Research Brief

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Child TRENDS

Neighborhood Characteristics and Children's Physical Activity

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OVERVIEW

Regular exercise is important for both physical and mental well-being.[i] For adolescents, regular physical activity helps to build and maintain healthy muscles and bones, controls weight, and has positive psychological benefits.[ii] Exercise also improves long-term health, by decreasing the risk of developing diabetes, heart disease, and hypertension in adulthood.[iii] Moreover, young people who are active tend to remain active and physically fit as adults. The U.S. Department of Health and Human Services recommends a level of physical activity that increases heart rate and causes heavy breathing at least some of the time, for a total of 60 minutes a day, at least five days a week.[iv]

In this report, we examine the relationship between physical exercise and neighborhood characteristics among children and youth, using data from the 2011-2012 National Survey of Children's Health (NSCH).

We begin by examining, in each state, the average number of days children ages 6 to 17 exercised in the past week. We also look at the frequency within each state of selected neighborhood characteristics: whether the child's neighborhood included a playground or recreation center, whether it had dilapidated housing, and whether parents felt their child was "usually" or "always" safe there. We then examine which of these characteristics were associated with a higher average number of days of exercise, when other factors affecting exercise frequency are taken into account.

KEY FINDINGS

- Parents in the United States reported that children and youth got an average of 4.4 days of moderate exercise in the past week. Thirty-five percent reported that the child exercised more than five days; nine percent reported that they exercised on no days.
- Children in New York State and the District of Columbia exercised less, on average, than the national average. In 15 states—predominantly rural—children exercised more than the national average.
- Where parents reported that children lived in a neighborhood with a recreation center, they also reported more days of exercise. Surprisingly, dilapidated housing in the neighborhood was also associated with more frequent exercise.

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- Although the (parent-reported) safety of the child's neighborhood was related to exercise frequency, the direction of the effect depended on whether the neighborhood was in a metropolitan or nonmetropolitan area. Specifically, children in safe metro areas were more *likely* to exercise frequently, whereas children in safe non-metro areas were less likely to exercise frequently.
- States' rankings on overall exercise frequency were more highly correlated with the safety measure than they were with the other neighborhood features.

BACKGROUND

The places that children grow up can have profound effects on their mental and physical well-being. The effects of home and school environments are heavily studied, but the surrounding community can also be quite important. Children and youth need safe and healthy places to play and socialize outside of school: playgrounds, sports fields, public pools or beaches, and even shopping districts and malls. One healthful thing that children often do in their communities is exercise. For both children and adults, adequate exercise is an important determinant of health. We would expect that having access to safe places to play would increase the amount that children exercise. However, the connection between the physical environment and children's exercise is incompletely understood.

Neighborhood features such as walkability, safety, and the presence of appropriate places to play may increase the likelihood that children and youth will exercise. However, such characteristics can be difficult to quantify. Qualitative studies suggest that children get most of their exercise in parks and playgrounds.[v] According to one review, studies using self- or parent-reported measures found that proximity to parks and recreation centers slightly increased exercise, but studies using accelerometers[1] to directly measure exercise did not find the same connection. Accelerometer measurements, on the other hand, may under-report certain types of exercise more common at parks and recreation centers, such as swimming and riding bikes.[vi]

The walkability of neighborhoods has been consistently linked to more exercise, for both adults and teens. Measures of walkability can incorporate numerous features, such as the presence of sidewalks and crosswalks, proximity of grocery stores and other shops carrying commonly-used items, traffic speed, and overall density of buildings in the neighborhood.[vii] The presence of broken windows and other signs of urban decay within the neighborhood have also been associated with less exercise.[viii] The effects of urban decay, at least for younger children, may be mediated by their *parents'* perception of the safety of the neighborhood.[ix]

Several of these neighborhood traits are assessed by the National Survey of Children's Health (NSCH). The NSCH is a household-based survey where a parent (or other knowledgeable adult) reports about a child in their household. In addition to information about the child, the survey also asks about the child's family and the neighborhood they live in. The data are representative of children younger than 18, and produce valid estimates for the nation, as well as for all 50 states and the District of Columbia.

The 2011-12 NSCH included questions on the presence, in the respondent's neighborhood, of sidewalks or walking paths, parks or playgrounds, and recreation or community centers. Parents were also asked whether there was garbage on the street or sidewalks, rundown housing, or vandalism such as broken windows or graffiti. In addition, parents were asked how often they felt that their child was safe in the community. (See Data and Variables box for specific question wording.)

1 Accelerometers are devices that measure motion. They can be used to measure the number of steps taken (pedometer) or otherwise physically measure activity.

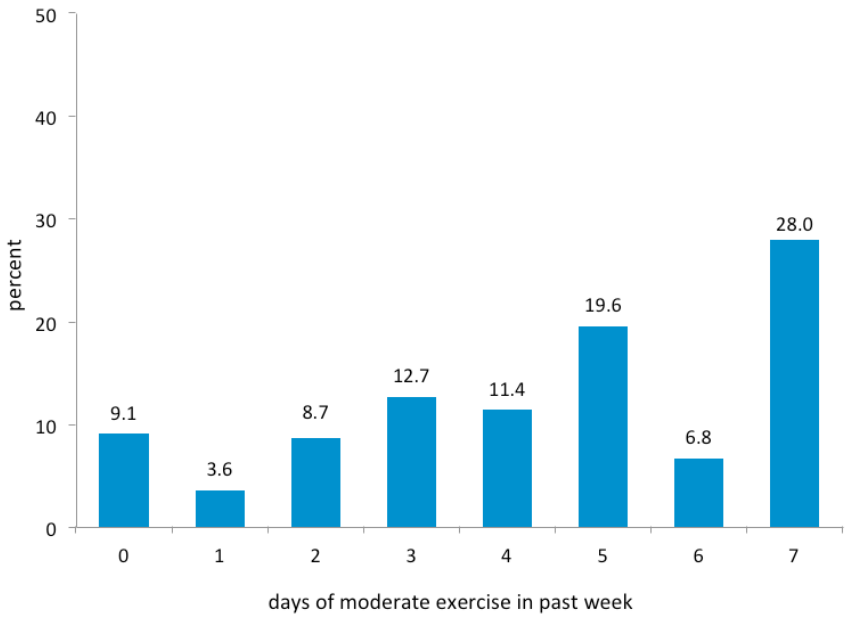
FINDINGS

FREQUENCY OF EXERCISE

Parents were asked for the number of days during the past week that their child had participated in moderate exercise for at least 20 minutes. (See Data and Variables box for specific question wording)

In 2011-2012, U.S. children exercised 4.4 days, on average, in the past week. The average was slightly higher among younger children (ages six to 11) than older ones (ages 12 to 17): 4.8, compared with 4.0 days, respectively. Overall, 35 percent of children and youth exercised on more than five days in the past week, and nine percent did not participate in moderate exercise on any day.

Figure 1. Number of days of exercise in the past week among children ages six to 17, 2011-2012



Across states, the average number of weekly exercise days ranged from 4.0 to 4.8. By way of comparison, a national analysis by race/ethnicity shows a similar range: from 3.8 (among Hispanics) to 4.6 days per week (among non-Hispanic whites). Averages for two jurisdictions—New York and the District of Columbia—were significantly lower than the national figure. In 15 states, averages were significantly higher. (See Table 1)

Across states, younger children were generally more likely to exercise than older children. Among children ages six to 11, the average weekly exercise ranged from 4.3 to 5.3 days, and among children ages 12 to 17, the average weekly exercise ranged from 3.7 to 4.5 days. (See Table 1)

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NEIGHBORHOOD CHARACTERISTICS

In 2011-2012, 69 percent of U.S. children and youth ages six to 17 lived in a neighborhood with a recreation center, and 84 percent lived in neighborhoods with a playground. Eighty-seven percent lived in neighborhoods where children were "usually" or "always" safe (by parent report), and 16 percent lived in neighborhoods with dilapidated housing.

Across states, the proportion of children and youth living in a neighborhood with a recreation center ranged from 52 to 85 percent. Ten states were significantly higher than the national average, and another 10 were significantly lower. The three jurisdictions where children had the greatest access to recreation centers were the District of Columbia, Hawaii, and California. The three with the least access were West Virginia, Mississippi, and Louisiana. (See Table 2)

The proportion of children and youth with access to a neighborhood playground ranged from 63 to 93 percent. In 18 states, this prevalence was significantly higher than the national average, while in 15 it was significantly lower. The five states with the lowest proportion of children in neighborhoods with playgrounds were Mississippi, South Carolina, Louisiana, Alabama, and West Virginia. The four jurisdictions with the highest proportions were Colorado, the District of Columbia, Illinois, and Utah. (See Table 2)

The proportion of children and youth living in neighborhoods with rundown housing ranged from nine to 31 percent. In 14 states, this measure was significantly higher than the national average, and in seven it was significantly lower. The three states with the highest proportion of children in neighborhoods with dilapidated housing were West Virginia, New Mexico, and Alaska. The three states with the lowest proportion were Connecticut, Virginia, and Maryland. (See Table 2)

The proportion, by state, of children and youth living in a neighborhood that parents considered "usually" or "always" safe ranged from 69 to 95 percent. In four states, this proportion was significantly lower than the national average; in 20 it was significantly higher. The four states with the lowest proportion of children in safe neighborhoods were the District of Columbia, California, New York, and Arizona. The four states with the highest proportions were Idaho, New Hampshire, Minnesota, and Utah. (See Table 2)

RELATIONSHIPS BETWEEN NEIGHBORHOOD CHARACTERISTICS AND EXERCISE

We examined associations between the presence of the several neighborhood amenities, signs of decay, parents' perception of neighborhood safety, and the frequency of exercise among children ages six to 17.

An initial analysis found that the report of one neighborhood amenity was positively associated with the report of others. Similarly, the report of a negative neighborhood attribute was associated with the report of other negative attributes, and (negatively) with perceived safety. However, the report of more positive neighborhood attributes was not strongly associated with the report of fewer negative attributes, or with perceived safety.

To determine the relationship between these neighborhood characteristics and the number of days of exercise in the past week, we took account of a number of possibly confounding variables. In addition to examining the neighborhood features discussed above, we controlled for the child's age, sex, race, and parental education, as well as for whether the child lived in a metropolitan area—the closest available approximation for urbanicity. An additional control used was a sex-by-age interaction term, reflecting the fact that the relationship between age and exercise frequency differed for boys and girls.

Our analyses of exercise frequency found that:

- The presence of playgrounds, sidewalks, garbage, and vandalism were all unrelated to how many days children exercised in the past week.
- Living in a neighborhood described by a parent as usually or always safe was associated with an average increase in exercise frequency of 0.4 days per week in metropolitan areas, but a decrease of 0.5 days in non-metropolitan areas.
- Having a recreation center in the neighborhood was associated with a small increase (0.2 days, on average) in the amount of weekly exercise.
- Living in a neighborhood with rundown housing was associated with an increase (0.2 days, on average) in the amount of weekly exercise.

Finally, we used statistical techniques to examine how closely states' rankings (from "best" to "worst") on the exercise variable were associated with their rankings on significant neighborhood characteristics. In general, we found low-to-moderate relationships. Overall, rankings on the frequency of exercise were most highly correlated with rankings on neighborhood safety, and less highly correlated with rankings on recreation centers and dilapidated housing.

CONCLUSIONS

We found small but significant associations between some neighborhood characteristics and the frequency of moderate exercise:

A neighborhood recreation center was associated with greater exercise frequency, but so was rundown or dilapidated housing. Neighborhood safety had mixed effects on exercise frequency, varying by whether or not children lived in a metropolitan area. Neither the presence of playgrounds nor signs of neighborhood decay had a measurable effect on exercise frequency. However, in a separate analysis that examined both frequent and infrequent exercise (not shown here) the presence of a playground was associated with a decreased likelihood of infrequent exercise, but had mixed effects on the likelihood of frequent exercise, depending on the age of the child.

The positive association between dilapidated housing and exercise frequency is puzzling, although it is conceivable that poor housing motivates children (or their parents) to get active outdoors. Dilapidated housing may also be a proxy for very rural neighborhoods, given that the states with the highest prevalence are West Virginia, New Mexico, and Alaska. Similarly, the mixed results associated with "safe" neighborhoods may reflect that "safety" in metropolitan areas can be associated with more suburban neighborhoods, but may have a different meaning in non-metropolitan areas.

Ultimately, our models showed only modest relationships between neighborhood environment and frequency of exercise. All effects of neighborhood features were dwarfed by much larger associations between exercise frequency and demographic variables, such as age, sex, and race (data not shown). This could be because other neighborhood variables matter more for exercise frequency, or it may be because the physical environment has only a small part to play in encouraging or discouraging exercise. For example, while children may exercise before or after school, much of their time is spent at school, and we had no measures of the school

environment. It could be that the time allotted for recess or physical education, the importance of team sports in the school culture, and even the amount of homework assigned influence how frequently children exercise more than whether they have access to a recreation center. In this study, we were unable to examine this aspect of children's lives.

Our data are also subject to some limitations. Within the confines of a brief, telephone-based survey, the NSCH provides a wealth of vital information on child well-being. However, parents may not always be able to reliably report on their child's exercise, particularly for older children. We also cannot know here what boundaries, near or far, parents use in defining a "neighborhood." Additional research would be needed to examine information on the quality, duration (beyond a 20-minute threshold), and type of physical activity that children participate in.

In addition, some neighborhood attributes, unrelated to the moderate exercise measure examined here, may be related to other types of exercise. The presence of sidewalks or vandalism may influence whether children habitually walk to school or other places in the neighborhood. Such exercise, unless it results in "breathing hard," would not qualify as "moderate" exercise, as used here. However, even low-intensity exercise has some health benefits.[x] Further research would be required to assess whether neighborhood qualities are associated with this, or other types, of exercise.

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Table 1. Among children and youth ages 6 to 17, average number of days with moderate exercise in the past week (parent-reported), by age, and percentage who exercised on no days, and on six or more days, in the past week: 2011-12

	Average Number of Days			Percentage of Children	
	Total	Ages 6 to 11	Ages 12 to 17	No days	More than 5 days
United States	**4.4**	**4.8**	**4.0**	**9.1**	**34.8**
Alabama	4.7 [a]	5.3 [a]	4.3	8.4	40.2 [a]
Alaska	4.7 [a]	4.9	4.5 [a]	7.9	40.2 [a]
Arizona	4.3	4.8	4.0	8.2	32.2
Arkansas	4.5	5.1 [a]	4.0	9.8	37.2
California	4.2	4.6	3.9	11.1	30.6
Colorado	4.5	4.8	4.1	9.0	37.3
Connecticut	4.3	4.6	4.0	8.7	33.1
Delaware	4.3	4.6	3.9	9.7	31.7
District of Columbia	4.0 [b]	4.3 [b]	3.8	14.4 [a]	31.6
Florida	4.4	5.0	3.9	11.7	36.8
Georgia	4.5	4.8	4.3	8.0	37.2
Hawaii	4.6	5.2 [a]	3.9	6.5 [b]	36.5
Idaho	4.5	4.9	4.0	8.7	35.2
Illinois	4.3	4.5 [b]	4.1	8.0	32.0
Indiana	4.4	4.8	4.0	8.6	36.2
Iowa	4.6 [a]	5.1 [a]	4.1	6.1 [b]	38.2
Kansas	4.6	5.0	4.2	7.4	38.1
Kentucky	4.6	5.1 [a]	4.0	8.6	38.7
Louisiana	4.6	5.0	4.2	8.9	38.0
Maine	4.8 [a]	5.2 [a]	4.3 [a]	4.9 [b]	39.3 [a]
Maryland	4.2	4.7	3.8	7.8	31.5
Massachusetts	4.3	4.6	3.9	9.2	33.0
Michigan	4.3	4.7	4.1	9.8	35.5
Minnesota	4.7 [a]	5.1 [a]	4.2	7.1	38.2
Missouri	4.7 [a]	5.2 [a]	4.2	5.1 [b]	39.1
Mississippi	4.4	4.9	4.0	9.4	33.6
Montana	4.8 [a]	5.2 [a]	4.3 [a]	4.7 [b]	39.8 [a]
Nebraska	4.7 [a]	5.0	4.4 [a]	6.5 [b]	38.1

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Table 1. Continued

	Average Number of Days			Percentage of Children	
	Total	Ages 6 to 11	Ages 12 to 17	No days	More than 5 days
Nevada	4.2	4.6	3.7	9.4	28.7 [b]
New Hampshire	4.4	4.9	4.0	8.8	37.3
New Jersey	4.3	4.4 [b]	4.2	9.6	32.9
New Mexico	4.5	4.9	4.1	8.4	35.6
New York	4.1 [b]	4.4 [b]	3.8	11.2	31.5
North Carolina	4.5	4.9	4.0	8.5	37.8
North Dakota	4.8 [a]	5.3 [a]	4.4 [a]	4.4 [b]	39.2
Ohio	4.3	4.7	4.1	9.7	35.9
Oklahoma	4.6	5.2 [a]	4.1	9.5	41.7 [a]
Oregon	4.4	4.7	4.1	8.9	35.6
Pennsylvania	4.4	4.7	4.1	7.8	34.3
Rhode Island	4.2	4.6	3.9	8.9	32.0
South Carolina	4.5	5.0	4.0	9.0	36.0
South Dakota	4.8 [a]	5.2 [a]	4.3	5.3 [b]	38.1
Tennessee	4.7 [a]	5.2 [a]	4.2	6.3 [b]	40.7 [a]
Texas	4.4	4.9	3.9	10.2	34.1
Utah	4.3	4.7	3.8	7.1	29.5 [b]
Vermont	4.8 [a]	5.3 [a]	4.4 [a]	5.1 [b]	39.1 [a]
Virginia	4.4	4.8	4.0	7.7	33.3
Washington	4.5	4.9	4.0	7.6	36.8
West Virginia	4.7 [a]	5.2 [a]	4.1	9.7	41.7 [a]
Wisconsin	4.6 [a]	5.0	4.2	6.8	35.9
Wyoming	4.7 [a]	5.0	4.3 [a]	5.7 [b]	37.9

[a] State is significantly higher than the national average on this measure.
[b] State is significantly lower than the national average on this measure.

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Table 2. Percent of children and youth, ages 6 to 17, living in neighborhoods with selected characteristics, according to parent report, 2011-12

	Dilapidated housing	"Usually" or "always" safe	Has a recreation center	Has a playground
United States	**16.1**	**86.9**	**69.2**	**83.6**
Alabama	18.6	88.2	62.1 [b]	68.0 [b]
Alaska	24.2 [a]	91.5 [a]	72.4	82.7
Arizona	17.3	82.2 [b]	64.9	86.2
Arkansas	22.6 [a]	88.6	64.6	71.1 [b]
California	13.2	80.5 [b]	78.8 [a]	92.3 [a]
Colorado	13.9	91.5 [a]	78.3 [a]	93.1 [a]
Connecticut	8.9 [b]	89.7	72.5	85.0
Delaware	13.3	87.4	70.8	79.3 [b]
District of Columbia	23.3 [a]	68.7 [b]	84.7 [a]	93.1 [a]
Florida	15.4	86.5	68.1	78.7 [b]
Georgia	15.1	88.1	67.5	69.4 [b]
Hawaii	21.8 [a]	86.2	81.8 [a]	90.5 [a]
Idaho	18.2	95.4 [a]	70.5	83.9
Illinois	14.4	85.8	73.5 [a]	92.9 [a]
Indiana	19.5	89.1	66.1	75.6 [b]
Iowa	14.8	63.9 [b]	70.2	89.4 [a]
Kansas	17.2	78.3 [a]	72.6	87.2 [a]
Kentucky	21.5 [a]	59.0 [b]	56.4 [b]	75.9 [b]
Louisiana	22.8 [a]	84.5	56.1 [b]	67.3 [b]
Maine	22.2 [a]	94.0 [a]	65.5	81.4
Maryland	10.2 [b]	88.9	70.0	86.0
Massachusetts	14.2	87.3	75.4 [a]	90.5 [a]
Michigan	17.3	86.7	65.0	86.2
Minnesota	11.5 [b]	95.0 [a]	71.1	90.4 [a]
Missouri	16.4	90.9 [a]	69.2	80.9
Mississippi	23.3 [a]	87.3	52.7 [b]	62.5 [b]
Montana	21.7 [a]	91.7 [a]	67.5	85.9
Nebraska	15.8	92.3 [a]	66.0	91.4 [a]

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Table 2. Continued

	Dilapidated housing	"Usually" or "always" safe	Has a recreation center	Has a playground
Nevada	16.9	84.0	73.4	90.9 [a]
New Hampshire	12.4 [b]	95.2 [a]	71.5	84.3
New Jersey	11.1 [b]	88.0	69.7	92.1 [a]
New Mexico	24.8 [a]	84.8	71.6	78.6 [b]
New York	17.6	81.6 [b]	68.1	91.4 [a]
North Carolina	16.1	89.4	62.0 [b]	69.8 [b]
North Dakota	13.0	93.9 [a]	70.3	87.1 [a]
Ohio	20.2 [a]	88.3	68.7	85.1
Oklahoma	23.4 [a]	88.7	58.9 [b]	75.2 [b]
Oregon	17.9	89.7	73.0	89.1 [a]
Pennsylvania	17.5	88.3	69.5	85.6
Rhode Island	14.9	85.7	78.4 [a]	89.6 [a]
South Carolina	16.1	87.2	62.2 [b]	64.3 [b]
South Dakota	17.6	93.9 [a]	70.8	85.2
Tennessee	16.9	89.2	66.1	69.9 [b]
Texas	16.5	85.2	63.9 [b]	80.8
Utah	13.1	94.9 [a]	78.3 [a]	92.7 [a]
Vermont	22.8 [a]	94.7 [a]	59.0 [b]	84.7
Virginia	9.8 [b]	91.5 [a]	70.9	80.4
Washington	17.3	90.0	74.5 [a]	85.4
West Virginia	31.4 [a]	92.2 [a]	52.1 [b]	68.1 [b]
Wisconsin	12.4 [b]	91.4 [a]	70.7	88.6 [a]
Wyoming	19.3	94.0 [a]	75.3 [a]	84.2

[a] State is significantly higher than the national average on this measure.
[b] State is significantly lower than the national average on this measure.

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Data and Variables

National Survey of Children's Health

The National Survey of Children's Health (NSCH) was conducted in 2011/12 in all 50 states and the District of Columbia by the National Center for Health Statistics, with funding from the Maternal and Child Health Bureau. Telephone numbers from a random sampling process were used to contact households, and one child in each household with children was randomly selected to be the focus of the study. An adult in the household knowledgeable about the child answered questions about the child and themselves. The survey is representative of children under 18 years old nationwide and also within each state. A total of 95,677 interviews were completed in 2011/12, the most current wave of data collection.

Variables

Exercise

During the past week, on how many days did [CHILD] exercise, play a sport, or participate in physical activity for at least 20 minutes that made [him/her] sweat and breathe hard? (1-7)

Neighborhood amenities

Do sidewalks or walking paths exist in your neighborhood? (Yes/No)

Does a park or playground area exist in your neighborhood? (Yes/No)

Does a recreation center, community center, or boys' or girls' club exist in your community? (Yes/No)

Neighborhood safety

How often do you feel [CHILD] is safe in your community or neighborhood? (Never/Sometimes/Usually/Always)

Negative neighborhood attributes

In your neighborhood, is there litter or garbage on the street or sidewalk? (Yes/No)

How about poorly kept or [dilapidated/rundown] housing? (Yes/No)

How about vandalism such as broken windows or graffiti? (Yes/No)

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