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Preschoolers' Total Daily Screen Time at Home and by Type of Child Care

Pooja S. Tandon, MD, MPH, Chuan Zhou, PhD, Paula Lozano, MD, MPH, and Dimitri A. Christakis, MD, MPH

Objective To assess preschoolers' cumulative daily screen time, measure the contributions of the home and the child care setting to this total, and characterize children that are most at risk for excessive screen time.

Study design We used data from the Early Childhood Longitudinal Study-Birth Cohort, to calculate daily screen time based on reports by preschooler's parents and care providers.

Results The sample size of 8950 represented approximately 4 million children. By preschool age, >80% of children were in some child care. On average, children in this study were exposed to 4.1 hours of screen time daily, including 3.6 hours at home and 0.4 hours in child care. Children in centers had the lowest screen time (3.2 hours) compared with children in parental care only (4.4 hours), home-based care (5.5 hours), and Head Start (4.2 hours). Even when adjusted for relevant covariates, these differences remained significant ($P < .001$).

Conclusions Preschoolers' cumulative screen time exceeds recommendations and most previous estimates. Pediatric clinicians are uniquely positioned to encourage families to discuss screen time with their children's caregivers and to advocate for high quality child care. Efforts to decrease screen time in homes and home-based child care settings are needed. (*J Pediatr* 2011;158:297-300).

The American Academy of Pediatrics recommends limiting screen time to 1 to 2 hours of quality programming per day for preschool-age children.¹ TV viewing in young children has been associated with cognitive and speech delays, aggressive behavior, decreased academic performance, and obesity.²⁻⁹ Screen time also potentially displaces other activities such as reading, physical activity, and imaginative play, all of which are beneficial to children's growth and development.¹⁰⁻¹³ Although pediatricians are encouraged to discuss child care and preschool choices with families,¹⁴ the extent to which these screen time recommendations are reaching all of the caregivers significantly involved in the care of young children is not known. Approximately 80% of children younger than 5 years old with working mothers are spending almost 40 hours a week in the care of someone other than their parents.¹⁵ As children spend less time in parental care, child care settings and nonparental caregivers have a more influential role in shaping health related attitudes and behaviors. Most prior estimates of screen time have been based on parental report and have documented that young children in the United States watch between 1 and 3 hours of television per day at home.¹⁶⁻²⁰ Two studies have assessed viewing in child care settings,^{21,22} but no national study to date has assessed cumulative screen time in young children at an individual level.

We therefore conducted a study using a nationally representative data base to assess children's cumulative daily screen time exposure, measure the relative contributions of the home and the child care setting to this total, and characterize children and settings that are most at risk for excessive screen time.

Methods

We used data from the Early Childhood Longitudinal Study-Birth Cohort (ECLS-B). The ECLS-B is a longitudinal, observational study of a nationally representative sample of 10 700 children born in 2001 with diverse socioeconomic and racial/ethnic backgrounds. The same children were followed and information was collected at approximately 9-months, 2 years, preschool (age 4 or a year away from kindergarten), and kindergarten age. Parents were interviewed at each of those ages and asked to provide contact information for the child's primary child care provider, if applicable. With the parent's permission, those who provide regular child care for the child were also interviewed.

The ECLS-B contains data on the type of primary child care arrangement, the amount of time spent there, and sociodemographic information. At 2 years and preschool age, both the parent and the caregiver were asked questions about the average number of hours of television and videos/DVDs the child watched while in their care.

The 9-month through preschool data are currently available through a restricted-use data license, which we obtained. This study was approved by the Seattle Children's Hospital Institutional Review Board.

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ECLS-B Early Childhood Longitudinal Study-Birth Cohort

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Our primary outcome variable was the number of hours of reported total daily screen time during weekdays at preschool age. We calculated this by adding together the total hours of TV and video/DVD time at home on weekdays as reported by their parent and in their primary child care setting as reported by their caregiver. Daily screen time was capped at 24 hours.

Our independent variable was the primary type of child care arrangement used at preschool age. Based on parental report of the child's primary child care arrangement, we classified the children into four mutually exclusive categories: parental care only, home-based child care, center-based care, and Head Start. Home-based care included both relative and nonrelative care in either the child's own home or in another home. Head Start is a federally funded preschool program that promotes the social and cognitive development of economically disadvantaged children through the provision of educational, health, nutritional, social, and other services.²³

Other variables considered for our analysis included those that might be expected to influence choice of child care and/or screen time, based on previous research or a priori hypotheses. These variables included child's age, race, sex; family income; mother's education, employment, and marital status; and educational level of caregiver.

Statistical Analysis

Because the data were collected on the basis of a complex survey design, we weighed all the analyses using sampling weights provided in the ECLS-B database for proper inference. All unweighted sample size numbers were rounded to the nearest 50 as required by the ECLS-B restricted-use data license. We calculated means and proportions for the whole sample and for each of the child care arrangement categories. We conducted bivariate analyses to calculate total screen time at home, at child care, and total daily screen time for each of the categories of child care. We compared total screen hours across care types using an adjusted Wald test after fitting multivariable regression models. In our final model, we adjusted for child's race and sex and mother's education and marital status. We did not include the other sociodemographic variables in our analysis due to issues of collinearity.

Results

Data were available for 8950 children at preschool age, representing a population size of 3 997 200. The weighted nonresponse rate for type of child care arrangement was 16.5%. Comparing respondents and nonrespondents, we found no differences in household income, child's race/ethnicity, child's sex, mother's education, mother's employment status, mother's marital status, and primary language at home. By preschool age, more than 80% of children were in some type of nonparental care, with the majority in center-based care. Descriptive statistics for the whole sample and by primary child care arrangement are shown in [Table I](#).

Information from the child care provider was available for 7200 children, which represents a population size of 2.4 million; 26.7% of home-based care providers did not report screen time, as compared with 18.4% center-based care providers and 17.6% of Head Start providers ($P < .001$). We recalibrated the sampling weights to account for the nonresponse rates. On average, children in this study were exposed to 4.1 (SE, 0.07) hours of screen time daily, with 3.6 (SE, 0.06) hours at home and 0.4 (SE, 0.02) hours in child care ([Figure](#)). The average daily screen time for all children in child care (excluding those in parental care only) was 3.5 hours. Children in center-based care had the lowest average total daily screen time compared with those in other settings. Even though children in Head Start and center-based care watched very small amounts of television and videos/DVDs during their child care hours, the home screen time contribution of children in Head Start was significantly larger than that of children in other center-based care. Even after adjusting for child's race, sex, mother's education and marital status, and primary language, the differences in screen time between care settings were statistically significant ([Table II](#)).

For the whole sample, 12% of child care time compared with 19% of weekday home time was spent in front of a screen. For the overall sample, 66% of children exceeded the recommended 2 hours of screen time. Seventy-four percent of children in parental care only, 87% of children in home-based child care, 52% of children in centers, and 70% of children in Head Start exceeded 2 hours of screen time per day.

Nationally, screen time in child care represented 8% of children's total weekday screen time. Screen time during child care hours represented 33% of total weekday screen time for children in home-based care and only 3% and 2%, respectively, for children in center-based care and Head Start.

Discussion

We found that preschool children in this nationally representative sample are, on average, exposed to about 4 hours of screen time on weekdays. For each category of child care, the home had a larger contribution to children's cumulative daily screen time than child care did. Although child care screen hours represent a relatively small proportion of total screen time for most children, they can be significant for children in home-based child care. These children are exposed to the most daily screen time and our results for this group were double prior estimates of preschoolers' screen time. Some studies have found that children who attend home-based child care were heavier than children in center-based care.^{24,25} Screen time estimates in our study may be one potential explanation for their findings.

There are some limitations to our study. First, despite the breadth of data available, it is possible that other unmeasured factors exist that are associated with either child care choice or screen time exposure, or both. Second, we saw a significantly lower response rate from the home-based providers compared with the others. We did recalibrate our sampling weights, however, and did not see a difference in

Table 1. ECLS-B sample characteristics at preschool age

	Whole sample	Parental care only	Home-based child care	Center-based child care	Head Start
n (%)	8950*	1650 (19%)	1900 (21%)	4150 (46%)	1250 (14%)
Child's sex (% female)	49%	51%	49%	49%	49%
Child's age mean (SE) (years)	4.37 (0.01)	4.33 (0.01)	4.34 (0.01)	4.39 (0.01)	4.40 (0.01)
Household income					
<\$30 K	35%	47%	35%	21%	69%
\$30-75K	37%	41%	40%	36%	27%
>\$75 K	28%	12%	25%	43%	4%
Child's race/ethnicity					
White	54%	50%	55%	66%	30%
Black	14%	10%	11%	10%	27%
Hispanic	26%	33%	25%	17%	36%
Asian/Pacific Islander	3%	2%	3%	3%	1%
Other	4%	4%	6%	4%	5%
Mother's education					
High school or less	42%	59%	44%	28%	68%
Some college	30%	27%	32%	31%	27%
College graduate	16%	10%	13%	24%	3%
Graduate degree	11%	4%	11%	17%	2%
Mother's employment status					
>35 h/wk	40%	17%	61%	40%	37%
<35 h/wk	20%	14%	24%	22%	16%
Looking for work	6%	8%	4%	4%	11%
Not in work force	34%	61%	11%	34%	36%
Mother's marital status					
Married	70%	72%	63%	78%	49%
Separated/divorced/widowed	9%	7%	12%	8%	11%
Never married	19%	18%	23%	13%	37%
Nonbiological parent	2%	3%	2%	2%	3%
Primary language at home					
English	82%	74%	84%	87%	71%
Spanish	14%	22%	13%	8%	24%
Other	4%	4%	3%	5%	5%
Mean hours in primary child care per week (SE)	28.2 (0.4)	n/a	35.8 (0.6)	24.6 (0.4)	28.4 (0.7)
Education of caregiver					
High school or less	21%	n/a	53%	11%	7%
Some college	34%		34%	31%	45%
College graduate	29%		9%	37%	32%
Graduate degree	16%		4%	21%	16%

*Represents population size of 3 997 200.

our estimates and standard errors. Finally, screen time exposures from parents and caregivers were by self-report only. These values may be underestimates due to social desirability bias or overestimates due to erroneous recall. However, the large sample size and complex sampling frame meant to capture a nationally representative group, strengthen our conclusions, and make the data more generalizable.

Despite these limitations, our findings highlight that preschoolers' cumulative screen time exceeds recommendations and even most previous estimates. For more socioeconomically vulnerable children, being in Head Start is associated with less average daily screen time compared with home-based care or parental care only, suggesting a potentially protective effect. A national survey of obesity prevention practices in Head Start found that most programs report doing more to support healthy eating and physical activity than is required by federal standards.²⁶ This study found that 90% of Head Start programs reported <60 minutes per day of TV time and 89% said they use television and videos for instructional purposes only. Expanding access to quality child care for vulnerable children would be beneficial for many reasons, including potentially limiting their screen time exposure.

A recent review of state regulations found that most states had few screen time regulations for child care facilities.²⁷ Although policy changes may be beneficial in decreasing screen time in some settings, strategies for decreasing screen time in

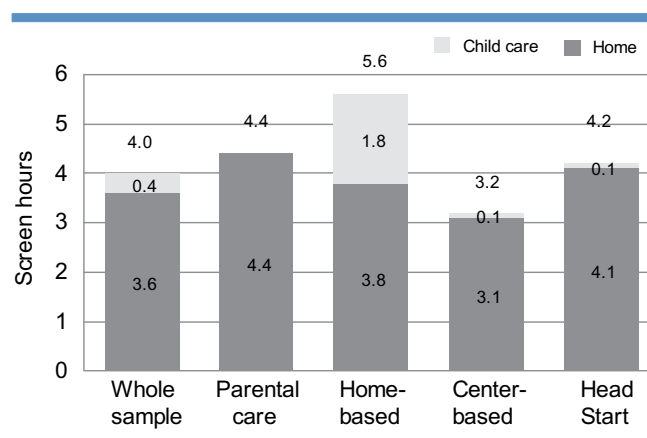
**Figure.** Home, child care, and total screen hours by child care type.

Table II. Screen time during child care varies by type of child care, in a multivariable model adjusting for covariates

	β Coefficient	95% CI	P value
Child care type			
Parental care only	1		
Nonparental home-based care	1.27	(0.96, 1.59)	<.001
Center-based care	-0.73	(-1.05, -.41)	<.001
Head Start	-0.61	(-0.99, -0.23)	.002
Race			
Black	1		
Non-black	-0.59	(-0.86, -0.32)	<.001
Child sex			
Male	1		
Female	-0.10	(-0.31, 0.09)	.285
Primary language			
Non-English	1		
English	-0.64	(-1.04, -0.23)	.002
Mother's education			
High school or less	1		
Some college	-0.11	(-1.08, -0.55)	<.001
College graduate	-1.29	(-1.61, -0.99)	<.001
Graduate degree	-1.66	(-2.02, -1.31)	<.001
Mother's marital status			
Married	1		
Separated/divorced/widowed	0.28	(0.01, 0.56)	.05
Never married	0.07	(-1.05, 1.19)	.89
Intercept	5.9	(5.40, 6.36)	<.001

homes and home-based child care must be further explored. Home-based child care environments are varied and generally understudied; thus, different approaches may be required, depending on the type of setting. A statement by the Surgeon General recommends that both parents and child care programs implement approaches that reflect expert recommendations on physical activity, screen time limitations, and good nutrition.²⁸ Pediatric clinicians are uniquely positioned to advocate for policy changes and also encourage families to discuss screen time and other health promoting recommendations with all of their children's caregivers. ■

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