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KIRWAN INSTITUTE
for the Study of Race and Ethnicity

The Child Opportunity Index

Measuring and mapping neighborhood-based opportunities for U.S. children

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Contents

EXECUTIVE SUMMARY

We begin this report with a tale of two neighborhoods that are close in distance (under 3 miles) but very far apart in terms of the opportunities they offer children. In the first neighborhood, children face a host of obstacles to opportunity and wellbeing. Few attend Pre-K programs and there are limited quality early childhood centers in close proximity. Local schools have high levels of poverty concentration; adults have low levels of educational attainment. The social and economic climate is characterized by high rates of poverty and unemployment. Moreover, high rates of housing vacancy, an absence of healthy food retailers, and very low availability of health facilities signal constrained health and environmental opportunities. In the second neighborhood, child-focused opportunities are plentiful. The educational climate is vibrant with a vast majority of young children attending Pre-K programs, many high quality early childhood education centers nearby, and high levels of education among adults. The social and economic climate is thriving with low rates of poverty and unemployment. Children have ample parks and green spaces, all food outlets are healthy, and there are close to 200 health facilities within 2 miles.

This divergent tale of two neighborhoods shows how vastly opportunities for children can differ within the same metropolitan area (and within just a few miles). Because neighborhoods have a direct influence on child health and development, and because children in metropolitan areas face high levels of racial/ethnic segregation, it is critical to understand the extent of neighborhood differences at a population level, and how these differences may reinforce (or alleviate) racial/ethnic inequities in child wellbeing. The Child Opportunity Index was designed to rank neighborhoods within metropolitan areas based on the opportunities they offer children and to then consider how equitably (or inequitably) children of different racial/ethnic groups are distributed across different levels of opportunity.

Research and policy motivations as well as demographic imperative drive the need for the Child Opportunity Index. From a research perspective, the growing evidence on how neighborhoods influence child wellbeing has primarily focused on neighborhood socioeconomic factors–which are crucial–but lacks information on specific neighborhood institutional resources (e.g. early childhood education centers) that are particularly salient for understanding how neighborhoods influence child development. By focusing on a single neighborhood factor, past research fails to capture the complexity of neighborhoods—the bundle of positives (community resources) and negatives (stressors) that together affect child wellbeing.

The demographic imperative is that the U.S. is growing increasingly diverse, with racial/ethnic minority groups comprising larger (trending towards majority) shares of the population. This growth in racial/ethnic minority groups, especially the Hispanic population, is occurring in the context of very high levels of residential segregation in metropolitan areas, begging the question of whether the systematically separate neighborhoods where children of different racial/ethnic groups live are systematically different in ways that matter for their development.

Finally, the policy context for the Child Opportunity Index is that increasingly, federal, state and local policies, as well as community initiatives, are addressing the role of neighborhoods in shaping child health and wellbeing. The implementation of these policies and initiatives requires data on neighborhood conditions for children at the population level. The Child Opportunity Index constitutes a valuable data resource that national, state and local policymakers, as well as other stakeholders, can use to understand the distribution of neighborhood opportunity across a given metropolitan area and where children

of various racial/ethnic groups live in relation to opportunity.

Motivated by research, demographics, and policy, the Child Opportunity Index is a first-of-its-kind measure of children's neighborhood environment that considers the multiple neighborhood influences on children. The Child Opportunity Index moves us forward by offering the first nationally-comprehensive (all children in the 100 largest U.S. metros) neighborhood index focused on a broad range of neighborhood factors that affect healthy child development, improving on past measures that focused on one or a few aspects of neighborhoods (usually socioeconomic conditions alone). The Child Opportunity Index incorporates 19 individual indicators organized into three domains: educational opportunity, health and environmental opportunity, and social and economic opportunity. The Child Opportunity Index was designed to broaden child-focused conversations about neighborhoods beyond a narrow focus on socioeconomic conditions.

A major contribution of the Child Opportunity Index is its usefulness for examining issues of racial/ethnic equity in children's neighborhood environments. Equity exists when children of different racial/ethnic groups are equally likely to live in a high- (or low-) opportunity neighborhood within their metro area. Equity allows all communities and population groups across a region to benefit from neighborhood resources that are conducive to healthy child development. The Child Opportunity Index data, the related interactive online mapping tools, and the corresponding equity measures and analyses presented in this report highlight the utility of the Child Opportunity Index for conducting both localized and population level equity-focused analyses of children's neighborhood environments.

In this report, in addition to introducing the index and describing data sources and methods, we present two initial analyses of the Child Opportunity Index data. First, we analyze whether children in each racial/ethnic group are evenly spread across levels of neighborhood opportunity such that they have an equal chance of living in a high- (or low-) opportunity neighborhood. It has been documented that children of different racial/ethnic groups live in separate neighborhoods in U.S. metro areas, due to pervasive and longstanding patterns of racial residential segregation. Additional research points to the negative consequences for racial and ethnic minority children associated with higher levels of racial residential segregation. What's missing from our existing knowledge base is a detailed understanding of why and how segregation leads to inequities in neighborhood environments that support healthy child development and may thus lead to inequities in child outcomes. The analysis in this report suggests that

segregation leads to differences in neighborhood quality in ways that are important for healthy child development.

We find large racial/ethnic inequities in the distribution of children across neighborhood opportunity levels in the 100 largest US metros. As an initial reference point, we define five neighborhood opportunity levels (very low- to very high-opportunity) such that roughly 20% of all children in the 100 largest U.S. metro areas live in neighborhoods of each opportunity level. If conditions were equitable we would expect to see this same result (20% in each level) for each racial/ethnic group. Instead, we find small proportions of white (9%) and Asian (12%) children living in very low-opportunity neighborhoods, compared with much larger proportions of Hispanic (32%) and black (40%) children. On the other end of the opportunity spectrum, we find the opposite is true: small proportions of black (7%) and Hispanic (10%) children live in very high-opportunity neighborhoods, compared with large proportions of white (30%) and Asian (31%) children.

The Child Opportunity Index also allows us to examine three specific domains of opportunity—educational opportunity, health and environmental opportunity, and social and economic opportunity. For the education and social and economic domains, we find similar results to those reported above for overall opportunity across the 100 largest U.S. metro areas combined.[i] However, we find that black and Hispanic children are less concentrated in neighborhoods of very low health and environmental opportunity than they are in neighborhoods of very low social and economic opportunity and educational opportunity. While the overall index is a useful measure to capture the cumulative aspects of multiple neighborhood factors, the ability to look at the individual opportunity domains is also important to gain further insights into the more nuanced story of neighborhood environments and equity, highlighting that neighborhoods can have lower opportunity along one dimension, e.g. socioeconomic, but may have better access to certain types of resources and services, e.g. community health centers.

To compare the 100 largest metropolitan areas, we examined the share of children of each racial/ethnic group living in very low-opportunity areas. We also developed a second (ratio) measure designed to capture the degree of racial/ethnic inequity in child neighborhood opportunity. These measures show substantial variation in the share of black and Hispanic children living in very low-opportunity areas depending on the metropolitan area—values

i. Patterns by domain may differ for specific metro areas and can be explored for specific metros using the Child Opportunity Index online mapping, data download, and analysis tools at diversitydatakids.org.

range from less than 10% up to 60%. Beyond the variation in the concentration of black and Hispanic children in very low-opportunity neighborhoods, another notable finding is that even in the "worst" metro areas for white children (i.e. metros with the highest concentrations of white children in very low opportunity neighborhoods), white children are still slightly underrepresented in very low-opportunity areas (i.e. less than 20% of white children live in very low-opportunity neighborhoods), while black and Hispanic children are about 2.5 times more concentrated in the lowest-opportunity neighborhoods than we would expect if conditions were equitable. The second equity measure, a ratio, looks at the proportion of minority to white children living in very low- (very high-) opportunity neighborhoods. Looking across children in the 100 largest metro areas combined, we find that black and Hispanic children are over four (4.4x) and over three (3.6x) times more likely than white children, respectively, to live in very low-opportunity areas. However, the value can be as high as 30 times in some places (e.g. the black-white ratio for Milwaukee, WI).

Upon finding that the extent of inequities varies meaningfully across metro areas, we examined whether the degree of inequity in neighborhood opportunity is greater in metros with higher levels of residential segregation. We find that racial/ethnic inequities in neighborhood opportunities are larger in metro areas with higher levels of segregation. Therefore, in addition to isolating black and Hispanic children from white children, residential segregation also isolates black and Hispanic children from opportunities for healthy development.

Beyond the types of analyses presented in this report, there are many potential applications of the Child Opportunity Index, at both the national and local levels. For localities, the Child Opportunity Index supports equity-focused analyses (e.g. analysis of fair housing practices for families with children as a protected class) and practices (e.g. incorporation of Child Opportunity Index data into housing searches and counseling strategies). It is useful for identifying low-opportunity neighborhoods for economic revitalization initiatives that emphasize child-focused investments and for guiding regional strategies to promote more equitable access to neighborhoods that already have high levels of opportunity. On a national level, the Child Opportunity Index provides the first large-scale comprehensive database of a broad range of children-relevant neighborhood factors. It offers a data resource that can be integrated with existing federal data tools used in policymaking and practice (e.g. HUD's opportunity indicator database) and could expand the coverage of these tools to include detailed information on children as a focal population.

Neighborhoods are an important part of our children's past, present, and future. As demonstrated in this report, the Child Opportunity Index is a uniquely powerful tool to support assessment, research, policy, advocacy and action as we work towards improving neighborhood opportunities for all children and achieving greater equity. We hope you will use the Child Opportunity Index in your work and share your story with us.

Neighborhood A

Children in **Neighborhood A** face a host of obstacles to opportunity and wellbeing. Less than one in ten (9%) of the neighborhood's 3-to-4 year-olds attend pre-K programs, and there are no high-quality early childhood education centers in close proximity. By fourth grade, almost two-thirds of students have still not achieved proficiency in math, limiting their future math achievement and subsequent college attendance and wages. Among adults age 25 or older, only one in five has earned a college degree.

Low levels of education are accompanied by high levels of unemployment and poverty. A third of workers are unemployed, which may affect youths' expectations of their own employment prospects and result in weaker networks of employed adults that can help young people find jobs. Close to three in five (58%) residents live below the poverty line, and 92% of students attending nearby schools are eligible for free or reduced price lunch. Such concentrated poverty in neighborhoods and schools is associated with poor physical and mental health, as well as low student graduation rates and future earnings.

Physical conditions and resources pose further challenges. A staggering 23% of housing units are vacant. High vacancy rates have been shown to be positively associated with neighborhood crime, increased fire risk and drug use, and have a negative effect on property maintenance and home values of neighboring units, thereby reducing household wealth. None of the neighborhood's food establishments can be considered "healthy food retailers". This is a source of concern because lack of access to healthy food is associated with children's health problems and obesity. Further, the availability of nearby health care facilities ranks in the lowest 25% of all the metro area's neighborhoods.

Neighborhood B

Meanwhile, just over three miles away in the same metro area, children in **Neighborhood B** get a jump start up the education ladder. There are two high-quality early childhood education centers nearby and close to two-thirds of its 3-to-4 year-olds attend pre-K programs. Math proficiency is almost universal (95%) among fourth graders. Four of every five adults age 25 or older have a college degree.

These highly educated neighbors may lead to children's increased expectations for their own education and work prospects and positively influence their attitudes and actions regarding college attendance. With so many highly educated residents, the neighborhood has an unemployment rate (3.8%) well less than half that of the overall metro area (9.8%) and a poverty rate (9.6%) that is also considerably below the metro area average (17.1%).

The neighborhood also has a host of healthy resources nearby. It contains several parks and green spaces which may facilitate children's physical activity, lessening the chances of obesity and associated health problems. Additionally, all of the neighborhood's food establishments can be considered "healthy food retailers," increasing access to good nutrition.

Health care facilities are plentiful and close by. **Neighborhood B** has 178 health care facilities located within two miles, putting it in closer proximity to health care resources than 94% of all neighborhoods in the metro area. This proximity to health care providers likely reduces travel times, which in turn yields greater utilization of routine health care services and lower utilization of emergency room care.

Introduction

What is the Child Opportunity Index?

INTRODUCTION

As exemplified by the vignettes, the neighborhoods where children live vary drastically in the conditions and resources they offer. Neighborhoods A and B are not hypothetical; they represent two real neighborhoods located within a few miles of one another in one of the metropolitan areas featured in this report. Research evidence increasingly supports the importance of neighborhoods for healthy child development. Other things being equal (for example, family income or parental education), the best research evidence available suggests that a child growing up in Neighborhood B would have better chances of developing into a healthy, thriving adult than a child growing up in Neighborhood A.

Consider again Neighborhoods A and B. Of the 912 children living in Neighborhood A, 95% are non-Hispanic black. Of the 749 living in Neighborhood B, 90% are non-Hispanic white. As we have learned from constructing and analyzing the Child Opportunity Index that you will read about in this report, these extreme differences in the quality of neighborhood resources for children and the correlation with the race/ethnicity of the children who live in them are pervasive across the 100 largest U.S. metropolitan areas.

Why should we worry about these differences? An important goal for every society is that children achieve healthy development, defined by the Institute of Medicine (2004) as the ability "to develop and realize their potential, satisfy their needs, and develop the capacities that allow them to interact successfully with their biological, physical, and social environments."[1] Some societies also aspire to equity, which exists when all children have an equal chance to achieve healthy development. Achieving equity requires that all children and their families have access to supportive environments and resources for healthy development in the settings where they live, learn, work and play. It also requires the eradication of unfair and avoidable systematic differences between groups of children in their access to opportunities to attain healthy development.

The importance of equity among children grows stronger as the U.S. population becomes more diverse, and as inequities in children's healthy development (e.g., school readiness and health) that have persisted for decades now affect a larger number—and a larger proportion—of U.S. children than ever before. If these inequities persist (or deepen) as our population continues to diversify, the implications for U.S. economic and civic vitality are self-evident. However, while the nation's gradual shift to a "minority-majority" population is well recognized, the extent and implications of inequities in children's opportunities to achieve healthy development are less frequently considered.

Child Equity

All children have a fair and equal chance of achieving healthy development. Inequity exists when we observe differences that can be traced to unequal social and economic conditions that are systematic and avoidable and therefore inherently unfair.

Despite increasing diversity, persistent inequities in child wellbeing, pervasive residential segregation, and recognition that neighborhoods matter for child development, we have limited tools to monitor and quantify equity (or inequity) in the opportunities children have across the nation. Because our future workforce and citizenry are growing up now, there is an urgent need to understand and systematically assess the neighborhood environments where children are developing. Without systematic measurement and documentation of children's neighborhood conditions, we are unable to describe the range of neighborhood environments children experience and whether children of all racial/ethnic groups have access to neighborhoods with

conditions and resources that support healthy development. Until now, policymakers and practitioners have had to piece together limited information from disparate, fragmented sources. To help fill this gap, diversitydatakids.org and the Kirwan Institute for the Study of Race and Ethnicity at The Ohio State University developed the **Child Opportunity Index**: the first comprehensive information system to monitor progress towards equitable neighborhood environment and wellbeing for children of all major racial/ethnic groups.

The Child Opportunity Index (COI) is an index of relative child neighborhood opportunity for all neighborhoods in the 100 largest U.S. metropolitan areas, home to two-thirds of U.S. children under 18 (49.2 million children). Unlike previous indices which have included neighborhood socioeconomic indicators for one or a few geographic areas, the COI includes a broad set of neighborhood-based opportunities that impact healthy child development, is calculated for the 100 largest metro areas, and is focused specifically on conditions and resources relevant to child development. Some COI measures, such as proximity to (quality) early childhood education centers, were collected and developed exclusively for this index and are unavailable elsewhere. The COI is available online through a user-friendly web interface that allows a broad range of users to manipulate interactive child opportunity maps and examine indicators of equity in neighborhood opportunity.

Intended Audience for the COI

The COI is designed to be accessible not only to data-savvy researchers, but to users from:

- a wide range of professional backgrounds (e.g. policymakers, practitioners, community organizers, journalists),
- across several sectors (e.g. health, housing, education and early education, community development),
- across many different types of organizations (e.g. local government planning departments, child welfare boards, community development groups, private industry, think tanks, media/ thought leaders).

This inaugural diversitydatakids.org report provides an overview of the Child Opportunity Index as an effective tool to measure equity in neighborhood opportunity for children. **Section 1** presents an overview of the importance of neighborhood-based opportunity for child development, followed by the consequent need for and contributions of the Child Opportunity Index. **Section 2** describes the construction, intrepretation, and limitations of the index. **Section 3** shows how to interpret COI maps using examples from two metro-

politan areas, and explains two equity measures that summarize racial/ethnic inequities in children's exposure to neighborhood-based opportunity.

Section 4 presents an analysis of COI data that compares the location of children (by race/ethnicity) with the location of neighborhood opportunity. The analysis presents equity measures for the 100 largest metropolitan areas combined, as well as rankings for each of the 100 metros based on the extent of racial/ethnic inequity in children's exposure to opportunity within each metro. We also analyze whether the degree of inequity in child neighborhood opportunity is associated with the level of residential segregation across metropolitan areas. These analyses find not only large, systematic inequities in child neighborhood opportunity across metropolitan areas, but also that inequities are greater in those areas where residential segregation is most severe. Specifically, black and Hispanic children are highly concentrated in the lowest opportunity neighborhoods across metropolitan areas—but this inequity is most extreme in metro areas that exhibit high residential segregation.

Section 5 discusses practical uses of the COI and provides examples of organizations that are using the index to better understand and improve the location and effects of neighborhood resources on child wellbeing, e.g. child health. We also suggest additional analyses and applications of the COI in fields such as fair housing that are seeking more rigorous data for improving children's neighborhood environments.

Section 1

Why a Neighborhood-Focused Child Opportunity Index?

SECTION 1: WHY A NEIGHBORHOOD-FOCUSED CHILD OPPORTUNITY INDEX?

In this section, we discuss the importance of neighborhoods for healthy child development, and relatedly, the important role that race/ethnicity plays in our understanding of the neighborhoods where U.S. children live. We discuss how these factors motivate the design of the Child Opportunity Index, and we highlight the key contributions of the development of the COI.

A. Why neighborhoods matter for children

Existing research supports the idea that neighborhood environments influence child health and developmental outcomes. Child development is influenced by the various settings that children travel through each day—neighborhoods are one of those settings. When considering what makes up a neighborhood, we realize that neighborhood environments have many dimensions, including their physical environment (e.g. parks and playgrounds), local institutions (e.g. schools, child care centers), and social conditions (e.g., poverty, employment).

Perhaps unsurprisingly, a large number of studies find an association between neighborhood socioeconomic characteristics and child outcomes. However, many of these studies examine a single measure of neighborhood environment, commonly neighborhood poverty, and do not draw causal conclusions. Beyond this research, several rigorous, causal studies confirm the negative effects of neighborhood socioeconomic disadvantage on children. For example, Sampson, Sharkey, and Raudenbush (2008) found that, on average, living in a severely disadvantaged neighborhood reduced black children's verbal abilities by a magnitude equivalent to a year or more of schooling.[2]

Research on the effects of neighborhood conditions on child outcomes is complicated because the same factors that may make people choose to live in neighborhoods with certain characteristics may also influence their children's outcomes.[3] For example, families interested in promoting their children's education may choose to move to neighborhoods with better schools. In this example, the child's development is likely influenced by a family level factor (i.e. high levels of parental support and emphasis on education) and a related neighborhood-level factor (i.e. opportunity to attend high-quality local schools). Given this complexity, it is important to know that the most rigorous neighborhood effects studies do, in fact, tease apart family influences from neighborhood influences and find that neighborhood-level socioeconomic factors affect children independently of family-level socioeconomic factors. In sum, these studies find that neighborhoods themselves matter for child development.

In addition to studies that examine socioeconomic aspects of neighborhoods, additional studies find that other neighborhood factors—such as public safety, levels of trust among neighbors, availability of safe recreational spaces, and access to affordable, healthy food—also influence children. Although most of these studies do not establish causality, they demonstrate the need to look beyond neighborhood socioeconomics and consider the availability of specific resources, presence of stressors, and a wide range of neighborhood characteristics that may influence children.[4-7]

A few rigorous studies do allow us to draw causal conclusions that confirm the importance of several specific neighborhood factors on child outcomes. A new analysis of data from the Moving to Opportunity study shows that children who moved from a high-poverty to a low-poverty neighborhood before the age of 13 had higher earnings and higher-quality college education as adults than children who stayed in

high-poverty neighborhoods.[8] Another recent study found that, after controlling for a number of child, caregiver, and household characteristics, several neighborhood dimensions strongly predict outcomes for Hispanic and African-American children from low-income families across multiple domains: physical/behavioral health, exposure to violence, risky behaviors, education, youth labor market outcomes, and marriage/childbearing. For example, in neighborhoods with lower rates of property crime, children have better health outcomes (i.e. asthma, neurodevelopmental disorders, obesity and internalizing behaviors such as depression and anxiety). Also, in neighborhoods where a higher proportion of residents have high prestige occupations, children exhibit fewer risky behaviors and have more favorable educational outcomes.[9]

While this strong body of evidence indicates that neighborhoods matter for child development, there are still important knowledge gaps. First, more research is needed to understand how specific resources and conditions, beyond neighborhood socioeconomic context, matter for children. Existing neighborhood socioeconomic measures do not capture the presence of specific resources that may positively influence children's development, such as the presence of quality educational institutions. Second, we need more research that captures the combined contributions of positive and negative neighborhood influences on children. Neighborhoods are complex and thus better characterized as a combination of community assets and stressors, rather than reduced to a single factor. Third, studies suggest that a child's exposure to multiple negative neighborhood factors has a cumulative effect, and conversely, that exposure to positive neighborhood factors can offset some of the influence of negative neighborhood factors.[10] The Child Opportunity Index is a first step towards addressing these gaps, by providing a child-specific measure of neighborhood environment that considers both neighborhood assets and stressors that matter for healthy child development.

B. Importance of race/ethnicity for understanding how neighborhoods matter for U.S. children

The U.S. population is becoming increasingly racially and ethnically diverse. From 1980 to 2014, the proportion of racial or ethnic minority children in the total child population increased from 26% to 48%. The growth of the Hispanic child population is especially dramatic, increasing from 9% to 24% of the total child population over the same period of time. Among children under age five, 50% are minority, and 26% are Hispanic.

In some geographic areas, the proportion of the child population that is racial/ethnic minority is substantially larger than these national figures. According to Intercensal Population Estimates for 2012, minority children already comprise half or more of the child population in 11 states and 93 metropolitan areas. In 2012, eight of the 10 largest metropolitan areas had majority-minority child populations—that is, the majority of the child population was comprised of racial/ethnic minority children—ranging from 57% of the child population in Metro Chicago to 80% in Metro Los Angeles.[i]

Race/ethnicity is also important in considering the importance of neighborhoods for children because U.S. children experience high levels of residential (i.e., neighborhood) segregation. In many places across the U.S., children of different racial/ethnic groups live in separate neighborhoods from one another; therefore they also experience different neighborhood environments. Past studies show that high levels of child residential segregation may be associated with inequitable exposure to neighborhood stressors, such as high neighborhood poverty levels.[11] Among black children, higher residential segregation is associated with negative child health outcomes such as premature births and low birthweight, which adversely affect child development and may even have repercussions for adult health.[12]

Given the growing diversity of our child population and the potential influence of neighborhoods on child health (a predictor of future national productivity), it is critical to monitor and address racial/ethnic inequities in children's neighborhood environments.

C. The need for the Child Opportunity Index

Over the last decade, research evidence supporting neighborhoods' importance to healthy child development has informed several federal policy initiatives and local programs intended to improve children's neighborhood environments. Policymakers increasingly recognize that children need multiple supports at different points throughout childhood and that these supports are especially important for low-income children whose families may have fewer resources. Promise Neighborhoods and Choice Neighborhoods are examples of federal initiatives intended to promote child-focused community development.[13] Both operate on the principle of saturating communities with a variety of resources for families with children. In the field of public health, there is an increasing interest in promoting better health through improved neighborhood environments. Some initiatives focus on improving the links between community development and health, while others try to improve neighborhood conditions and resources associated with specific health outcomes (i.e. the local food environment's connection to child nutrition and obesity).

Federal, state and local efforts to improve neighborhoods for children often focus on one or a few disadvantaged neighborhoods without considering the distribution of neighborhood conditions and child-supportive resources across the entire region, or where children of different racial/ethnic groups live in relation to those neighborhood conditions and resources. Of course, neighborhoods do not exist in isolation. The resources and conditions available in an individual neighborhood are shaped by broader regional markets and dynamics, such as housing markets, employment markets and residential segregation.[14] Therefore, initiatives focused on a particular neighborhood within a region can be better informed by understanding the broader regional context. For example, between 1980 and 2008, across the 100 largest metropolitan areas, low-income neighborhoods were more likely to increase their average household incomes if they were located in metro areas whose average household income was increasing.[15] Moreover,

i. Authors' calculations based on data from diversitydatakids.org.

policymakers and stakeholders who are focused on issues of racial/ethnic equity must take a regional perspective to understand the full degree of inequities in children's residential environments. For example, inequities between black and white children living inside the urban core of a metropolitan area (where black children are often overrepresented and white children underrepresented) are often smaller than black-white inequities across the full metro, which includes suburban areas (where black children are often underrepresented and white children overrepresented).[14,16]

Many individual neighborhoods, cities, and metropolitan areas have a wealth of neighborhood-level data specific to their areas. However, despite availability of these discrete datasets and the current political momentum towards improving neighborhood environments for children, national policymakers lack a comprehensive data system of child neighborhood environments that covers a large fraction of the U.S. child population. Policymakers are required to piece together neighborhood information from disparate, fragmented sources, and they may also lack the tools for summarizing, mapping, and analyzing neighborhood conditions. The Child Opportunity Index and its associated online mapping and analysis tools (newly developed by diversitydatakids.org and the Kirwan Institute for the Study of Race and Ethnicity) seek to fill these gaps by offering a unified, interactive information system on child neighborhood environments for the 100 largest U.S. metropolitan areas.[17]

D. What is the Child Opportunity Index and how does it move us forward?

What is the Child Opportunity Index?

The Child Opportunity Index is a newly developed measure that seeks to capture the many neighborhood conditions and resources that influence child health and development. The COI incorporates 19 individual indicators organized into three domains: educational opportunity, health and environmental opportunity, and social and economic opportunity[18,19] (Appendix A (note: electronic appendix only) describes the index methodology). The COI was developed for the 100 largest U.S. metropolitan areas, home to almost 50 million children, or nearly two-thirds of the U.S. child population.[ii] The COI's interactive mapping tools and neighborhood-level data are available in a user-friendly, online platform.

Importantly, the COI is a measure of relative opportunity across all neighborhoods in a given metropolitan area. Each neighborhood is assessed relative to the "geography of opportunity" in its

ii. By race/ethnicity, larger proportions of Asian/Pacific Islander (87%), Hispanic (77%), and black (74%) children live in the 100 largest U.S. metropolitan areas compared to non-Hispanic white children (58%).

metropolitan area. For example, a given neighborhood may have relatively higher educational opportunities (e.g. a higher number of quality early childhood education centers) than other neighborhoods in the same metropolitan area. The central premise of a "geography of opportunity" framework is that, across a metropolitan region, children live in a context of neighborhood-based opportunities that shape their quality of life and healthy development. Regional or metropolitan factors (e.g., regional housing and labor markets, infrastructure) influence the opportunities found in any one individual neighborhood as well as the distribution of opportunity across the region.[11,20-22] For instance, the level of youth unemployment in a neighborhood is influenced by the neighborhood's own opportunities as well as by its distance to job opportunities in other neighborhoods in the region. This geography of opportunity framework informed the decision to use the metropolitan area as the relevant reference region for developing the COI.

How does the COI move us forward?

The COI is the first nationally-comprehensive neighborhood index focused on a broad range of neighborhood factors that affect healthy child development. The COI's multidimensionality is an improvement over previous indices that focus on one dimension (such as concentrated socioeconomic disadvantage), providing a measure that better captures the combination of risks and resources that make up children's neighborhood environments. It is also unique in its focus on child-relevant conditions and resources (other indices do not focus on neighborhood conditions specific to children). Furthermore, it includes original child-focused indicators that are unavailable elsewhere, such as the proximity to quality early childhood education centers.

The COI follows examples like the widely used Human Development Index (HDI), which also aggregates information across three domains. The HDI allows for easy comparison with an economic indicator, the Gross Domestic Product (GDP), and thus has helped shift attention away from purely economic indicators and towards broader human development indicators such as education and health.[23] In this fashion, the COI also makes the important contribution of offering a single metric, which can be useful in initiating conversations about equity in neighborhood-based opportunity and broadening such conversations beyond a narrow focus on socioeconomic conditions.

Finally, the COI advances our ability to examine issues of racial/ethnic equity in children's neighborhood environments. Equity exists when children of different racial/ethnic groups are equally likely to live in high- (or low-) opportunity neighborhood within their metro area. Equity allows all communities and population groups across a region to benefit from neighborhood resources that are conducive to healthy child development.

The index is specifically designed to support equity-focused analysis, but is, by design, intentionally race-neutral; that is, it includes no measures of neighborhood racial/ethnic composition. To examine racial/ethnic inequities in neighborhood environments, the COI is paired with data on the child population in each neighborhood. By pairing the COI with child population data, one can create descriptive maps and can also calculate summary, metropolitan-level metrics of racial/ethnic equity based on where children live in relation to neighborhood opportunity. In this report we provide preliminary equity-focused analysis of the COI, examining whether there is equity in the location of children in relation to neighborhood opportunity within metropolitan areas.

Having described in this first section the research, policy and practical motivation for the development of the Child Opportunity Index, we turn in **Section 2** to a discussion of the technical details of the index (construction, data sources, how to interpret, and important limitations).

Section 2

About the Child Opportunity Index

SECTION 2: ABOUT THE CHILD OPPORTUNITY INDEX

In this section we describe the technical details of the Child Opportunity Index, including the indicators chosen for the index, methods for computing index values, and data sources. We also discuss how to compare the COI results across metropolitan areas, given that it is a "relative" measure of opportunity, and limitations of the index.

A. Index Construction

Geographic Scope

The COI currently measures all of the approximately 47,000 neighborhoods (i.e., census tracts) in the 100 largest U.S. Metropolitan Statistical Areas ("MSAs," "metros" or "metropolitan areas" hereafter). Census tracts typically contain about 4,000 people and 1,600 housing units. The U.S. Office of Management and Budget (OMB) defines metropolitan areas for use by federal statistical agencies in collecting, tabulating and publishing federal statistics. A metropolitan area contains a core urban population of at least 50,000 and includes the counties containing the core urban area, as well as any adjacent counties that have a high degree of social and economic integration (as measured by commuting to work) with the urban core. The metropolitan areas presented in the Child Opportunity Index have geographic boundaries defined as of 2009. Throughout this report, we use only the name of the principal city when referring to a metro area. The 100 largest U.S. metros (defined as the 100 metros with the largest populations), have an average of 467 tracts (or neighborhoods) per metro.

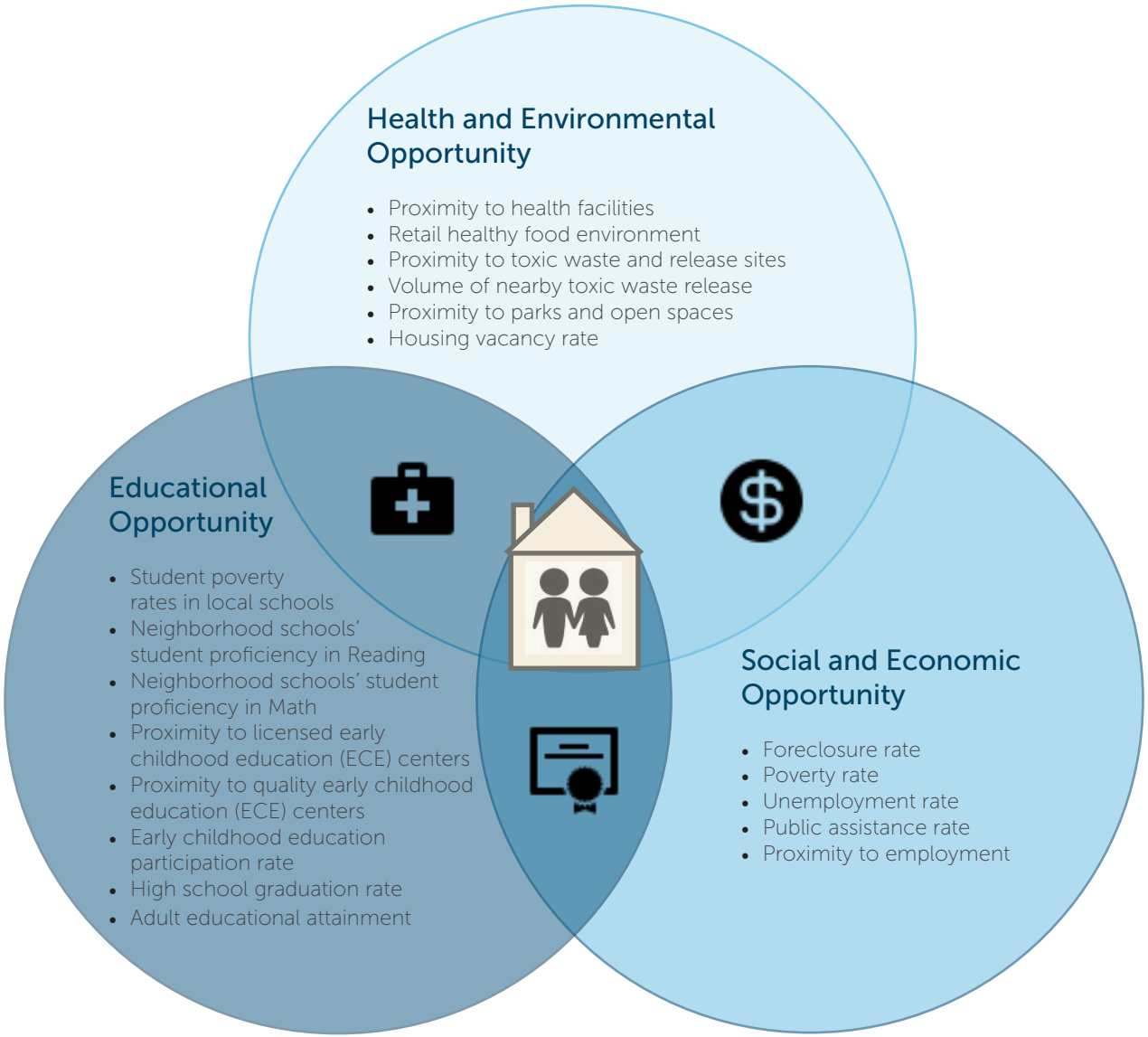
What measures are in the index?

The Child Opportunity Index combines 19 separate indicators into a single composite measure designed to capture a range of resources and stressors that children encounter in their neighborhoods and which may influence healthy development. These 19 indicators include measures ranging from presence of quality early childhood education centers in or near the neighborhood, to proximity to parks and healthcare facilities, to housing foreclosure rates. See **Figure 2.1** and **Table 2.1** for the complete list. The indicators are organized into three sub-groups, called opportunity domains: educational opportunity (hereafter educational), health and environmental opportunity (hereafter health), and social and economic opportunity (hereafter socioeconomic). These domains allow users the flexibility to examine either the overall composite opportunity index (i.e. all 19 indicators combined) or a single domain (i.e. educational opportunity).

Table 2.1 Opportunity indicators in the Child Opportunity Index

Indicators by Domain
Educational Opportunity
• Student poverty rates in local schools • Neighborhood schools' student proficiency in Reading • Neighborhood schools' student proficiency in Math • Proximity to licensed early childhood education (ECE) centers • Proximity to quality early childhood education (ECE) centers • Early childhood education participation rate • High school graduation rate • Adult educational attainment
Health and Environmental Opportunity
• Proximity to health facilities • Retail healthy food environment • Proximity to toxic waste and release sites • Volume of nearby toxic release • Proximity to parks and open spaces • Housing vacancy rate
Social and Economic Opportunity
• Foreclosure rate • Poverty rate • Unemployment rate • Public assistance rate • Proximity to employment

Figure 2.1
Dimensions of the Child Opportunity Index



The relevance of each COI indicator to child development is supported by empirical literature on neighborhood effects or conceptual frameworks of neighborhood influences on children.[i]

Data availability also guided indicator selection for each domain. Given that the COI spans 100 metropolitan areas, its indicators are limited to those that are consistently available. Certain factors important to child wellbeing, such as exposure to crime and neighborhood violence, are absent from the COI due to a lack of comparable neighborhood-level data (see "Limitations"). Despite this limitation, the COI is easily combined with additional local data sources—such as neighborhood-level crime data for an individual metro area—that may enhance its richness and relevance for specific communities (See "Applications").

How do we calculate index values?

The indicators included in the index are measured in different units and have different magnitudes and ranges. For

i. In earlier work on opportunity indices for specific geographic areas, practitioners' experience working with communities locally also informed indicator selection. In one of these instances, the Kirwan Institute at Ohio State University worked with practitioners in Duval County, Florida to develop a child-focused opportunity index for the county. For more information about the Duval County Child Opportunity Index work, see the full report.

example, a child's proximity to parks and open spaces is measured in terms of distance (e.g. miles), while the poverty rate is measured in terms of percent of population. Thus, it is necessary to standardize each indicator before combining it with others. This standardization is done through the creation of z-scores for each indicator for each tract within a metro area. A z-score is a statistical measure that quantifies the distance (in standard deviations) of an individual data point from the mean (average) value. The use of z-scores allows data for a census tract to be measured in terms of the relative distance from the mean of the metro area. Z-scores are helpful in the interpretation of raw scores, since they incorporate both the mean and the variability (or the standard deviation) of the distribution.

z-scores are calculated as:

$$z_i = \frac{(x_i - \mu)}{\sigma}$$

Where:

x_i = indicator value for tract (i)

μ = mean value of the indicator for all tracts in the metro area

σ = standard deviation of the indicator for all tracts in the metro area

Thus, a tract z-score of 1 represents a value that is 1 standard deviation greater than the mean for all census tracts in the metropolitan area. A tract z-score of -1 represents a value that is 1 standard deviation less than the mean of all census tracts in the metropolitan area. While some COI indicators measure the presence of positive resources (such as healthy food outlets) in which higher numbers are desirable, others measure the presence of stressors (such as the foreclosure rate) in which higher numbers are undesirable. Therefore, the z-scores are further transformed so that the magnitude of each z-score is consistent with higher values indicating a "better" neighborhood condition. For example, a high value for the poverty rate indicator (high poverty) reflects a less desirable outcome. Thus, z-scores for poverty rate are multiplied by -1 so that higher poverty rates translate to lower z-scores.

The scores for related indicators are then averaged together to create scores for the three domains: educational, health and socioeconomic opportunity. **Table 2.1** illustrates which indicators are combined to form each of the three domain scores.

Finally, the three domain scores are averaged to produce the Overall Child Opportunity Index z-score for each census tract.

No weighting is applied to the various indicators in creating the domain scores or the overall index score; all indicators are treated as equal in importance.[ii]

Once each tract has an opportunity index z-score, all tracts in a given metro area are rank-ordered and divided into quintiles (fifths), resulting in five opportunity levels. Each level is then labeled (for both the overall index and the three domain indices) as very low, low, moderate, high or very high. Thus, the census tracts identified as very high-opportunity represent the top 20% of scores among census tracts within that metro area. Conversely, census tracts identified as very low-opportunity represent the lowest scoring 20% of census tracts within that metro area.

Data Sources: Building the COI dataset

The indicators for the COI are calculated using data from a number of national survey and administrative sources (e.g. Decennial Census, American Community Survey (ACS), National Center for Education Statistics) and from specialized, large-scale micro-data collections conducted by the COI developers from state and national administrative databases. All indicator values reflect authors' calculations of primary source

ii. The literature provides little or no guidance on the relative degree of influence of one quality of life indicator compared to another, and so no explicit weighting is employed in calculating the overall opportunity index or domain indices.

data. Technical details related to indicator definitions, computations, and spatial aggregation methods can be found in Appendix A (note: electronic appendix only).

Notably, the COI utilizes data from two specialized micro-data collections: a school-level data collection for public primary schools in the 100 largest U.S. metros, and a collection of early childhood care and education (ECE) center-level data (as part of a project called the diversitydatakids.org Early Childhood Database Project, "ECDP"). The key output of the ECDP project was a state-by-state, national database that: (i) details the point location of all licensed, center-based ECE providers, and (ii) identifies the centers that have accreditation from NAEYC (National Association for the Education of Young Children), signaling compliance with national quality standards. This newly created national database cross-references three ECE-focused data sources, including: State Early Childhood Care and Education Licensing Databases from 43 U.S. States (includes location of all center-based, licensed ECE providers), National Center for Education Statistics, Common Core of Data (includes location of all public Pre-K providers), and the NAEYC Accredited Program Database (includes the location of all NAEYC-accredited ECE providers). These specialized micro-data collections were motivated by the absence of consolidated national databases with neighborhood-level data on the quality and characteristics of local schools and early childhood centers (two critical components of the neighborhood opportunity structure for children).

B. Limitations

The COI combines information about 19 indicators of neighborhood opportunity into a single number or score. The simplicity of the index allows users to quickly scan the neighborhood distribution of child opportunity across a metro area. Like other indices, the COI is useful because it allows us to synthesize complex data into a single measure, which can be used to start an analysis or a community conversation about equity in the location of opportunity across an area. However, this simplicity also limits the index for certain uses. For example, the COI should not be used to decide the location of resources or programs without analyzing additional information. Users can gain a more detailed understanding of the geography of opportunity for a given area by examining separately the three domain indices: educational, health, and socioeconomic opportunity. Additionally, users interested in further analysis and in supplementing the COI with local data can also examine the individual COI indicators.[17]

As discussed previously, the COI was developed to provide comprehensive data on children's neighborhood environment for a large fraction of the U.S. child population. This required the use of comparable data available for these metropolitan areas without a prohibitively onerous data collection effort. Therefore, it was not possible to include variables such as crime rates, housing code violations, or "value-added" measures of school performance, which can be obtained only by requesting data from each relevant jurisdiction within a given metro. However, the COI can and is already being used in combination with supplemental local data to provide a more nuanced picture of children's neighborhood environments (see examples in "Applications").[17]

C. The COI as a "Relative" Measure of Neighborhood Opportunity

The COI is a measure of relative neighborhood opportunity within a given metropolitan area. Neighborhood conditions vary considerably across metros and inequities in the geography of opportunity reflect individual contexts of each metropolitan area, making it inappropriate to create an index that is

comparable across metropolitan areas. The policy implications derived from an analysis of neighborhood opportunity are largely metropolitan area-specific. For example, it would be useful to know that there is a lack of affordable housing in high-opportunity neighborhoods in a given metro area, because then new affordable housing could be sited in those particular neighborhoods. On the other hand, even if there were an abundance of affordable housing in high-opportunity neighborhoods in a different metro, this would be largely irrelevant for families and for housing and community development agencies in the first metro. In sum, given that both neighborhood inequities and possible policy remedies are defined regionally, a national COI across all metropolitan areas would not be appropriate.

The COI ranks neighborhoods according to their opportunity level within a given metro area, rather than across metro areas. Because opportunity categories are relative within metropolitan areas, the conditions of very low-opportunity neighborhoods of one metropolitan area are not necessarily comparable to the conditions in very low-opportunity neighborhoods of another metropolitan area. For example, a very low-opportunity neighborhood may have a high poverty rate compared to the other neighborhoods in the same metropolitan area. However, if the metropolitan area in question is economically strong, its neighborhoods—even those that are very low-opportunity—may have better absolute levels of some indicators than very low-opportunity neighborhoods in economically weaker metropolitan areas. For instance, in economically strong metropolitan Boston (metro median household income=$71,878, (2007-11 ACS)), the median poverty rate in very low-opportunity neighborhoods is 20.3%, while in economically weaker metropolitan Milwaukee (metro median household income=$53,618, (2007-11 ACS)), the median poverty rate in very low-opportunity neighborhoods is 40.6%.[iii] Therefore, the COI should not be used to compare neighborhood opportunity between neighborhoods in different metropolitan areas.

What can be compared across metropolitan areas, using the COI, is the nature and degree of any observed inequities in neighborhood opportunity that children of different racial/ethnic groups experience. From this perspective, the COI can be thought of as similar to other measures commonly used to compare levels of inequality; for example, measures of income inequality (e.g. the Gini Index), which compares the degree of income inequality across places (e.g. countries, metropolitan areas, states, etc.), or for the same place over time. Measures of income inequality are not designed to compare differences in the absolute levels of income, but are instead designed to compare the degree of inequality in incomes across time and/or place. Likewise, comparing the nature and degree of (in)equity in child neighborhood opportunity across metros for children of different racial/ethnic groups is an appropriate application of the COI. For more discussion of this application of the COI, see **Sections 3 and 4**.

Having provided the technical details of the Child Opportunity Index in this section, the next section shows readers what Child Opportunity Index maps look like and how to interpret them and describes equity-focused measures that can be used to summarize the COI data at the metropolitan area level.

iii. Additionally, the COI cannot be used to compare absolute differences between the highest and the lowest opportunity neighborhoods within or across metropolitan areas. In some areas, for some indicators, the absolute distance between the lowest and the highest opportunity neighborhoods (for example, the difference in their average poverty rate) may be narrow while in other metro areas it may be wide. In those areas with a broader spread, the absolute inequality between the highest- and lowest-opportunity neighborhoods would be greater than in areas with a narrower spread. However, as the COI uses quintiles derived from ranking standardized z-scores for a metro area, it does not provide information about the absolute distance between lower and higher opportunity neighborhoods.

Section 3

Interpreting Child Opportunity Maps and Equity Measures

SECTION 3: INTERPRETING CHILD OPPORTUNITY INDEX MAPS AND EQUITY MEASURES

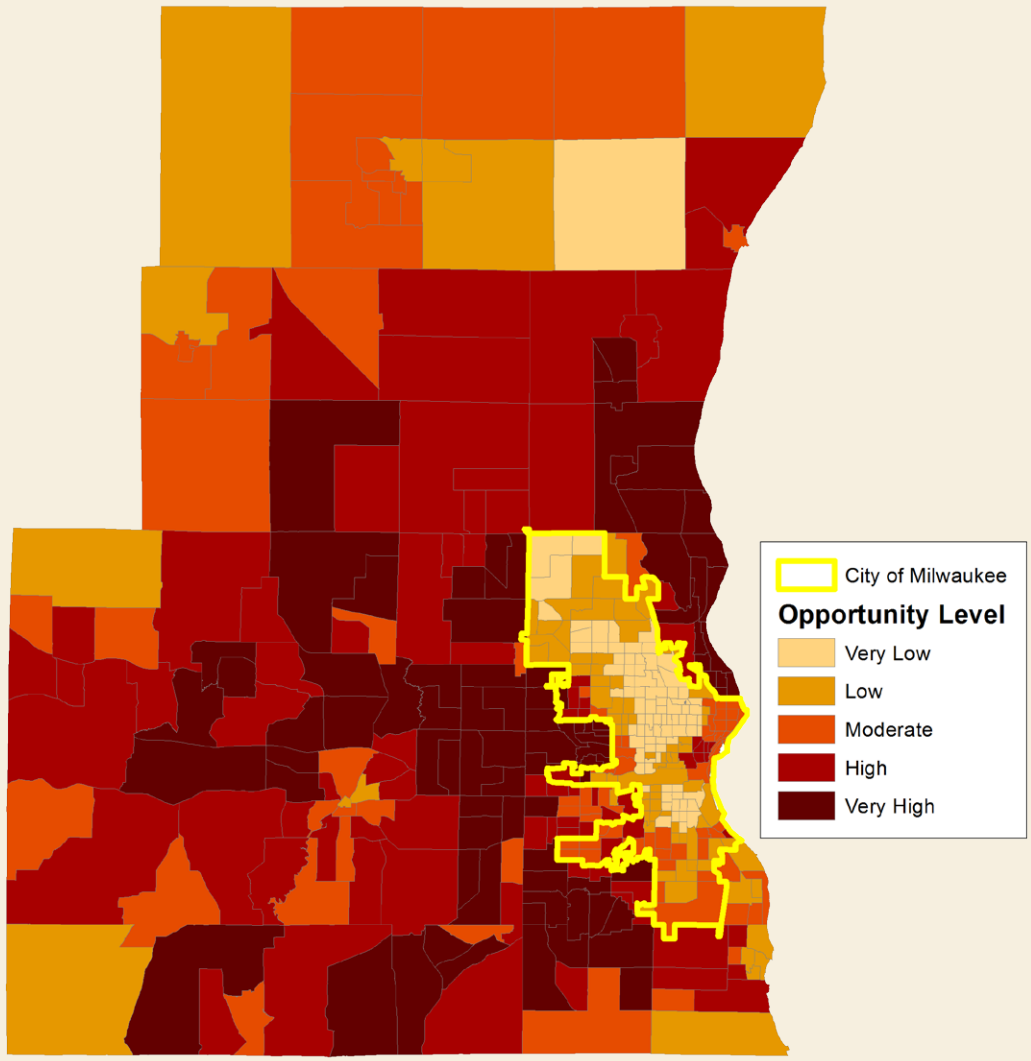
A. Interpreting the maps

In this section we demonstrate how to interpret and explore Child Opportunity Index maps. We also describe approaches that go beyond mapping of the COI data to create summary measures for analyses of racial/ethnic inequities in children's neighborhood opportunity levels.

Child Opportunity Index maps for the 100 largest metropolitan areas are available at diversitydatakids.org. You can access online mapping tools to display more detailed maps with the child population overlaid on neighborhood opportunity by clicking on the "Customize Map" button to the upper right of each map. The website also contains the data underlying the maps—available using the Get Data link—and detailed technical documentation.

Figure 3.1 shows a COI map for the Milwaukee metropolitan area. The small areas in the map represent neighborhoods (i.e. census tracts). The yellow line denotes the City of Milwaukee, which is the urban core of this metro

Figure 3.1
Milwaukee, WI Metro Area Child Opportunity Index



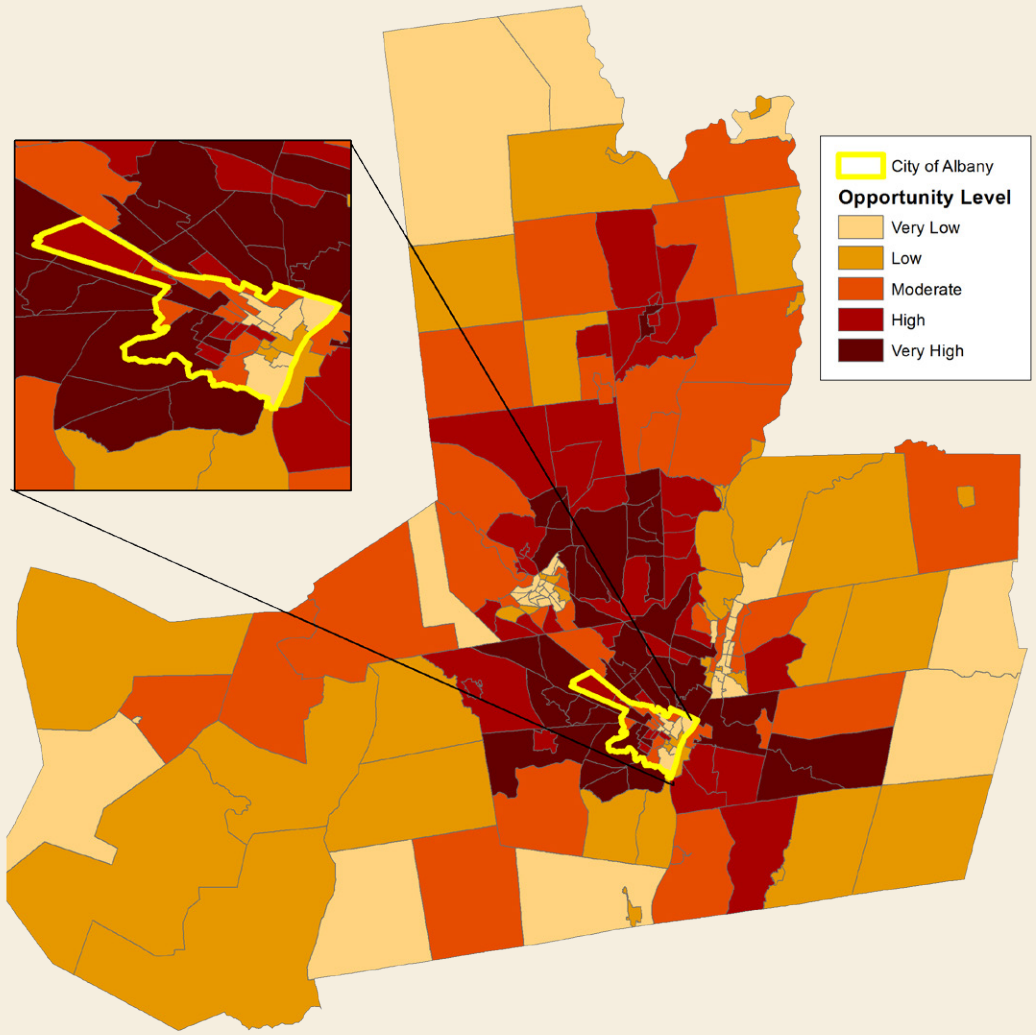
Source: diversitydatakids.org-Kirwan Institute Child Opportunity Index.

area. Each neighborhood is shaded a color ranging from light yellow (the bottom 20% of neighborhoods, with very low-opportunity scores for metro Milwaukee), up to dark maroon (the top 20% of neighborhoods, with very high-opportunity scores for metro Milwaukee).

This map shows the "geography of opportunity" within the Milwaukee metropolitan area. In metro Milwaukee, the geography of opportunity is characterized by opportunity clustering—neighborhoods of similar opportunity levels are clustered together within the city of Milwaukee, rather than dispersed evenly throughout the metro area. Notice the large cluster of very low- and low-opportunity neighborhoods in the city's central core, juxtaposed with a large cluster of high- and very high-opportunity neighborhoods surrounding the urban core to the west. Finally, notice the band of low and moderate opportunity in the outer suburbs of the metro area.

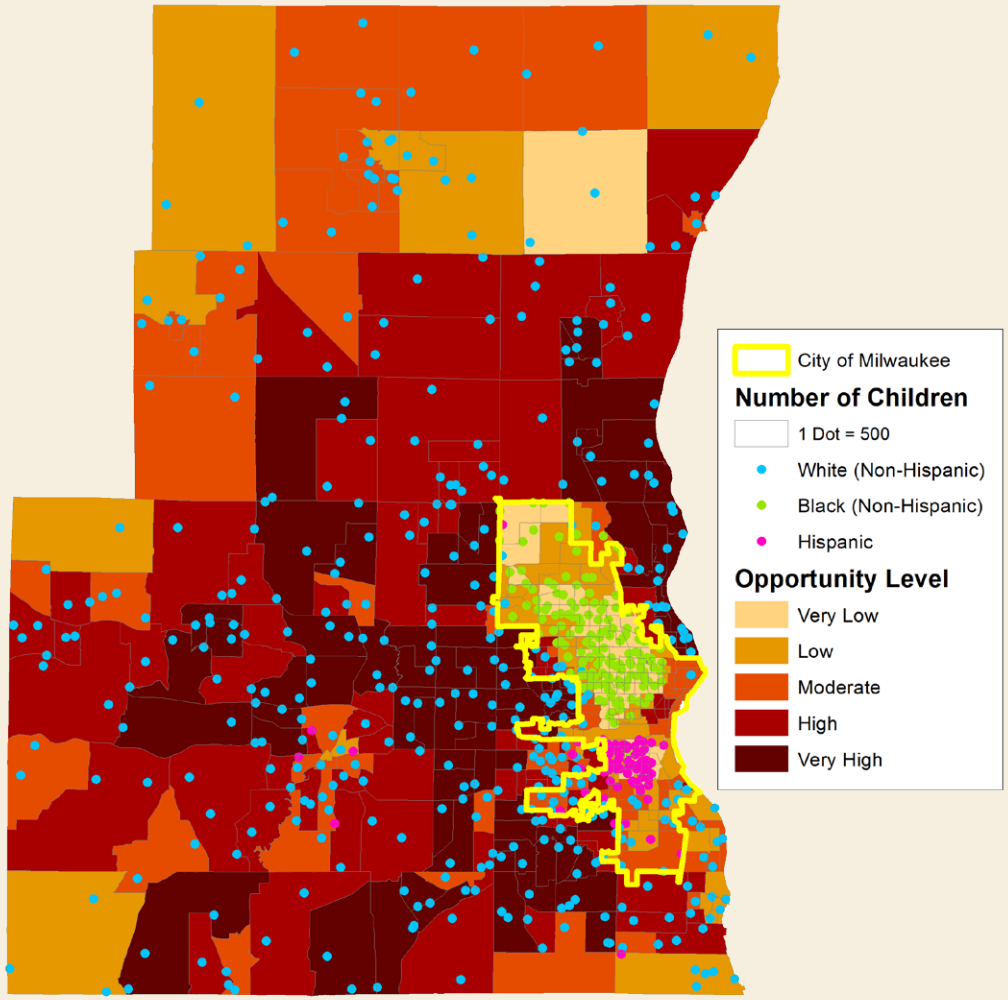
Each metro has its own unique geography of opportunity. For example, if you compare Milwaukee to metro Albany (see **Figure 3.2**), the geography of opportunity is quite different. In the Albany map depicted here, the yellow line again denotes the city limits. Within the city are neighborhoods of all opportunity levels from very low to very high. Just outside the city is a band of

Figure 3.2
Albany, NY Metro Area Child Opportunity Index



Source: diversitydatakids.org-Kirwan Institute Child Opportunity Index.

Figure 3.3
Milwaukee, WI Metro Area Child Opportunity Index
With Overlay of White, Black, and Hispanic Children



Note: Dot placement is random within neighborhoods (census tracts) and does not identify exact location of child populations. Hispanics may be of any race.
Source: diversitydatakids.org-Kirwan Institute Child Opportunity Index.

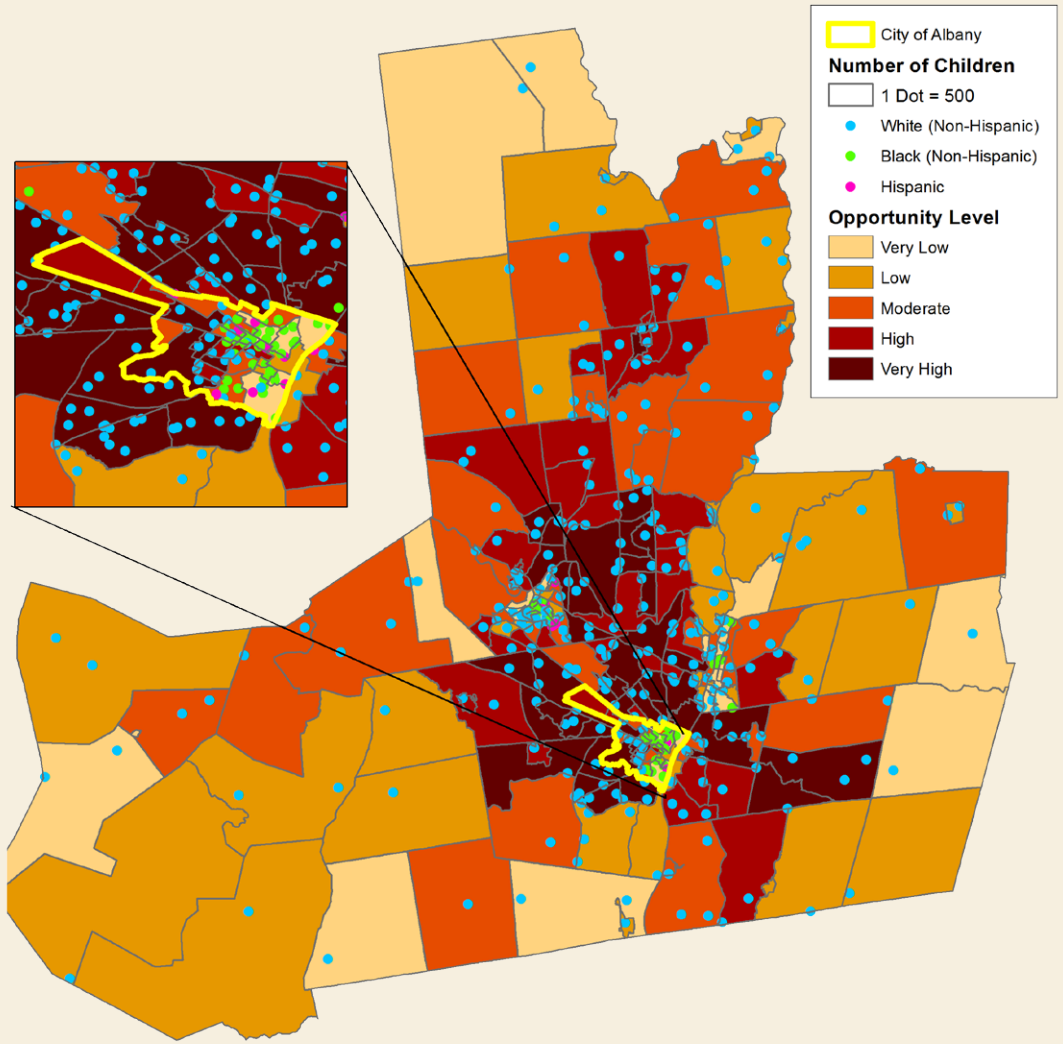
high- and very high-opportunity neighborhoods, and beyond this is a wide band of low- and very low-opportunity neighborhoods.

After creating the neighborhood opportunity map for a metropolitan area, the next step is to overlay the child population in order to see the location of children of different racial/ethnic groups in relation to the geography of opportunity.

The Milwaukee map (**Figure 3.3**) suggests that white children live in high- and very high-opportunity neighborhoods outside the City of Milwaukee. On the other hand, black children live in very low- and low-opportunity neighborhoods in the mid-to-northern portion of the city. Large shares of Hispanic children live in very low- and low-opportunity neighborhoods in the southeastern portion of the city. Milwaukee has one of the highest levels of racial/ethnic inequity in child neighborhood opportunity among the largest 100 U.S. metros (for further discussion, see **Section 4**).

The Milwaukee map also illustrates that, when considering equity, it is important to examine metropolitan areas instead of individual neighborhoods or just the urban (suburban) portion of the metro area. As shown in the map, black and Hispanic children largely live within the

Figure 3.4
Albany, NY Metro Area Child Opportunity Index
With Overlay of White, Black, and Hispanic Children



Note: Dot placement is random within neighborhoods (census tracts) and does not identify exact location of child populations. Hispanics may be of any race.
Source: diversitydatakids.org-Kirwan Institute Child Opportunity Index.

Milwaukee city limits, while the majority of white children live in the suburbs. To focus only on the central city portion of the metropolitan area would be to ignore large inequities that exist across the full metro.

In metro Albany (**Figure 3.4**), white children live in high- and very high-opportunity neighborhoods both within the city limits and in the suburbs. Black and Hispanic children are concentrated in very low-opportunity neighborhoods in the City of Albany as well as in the smaller cities of Troy and Schenectady to the northeast and northwest. As we will see later, both metro Milwaukee and metro Albany have a strong concentration of black children in very low-opportunity neighborhoods, but each metro displays different geographic distributions of both opportunity and of children.

Opportunity maps for the 100 largest metropolitan areas as well as a "how to" guide, technical documentation, and video tutorial are available at diversitydatakids.org.

B. Summarizing the maps

While exploring the COI maps allows us to visualize the geographic location of opportunity in relation to where children of different racial/ethnic groups live, it is also helpful to distill these patterns into summary measures of the magnitude of racial/ethnic (in)equity.

Through descriptive mapping, we are able to see patterns in the data in a descriptive, but not summative, way. For example, we can see how clustered or interspersed high-/low-opportunity neighborhoods are and how that relates to where children of different racial/ethnic groups live. This level of descriptive detail is very important to understand geographic patterns and to identify and understand children's contexts in different places across a metro area.

In combination with descriptive mapping, summary measures tell us "what it all adds up to". Summary measures can be used to calculate metrics like the share of Hispanic children, in a given metro, that live in very low-opportunity neighborhoods. In other words, summative measures allow us to summarize and distill the descriptive patterns into numbers. They are often used for the purposes of assessment, monitoring, benchmarking, and/or evaluation.

The following are two basic, equity-focused summary measures used in the analyses presented in the next section of this report:

- **Equity measure 1:** Proportion of children living in very low- (very high-) opportunity neighborhoods by race/ethnicity. For example, a figure of 40% for Hispanic children indicates that, within the metropolitan area, 40% of Hispanic children live in the 20% of neighborhoods with the lowest/(highest) child opportunity scores. This measure is available for all racial/ethnic groups.

- **Equity measure 2:** Ratio of the proportion of minority to white children living in very low- (very high-) opportunity neighborhoods. For example, a ratio of 2.6 for Hispanic children shows that, within the metropolitan area, the proportion of Hispanic children living in very low-opportunity/(very high-opportunity) neighborhoods is 2.6 times larger than the corresponding proportion of white children. This measure is not available for non-Hispanic white children because they are the reference, or comparison, group.

Equity Measure 1
Proportion of children in very low-opportunity (very high-opportunity) neighborhoods by race/ethnicity

While it is not appropriate to use the opportunity index to compare the absolute level of neighborhood opportunity between metropolitan areas, it is appropriate and useful to compare the extent of (in)equity in the distribution of children of different racial/ethnic groups by opportunity level between metropolitan areas. For example, one can compare or rank metropolitan areas according to the proportion of children of a given racial/ethnic group that live in very low-opportunity neighborhoods within their metropolitan area. A similar measure from the field of income inequality is the proportion of total income held by households in the bottom quintile of the income distribution (the poorest portion of the income distribution). While two metropolitan areas, for example, Boston and Milwaukee, may have very different absolute income levels (median household incomes of $71,878 and $53,618, respectively), this measure compares the extent of income inequality in the two metros. For example, in Boston, the poorest 20% of the income distribution holds only 2.8% of total income. In Milwaukee, the poorest 20% holds 3.3% of total income. In sum, while Boston is more affluent than Milwaukee, by this measure the two

metros have similar levels of income inequality. Likewise, we can compare two metro areas according to the proportion of children of a given racial/ethnic group that live in the lowest-opportunity neighborhoods within that metro area, which is a measure of equity in access to opportunity neighborhoods.

Census tracts, as defined by the Census Bureau, have similarly-sized populations, suggesting that, if children of all racial/ethnic groups were distributed uniformly across all neighborhood opportunity levels, we would expect each neighborhood opportunity level (quintile) to include about 20% of the children in any given racial/ethnic group. However, the COI shows that black and Hispanic children are concentrated in the lowest-opportunity neighborhoods at a level much higher than 20%. In metro Boston, for example, nearly 60% of black and Hispanic children live in very low-opportunity neighborhoods. Similarly, in the vast majority of metro areas, non-Hispanic white children are concentrated in the highest opportunity neighborhoods at a level higher than 20%. In metro Los Angeles, for example, 44.9% of non-Hispanic white children live in very high-opportunity neighborhoods.

Equity Measure 2

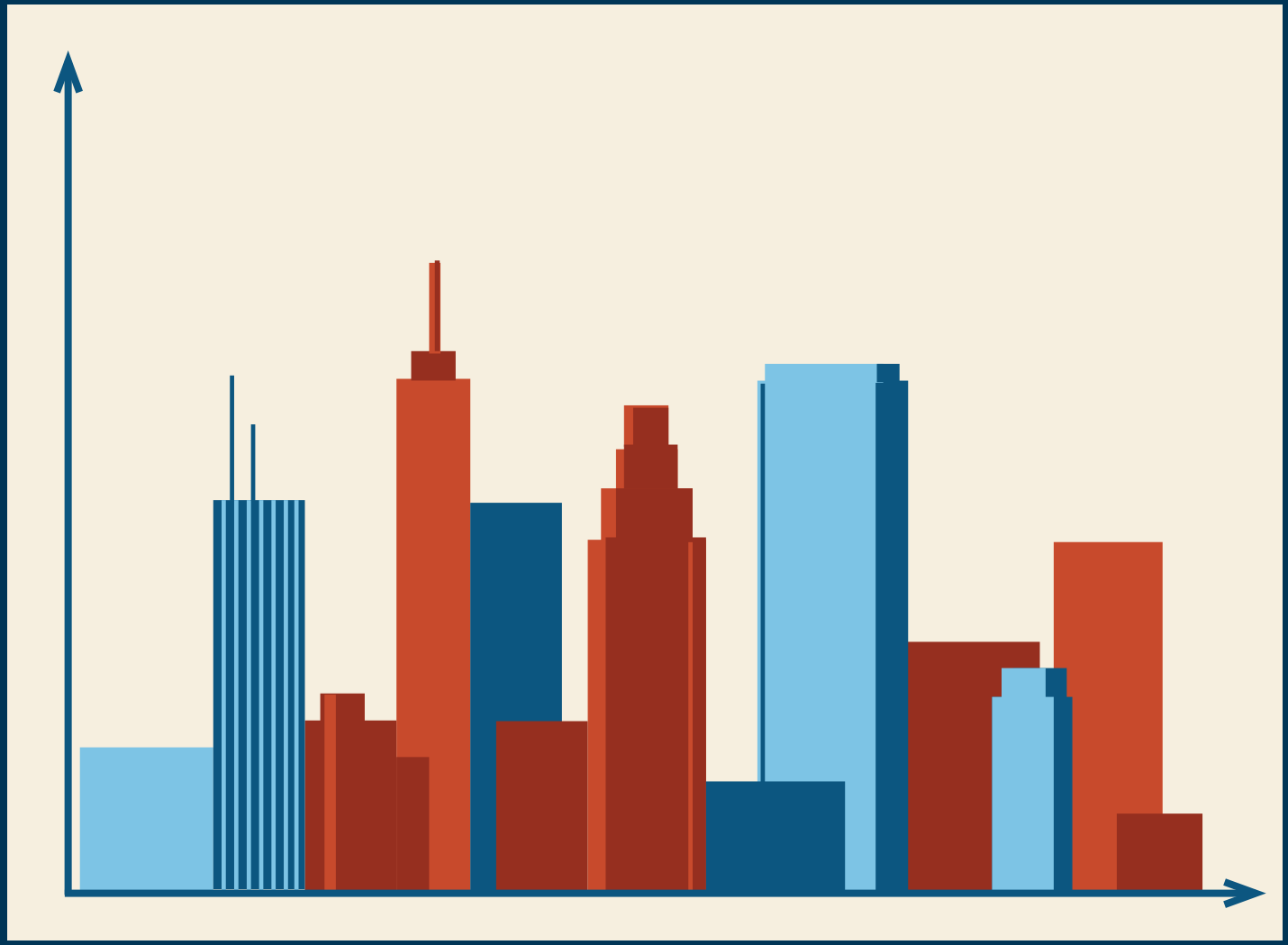
Ratio of the proportion of minority to white children living in very low- (very high-) opportunity neighborhoods.

We created this measure to compare relative neighborhood opportunity for children of different racial/ethnic groups. It compares the proportion of children in a specified minority group that live in very low-/very-high opportunity neighborhoods to the proportion of white children living in such neighborhoods. The measure is calculated as the ratio of the minority proportion to the white proportion. Separate ratios are calculated for each minority group. This measure tells us the extent of the inequity between minorities and whites in the concentration of children in a given neighborhood type (e.g. very low-opportunity). In metro Boston, for example, 58% of black children and 9% of white children live in very low-opportunity neighborhoods. Therefore, black children are 6.4 times more likely than white children to live in very low-opportunity neighborhoods. Moreover, 24% of white children live in very high-opportunity areas in Metro Boston. In contrast, just 7% of black children live in very high-opportunity areas, less than one third the rate at which white children live in such areas.

In this section we provided illustrations of Child Opportunity Index maps, explained how to interpret them, and described the types of analyses and conclusions that can be drawn from descriptive mapping of the COI data and from the use of equity-focused summary measures. In **Section 4** we compare the location of children (by race/ethnicity) with the location of neighborhood opportunity for children living in the 100 largest U.S. metro areas, utilizing the two equity-focused measures described above to summarize the degree and nature of racial/ethnic inequities in children's neighborhood contexts.

Section 4

Analysis



SECTION 4: ANALYSIS

In this section, we discuss the results of two analyses of the newly-developed COI. In the first analysis, we compare the location of children in different racial/ethnic groups to the location of neighborhood opportunity. Due to pervasive patterns of residential segregation, children of different racial/ethnic groups often live in separate neighborhoods within U.S. metros. Therefore, we ask:

Are children in each racial/ethnic group evenly spread across levels of neighborhood opportunity within their metro area such that they have an equal chance of living in a high- (or low-) opportunity neighborhood? (Analysis 1)

As will become evident, on average across the 100 largest U.S. metro areas there are large racial/ethnic inequities in the distribution of children across neighborhood opportunity levels (Analysis 1, Part 1). However, the nature and extent of inequities vary across metro areas (Analysis 1, Part 2). These results motivate a second analysis that asks:

Is the degree of inequity in child neighborhood opportunity greater in metros with higher levels of residential segregation? (Analysis 2)

A growing body of research suggests that racial/ethnic minority children who face high levels of neighborhood segregation experience adverse health and future economic outcomes. For example, high metro area segregation levels are associated with poor health outcomes for black children in their early years (e.g. premature births and low birthweight), with effects that can last into adulthood. Other studies find that blacks in more segregated areas have significantly worse education and employment outcomes than blacks in less segregated areas.[24] Recent research shows that segregation hinders a child's upward income mobility, defined as the degree to which a child achieves greater economic success than her parents.[25]

Although prior studies have identified the negative consequences of residential segregation, more research is needed to understand why and how segregation leads to worse outcomes for racial/ethnic minority children. One possibility (tested here using the COI) is that segregation leads to differences in neighborhood quality in ways that are important for healthy child development. Past studies have found that, in highly segregated metros, there is more racial/ethnic inequity in neighborhood socioeconomic conditions (typically neighborhood poverty).[11, 26]

To date, no research has examined the relationship between patterns of residential segregation and neighborhood quality, as measured by a broad range of factors important for child development. Analysis of the COI advances our understanding of why and how segregation matters for child development by establishing whether segregation results in isolation from neighborhood opportunity for racial/ethnic minority children.

Segregation may be positively correlated with some negative aspects of neighborhood opportunity. For example, higher levels of segregation may be associated with higher exposure to neighborhood poverty for black and Hispanic children. In contrast, some positive neighborhood resources relevant for children may be more prevalent in primarily minority and/or low-income neighborhoods. For example, by program design, community health centers and Head Start programs are more likely to be located in socioeconomically deprived areas. The literature on urban inequality has noted that poor neighborhoods may indeed be institutionally rich regarding social and health services that cater to low-income residents.[27, 28] Therefore, since neighborhoods have complex configurations of resources and stressors, rather than assuming that segregation is associated with lack (or presence) of neighborhood opportunity for children, it is important to examine

this question empirically using a multi-dimensional measure such as the Child Opportunity Index, which includes both neighborhood stressors and resources.

A. Analysis 1: COI equity analysis for the 100 largest U.S. metro areas

The COI equity analysis examines the presence of racial/ethnic inequities for children across levels of neighborhood opportunity. We start by examining patterns for all children in the 100 largest U.S. metro areas combined, and then explore how metro areas differ from one another.

Overall opportunity

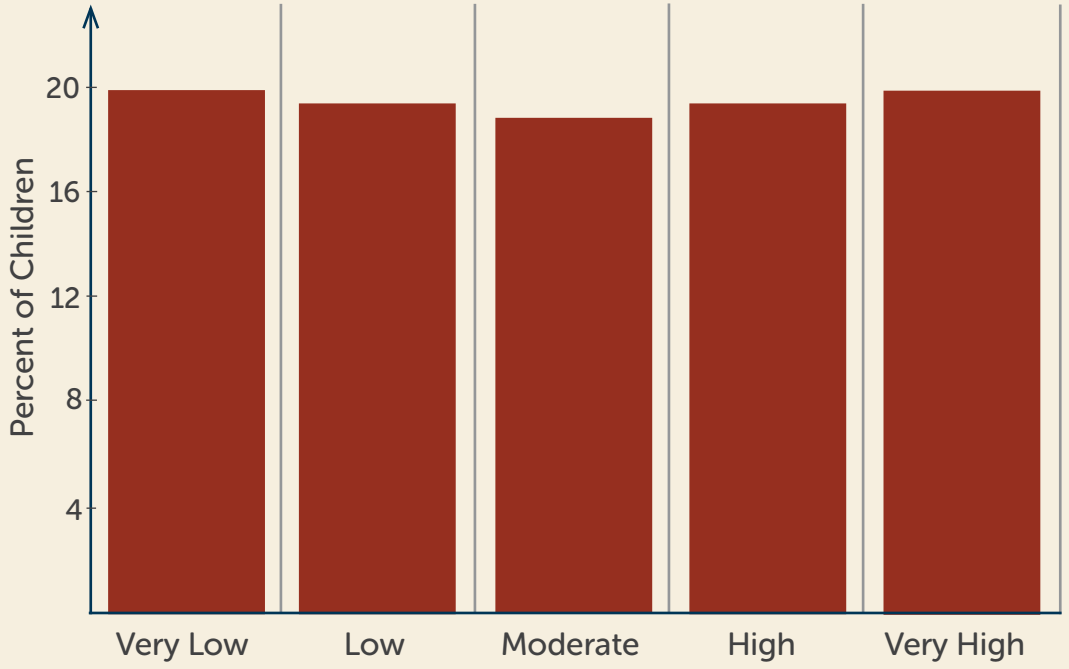
Equity exists when children of different racial/ethnic groups are equally likely to live in high- (or low-) opportunity neighborhoods within their metro area, allowing all communities and population groups across a region to benefit from those neighborhood resources that are conducive to healthy development. Let's walk through what the numbers *would* look like, in hypothetical terms, when racial/ethnic equity exists.

Figure 4.1 shows the distribution of all children in the 100 largest U.S. metros combined, across the five neighborhood opportunity levels.

Notice that roughly 20% of all children live in neighborhoods in each of the five opportunity levels, as we might expect, given that the levels are created by dividing neighborhoods in each metro into quintiles (i.e. five categories) and that census tracts have similar population sizes.

If racial/ethnic equity existed, children in each racial/ethnic group would be distributed uniformly across all neighborhood opportunity levels and we would expect each neighborhood opportunity level (quintile) to include about 20% of the children in any given racial/ethnic group. In this hypothetical scenario (**Figure 4.2**) the distribution graphs for each racial/ethnic group would look similar to that in **Figure 4.1** and would be roughly similar to one another.

Figure 4.1 Percent of children in each opportunity level for all racial/ethnic groups combined



Source for Figures 4.1 to 4.3: diversitydatakids.org-Kirwan Institute Child Opportunity Index.

Figure 4.2
Percent of children in each neighborhood opportunity level

HYPOTHETICAL distribution (assumes equity)

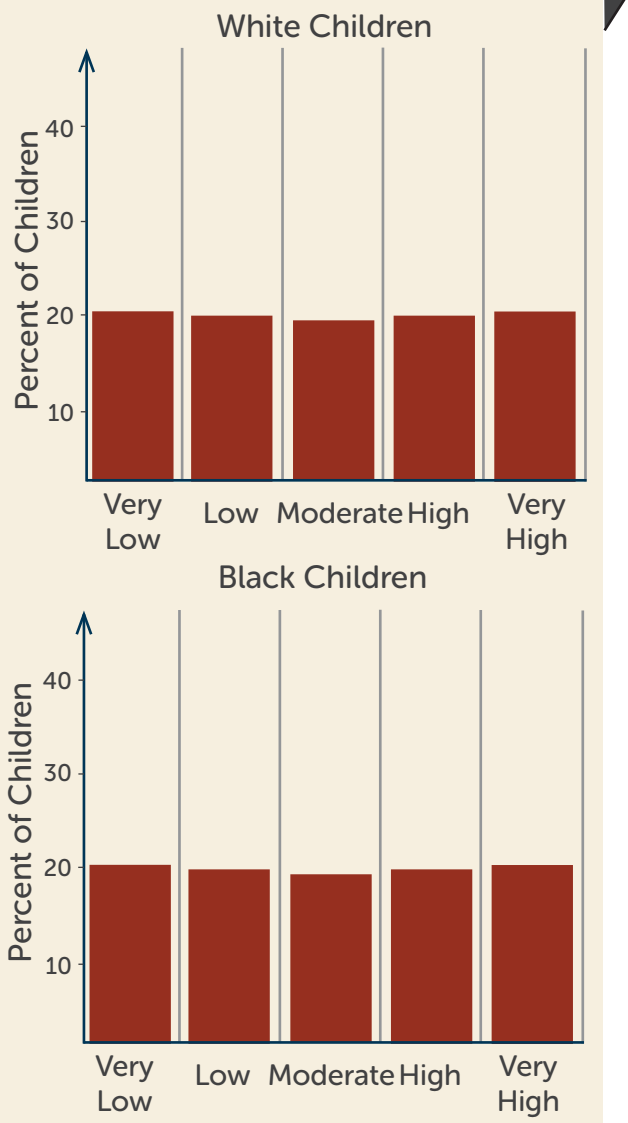


Figure 4.3
Percent of children in each neighborhood opportunity level across 100 largest US metros combined

ACTUAL distribution

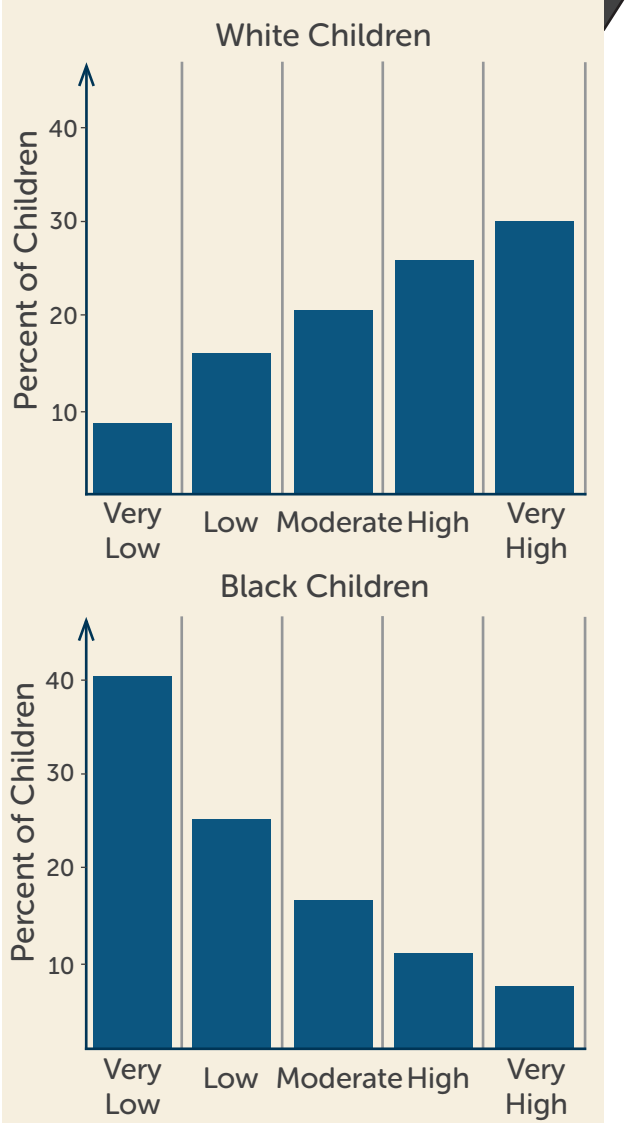
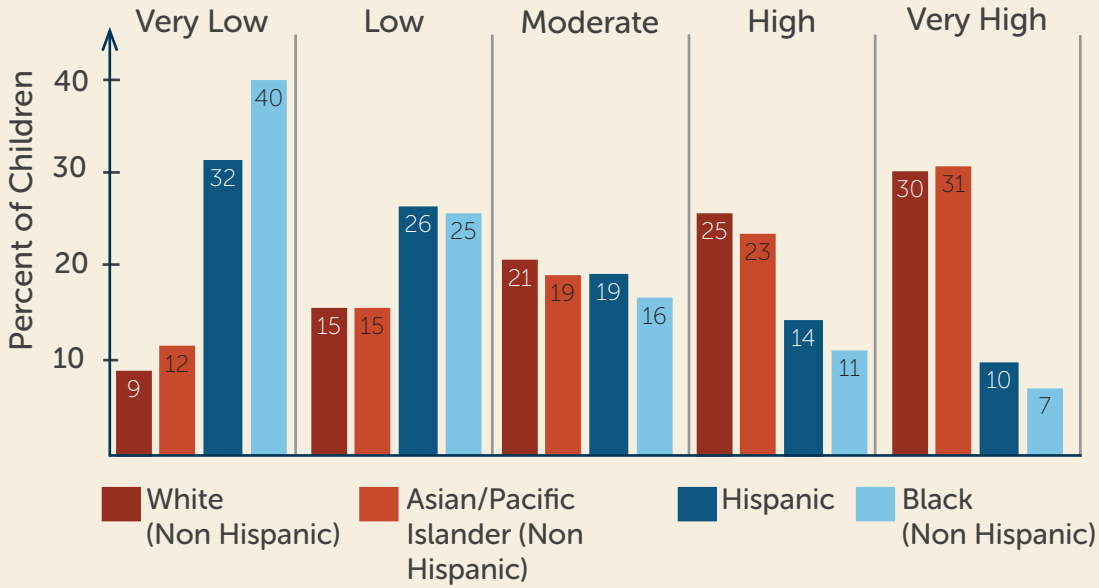


Figure 4.3 shows the actual distribution of non-Hispanic white and non-Hispanic black children across neighborhood opportunity levels for the 100 largest metropolitan areas combined. The figures for white and black children are almost mirror images, with large proportions of white children concentrated in higher-opportunity neighborhoods and large proportions of black children concentrated in lower-opportunity neighborhoods. For example, 40% of black children live in very low-opportunity neighborhoods—twice as much as the expected 20%—while only 9% of white children live in such neighborhoods—about half of the expected 20%. The actual distribution of children shown in **Figure 4.3** is starkly different from the equitable distribution shown in **Figure 4.2**, highlighting the nature and degree of the inequities between white and black children.

Figure 4.4 Percent of children across 100 largest metros in each neighborhood opportunity level by race/ethnicity



Source for Figures 4.4 to 4.6: diversitydatakids.org-Kirwan Institute Child Opportunity Index.

Figure 4.4 contains the full results of the analysis with children in all major racial/ethnic groups included. On average across the 100 largest metropolitan areas, there are significant racial/ethnic inequities in the distribution of children across levels of neighborhood opportunity. Small proportions of white (9%) and Asian (12%) children live in very low-opportunity neighborhoods within their metropolitan areas. Much larger proportions of Hispanic (32%) and black (40%) children live in very low-opportunity neighborhoods. In very high-opportunity neighborhoods the opposite is true: there are small proportions of black (7%) and Hispanic (10%) children but large proportions of white (30%) and Asian (31%) children.

In sum, black and Hispanic children are concentrated in neighborhoods with fewer resources conducive to healthy child development. In contrast, white and Asian children are concentrated in those neighborhoods with more resources.

By Opportunity Domain (Education, Health, Socioeconomic)

Multiple aspects of neighborhoods influence children, making multidimensionality a key virtue of the COI. For example, neighborhoods that have lower socioeconomic opportunity may have better access to certain types of resources and services. While the overall index is a useful measure of opportunity across different dimensions, further insights into neighborhood resources and equity (i.e., distributional issues) require individual examination of the three COI domains (educational, health and socioeconomic).

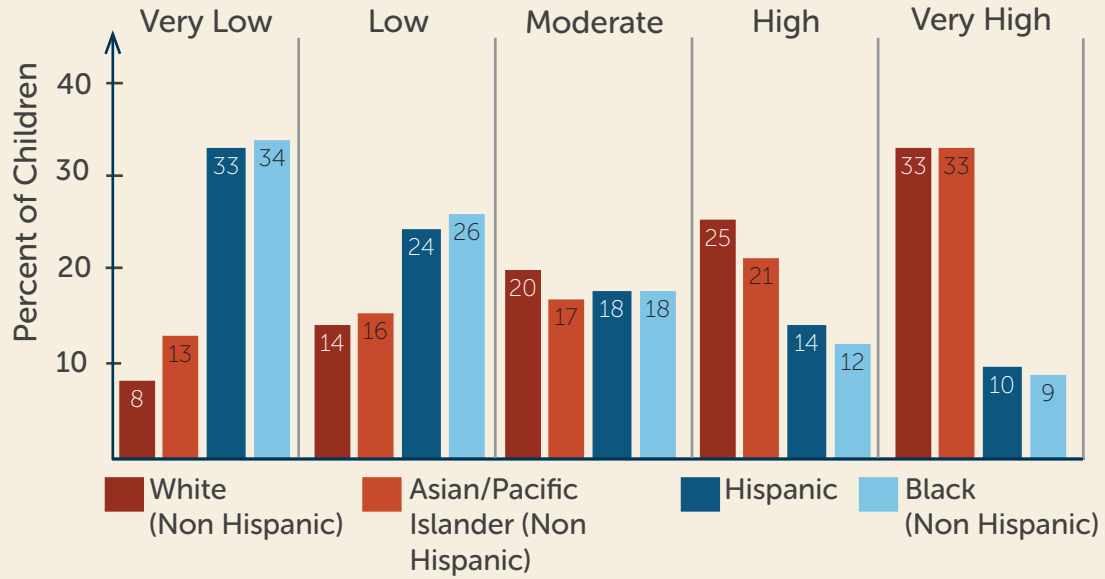
Therefore, in addition to considering equity in relation to the overall opportunity index, we examine the three domains separately. As shown in **Figure 4.5**, distribution of children across levels of socioeconomic and educational neighborhood opportunity is similar to distribution across levels of overall opportunity. However, the distribution across levels of health opportunity shows a different pattern. Black and Hispanic children are less concentrated in neighborhoods of very low health opportunity than they are in neighborhoods of very low socioeconomic opportunity and educational

opportunity.[i]

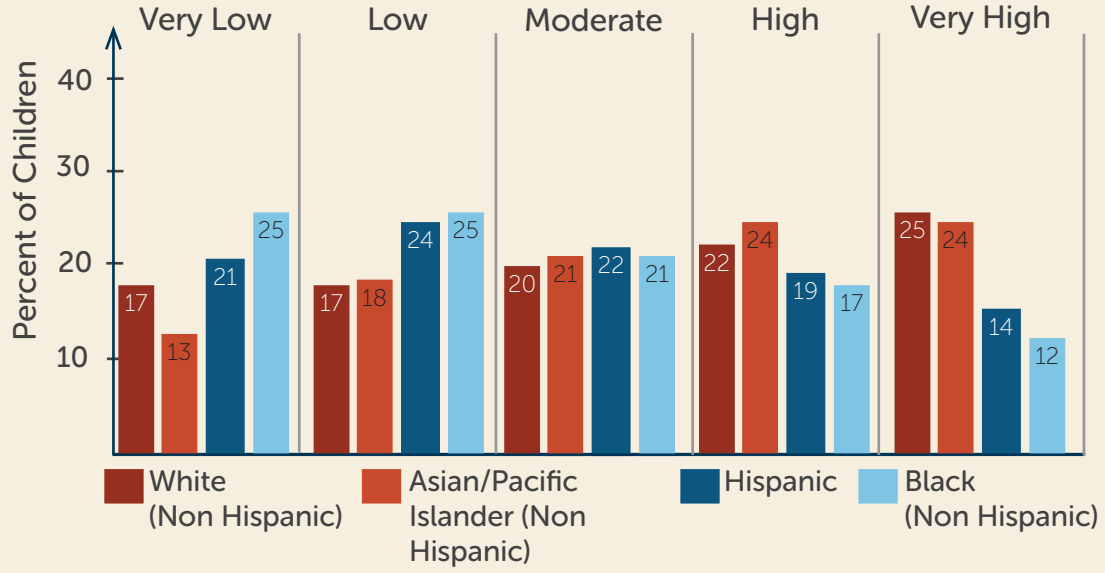
Diversitydatakids.org features an online charting tool which allows users to create bar charts like those pictured in this report and explore the distribution of children, by race/ethnicity, across opportunity levels in any of the 100 largest metro areas. In addition to specifying the metro area and racial/ethnic groups of interest, users can choose to examine either the overall COI or any of the three domains.

Figure 4.6 shows analysis results for a second equity measure—the minority/white ratio in the proportion of children living in very low-opportunity neighborhoods for the overall index and for each of the three domains (Equity Measure 2 as described earlier). In the socioeconomic domain, black and Hispanic children are about five times and three and a half times more concentrated (respectively) in very low-opportunity neighborhoods than

Figure 4.5
Percent in each neighborhood opportunity level
(a) Educational Opportunity



(b) Health and Environmental Opportunity



i. Our analysis indicates that the lower level of inequity for the health and environmental domain reflects the fact that health facilities are more likely to be located in relatively disadvantaged neighborhoods in the urban core and that lower-opportunity neighborhoods are also often in closer proximity to parks or open spaces. For example, in metro Boston, while just 4.2% of black children are in the best quintile of neighborhoods in terms of neighborhood poverty, 18.3% are in the best quintile in terms of proximity to health facilities and 26.9% are in the best quintile in terms of proximity to parks or open spaces. For metro Milwaukee, the percentages are 2.3%, 8.5%, and 23.4% respectively.

are white children (Asian children are slightly more concentrated than white children at a ratio of 1.4). The extent of this inequity is similar to that of the overall index discussed above, as is the inequity for the educational domain. In contrast, for the health domain, black and Hispanic children are only about 1.5 and 1.2 times more concentrated (respectively) in very low-opportunity neighborhoods than are white children.

In sum, we observe large proportions of racial/ethnic minority children (particularly black and Hispanic children) concentrated in very low-opportunity neighborhoods, and pronounced inequities between racial/ethnic minority and white children. These results hold true for the Overall Child Opportunity Index and for all three individual domains, although the inequities are less severe for the health domain.

Figure 4.5

Percent in each neighborhood opportunity level

(c) Social and Economic Opportunity

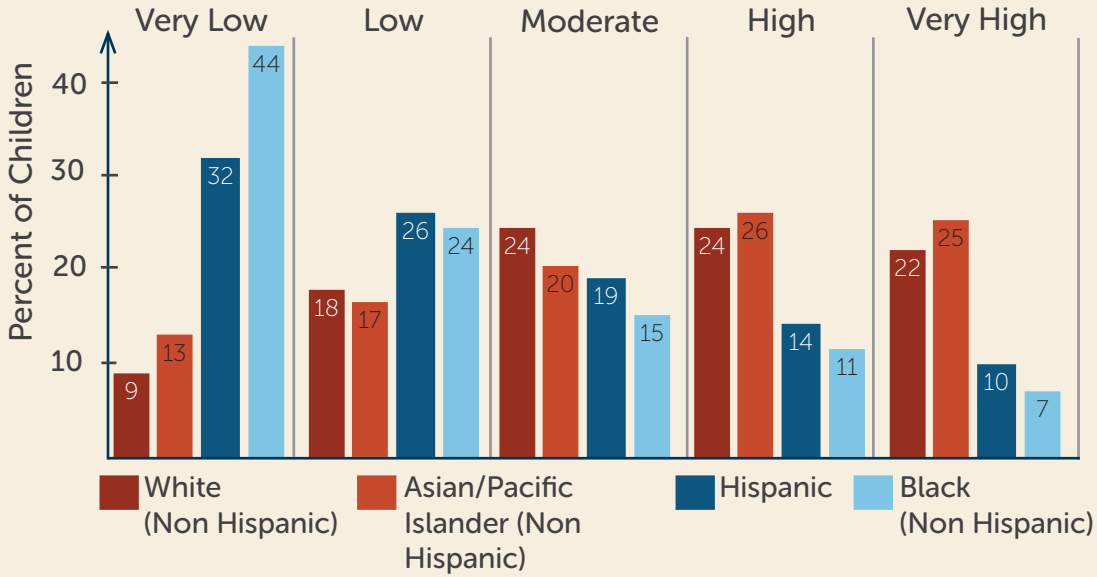


Figure 4.6

Minority/white ratio in proportion of children in very low neighborhood opportunity level

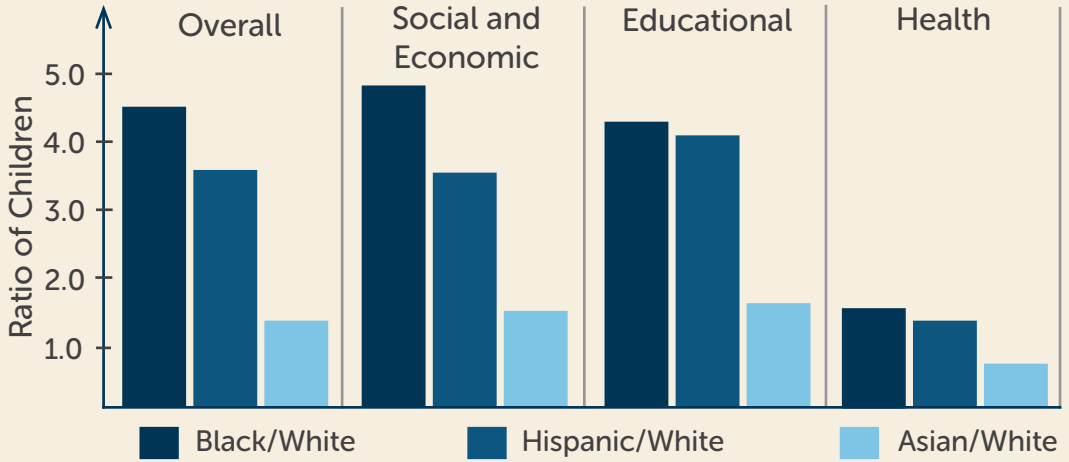


Table 4.1
Rankings of worst and best ten large metro areas by percent of children living in very low-opportunity neighborhoods within their metro area

White (Non-Hispanic) Children

Ten Worst Metro Areas	%	Ratio	Ten Best Metro Areas	%	Ratio
Honolulu, HI	23.0	N/A	Chicago, IL-IN-WI	2.0	N/A
North Port, FL	21.0	N/A	Milwaukee, WI	2.0	N/A
Cape Coral, FL	19.6	N/A	Jackson, MS	3.5	N/A
Provo, UT	18.6	N/A	Cleveland, OH	3.7	N/A
Palm Bay, FL	18.4	N/A	Detroit, MI	3.8	N/A
Knoxville, TN	17.5	N/A	Oxnard, CA	3.9	N/A
Lakeland, FL	17.5	N/A	Bridgeport, CT	4.2	N/A
Portland, OR-WA	16.5	N/A	Memphis, TN-MS-AR	4.2	N/A
Syracuse, NY	16.5	N/A	Los Angeles, CA	4.3	N/A
Madison, WI	16.3	N/A	New Haven, CT	4.5	N/A
Ten worst metro areas combined	**17.7**	N/A	**Ten best metro areas combined**	**3.3**	N/A

Black (Non-Hispanic) Children

Ten Worst Metro Areas	%	Ratio	Ten Best Metro Areas	%	Ratio
Albany, NY	60.3	5.8	McAllen, TX	7.6	0.6
Milwaukee, WI	60.0	30.0	Boise City, ID	9.2	0.8
Omaha, NE-IA	59.7	6.9	Modesto, CA	15.0	1.8
Springfield, MA	58.4	6.9	El Paso, TX	15.5	1.2
Youngstown, OH-PA	58.2	9.4	Albuquerque, NM	16.3	1.3
Boston, MA-NH	57.8	6.4	Ogden, UT	18.0	1.8
San Francisco, CA	57.5	8.1	Stockton, CA	18.3	3.7
Rochester, NY	57.4	9.9	Augusta, GA-SC	18.7	1.5
Dayton, OH	57.2	7.7	Provo, UT	18.9	1.0
North Port, FL	57.1	2.7	Oxnard, CA	19.3	4.9
Ten worst metro areas combined	**58.4**	**7.2**	**Ten best metro areas combined**	**17.9**	**1.6**

Metro area comparisons (rankings): Concentration in very low-opportunity neighborhoods

The first part of the analysis looked at average patterns for all children in the 100 largest U.S. metros combined. We now examine metro areas individually to understand how conditions may differ for children across the U.S.

For each racial/ethnic group, we ranked the 100 largest metropolitan areas according to the proportion of children living in very low-opportunity neighborhoods within the specified metro (Equity Measure 1). **Table 4.1** shows the ten "best" and the ten "worst" metropolitan areas in terms of the concentration of children in very low-opportunity neighborhoods by race/ethnicity.

Among the top ten worst areas for black and Hispanic children, the average proportion of children living in very low-opportunity neighborhoods is about 58% for black children and 51% for Hispanic children. In contrast, in the ten worst areas for white children the average proportion of children in very low-opportunity neighborhoods is 18%, and for Asian children it is 31%. If children were distributed evenly across opportunity levels, we would expect about 20% of children of any given group to live in very low-opportunity neighborhoods. These discrepancies show that, even in the worst metro areas for white chil-

Table 4.1, continued

Hispanic Children

Ten worst metro areas	%	Ratio	Ten best metro areas	%	Ratio
Boston, MA-NH	57.6	6.3	New Orleans, LA	9.9	1.7
Lancaster, PA	57.3	9.1	Baton Rouge, LA	10.3	2.2
Providence, RI-MA	56.4	5.9	Birmingham, AL	11.8	1.7
Allentown, PA-NJ	51.7	4.1	Jacksonville, FL	12.6	1.4
Springfield, MA	50.4	5.9	Columbia, SC	13.2	1.2
Denver, CO	50.0	6.3	Virginia Beach, VA-NC	13.5	1.8
North Port, FL	48.5	2.3	Memphis, TN-MS-AR	14.9	3.5
Scranton, PA	47.5	3.4	Baltimore, MD	15.7	3.1
Philadelphia, PA-NJ-DE-MD	47.4	8.9	Augusta, GA-SC	16.3	1.3
Omaha, NE-IA	46.9	5.4	Atlanta, GA	16.3	1.4
Ten worst metro areas combined	**51.4**	**6.1**	**Ten best meto areas combined**	**14.8**	**1.3**

Asian/Pacific Islander (Non-Hispanic) Children

Ten worst metro areas	%	Ratio	Ten best metro areas	%	Ratio
Minneapolis, MN-WI	39.9	4.8	McAllen, TX	0.9	0.1
Salt Lake City, UT	31.9	2.0	Chicago, IL-IN-WI	1.7	0.9
Sacramento, CA	30.3	2.6	Greenville, SC	2.0	0.2
Honolulu, HI	29.2	1.3	Toledo, OH	2.0	0.2
Syracuse, NY	27.7	1.7	Memphis, TN-MS-AR	2.1	0.5
Fresno, CA	26.5	4.6	Dayton, OH	2.3	0.3
Providence, RI-MA	26.2	2.7	Birmingham, AL	2.4	0.3
Buffalo, NY	26.2	3.3	Augusta, GA-SC	2.5	0.2
Milwaukee, WI	24.8	12.4	Jackson, MS	2.6	0.7
Des Moines, IA	23.2	2.1	Raleigh, NC	2.6	0.2
Ten worst metro areas combined	**31.0**	**3.2**	**Ten best metro areas combined**	**1.8**	**0.3**

Source: Analysis of the diversitydatakids.org-Kirwan Institute Child Opportunity Index.

Note: "Ratio" refers to the ratio of the proportion of minority children living in very low-opportunity neighborhoods to the proportion of white children living in very low-opportunity neighborhoods, within the specified metro.

dren, white children are slightly under-represented in very low-opportunity areas relative to what we would expect. In contrast, black and Hispanic children are over 2.5 times more concentrated in the lowest-opportunity neighborhoods than we would expect. The share of children from each racial/ethnic group living in neighborhoods of varying opportunity levels within their metro area can be viewed and ranked using the diversitydatakids.org Rankings Tool.

Table 4.1 also shows the ratio of the proportion of minority to white children living in very low-opportunity neighborhoods, within the specified metro (Equity Measure 2). For example, in metro Albany, NY, about 60% of black children live in very low-opportunity areas, 5.8 times the rate at which white children live in the metro's very low-opportunity areas. In comparison, 60% of black children in metro Milwaukee also live in very low-opportunity areas, but in Milwaukee that figure is 30 times the rate at which white children live in such areas. This reveals a much more unequal distribution of children by race across the opportunity spectrum than that found in metro Albany.

Metro area comparisons (rankings): Concentration in very high-opportunity neighborhoods

We conducted a similar analysis for children living in very high-opportunity neighborhoods, i.e. those neighborhoods with better conditions and resources for healthy development. This analysis shows that inequity in neighborhood opportunity happens at both ends of the neighborhood opportunity spectrum. Not only are black and Hispanic children much more concentrated in very low-opportunity neighborhoods than white and Asian children, but white and Asian children are also much more concentrated in very high-opportunity neighborhoods than black and Hispanic children.

Among the top ten best areas in the nation for black and Hispanic children, the average proportion of children living in very high-opportunity neighborhoods is 20% for black children and 22% for Hispanic children—roughly what we might expect given an even playing field. In contrast, in the top ten best areas for white children, the proportion of children in very high-opportunity neighborhoods is 38%, and for Asian children it is 59%. Again, if children were distributed evenly across opportunity levels we would expect about 20% of children of any given group to live in very high-opportunity neighborhoods. Therefore,

Table 4.2
Rankings of best and worst ten large metro areas by percent of children living in very high-opportunity neighborhoods within their metro area

White (Non-Hispanic) Children

Ten best metro areas	%	Ratio	Ten worst metro areas	%	Ratio
Los Angeles	44.9	N/A	Honolulu, HI	14.0	N/A
Memphis, TN-MS-AR	43.1	N/A	North Port, FL	16.8	N/A
McAllen, TX	43.0	N/A	Madison, WI	19.6	N/A
Stockton, CA	38.0	N/A	Portland, OR-WA	20.0	N/A
Houston, TX	37.5	N/A	Provo, UT	20.1	N/A
Miami, FL	37.4	N/A	Cape Coral, FL	20.3	N/A
Fresno, CA	37.2	N/A	Raleigh, NC	20.6	N/A
Richmond, VA	37.1	N/A	Seattle, WA	20.8	N/A
San Francisco, CA	36.8	N/A	Boise City, ID	21.4	N/A
New York, NY-NJ-PA	36.3	N/A	Greensboro, NC	21.6	N/A
Ten best metro areas combined	**38.3**	N/A	**Ten worst metro areas combined**	**20.2**	N/A

Black (Non-Hispanic) Children

Ten best metro areas	%	Ratio	Ten worst metro areas	%	Ratio
McAllen, TX	53.2	1.2	Milwaukee, WI	2.9	0.1
Provo, UT	24.2	1.2	North Port, FL	3.0	0.2
Modesto, CA	23.4	0.9	Philadelphia, PA-NJ-DE-MD	3.6	0.1
Ogden, UT	22.5	0.9	New Haven, CT	3.8	0.1
Boise City, ID	21.9	1.0	New Orleans, LA	3.9	0.1
Columbia, SC	21.3	0.6	New York, NY-NJ-PA	4.0	0.1
El Paso, TX	18.9	0.6	San Francisco, CA	4.1	0.1
Riverside, CA	18.1	0.5	Washington, DC-VA-MD-WV	4.5	0.1
Stockton, CA	17.8	0.5	Chicago, IL-IN-WI	4.6	0.1
Albuquerque, NM	16.8	0.6	Sacramento, CA	4.7	0.2
Ten best metro areas combined	**19.6**	**0.7**	**Ten worst metro areas combined**	**4.1**	**0.1**

even in the best metro areas for black and Hispanic children, they are only represented in very high-opportunity neighborhoods to about the extent we would expect given an even distribution of children across the five opportunity levels. On the other hand, white and Asian children are respectively about two to three times more concentrated in the highest-opportunity neighborhoods than we would expect given an even distribution.

Table 4.2 also shows the ratio of the proportion of minority to white children living in very high-opportunity neighborhoods within the specified metro. For example, in metro Pittsburgh, 27% of Hispanic children live in very high-opportunity areas, about the same rate at which white children live in such areas, yielding a ratio value of 1.0. In contrast, in metro San Jose, just 5% of Hispanic children live in very high-opportunity areas, only about 20% of the rate at which white children live in such areas.

In sum, we find that, on average, across the 100 largest U.S. metro areas, there are large racial/ethnic inequities in the distribution of children across levels of neighborhood opportunity and notable variation between metros in the size and nature of these inequities. As a first step in understanding why and how conditions vary between metros, we now turn

Table 4.2, continued

Hispanic Children

Ten best metro areas	%	Ratio	Ten worst metro areas	%	Ratio
Pittsburgh, PA	27.0	1.0	San Jose, CA	5.0	0.2
Akron, OH	25.6	0.9	New Haven, CT	5.1	0.2
Jacksonville, FL	24.8	0.8	Springfield, MA	5.4	0.2
Dayton, OH	23.4	0.9	Denver, CO	5.9	0.2
Virginia Beach, VA-NC	22.5	0.7	Los Angeles, CA	5.9	0.1
Baton Rouge, LA	22.2	0.7	Oxnard, CA	6.2	0.2
Youngstown, OH-PA	21.9	0.7	Providence, RI-MA	6.3	0.2
Augusta, GA-SC	21.9	0.7	Chicago, IL-IN-WI	6.3	0.2
Tampa, FL	21.4	0.8	Salt Lake City, UT	6.4	0.3
Jackson, MS	20.9	0.6	Scranton, PA	6.5	0.3
Ten best metro areas combined	**22.4**	**0.7**	**Ten worst meto areas combined**	**6.0**	**0.2**

Asian/Pacific Islander (Non-Hispanic) Children

Ten best metro areas	%	Ratio	Ten worst metro areas	%	Ratio
McAllen, TX	69.8	1.6	Salt Lake City, UT	13.2	0.6
Pittsburgh, PA	62.9	2.2	Sacramento, CA	14.9	0.5
Cincinnati, OH-KY-IN	60.3	2.1	Fresno, CA	15.9	0.4
Greenville, SC	60.2	2.2	Minneapolis, MN-WI	16.2	0.7
Augusta, GA-SC	59.2	1.8	Honolulu, HI	16.2	1.2
Youngstown, OH-PA	58.9	2.0	North Port, FL	16.9	1.0
Toledo, OH	58.9	1.9	San Francisco, CA	20.2	0.5
Richmond, VA	57.2	1.5	New Orleans, LA	20.6	0.6
Indianapolis, IN	56.6	1.6	Orlando, FL	22.1	0.8
Knoxville, TN	55.4	2.4	Seattle, WA	22.7	1.1
Ten best metro areas combined	**59.4**	**2.0**	**Ten worst metro areas combined**	**18.6**	**0.7**

Source: Analysis of the diversitydatakids.org-Kirwan Institute Child Opportunity Index.

Note: "Ratio" refers to the ratio of the proportion of minority children living in very high-opportunity neighborhoods to the proportion of white children living in very high-opportunity neighborhoods, within the specified metro.

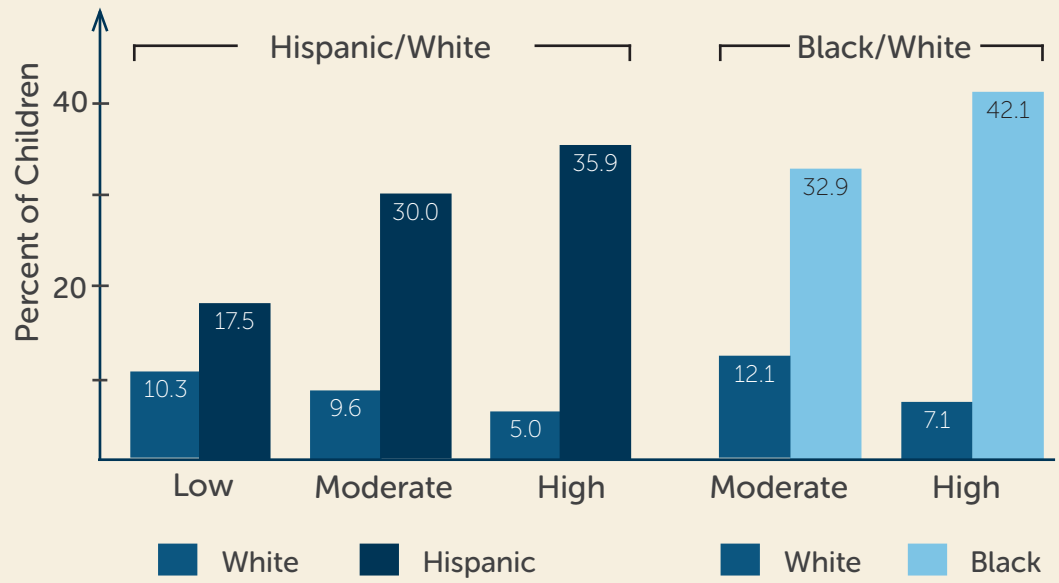
to an analysis that explores the relationship between the level of racial/ethnic residential (i.e. neighborhood) segregation in a metro and its level of inequity in child neighborhood opportunity.

B. Analysis 2: Residential segregation and inequity in child neighborhood opportunity

Having observed differences between metro areas in the nature and magnitude of inequities in child neighborhood opportunity, we ask: Is the level/degree of inequity in child neighborhood opportunity greater in metros with higher levels of residential segregation?

We categorize the 100 largest U.S. metropolitan areas according to their dissimilarity indices (the most commonly used measure of residential segregation), between 1) non-Hispanic white and Hispanic children and 2) non-Hispanic white and non-Hispanic black children. The dissimilarity index measures the evenness of two populations across a geographic area and ranges from 0 (no segregation) to 1 (absolute segregation). The dissimilarity statistic is interpreted as the proportion of one racial/ethnic group that would need to relocate to another neighborhood (census tract) in order for that racial group to be distributed across the metro area like the second (reference) racial group.

Figure 4.7 Percent of children living in very low-opportunity neighborhoods, by segregation level of metro area



Source: Analysis of the diversitydatakids.org-Kirwan Institute Child Opportunity Index.

Metropolitan segregation categories were defined as: (1) Low Segregation: dissimilarity index less than 0.3. (2) Moderate Segregation: dissimilarity index between 0.3 and 0.6, and (3) High Segregation: dissimilarity index above 0.6. The first set of bars in **Figure 4.7** compares the percent of all white children and all Hispanic children that live in very low-opportunity neighborhoods, for each of the three Hispanic/white metropolitan segregation categories.

The second set of bars compares the percent of all white children and all black children that live in very low-opportunity neighborhoods, for each of two black/white metropolitan segregation categories. For the black/white segregation comparison, three metropolitan areas (McAllen, TX, Ogden, UT, and Provo, UT) were excluded from the analysis because of unreliable estimates of dissimilarity. Thus, no metropolitan areas ranked as "Low Segregation," and data are only presented for metros of "Moderate" and "High" Segregation.

Although racial/ethnic inequities in the distribution of children across levels of neighborhood opportunity exist across all metropolitan areas, **Figure 4.7** shows that the level of inequity varies according to the degree of residential segregation in the metro. Higher levels of metro residential segregation correspond to more significant minority/white inequity in the concentration of children in very low-opportunity neighborhoods.

In low segregation areas, 10% of white children live in very low-opportunity neighborhoods compared to 18% of Hispanic children. Thus, the proportion of Hispanic children living in very low-opportunity neighborhoods is 1.8 times larger than the proportion of white children living in such neighborhoods. The inequity is larger in areas with moderate segregation (10% versus 30%; 3 times) and even larger in areas with high segregation (5% versus 36%; 7.2 times) (ANOVA significant at $p<0.000$). The same pattern is apparent when comparing distributions of black children and white children. In areas of moderate segregation, the proportion of black children living in very low-opportunity neighborhoods is 2.8 times larger than the proportion of white children living in such neighborhoods. In highly segregated areas, black children are 6 times more likely to live in very low-opportunity neighborhoods than are white children. Further, as segregation increases, the share of minority children in very low-opportunity neighborhoods increases, while the share of white children in very low-opportunity neighborhoods decreases, reflecting a greater separation of these groups into vastly different neighborhoods.

In this section, we summarized results from two analyses of the COI. First, we examined the relationship between the location of child-focused neighborhood opportunities and the location of children of different racial/ethnic groups. Across the 100 largest U.S. metros, we find that black and Hispanic children are disproportionately highly concentrated in very low-opportunity neighborhoods. We also observe systematic and pervasive inequities in neighborhood opportunity between black and Hispanic children, on the one hand, and their white and Asian counterparts. Second, we explored whether there is a relationship between the degree of residential (i.e. neighborhood) segregation and the degree of inequity in neighborhood opportunities for children. We find that racial/ethnic inequities in neighborhood opportunities are larger in metro areas with higher levels of segregation. We therefore concluded that, in addition to isolating black and Hispanic children from white children, residential segregation is also isolating black and Hispanic children from opportunities for healthy development.

Section 5

Applications of the Child Opportunity Index

SECTION 5: APPLICATIONS OF THE CHILD OPPORTUNITY INDEX

The Child Opportunity Index is a readily available data tool that can be integrated into policy and interventions to guide purposeful focus on improving children's neighborhood environments. Given the inequities highlighted through the analyses in **Section 4**, attention to reversing these patterns is critical.

The analyses of the Child Opportunity Index presented in this report show that the high concentration of black and Hispanic children in the lowest child opportunity neighborhoods is pervasive across metropolitan areas. The results also suggest that isolation from opportunity is an additional negative consequence of residential segregation for black and Hispanic children. These findings are consistent with prior research indicating that racial/ethnic inequities in the quality of neighborhood environment are so staggering that they constitute a "difference of kind, not degree."[29] Neighborhood conditions and resources shape a child's opportunities to learn, develop and thrive. Place is such a strong marker of opportunity that in a 2014 book, a legal scholar argued that growing up in low-opportunity neighborhoods should be considered in the college admissions process in lieu of race, now that race-based affirmative action no longer appears viable.[30] However, child development experts would argue that college entry is too late a point of intervention to rectify children's exposure to challenging neighborhood environments.

There are many potential applications of the Child Opportunity Index for localities. These include equity analysis, identification of low-opportunity neighborhoods for economic revitalization and child-focused investments, and guidance for regional strategies to promote more equitable access to neighborhoods with already high levels of opportunity. Below we discuss some possible applications, and note uses of the Child Opportunity Index that would not be appropriate.

To guide conversations about equity in a region

One important use of the COI is to start or guide conversations about the extent of inequities in children's neighborhood context. The COI provides rigorous data as well as compelling visual representations (maps and charts) about the spatial distribution of neighborhood opportunity in a given area. The comprehensive representation of the region made possible with the COI enables a shared understanding of current conditions across multiple stakeholders in a community, and provides a foundation for discussions of priorities and opportunities for action. In its absence, communities and policymakers at best have a potentially contested sense of patterns of segregation and the scarcity of resources across neighborhoods.

Good Shepherd Services, a multi-service agency that works annually with nearly 30,000 youth and families through over 80 programs in under-resourced New York City neighborhoods, used the Child Opportunity Index to create a report entitled "Expanding the Geography of Opportunity in New York City." Good Shepherd used the index to show that in the Brooklyn and Bronx neighborhoods where their programs are concentrated, children, youth and families are disconnected from resources and opportunities available in other neighborhoods. Through a network of strategically located youth and family development and educational programs, Good Shepherd is trying to address these inequities. Their report

> "We appreciate the Child Opportunity Index because it allows us to frame our work in terms of structural issues of equity and to highlight the importance of developmentally-informed interventions."
>
> -- Good Shepherd Services, New York City

featuring the COI has been shared with policymakers, funders and stakeholders.

To identify fair housing challenges

The COI can aid localities' uses of federal funds towards addressing discrimination and toppling barriers to opportunity for all their residents. Specifically, the COI can directly contribute to local analysis of the impediments to fair housing in a region. The COI provides local data on families with children and racial/ethnic minority families—two protected classes under federal law.

As discussed in **Section 1**, neighborhood supports, resources, and stressors form the locally-based "ecosystem" in which children develop (i.e. where children receive child care and early education, go to school, play and form peer networks). Therefore, a rigorous assessment of fair housing from the perspectives of families with children and racial/ethnic equity should ask jurisdictions to determine: (1) the extent to which sufficient neighborhood-based opportunities for healthy child development are present in the places where children live, and (2) the degree of (in)equity in the distribution of those opportunities across racial/ethnic groups. In its new rule to help local jurisdictions assess and promote fair housing opportunities, the Department of Housing and Urban Development (HUD) is asking that jurisdictions use data to assess not only patterns of segregation but also the spatial distribution of community assets and adverse factors.[31] HUD will provide local-level data and maps covering a range of neighborhood assets and stressors and the location of children by race/ethnicity. Jurisdictions can utilize the Child Opportunity Index to enhance and improve their fair housing analyses, adding important child-specific information and insight not available in the HUD-provided data.

Beyond identifying the local impediments to fair housing, the COI can be used in initiatives to correct segregated housing patterns. For example, the index or its components can serve as a guide in housing search counseling programs or housing desegregation programs that aim to facilitate families' moves to higher-opportunity neighborhoods. Precedent for fair housing applications of opportunity indices exists in the use of Kirwan Institute developed indices in specific geographic areas. A major desegregation court ruling in Baltimore found that HUD had violated the Fair Housing Act by unfairly concentrating African-American public housing residents in the poorest, most segregated areas of the City. The local response has included the provision of housing search counseling and support for families to be able to move to higher opportunity neighborhoods within the region. Additionally, some housing authorities are already using neighbor-

hood opportunity as a framework for their housing mobility programs. For instance, the Chicago Housing Authority defines opportunity as a neighborhood (census tract) with a poverty rate lower than 20% and a low concentration of subsidized housing, and it provides benefits such as counseling and financial incentives to mobility program participants who move to opportunity areas.[32] Generally, the focus in these housing authority opportunity frameworks is not on markers of child neighborhood opportunity—or resources or conditions that matter for health child development, such as quality early childhood education and schools. Therefore, such local efforts would be strengthened by the child-focused neighborhood data available in the COI.

The concept of neighborhood opportunity is also increasingly recognized and operationalized in the development of housing for low-income families, including codification for use in some state Low Income Housing Tax Credit (LIHTC) Qualified Allocation Plans (e.g., Massachusetts, Texas and Louisiana).[33] For example, in Massachusetts, the Department of Housing and Community Development reviews proposals for low-income housing developments based on a scoring system. Of 182 possible points for housing development proposals, 14 points are allocated based on whether the development will be located in a high-opportunity neighborhood. The definition of opportunity is multifaceted; it includes, for example, the poverty rate, the strength of the public school system, access to employment, access to higher education, and access to health care.[34] New research suggests that states that provide incentives towards location of housing developments in higher opportunity areas show increases in the share of tax credits allocated for projects in low-poverty areas.[33]

In sum, there are already applications of opportunity indices in the fields of housing and community development in state and federal programs, which can be expanded to include more specifically child-focused neighborhood opportunity, when appropriate.

To target and design place-based interventions

The COI and its underlying indicators can also be used to target neighborhoods for community investments. For example, a low educational opportunity neighborhood with limited availability of early childhood education centers could be prioritized as a site for Head Start. Also, high-opportunity neighborhoods may lack affordable housing; therefore, they could become sites for new affordable housing with unit sizes appropriate for families with children (e.g., two or three bedroom apartments). Relatedly, COI data can be used to incentivize health elements in local zoning and planning requirements, thereby aiding localities' articulation of goals and the selection of indicators for tracking conditions over time. Community development is often conceptualized as revitalization or economic development of highly disadvantaged neighborhoods. However, in relation to families with children, a more helpful framework is matching the location of children to the availability of opportunities for healthy development. This can include both improving resources for children in

> "I see the index as starting to give us a common language for thinking about how we improve child health and well-being. One of the things that's essential for us in having different types of organizations and groups collaborating around a common goal is having a way to measure progress and identify challenges to be addressed. So we're just touching the tip of the iceberg for the potential the COI has in helping us not only making improvements for child health locally in Boston, but in supporting other communities around the country to make similar improvements."
>
> -- Renee Boynton-Jarrett, MD, Boston Medical Center, and Founder of Vital Village Network, Boston, MA

"We're already seeing associations between child opportunity and several health measures related to children, like obesity and teen birth rate. Our goal is to use the COI as a platform through which we can suggest place-based interventions where they're needed most. We want to take the COI and use it as a baseline for city-wide development of resources and intervention programs."

-- Nik Prachand, Epidemiologist, Chicago Department of Public Health, Healthy Chicago 2.0, Chicago, IL

"The Child Opportunity Index is a great tool. I am sure it will result in better decisions when tackling the issue of inequity and inequality. The website is also nicely laid out and easy to navigate."

-- Joe Baldwin, Planning Section Manager, Planning & Contracts Services, Human Services Department, Pinellas County, FL

low-opportunity neighborhoods, as well as facilitating the (re)location of families with children to high-opportunity areas.

To understand the association between neighborhood resources and child outcomes

While cross-sector efforts targeting the social determinants of health are increasing, empirical evidence of the health impacts of community development is sorely limited. This evidence can further a field-level commitment to such investments as well as local efforts to attack the social determinants of health and health inequity. The COI provides a tremendous resource for advancing this understanding. The COI can be merged with other data about child outcomes and neighborhood conditions/resources for a given area in order to better understand geographic patterns of child health and wellbeing in relation to neighborhood opportunity. For example, users can add to the COI individual level or aggregate data on child health, educational or other outcomes, as well as additional neighborhood data such as location of services for children and families.

For example, researchers with the Vital Village Network at Boston Medical Center are combining pediatric patient medical records and neighborhood-level crime data with the Child Opportunity Index for Boston. Their goal is to understand the association between child health indicators of obesity, hypertension, and asthma and neighborhood opportunity and violent crime prevalence. The Chicago Department of Public Health has also begun to use the Child Opportunity Index as part of Healthy Chicago 2.0, a five-year priority plan for health in the City of Chicago. In consultation with diversitydatakids.org researchers, the Healthy Chicago 2.0 team has developed a City of Chicago Child Opportunity Index map and is examining the association between teen birth rates, non-fatal shootings and blood lead levels in children and the COI. The Juvenile Welfare Board of Pinellas County, Florida, and the University of South Florida are collaborating on a cross-site demonstration project for the National Neighborhood Indicators Partnership, led by the Urban Institute and funded by the Annie E. Casey Foundation. They have worked with researchers at diversitydatakids.org to use the Child Opportunity Index data for Pinellas County to explore the relative contributions of neighborhood, school, and child/family factors on student absenteeism. This project hopes to demonstrate the utility of integrated data systems to look at how factors in these domains impact absenteeism, both total and chronic, and thus academic performance.

The above examples show that the COI can become part of data systems to monitor child outcomes and their association with neighborhood environment. Increasingly government

agencies and other organizations serving children recognize that data on children's neighborhoods should be integrated into both surveillance of child outcomes and decisionmaking about the location of services and resources for children and families.

To help meet community data reporting requirements under federal and state laws

The Child Opportunity Index can also be used to help meet the various data reporting requirements on community needs that are mandated under different laws. For example, the Affordable Care Act creates an opportunity for hospital organizations and governmental public health agencies to improve community health by conducting community health needs assessments and adopting related implementation strategies that address priority health needs. The local data available through the COI are not only immediately relevant to this comprehensive assessment, but the COI maps and interactive resources can aid hospitals' coordination with members of their community in the development of their assessment and implementation strategies. Similar data reporting requirements exist for financial organizations under the Community Reinvestment Act. As part of the "performance context" information that financial organizations are required to provide, they must document the needs of the community they serve. The COI as well as the variables that underlie the index can be a valuable data component in these needs assessments.

Limitations and potential modifications of the COI for policy applications

The COI is a valuable tool for a wide variety of policy applications, as described above, but it also has certain inherent limitations. Awareness of such limitations will allow users to make informed and conscious decisions when using or modifying the COI in their own specific contexts.

Because the COI aggregates information on 19 indicators, it should not be used to make decisions about resource allocation without additional information. Instead, it would be important to look at the different components of the index separately, depending on the specific aspects of child health and development that a policy or program is trying to address. For example, if a program is trying to improve the availability of early childhood education, the COI indicator on proximity to quality early childhood may be more appropriately used than the overall index. On diversitydatakids.org, users can examine and separately map the indices for each of the three domains: educational, health, and socioeconomic opportunity. Users

may also download the z-scores for each indicator in the index for all neighborhoods in their metro area in order to see how any particular neighborhood ranks according to a particular indicator.

In some cases, the index can better help guide resource allocation or programmatic decisions if supplemented with additional local data. For example, the COI indicator on availability of healthy food outlets can be supplemented with data on food stamp utilization and food retail stores to guide programs trying to improve the neighborhood supply of healthy food for low-income families. Data on crime or exposure to neighborhood violence, if available at the local level, may be particularly valuable additions to the index. Also, depending on their priorities, users may want to re-weight the components of the index to increase/decrease the importance of certain variables. As currently constructed, each of the component variables in each of the three domains is given an equal weight, and then each of the three domains is given an equal weight in constructing the final overall index. But, for example, users predominantly but not exclusively interested in education may want to increase the weight of the education domain index, customizing the overall index more precisely for their analytical and policy needs.

Relying solely on the quantitative data used in the COI maps is not enough to make investment decisions. It is important that the data be used in addition to qualitative information from stakeholders, experts in a given topic (i.e., education, public health), and community members who experience the conditions that the maps are portraying.

Lastly, the COI is purposefully an index of child opportunity, focusing on the specific neighborhood resources and stressors that affect child well-being. Many of these neighborhood characteristics may affect other demographic groups (for instance, elders) in similar ways in which they affect children. However, in some cases, different groups may have different needs—for example elders' well-being would arguably be more affected by the proximity to senior centers or certain transportation options than to early childhood centers. Therefore drawing conclusions from the COI about non-child populations should be done with caution.

Conclusion

CONCLUSION

While the U.S. child population grows increasingly diverse, evidence continues to mount about the persistence of racial/ethnic disparities in child health and wellbeing. Policymakers are, in turn, increasingly focused on understanding the causes and drivers of disparities in child health. Neighborhoods have been identified as one potential driver of disparities. Research shows that neighborhoods have a direct influence on child health and wellbeing, and at the same time, children across the U.S. have been shown to live in racially segregated neighborhoods, making inequities in neighborhood environments a likely important contributing factor to disparities in child outcomes.

However, while the research base grows and policies increasingly consider the importance of neighborhoods for child health, policymakers and stakeholders have lacked rich, systematic, neighborhood-level data that paint a detailed picture of children's neighborhood environments and how those environments vary for children of different racial/ethnic and socioeconomic groups. The Child Opportunity Index was developed to move us one step closer to painting this detailed picture. It was designed to move beyond neighborhood socioeconomic variables to also include measures of specific educational and health and environmental resources and conditions that are important for child health. The COI aims to support equity analyses that help us understand, on both a local and a U.S. population level, the extent of racial/ethnic inequities in children's neighborhood opportunities for healthy development.

Before the release of the COI and its related interactive web-based mapping and analysis tools, policymakers were forced to compile (often limited) available data from disparate and often inconsistent sources. Now, in the COI, policymakers have a comprehensive, interactive information system with rich data on children's neighborhood environments and all of the necessary data points and tools to perform local- or nationally-focused analyses. The COI serves as a timely, powerful resource as local and federal policymakers and stakeholders—such as local housing agencies conducting fair housing assessments, or pediatricians looking to integrate local contextual data into their practice—increasingly seek to utilize child-focused, neighborhood-level data to help improve the lives of all children while addressing inequities.

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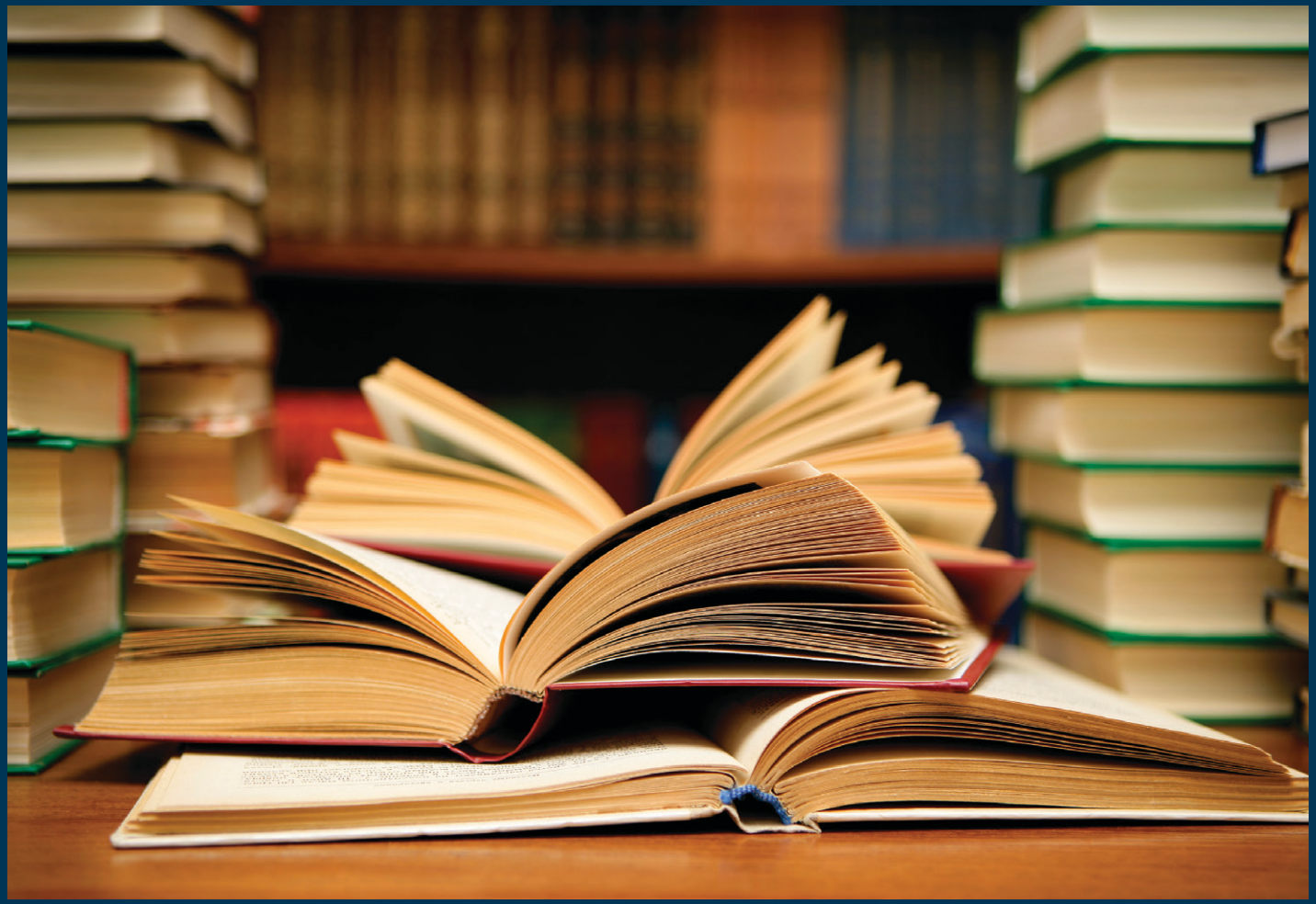

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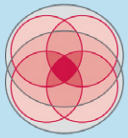

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