in the labor force participation rate, negatively impacting the city's economic productivity. In addition, according to the 2023 Kids Count Data Book, Washington, D.C.'s average annual cost of childcare is \$24,396, which makes it the most expensive in the country, as seen in Figure #.⁹⁵ The city's unique position as the seat of the federal government fosters an intersection of governmental policies and social services. As such, architectural projects can leverage this dynamic environment by creating spaces that align with broader social goals. This intersection provides an opportunity to influence and shape a response to the childcare crisis on a national scale. Washington, D.C. is an ideal backdrop for the creation of a childcare space that resonates beyond the city's limits.

The site for the Cutting-Edge Early Learning site must capitalize on Washington D.C.'s unique educational and cultural resources, diverse community,

⁹⁵ Megan Sayles AFRO Business Writer, "D.C. Ranks as Most Expensive Place for Early Childcare in the U.S.," *AFRO American Newspapers*, accessed November 21, 2023, <https://afro.com/d-c-ranks-as-most-expensive-place-for-early-childcare-in-the-u-s/#:~:text=A%20new%20report%20from%20the,based%20toddler%20daycare%20costs%20%2419%2C291>.

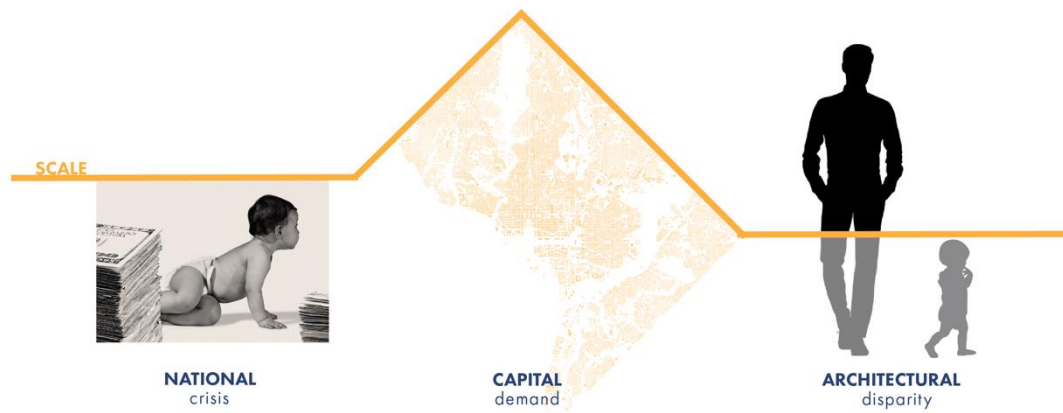


Figure 43. The range of scales this thesis seeks to address.

and convenient public transportation options. The site will align with the values of the place itself, including safety, accessibility, and quality. It is necessary to consider the diversity of a neighborhood to promote the space's commitment to inclusivity within childcare and foster a safe and secure environment for children and their families. As such, the property must have ample outdoor space for age-appropriate play activities that allow for proper safety measures. With access to the Metro and bus stops, it will make transportation easy for parents and caregivers and nearby parks must provide additional recreational options, promoting physical activity and a connection to nature. Situated in close proximity to cultural institutions and educational resources, the location should offer enriching learning opportunities for children. Overall, the site must provide a secure and enriching environment for young children and leverage the city's wealth of cultural and educational resources, all while fostering community engagement and accessibility for families. This chapter will consider more specific criteria in the selection of a site, then analyze specific locations, until ultimately selecting one for the location of the Cutting-Edge Early Learning Center. The chapter

concludes with a more in-depth analysis of the preferred site, which leads into Chapter 10, where program and blocking techniques are tested on the site.

Site Criteria

In Washington, DC, it is necessary to consider a range of multifaceted site criteria, encompassing accessibility, safety, demographics, outdoor spaces, educational resources, and possibilities for future growth. This section will discuss the eight main criteria and their subcategories that influenced the final site selection. These criteria consider the physical benefits and challenges of the site, as well as the cultural and socioeconomic diversity, quality of life, and demand for future childcare options.

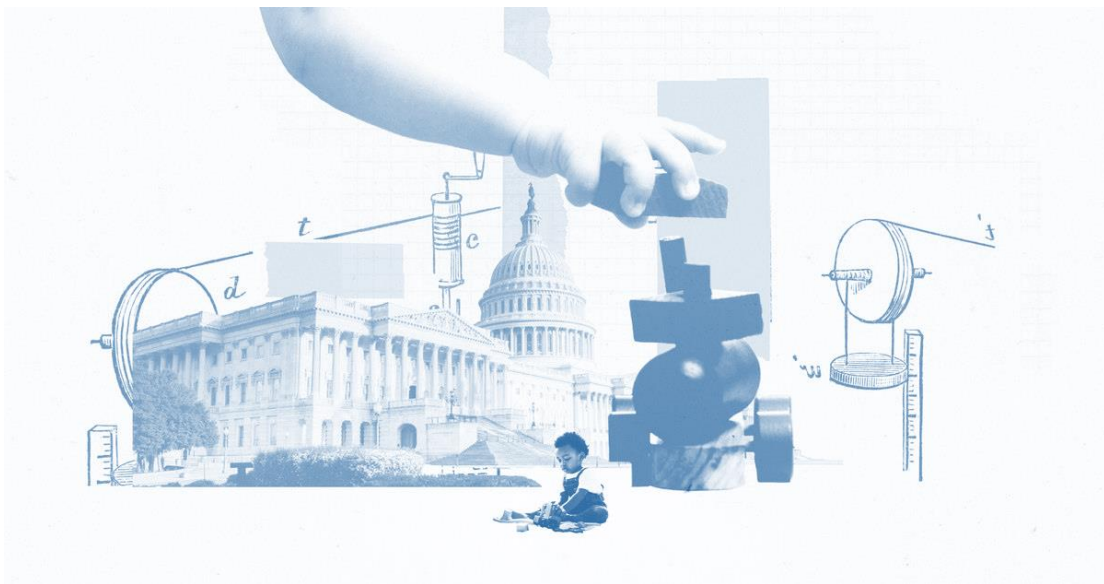


Figure 44. The Nation's Capital & Childcare.

The first site consideration is the quality of the outdoor environment. Outdoor play is essential for children's physical, emotional, and cognitive development. It allows them to explore and interact with the natural world, as well as provide ample

opportunity for physical activity.⁹⁶ The quality of the outdoor environment is directly related to the natural connection zone, as playing outdoors provides a wealth of opportunities for social and emotional growth. The determining subcategories include existing tree coverage, existing green space, opportunities for green space, condition of streets, and access to natural light. The existing tree coverage is important to consider, as it offers a space for shade and shelter from the sun. Additionally, trees can improve air quality and reduce noise pollution, providing a healthier environment for children to play. Similarly, existing green space can improve air quality, reduce noise pollution, and provide relief from the heat. In addition, green spaces provide a safe place for children to explore and play outdoors, which can help improve physical health and cognitive development.⁹⁷ This differs from opportunities for green space, as adding programmed green space to the existing facilitates social engagement and interaction. As such, new, programmed green space can promote a sense of community that encourages relationships between children and their elders. Next, the condition of streets is important to consider for safety reasons, including the unevenness of the pavement, existing buffers, such as trees, bike lanes, or parking spots, existing lighting for visibility, and maintenance of the sidewalks for sanitation reasons. Finally, access to natural light improves focus, concentration, and creativity, while also reducing the amount of energy used in the building.⁹⁸ These factors

⁹⁶ Joseph Moravec, "Childcare Center Design Guide," GSA Public Buildings Service (July 2003). <https://www.gsa.gov/system/files/designguidesmall.pdf>

⁹⁷ Jules Pretty, Caroline Angus, Madeleine Bain, Jo Barton, Valerie Gladwell, Rachel Hine, and M. Sellens. "Nature, childhood, health and life pathways." *Occasional Paper 2* (2009): 202009-2.

⁹⁸ Marzieh Eshkaftaki Ghasemi. "Providing Design Solutions for Children's Centers based on the Factors that Improve Creativity." *European Online Journal of Natural and Social Sciences* 4, no. 3 (2015): 461.

contribute to the quality of an outdoor environment, which has the potential to significantly influence the physical, mental, and social development of children. A suitable outdoor environment can provide positive experiences and opportunities within a safe and secure environment. With that being said, the next site criteria to be explored in further detail is safety.

Children have a natural curiosity to explore and can quickly get into areas that can be dangerous if not properly supervised. To ensure the safety of the children, it is important to consider the potential risks and hazards that could be present. As such, the determining subcategories include property and violent crimes, as well as proximity to industrial areas. These subcategories do not represent the holistic consideration of safety, as other subcategories, such as existing tree coverage for protection from the sun and the condition of street buffers, among others, encompass additional safety factors. Property crimes, such as burglary and vandalism, could result in financial losses, as well as create a sense of fear and insecurity for both children and staff. If the site is regularly targeted by property crimes, it could lead to children feeling scared to attend and parents being hesitant to enroll their children. Even worse, violent crimes, such as assault and homicide, are a serious concern for a childcare space. Such crimes have a significant impact on the safety and security of a childcare space and its inhabitants.⁹⁹ Finally, proximity to industrial areas is important to consider, as they have significant impacts on the health of children. Children are particularly vulnerable to the effects of air pollution, as their bodies are still developing, and they are more likely to be exposed to it over a longer period of

⁹⁹ Gill Valentine. *Public space and the culture of childhood*. Routledge, 2017.

time. Each of these factors will be considered in choosing a specific site, but it is also important to note that security precautions within the space have the ability to provide a safe and healthy environment for children. Next, the surrounding context will be explored in further detail to understand the density of the urban area.

The surrounding context of a site should focus on providing a safe and secure environment while also

allowing for plenty of educational and outdoor activities. Surrounding context is necessary to consider in terms of geography, as well as the proximity to hospitals, parks, and other facilities. As such, determining subcategories include proximity to residential areas, proximity to emergency services, and surrounding building typologies. Proximity to residential areas is important to consider in terms of convenience for parents and caregivers, as well as fostering a sense of community. By being in close proximity to where people live, the childcare space can become an integral part of the local community. Next, proximity to emergency services is important because responding to situations quickly can mean the difference between a minor injury and a serious one. Being close to emergency services also means that help can arrive quickly if a child is suffering from a medical emergency. This gives

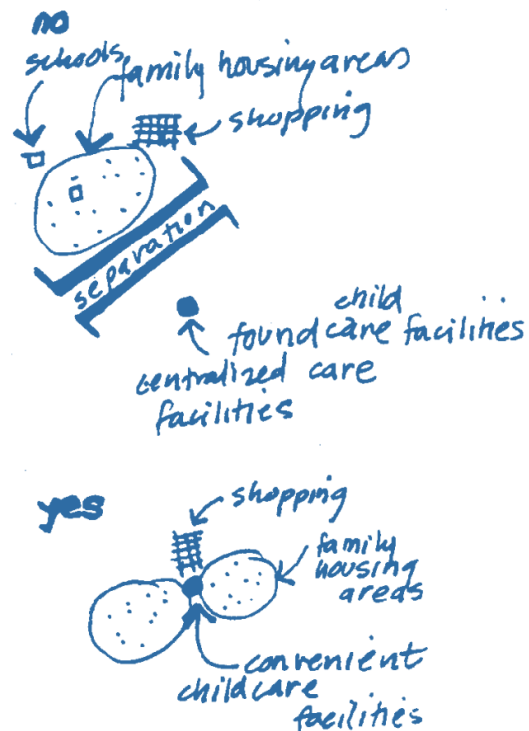


Figure 45. Importance of convenience in site selection.

both parents and caregivers peace of mind, as knowing that help is close by can reduce anxiety and provide reassurance. Finally, it is necessary to consider surrounding building typologies, as they provide an indication of the potential expansion and potential for connecting the space to other facilities in the future. The typology of the surrounding buildings helps ensure the childcare space is the right fit for the area and may help determine the correct scale of the building. The next site criteria to be explored in further detail is the demographic diversity of the area.

The demographic diversity of an area is necessary to foster an inclusive and equitable space for all children. This not only ensures that all children are comfortable, but it also encourages positive social development. In a diverse space, children of all backgrounds can interact and learn from each other to create a tolerant environment for future generations.¹⁰⁰ The determining subcategories include population ages 0-5, density of single parent households, diversity of socioeconomic groups, and density of caregiver population. The population of children ages 0-5 indicates a demand for childcare spaces, as well as the physical, psychological, and social needs of these children vary from those of older children and adults. Similarly, the density of single parent households also indicates demand, as well as a need for appropriate resources and support, such as counseling and access to additional services. Also, the diversity of socioeconomic groups is important for promoting equitable access to childcare. If the space is designed with the needs of all children in mind, it will be more likely to be accessible for more families. Finally, the density of

¹⁰⁰ Naomi Geens and Michel Vandenbroeck. "Early childhood education and care as a space for social support in urban contexts of diversity." *European Early Childhood Education Research Journal* 21, no. 3 (2013): 407-419.

the caregiver population may affect the amount of available care for children in the area, as well as the quality of care. A low density of caregivers in an area makes it difficult for children to access quality childcare, as there are fewer options available for parents, and a lack of competition decreases the quality of care.

The density of the surrounding area is important to consider, as it may influence future design decisions. For instance, if the space is located in a densely

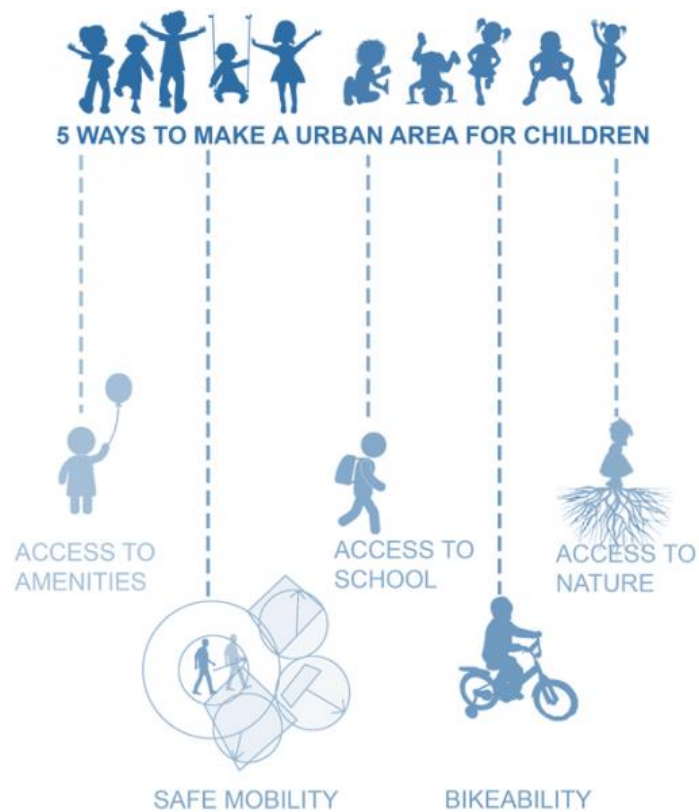


Figure 46. Urban Considerations in Childcare Spaces.

populated urban area, the space would need to be able to accommodate a larger number of children while also ensuring safety and security. As such, determining subcategories include traffic density and congestion, parking and drop off feasibility, noise pollution, housing units, and potential future development. Traffic density and congestion directly influence the risk associated with drop-off and pick-up feasibility. The safety, efficiency, and well-being of children, parents, and staff are related to the traffic dynamics surrounding the space. Similarly, a site situated in an area with high

traffic volume and congestion poses a potential hazard during drop-off and pick-up, as hurried parents may find it challenging to navigate safely around the area.¹⁰¹

Noise pollution from industrial areas can also be damaging to children's health and well-being. Loud noises have the potential to disrupt sleep patterns and cause stress and anxiety in children. This can have a negative impact on their ability to focus and learn and can lead to long-term behavioral and physical issues.¹⁰² Finally, the accessibility of a space for children is fundamentally related to the density of housing units in its proximity. By strategically situating childcare centers in areas with appropriate housing density, parents can balance work commitments with the needs of their children more effectively, promoting family well-being. Areas with planned or anticipated growth may provide opportunities for the space to evolve alongside the community, ensuring that it remains relevant and accessible over time. This approach positions childcare spaces as contributors to community development capable of adapting to the changing needs of families.

Placing childcare centers in areas with demand for the service ensures that they are designed to cater to the maximum number of families. Accessibility and convenience are critical factors for parents balancing work, family, and other commitments, making the space an attractive and viable choice for their childcare needs. Determining factors include the degree of childcare desert and distance to the closest childcare center. The degree of childcare desert may attract and retain a working population, contributing to local economic development. In addition,

¹⁰¹ Kenneth R. Ginsburg and Committee on Psychosocial Aspects of Child and Family Health. "The importance of play in promoting healthy child development and maintaining strong parent-child bonds." *Pediatrics* 119, no. 1 (2007): 182-191.

¹⁰² Ross A. Thompson. "Stress and child development." *The Future of Children* (2014): 41-59.

choosing a site based on proximity to the closest childcare center ensures that services are distributed equitably, reaching areas where the need is greatest.

Access to public transportation ensures that childcare spaces are



Figure 47. Transportation & Childcare Spaces.

inclusive and accessible to a diverse range of families, which welcomes families from different socio-economic backgrounds and contributes to social equity in early childhood education. Additionally, encouraging public transportation fosters community connectivity, supports environmental sustainability, and assists the caregiver community.¹⁰³ Determining factors include distance to the metro and bus. Access to multiple transportation options makes the daily commute more efficient, allowing parents to drop off and pick up their children without any added stress.

Childhood education is not confined to the walls of a childcare space, so proximity to educational and cultural opportunities offers a well-rounded learning experience. Field trips and participation in cultural events become integral components of curriculum to ensure that children receive a comprehensive education that goes beyond traditional classroom settings. Locating childcare centers near

¹⁰³ Naomi Geens and Michel Vandenbroeck. "Early childhood education and care as a space for social support in urban contexts of diversity." *European Early Childhood Education Research Journal* 21, no. 3 (2013): 407-419.

institutions, events, and diverse communities facilitates cultural exposure, as well as enhances the center's resources, as it is surrounded by an educational environment.¹⁰⁴

Each site consideration has far-reaching implications for the quality of early childhood education, community engagement, and the overall development of young children. A central location contributes to accessibility, making the childcare center a practical and viable choice for a diverse range of families. The next section, *Site Matrix*, will consider specific sites and rank them based on their ability to meet the needs of a childcare space.

Site Matrix

An innovative childcare space in Washington, D.C. has the potential to be a transformative force in addressing the childcare crisis in the United States. By focusing on safety, accessibility, affordability, holistic education, community engagement, and professional development, such a space can offer solutions that extend beyond its immediate community. In doing so, the space has the ability to build a future where quality childcare is an integral part of fostering thriving families and communities. As such, the following section will examine three sites that were considered for the Cutting-Edge Early Learning Center in the United States capital. The following analysis considers each of the site criteria mentioned in the previous section. Each site received a score between 1 and 3 with 3 being the highest (or most ideal).

¹⁰⁴ Naomi Geens and Michel Vandenbroeck. "Early childhood education and care as a space for social support in urban contexts of diversity." *European Early Childhood Education Research Journal* 21, no. 3 (2013): 407-419.

SITE MATRIX SCALE: 1-3 (3 BEING MOST PREFERABLE)			
	 1790 ASH ST SE St. Elizabeths	 1327 VAN BUREN ST NW Walter Reed	 2024 CONCESSIONS PENTAGON McMillan Reservoir
Quality of Outdoor Environment	Existing Tree Coverage	3	1
	Existing Green Space (sqft)	3	3
	Opportunities for Green Space	3	3
	Condition of Streets (Upkeep)	2	2
Safety	Access to Natural Light	2	3
	Property Crimes	1	1
	Violent Crimes	1	1
	Proximity to Industrial Areas (Fumes/Dust Exposure)	1	2
Surrounding Context	Proximity to Residential Areas	2	3
	Proximity to Emergency Services	2	3
	Surrounding Building Typologies	2	3
	Population Ages 0-5	3	2
Demographic Diversity	Density of Single Parent Households	3	2
	Diversity of Socio-Economic Groups	3	2
	Caregiver Population	2	1
	Traffic Density / Congestion	1	2
Density	Parking & Drop Off Feasibility	3	3
	Noise Pollution	1	2
	Housing Units	3	3
	Potential Future Development	3	3
Childcare Demand	Degree of Childcare Desert	2	3
	Distance to closest childcare center	3	3
	Pre-School Profile (EASI data)	3	2
	Distance to Metro	2	1
Access to Public Transportation	Distance to Bus	3	3
	Culture Index	3	3
	Education Index	1	3
	TOTAL	61	62
Educational and Cultural Opportunities	Distance to Metro	2	1
	Distance to Bus	3	3
	Culture Index	3	3
	Education Index	1	3
TOTAL	Distance to Metro	2	1
	Distance to Bus	3	3
	Culture Index	3	3
	Education Index	1	3
TOTAL	Distance to Metro	2	1
	Distance to Bus	3	3
	Culture Index	3	3
	Education Index	1	3

Figure 48. Site Matrix.

1790 Ash St. SE, also known as St. Elizabeth's Hospital, was first established as the Government Hospital for the Insane in 1888 on the current site overlooking the Anacostia River. While parts of the campus remain dedicated to mental health services, other areas have undergone redevelopment initiatives. The campus hosts government offices, residential spaces, and cultural institutions, reflective of the revitalization of the surrounding community.¹⁰⁵ The site is near various redevelopments and projects in the area, such as the new Frederick Douglas



Figure 49. St. Elizabeth's Hospital Site.

Memorial Bridge, and it is just south of the proposed Anacostia Waterfront Initiative.

1327 Van Buren Street NW is a site adjacent to the Parks at Walter Reed, an ambitious redevelopment project that is transforming a former military base into a vibrant urban community. There are more than 1,200 new residential units, some of

¹⁰⁵ Cowell, Margaret, Christina Gabriel, Sakina Khan, Heike Mayer, and Patrick O'Brien. "DC Innovation Strategy for Saint Elizabeths." (2012).

which are affordable housing, as well as commercial and retail areas, parks, and new public spaces.¹⁰⁶



Figure 50. Walter Reed Site.

McMillan Drive NW is the area adjacent to McMillan Reservoir, which was originally designed to address public health concerns by improving the city's water supply and sanitation. The sand filtration site to the East, known as the “Reservoir District,” is currently being redeveloped and will provide more housing, restaurants, businesses, and recreational opportunities in the area.¹⁰⁷ Surrounded by residential neighborhoods, schools, and cultural institutions, this new district will become an integral part of the urban fabric.

The McMillan Drive NW (McMillan Reservoir) site received the highest score and was ultimately chosen for the site of the Cutting-Edge Early Learning

¹⁰⁶ “Residential Living in a Vibrant Community.” *The Parks*. Last modified June 22, 2023. Accessed December 19, 2023. <https://theparksdc.com/>.

¹⁰⁷ “A New Era for a Storied Site.” Reservoir District. Accessed December 19, 2023. <https://www.reservoirdistrict.com/>.

Center. The area's central location in the heart of the city, historical significance, surrounding community, access to outdoor space, ongoing redevelopment, and cultural diversity provides a compelling and advantageous environment for a

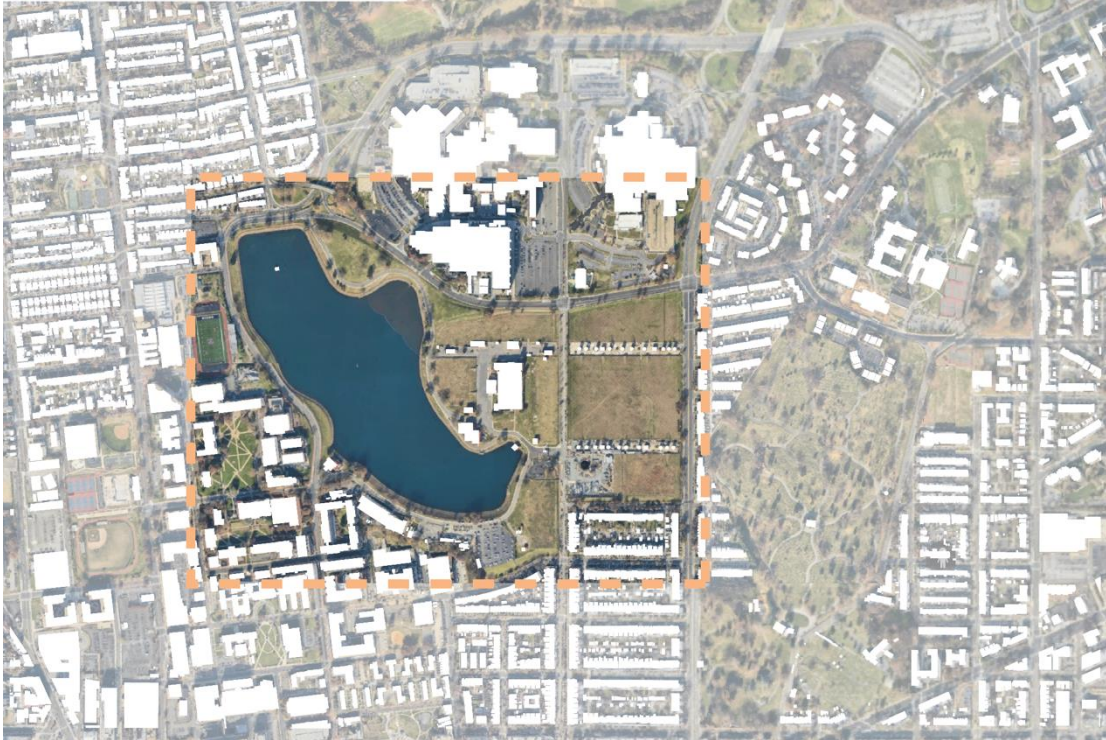


Figure 51. McMillan Reservoir Site.

childcare space. The historical significance of the area, which will be discussed in the following section, creates a sense of place and identity for the children, their caregivers, and their families.

Understanding McMillan Reservoir's Unique Context

McMillan Reservoir creates an environment that is not only safe and secure but also conducive to the well-being and development of the children it serves and their caregivers. The site's proximity to emergency services, such as Children's Hospital and Washington Hospital Center, and the adjacent educational and recreational resources, such as Howard University and the new Reservoir District,

facilitate potential relationships that enhance the overall quality of the childcare space. The chosen site aligns with the mission and goals of the childcare space itself, which will be further depicted in a history and analysis of the area in this section.



Figure 52. Surrounding educational and cultural resources.

Located in the heart of Washington, D.C., the McMillan Reservoir was originally constructed as a response to water quality concerns, and today it has evolved into a historic landmark for the city. The reservoir was designed as a part of a larger water treatment complex, which included the McMillan Sand Filtration Site directly to the east. Over the years, the McMillan Reservoir became a recognizable landmark in the city, known not only for its functional role but also for the surrounding park that emerged from the McMillan Plan's vision.¹⁰⁸ The park featured open spaces, walkways, and sand filtration cells that added to the aesthetic appeal of

¹⁰⁸ Robert Malesky. "Creating McMillan Park." *Bygone Brookland*. Last modified October 20, 2021. Accessed December 19, 2023. <https://bygonebrookland.com/2021/07/05/creating-mcmillan-park/>.

the area. The following section will provide an in-depth history of the area, as well as a site analysis of its current state and plans for future development. Throughout this section, specific criteria will be addressed in order to highlight the rationale in choosing this area as the site for the Cutting-Edge Early Learning Center.

In 1850, Frederick Law Olmsted visited Birkenhead Park in England where he observed a unique aspect of the park, as it was accessible to all social classes. This

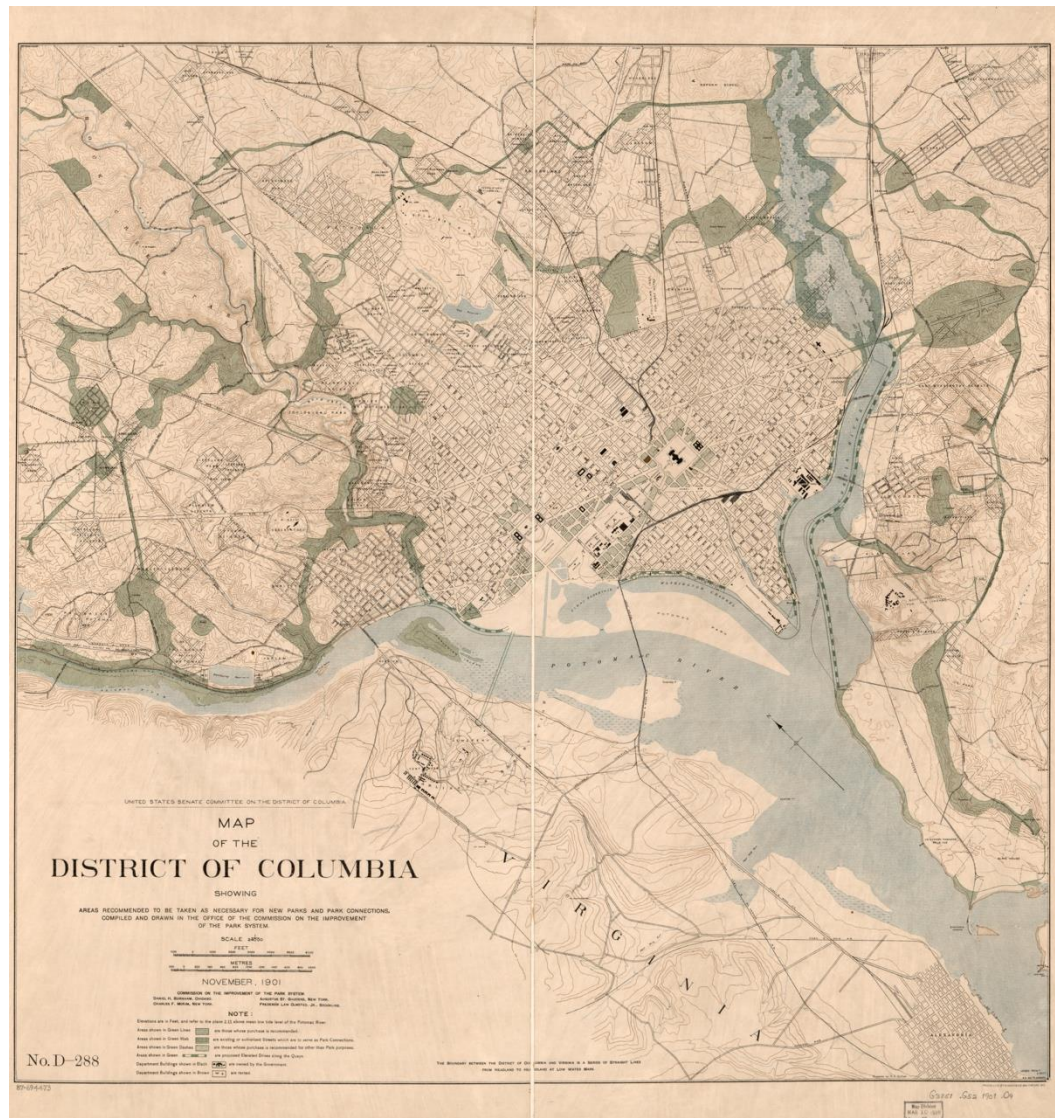


Figure 53. McMillan Commission's proposed plan for DC network of parks (1902).

concept, not yet adapted by the United States, would later influence his work and contribute to the development of public spaces in Washington, D.C.¹⁰⁹

In 1901, a group of urban planners and architects known as the McMillan Commission, including Olmsted, proposed a comprehensive plan to beautify and improve the city of Washington, D.C. This plan included the construction of the McMillan Reservoir, which was completed in 1903 in today's Bloomingdale neighborhood. The McMillan Plan envisioned creating public spaces that catered to all social classes, similar to Birkenhead Park, deviating from the previous trend of

¹⁰⁹ Robert Malesky. "Creating McMillan Park." *Bygone Brookland*. Last modified October 20, 2021. Accessed December 19, 2023. <https://bygonebrookland.com/2021/07/05/creating-mcmillan-park/>.

parks being exclusive to the wealthy or royal classes. As such, adjacent to the reservoir, Bloomingdale Playground, designed by Frederick Law Olmsted Jr., became

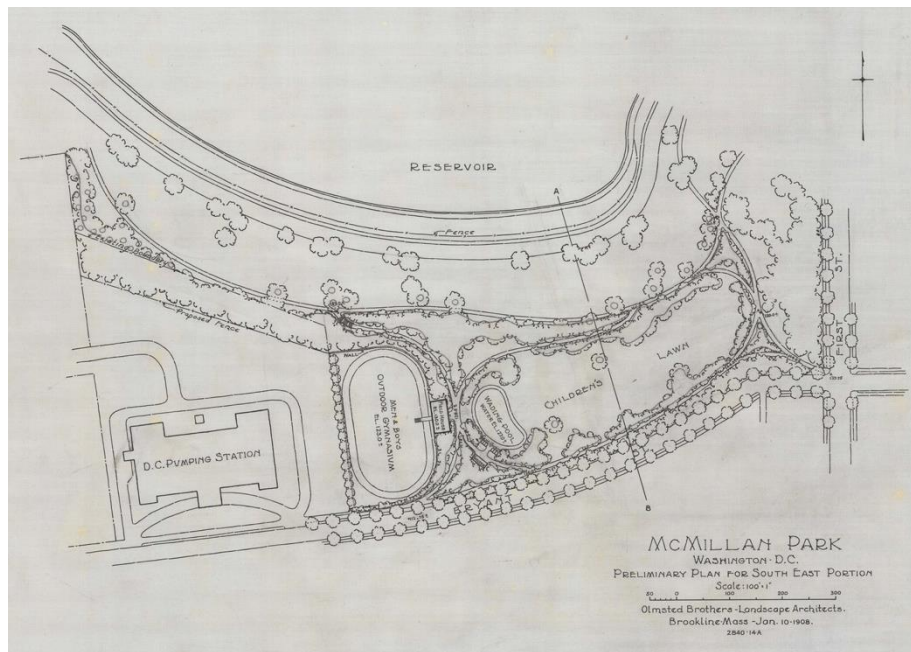


Figure 54. (a) McMillan Park Site Plan (b) Children's Lawn (1911).

a public space that served both aesthetic and functional purposes. Green spaces and play areas provided a backdrop for community events within the area.

By the early 20th century, the Bloomingdale playground became a focal point of racial segregation. The playground was located in the predominantly white neighborhood of Bloomingdale, which was built up around the same time as Olmsted's work at McMillan Park in 1907. This neighborhood was subject to racially restrictive covenants that prevented non-white families from living there.¹¹⁰ The adjacent LeDroit Park, however, eventually became a predominantly black neighborhood. This juxtaposition of a white-only neighborhood and a black-only



Figure 55. LeDroit and Bloomingdale Park Neighborhoods (1921).

neighborhood was one instance of racial segregation that was seen throughout much of the city, and it particularly affected the Bloomingdale Playground. The playground's racial segregation was perpetuated by the fact that it was surrounded by a majority of white-owned businesses.

¹¹⁰ Robert Malesky. "Creating McMillan Park." *Bygone Brookland*. Last modified October 20, 2021. Accessed December 19, 2023. <https://bygonebrookland.com/2021/07/05/creating-mcmillan-park/>.

The dynamics of Bloomingdale Playground and the surrounding area changed during and after World War II. The entirety of McMillan Park was neglected as facilities expanded and the public space was repurposed for utilitarian needs. A fence was constructed around McMillan Park, limiting public access as officials felt the area required additional protection. The playground, which briefly reopened after the

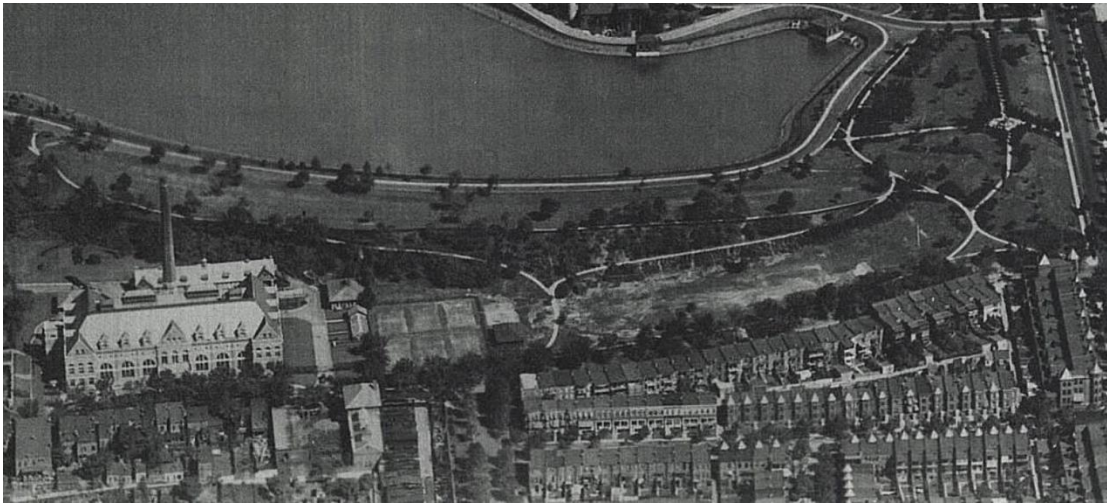


Figure 56. Southern end of McMillan Park (playground, 1921 vs. present day).

war, closed for good in 1952.¹¹¹ Since then, the McMillan Reservoir and surrounding

¹¹¹ Robert Malesky. "Creating McMillan Park." *Bygone Brookland*. Last modified October 20, 2021. Accessed December 19, 2023. <https://bygonebrookland.com/2021/07/05/creating-mcmillan-park/>.

park has been subject to revitalization efforts with the goal to preserve its historical character while accommodating modern needs. The area, known as the McMillan Historic District, includes the area outlined in Figure 57. Strict design guidelines inside this boundary include preserving the area’s significance and original function. As such, a childcare space aligns with these goals and benefits the surrounding community, as it is restoring the once children’s play area and will have a positive impact on the area's future.



Figure 57. The McMillan historic district boundary line.

The Reservoir District is a new mixed-use development coming to the former McMillan Sand Filtration Site. The site will encompass approximately 120 acres of land, directly east of the existing McMillan Reservoir site.¹¹² It will include a mix of

¹¹² “A New Era for a Storied Site.” Reservoir District. Accessed December 19, 2023. <https://www.reservoirdistrict.com/>.

residential, retail, and office space, as well as a variety of parks, plazas, and a community center. The Reservoir District also includes new healthcare amenities to complement existing ones, such as Children's Hospital and Washington Hospital Center. As the area evolves into a hub for residential and commercial activities, the availability of quality childcare services becomes essential. Parents working or residing in the Reservoir District will benefit from the convenience and peace of mind that comes with having a reliable childcare space like Cutting-Edge Injury Prevention nearby. The next chapter will explore a synthesis of program and site information in a series of blocking and stacking explorations.

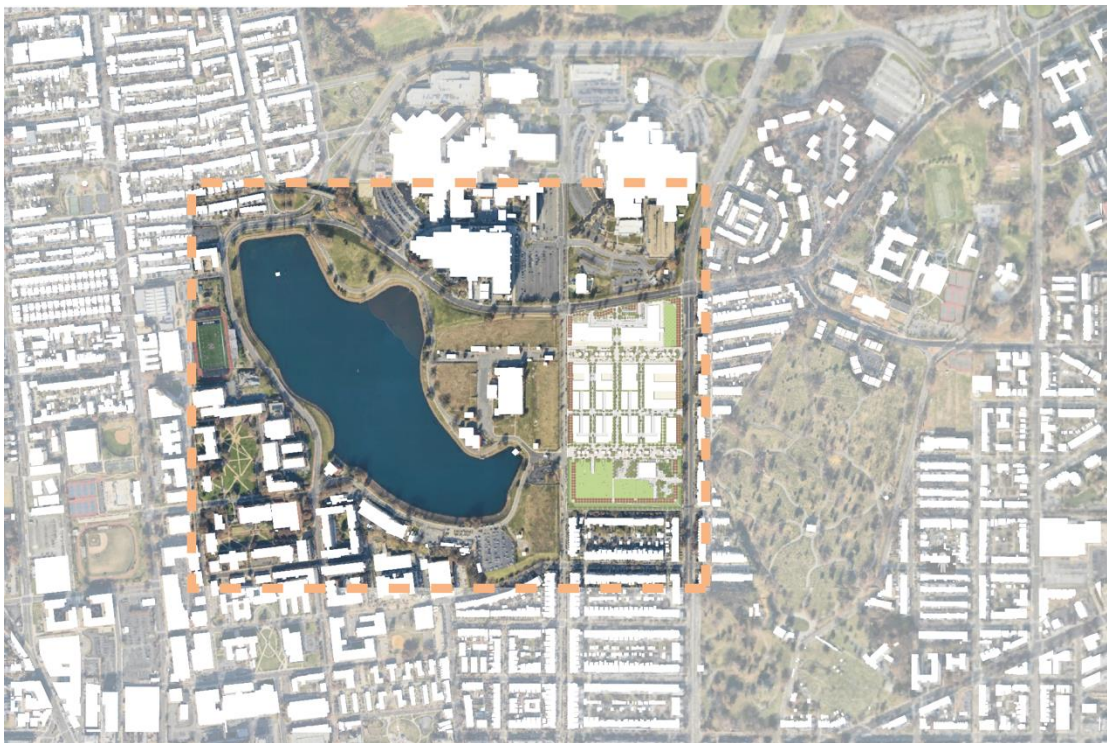


Figure 58. The site with the addition of the new Reservoir District.



Figure 59. New Reservoir District (a) before and (b) after.

Chapter 10: Schematic Design Considerations

The Cutting-Edge Early Learning Center's unique location beside McMillan Reservoir will contribute to the revival of community spaces reminiscent of Bloomingdale Park's legacy. By integrating Bloomingdale's historical context into the design and mission of the space, the site becomes a community hub that honors the area's rich heritage. Drawing inspiration from the historical role of Bloomingdale Park, the childcare space facilitates social interactions between diverse populations and creates a sense of place for residents in the area. This preservation effort within

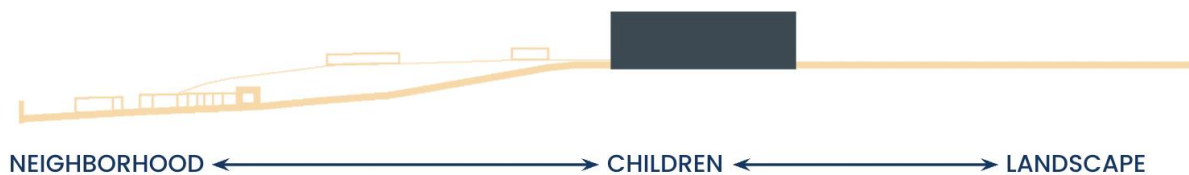
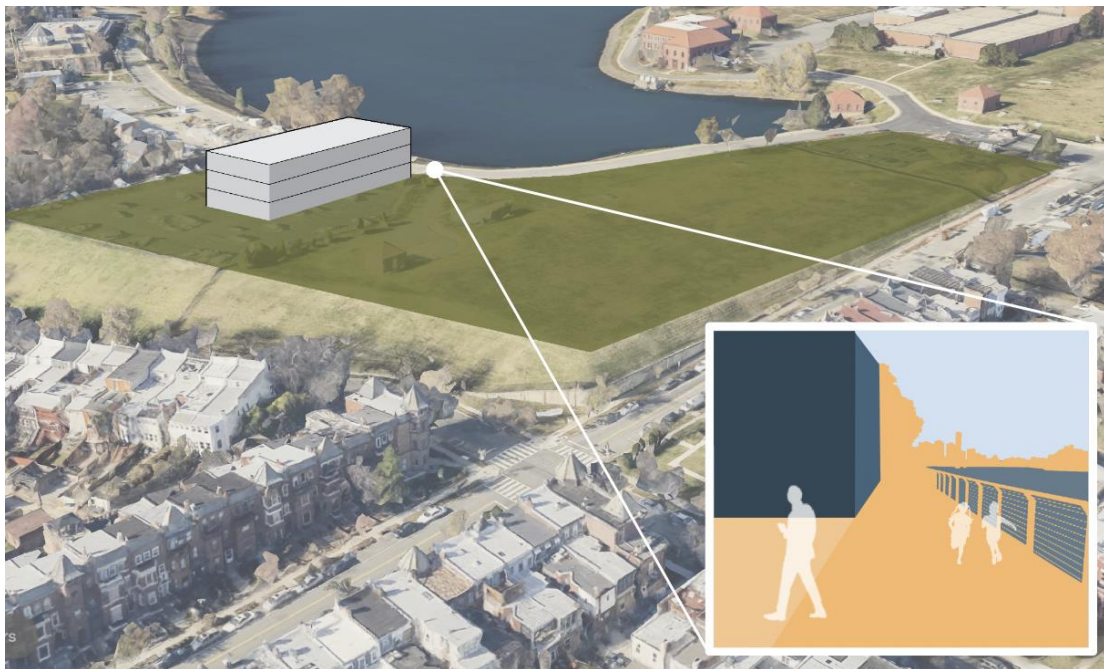


Figure 60. Concept 1: Re-establish the park for communal use.

the site's historical district paired with a modern approach to childcare sets a standard for the rest of the country.

Conceptual Site Design

The first design emphasizes the once utilized children's playground by proposing to reestablish the open, natural areas within and around the childcare space. Preserving the essence of Bloomingdale Park reinforces the connection between the childcare space and the community, so it is a place where multi-generational relationships are able to thrive. This concept would adapt to an ideal organization of the program outlined in Chapter 8, where a courtyard would become an outdoor space for private purposes (this organization can be seen in Figure 41).

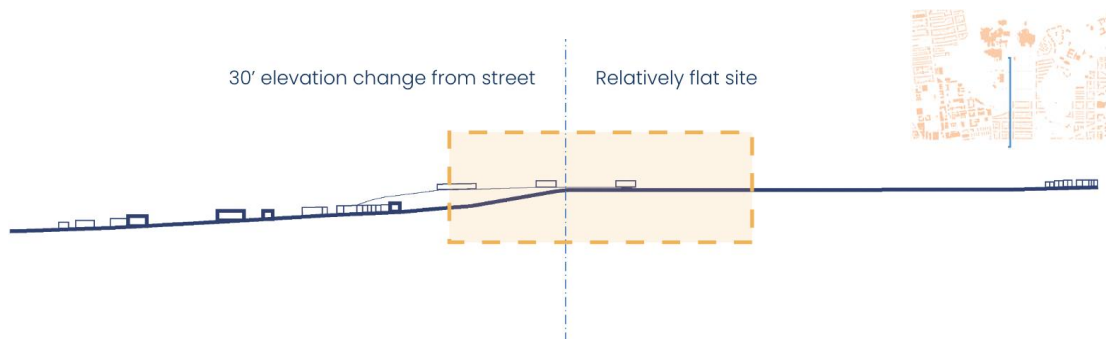


Figure 61. NS site section showing topography change.

The following design concepts embrace the natural contours of the landscape. The 30' difference in elevation at the southern end of the site (as seen in Figure 61) offers an opportunity to split the ground level. In doing so, different levels can cater to various age groups or developmental stages, ensuring that each child is able to exit the building safely. This inclusive approach allows for customized educational experiences within a shared environment. The first, as seen in Figure 62, utilizes the corner of First St. and Bryant St. In doing so, it lies between the Bloomingdale and LeDroit neighborhoods, offering accessible services to both areas. The program is divided both facing these neighborhoods, as well as embracing a private outdoor area on the corner of the open field facing the reservoir.

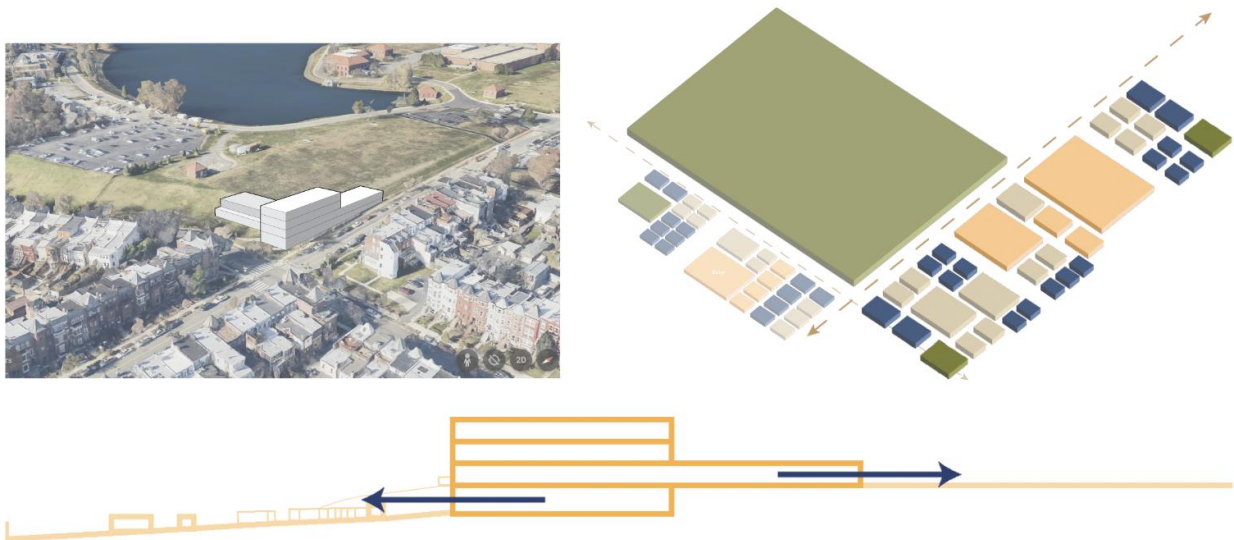


Figure 62. Concept: split-levels to allow for multiple ground-floor exits.

The next concept, seen in Figure 63, develops a strong relationship with the new reservoir district. The ground floor facing First Street offers family and caregiver resources, while the more private zones facing the reservoir are for the children's educational spaces.

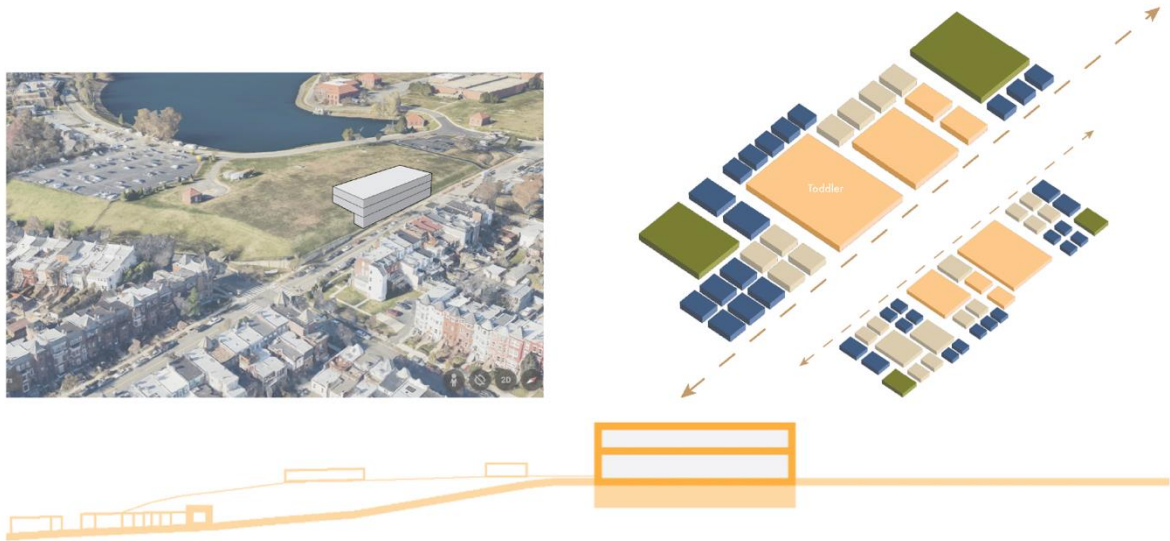


Figure 63. Concept: caregiver spaces face the street, while children's spaces look out toward the reservoir.

This chapter is the initial response to a synthesis of site and program considerations in the design of a guide for childcare spaces that exceed traditional practices. This thesis addresses an urban space with historical significance and determines how it can be repurposed to address contemporary needs while still honoring the past. The following design proposal will address the demands of the childcare crisis in the United States while also proposing an architectural response to promoting child development and safety within the spaces that children inhabit.

Chapter 11: Cutting Edge Design Proposition

As a building type, childcare centers present a unique architectural challenge, where there is no single, universally accepted model that responds to the high degree of complexity and creativity required of a space with such diverse needs. As such, the architecture of these spaces is not defined by rigid standards, but rather by adaptability to the diverse needs of local children, families, and communities. As such, the final design for the Cutting-Edge Early Learning Center is one that is unique, supportive, and enriching to its surrounding context. At the same time, the center may serve as a prototype that demonstrates best practices at the time of its design, while also inspiring the development of similar centers nationwide. This chapter will address the intertwined relationship between the building typology and uniqueness of McMillan Reservoir in laying out the programmatic needs, then it will lay out the design itself and how users may experience the space, and finally conclude with a reflection that examines the success of the design.



Figure 64. Site position between North Capitol Street and McMillan Reservoir.

Relationship of Interior and Exterior Space

Positioned between North Capitol St. and McMillan Reservoir, Cutting Edge Early Learning Center stands between the very structure that represents the nation's legislature and the one that represents the ideals. As one travels south on North Capitol Street, Cutting Edge Early Learning Center sits on the right within the new Reservoir District, while a clear view of the Capitol building is seen ahead. On the

opposite side of the center, if one is to linger on the re-established Olmsted Walk parallel to First Street, a view of the Washington Monument may be seen above the skyline of Howard University. This intersection of two symbolic pieces of American architecture creates a strong foundation for a structure that intends to reconsider the way in which the United States cares for children. Simultaneously, located within a new development, the building envisions a future where children are prioritized in the growth of cities throughout the country. This section will outline the intersection of site and program, finally terminating in a thoughtfully designed space that contributes to a child's growth and the health of those caring for them.

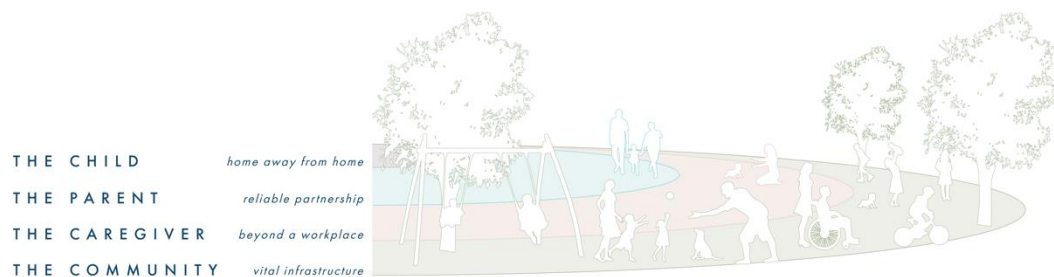


Figure 65. User Driven Design.

The design for Cutting Edge Early Learning Center is a result of user-driven goals, where the child, the parents, the caregivers, and the community are considered both individually and all together to create a space where each is prioritized within one single building. As seen in Figure 65, the needs of these users build off of one another to create a community. As such, making the space feel as if it supported each was necessary in the initial design. Just as these users build off of one another, the

layout of the space builds off of the historic background of the site. The initial layout is a result of both the historic sand filtration structure as well as the new Reservoir District. Building off of one another, the layout shapes an interior courtyard with a large porch that acts as a transitioning space between interior and exterior play areas.

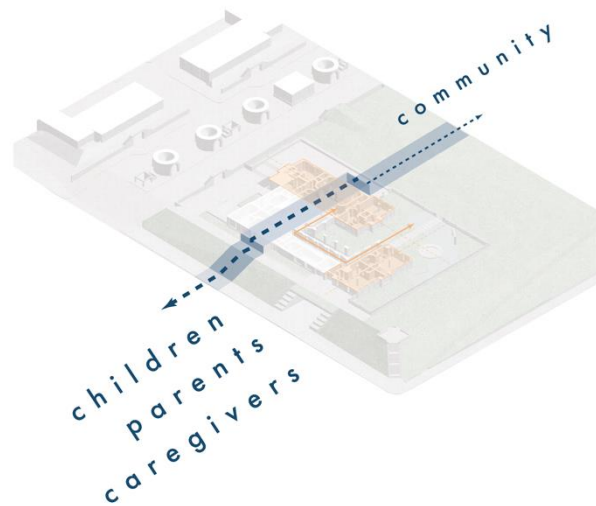


Figure 66. User-driven program on site.

Cutting Edge Early Learning Center appeals to both the existing Bloomingdale and LeDroit neighborhoods, as well as the new residents of the Reservoir District. As seen in Figure 67, the drop off and pick up areas have been strategically designed to both appeal to different residents, as well as adhere to the existing topography. The walk-in arrivals enter from the North, where they are greeted by the large lobby and multipurpose space. The drive-in arrivals enter underground, where they display the historic sand filtration vault structure and eventually, after climbing a set of stairs, reach the same lobby as the walk-ins. These

two entrances are symbolic of combining the history of the site with the needs of the present, as they work both together and separately to make a functional space for the building's users. These two drop-off zones eventually terminate at the same lobby on the ground floor, which is met on both sides by sunrooms, pulling the community center toward the reservoir. Here, we find an intersection of the new development and

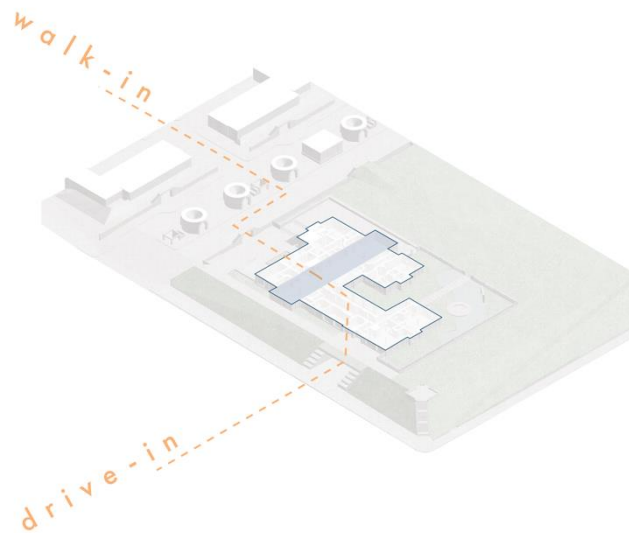


Figure 67. Drop-off and pick-up arrangements.

existing neighborhoods with the community center and reservoir. This space acts as a symbol for the overall design of the center, separating and connecting different age groups for development, as well as providing a place for the community within the center to come together. Here, the scale of every user is considered, where natural materials and textures give a human scale to the seemingly large space, a large window seat offers caregivers and parents to experience the children's eye level, and the two sunrooms offer a panoramic view of the surrounding landscape. The two youngest age groups, infants and young toddlers, are arranged at the Eastern end of

the lobby space, while the older toddlers exist at the end of “Main Street,” as seen in the plan in Figure 69. While this separation is necessary for developmental purposes, there exists a visual tie between the older and younger toddlers, separated only by outdoor space that will be used throughout the day. Main Street itself offers opportunity for physical development, as its minimal slope allows for climbing and exploring. Niched spaces along the corridor allow for a range of activities, such as imaginative play or independent relaxation time. As such, this area becomes a space itself, rather than a typical corridor.



Figure 68. Main lobby space (from a child's vantage point).

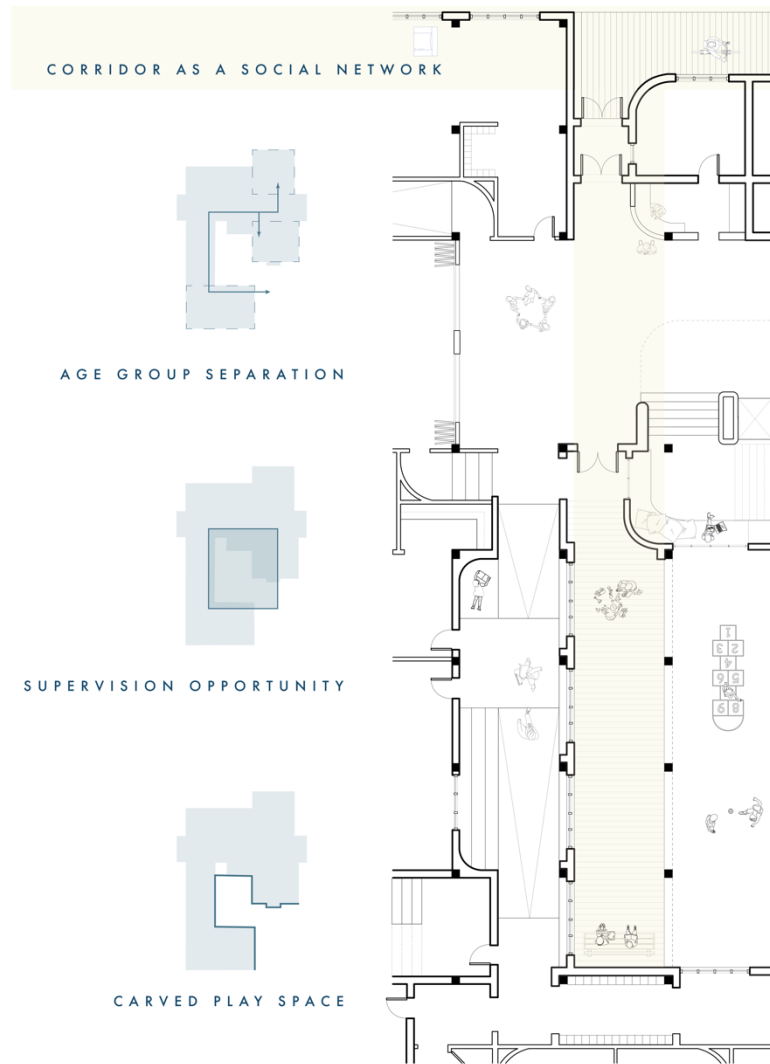


Figure 69. Main Street design considerations.

The oldest age group classrooms are above the infant and young toddlers, where they hold a strong visible connection with the surrounding park spaces and new reservoir district, as well as into the eastern sunroom space. The second floor also features the caregiver and family spaces arranged off “Second Street,” which offers glimpses of the corridor below as well as the outdoor play area and existing

park to the East, as seen in Figure 70. The interior family and caregiver spaces have views to the Reservoir, which offers a calming break from the chaos of the interior space. The following section, *Design at Varying Scales*, will further explore the interior classroom spaces for both child and caregiver heights and functions.



Figure 70. Second Street, also known as the caregiver's corridor.

Design at Varying Scales

From the urban environment to the twenty-seven-inch eye level of a child, each level of detail in the design of Cutting-Edge Early Development Center contributed to creating a safe and engaging space that hopes to set a precedent for the future care of children. Designing for a range of scales included considering the eye level of each individual within the space (seen as a dotted orange line in the following figures), as well as how they come together to create community with one another.

This section will explore the design of individual classrooms within the larger center and how they relate to the overall building concept.

Each classroom has a particular relationship with the main lobby and multipurpose space. All classrooms are simultaneously visually connected and separated from the community space and other age groups. Within the spaces themselves, the cubby areas separate the public space and quiet, sleep areas. Then, the activity areas exist along the exterior envelope. As such, the cubby space acts as a buffer between the loud, communal lobby space and the sleep area. This buffer also allows for the display of artwork, so children may feel a sense of ownership and pride in their environment. In doing so, the design adapts to the schedule of varying age groups. In addition, the design layout allows caregivers to have unobstructed views of children at all times throughout the space. This not only enhances supervision but also provides a sense of security for children at a young age who find security in knowing that adults are nearby. At the same time, low tables and chairs, reachable shelves, and child-height sinks and toilets empower children to use the space independently. In a similar way, toy storage exists at the eye level of the child in order to encourage free play, rather than restrict it. As such, they may develop independently and take their own risks, when necessary, within the space. Apart from built-ins, movable furniture creates adaptable spaces that can change to meet different activities and group sizes, promoting a dynamic learning environment within each classroom. Similar age classrooms are often connected by a cozy nook, or quiet corner, where children can retreat for a moment of solitude and/or emotional regulation. These spaces, as well as

other areas throughout the classroom, offer views of nature, which may have a calming effect and enhance the overall atmosphere of the space.

Another consideration, egress, is a particularly critical consideration in the design of childcare spaces, as it must adapt to the unique vulnerabilities and needs of such young children. On the ground floor, the infant, younger, and older toddler classrooms each have direct access to the exterior park and play spaces in case of emergency. In addition, the typical code for a 48” corridor is enlarged to 96”, as seen

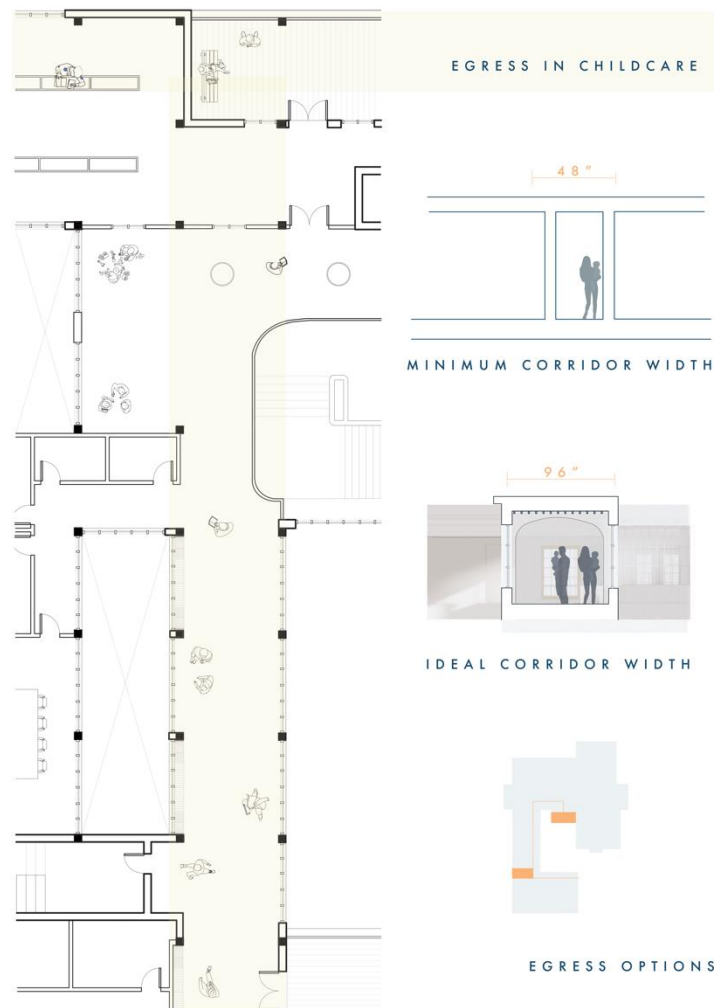


Figure 71. Minimum vs. ideal egress.

in Figure 70, to allow for the width of a caregiver carrying a child, a consideration that is not taken lightly in case of emergency. In addition, such design promotes a culture of safety and preparedness that benefits children, caregivers, and the broader community.

Designing individual classroom spaces from a child's perspective involves more than just scaling down adult environments. Instead, such design requires a focus on safety and flexibility, sensory stimulation, emotional well-being, and connection to nature, in order to craft spaces that truly cater to the needs of children.



Figure 72. Designing for varying realities.

Conclusion

Imagine kneeling to a child's height, the world transforms. Everything appears larger, more intimidating, out of reach. At this vantage point, every room is bigger, every flaw carrying more weight. The effects of a harmful environment can last a lifetime and affect much more than a single individual. As such, addressing the childcare crisis is rooted in a commitment to the well-being of the youngest, most vulnerable population. This world, seen through the eyes of a child, is one free from prejudice, from judgment, from apprehension, and it is one that must be adjusted in the design of childcare spaces. Designing from a child's perspective is not just an architectural challenge; it requires a mental and emotional shift, a new mindset that caters to the memories of early childhood. Natural textures, rounded edges, and child-scaled windows are more than design decisions here, instead, they are acknowledgements of a younger, smaller presence. This thesis strives to provoke change that is not only morally imperative, but also a thoughtful investment in our nation's future. One that cannot be ignored.

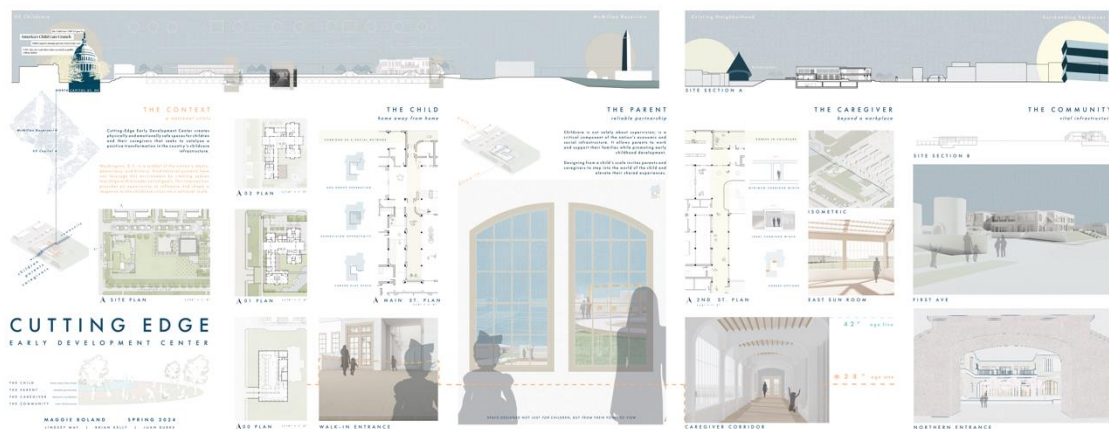


Figure 73. Final board layout.

Appendix A

Figure 1. *Historic NYC Childcare Protest (1950s)*. Bloomberg News. "Why New York's Affordable Childcare Centers Are Closing." *Bloomberg*, December 28, 2022, <https://www.bloomberg.com/news/articles/2022-12-28/why-new-york-s-affordable-child-care-centers-are-closing>.

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Figure 27. *Developmental Stimulation Program Graphic*. (Author)

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Figure 29. *Caregiver’s Hub Program Graphic*. (Author)

Figure 30. *Natural Connections Program Graphic*. (Author)

Figure 31. Maggie Daley Park Playground. “6 Things You Need to Know: Maggie Daley Park.” *Chicago Architecture Center*. Accessed December 19, 2023. <https://www.architecture.org/news/chicagos-playscapes/six-things-you-need-to-know-maggie-daley-park/>.

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