School Readiness Among United States Children: Results From the 2022 National Survey of Children's Health

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Received for publication December 11, 2023; accepted February 25, 2024.

ABSTRACT

OBJECTIVE: Provide the latest national and state estimates and correlates of the proportion of young children who are healthy and ready to learn (HRTL) using a revised measure from the National Survey of Children's Health (NSCH).

METHODS: Data were analyzed for 11,121 children ages 3 to 5 years from the 2022 NSCH, an address-based, parent-completed survey on the health and well-being of children in the United States. A total of 27 items across 5 domains (early learning skills, social emotional development, self-regulation, motor development, and health) were used to calculate domain-specific assessments scored as "on track," "emerging," or "needs support" according to age-appropriate developmental expectations. Children "on track" in 4 to 5 domains with no domain that "needs support" were considered HRTL.

RESULTS: In 2022, 63.6% of 3- to 5-year-old children were HRTL. The proportion of children "on track" ranged from just over two thirds for early learning skills and motor development to 88.9% for health. One million children, or 9.0%, needed support in multiple domains. Being HRTL was associated with child, family, community factors including participation in early childhood education, special health care needs status/type, male sex, reading/singing/storytelling by family members, adverse childhood experiences, parental mental health and education, food insufficiency, outdoor play, household language, neighborhood amenities, rural residence, medical home access.

CONCLUSIONS: Nearly two thirds of young children are reported to be HRTL, meeting the Title V National Outcome Measure for School Readiness. Using a revised measure, modifiable factors are identified which offer a range of intervention opportunities at the child, family, and community levels.

KEYWORDS: early intervention; educational; child; child development; healthy and ready to learn; National Survey of Children's Health; preschool

ACADEMIC PEDIATRICS 2024; 24:1049–1061

WHAT'S NEW

Research on school readiness has identified contextual factors as more important than sociodemographic characteristics. Interventions addressing multiple factors and emphasizing quality and duration yield greater impacts, but only if meaningfully extended to families with diverse needs and experiences.

Beginning with the establishment of the National Educational Goals Panel,[1] through an array of state and national policy, programmatic, and surveillance efforts,[2,3] to its selection as a Healthy People 2030 Objective,[4] school readiness has drawn increasing attention as an urgent public health challenge in the United States. Research shows that the critical pathways for healthy development begin before birth, while the social-emotional and cognitive foundations of optimal health, social, and economic outcomes are laid well before children enter school.[2,5–7] The framing as a public health challenge is also well-deserved. Theoretical approaches to school readiness vary from a focus on child-level characteristics, for example, mastery of specific skills, to an emphasis on environment and relationships, to the use of social and cultural norms as guideposts for interpreting readiness.[2,8] There remains significant variation in the

implementation of assessments of school readiness across the nation,[9] to say nothing of the variation across programs targeting specific populations. Kaminski and colleagues[10] named school readiness a pediatric vital sign in 2023 both despite and because of these challenges. They note that unlike other population measures of child health, school readiness "reflects the degree to which the development of young children is supported, protected, and promoted" over time and across multiple environments, and as such, serves as a seminal measure of child well-being. Importantly, researchers, policy makers, and practitioners have identified opportunities for effective intervention at multiple levels, targeting both proximate and distal drivers of development.[6,7,11,12]

Central to this work has been the need for a standardized, population-level measure that accounts for multiple aspects of early learning and development and assesses ascertainment of related skills and competencies before school entry, and within the broader contexts of health, family, and community. The Health Resources and Services Administration's Maternal and Child Health Bureau (HRSA MCHB), in partnership with Child Trends and the Centers for Disease Control and Prevention, have worked to address this gap since 2016 when questions were added to the National Survey of Children's Health (NSCH) to measure the proportion of children, ages 3 to 5 years, who could be considered healthy and ready to learn (HRTL).[13] One of the key drivers for this work was the selection of School Readiness as a National Outcome Measure for the Title V Maternal and Child Health Services Block Grant[14] program, which is funded in all 50 states and 9 jurisdictions to support maternal, infant, and child health. The development of the pilot HRTL measure has been described in detail and preliminary estimates reported.[15] Since these initial results were published, significant work was undertaken to refine both survey content and the resultant domain and summary measures to better identify meaningful differences by age and to address the absence of content on numeracy, as distinct from literacy, and motor skills as distinct from overall health. These analyses update this prior work, detailing final item, domain, and scoring changes and providing the latest national and state estimates and correlates of the proportion of young children who are HRTL.

METHODS

We used data from the 2022 NSCH, an annual, cross-sectional, address-based survey on the health and well-being of children ages 0 to 17 years in the United States. The survey is funded and directed by HRSA MCHB and conducted by the US Census Bureau. Data are collected, in English and Spanish, from parents/caregivers knowledgeable about the health and health care of 1 randomly selected child per sampled household via web and paper. The 2022 NSCH was fielded July 2022 to January 2023, yielding completed questionnaires for 54,103 children, 11,121 of whom were 3 to 5 years of age and for whom HRTL data were collected. The overall weighted response rate, reflecting the proportion of sampled households that completed the survey, was 39.1% and the interview completion rate, or the proportion of households that completed the survey once started, was 78.5%. Information on survey administration and methods is detailed elsewhere.[16]

A final set of 28 questions was used to calculate the HRTL domain and summary measures (Fig. 1). The survey items included in the 2022 NSCH reflect an extension of content to better address 3 limitations of the pilot measure identified through expert review, cognitive interviews,[17] and voluntary administration within community sites: the need to assess mathematical skills, content that distinguished between motor development and health, and questions that supported more meaningful distinctions between 3-, 4-, and 5-year-olds. With the addition of these items, subsequent factor analysis revealed the presence of 5 domains: early learning skills (9 items), social emotional development (6 items), self-regulation (5 items), motor development (4 items), and health (3 items). Factor loadings for all 5 domains were ≥0.6. Together these 27 items, organized across 5 domains, reflect the spectrum of skills and capacities that are commonly understood to support school success.[2,18,19]

Consistent with our previous approach, parent/caregiver responses were coded on a 3-point scale, 1 = needs support, 2 = emerging, and 3 = on track, depending on age-appropriate developmental expectations and an assessment of the overall distribution of responses across domain items and ages. Most items had age-specific scoring based on age-related skill development. For example, a 4-year-old who could not identify any letters of the alphabet in response to the question, "About how many letters of the alphabet can this child recognize?" would be considered to "need support" and assigned 1 point, while a 4-year-old who could identify "about half of them" would be considered to have "emerging" skills in this area and assigned 2 points, and one who could identify "most" or "all of them" would be considered to be "on track" and assigned 3 points. A total of 10 items did not show variation by age or have age-related expectations. This approach was originally developed by KA Moore at Child Trends[13,15] and was subsequently reviewed and refined by HRSA MCHB and Child Trends researchers.

An overall score for each domain was calculated by averaging the items, and developing cut-points of those averages: on track (average score ≥ 2.5; most items received a score of 3 or "on track"), emerging (average score 2.0–2.49; most items received a score of 2 or "emerging"), and needs support (average score < 2.0; indicating at least 1 and usually multiple items received a score of 1 or "needs support"). The overall HRTL measure was calculated by summing the number of domains in which a child was "on track," "emerging," and "needs support." Children "on track" in 4 to 5 domains with no domain that "needs support" were considered HRTL, forming the definition for the Title V National Outcome Measure for School Readiness. This definition offers latitude to be emerging in 1 domain given the continuum of skill development and number of domains, including motor and health, that may not preclude a child from school success. Children with ≤4 "on track" domains and no more than 1 "needs support" domain were considered "emerging" overall.

Figure 1. *"Healthy and ready to learn" survey questions, by domain, National Survey of Children's Health 2022.*

Children with "needs support" in ≥2 domains were considered "needs support" overall. Supplementary Table 1 contains a list of items in each domain and details the scoring of each item by age; statistical code for the measure will be publicly posted in the Title V Federally Available Data Resource Document on April 1, 2024.

A range of factors at the child, family, community, and behavioral levels were included based on previously demonstrated associations with school readiness[15] or child development.[2,6,10,20,21] Child-level characteristics included sex, age, race and ethnicity, presence/type of special health care needs (SHCN) as identified through the children with special health care needs (CSHCN) screener,[22] and pre/school attendance. Family- and community-level factors included primary language spoken in the household, highest educational attainment among adults in the household, household income-to-poverty, and binary indicators for household food sufficiency, housing instability, parental mental health, child's lifetime exposure to adverse childhood experiences (eg, witnessed neighborhood violence), presence of neighborhood amenities (eg, library or book mobile), rural-urban residence, and receipt of care in a medical home. Finally, behavioral risk and protective factors included average weekday screen time, average past week sleep and literacy-promoting behaviors, and average weekday and weekend time spent playing outdoors.

We report univariate statistics on the prevalence of being HRTL and being classified as "on track," "emerging," or "needs support" by domain (Table 1). Bivariate analyses were conducted using chi-square tests to identify significant associations (Table 2) followed by multivariable logistic regression models to estimate adjusted associations presented as adjusted prevalence ratios using marginal probability conversions from odds (Table 3). Multivariable models included an interaction between age and school attendance to help differentiate preschool (predominantly reported among 3–4-year-olds) from kindergarten or first grade (predominantly reported for 5-year-olds) presented as stratified prevalence ratios. State-level estimates were compared to national estimates using *t* tests for overlapping groups (Fig. 2 and Supplementary Table 2); multivariable adjustments were not performed owing to small state-level estimates that rendered imprecise crude estimates for many states. Missing data for variables used in weighting were imputed by the US Census Bureau: child sex, race, ethnicity, and parental education (< 5% missing) using hot-deck imputation while family income to poverty ratio (19% missing) was multiply imputed using regression methods. To preserve data on outcomes and multidimensional covariates, only those with missing data on all components were excluded and those with any data were scored according to available information; 7% were missing data on any covariate and excluded in regression models.

Table 1. Healthy and Ready to Learn and Domain-Specific Measures, National Survey of Children's Health, 2022

	Overall School Readiness* (n = 11,121)		Early Learning Skills (n = 10,885)		Social Emotional Development (n = 10,977)		Self-Regulation (n = 10,851)		Motor Development (n = 10,909)		Health (n = 11,121)	
	Percent	(95% CI)	Percent	(95% CI)	Percent	(95% CI)	Percent	(95% CI)	Percent	(95% CI)	Percent	(95% CI)
On track	63.6	(61.6–65.6)	68.8	(66.8–70.8)	82.9	(81.0–84.6)	72.6	(70.7–74.3)	68.2	(66.3–70.1)	88.9	(87.5–90.1)
Emerging	27.4	(25.6–29.2)	20.7	(19.1–22.5)	10.0	(8.7–11.4)	16.8	(15.4–18.3)	22.8	(21.2–24.5)	9.3	(8.2–10.6)
Needs support	9.0	(7.6–10.5)	10.4	(9.0–12.1)	7.1	(5.9–8.6)	10.6	(9.3–12.1)	9.0	(7.8–10.3)	1.8	(1.4–2.4)

* Defined as "on track" if "on track" in 4 to 5 domains with no domain that "needs support," "emerging" if "on track" in 4 or fewer domains with no more than 1 domain "needs support," and "needs support" if 2 or more domains were "needs support."

Data were weighted to account for the probability of selection and nonresponse and adjusted to represent the population of noninstitutionalized children in the United States. All analyses adjusted the variance estimates for the complex sampling design and multiple imputation of poverty using SAS-callable SUDAAN version 11.0.1 (Research Triangle Institute).

RESULTS

In 2022, 63.6% of 3- to 5-year-old children (or 7.5 million) were HRTL. By domain, the proportion of children "on track" ranged from just over two thirds for early learning skills (68.8%) and motor development (68.2%) to 88.9% for health. Meeting the overall definition for "needs support," 9.0% or 1 million children needed support in multiple domains. More than 1 in 10 children needed support for early learning skills (10.4%) and self-regulation (10.6%) (Table 1).

Nearly all bivariate associations were significant (Table 2). Females were more likely than males to be considered HRTL (70.1% vs 57.4%) as were non-Hispanic White and multiple race children (70%) compared to non-Hispanic Black (52.2%) and Hispanic (55.2%) children, and less than two thirds of non-Hispanic Asian and Indigenous children. The proportion of children who were HRTL and "on track" by domain varied significantly by the presence and type of SHCN. Less than one third (29.8%) of CSHCN were HRTL, compared to 69.4% of children without SHCN. Household income, adult educational attainment, and primary language were all significantly associated with both summary and domain measures of HRTL. Similarly, those living in households that experienced food insufficiency, housing instability, or who had experienced any lifetime ACEs were less likely to be HRTL by about 20% points, while those with a caregiver in poorer mental health were 15% points less likely. Attainment of early learning skills appeared to be particularly sensitive to these factors with children experiencing any of these adverse characteristics being 14% to 17% points less likely to be "on track" in this domain. Rural children were approximately 10% points less likely to be HRTL and "on track" for early learning skills than those in metropolitan or urban areas.

After multivariable adjustment, demographic disparities by race and ethnicity and income were eliminated overall and for most domains (Table 3). Being in school was the most protective factor with the largest associated increase in being HRTL ((adjusted risk ratio) aPR: 1.23) and "on track" for early learning skills (aPR: 1.30), social emotional development (aPR: 1.12), and motor development (aPR: 1.17). The interaction with age confirmed that being in school was protective for children overall at each age and for early learning skills, specifically. Family literacy practices of reading, singing, or storytelling on most days of the week were also associated with improved rates of being HRTL overall (aPR: 1.16) and for early learning skills (aPR: 1.15), social emotional development (aPR: 1.09), and motor development (aPR: 1.16). Outdoor play of 2 or more hours per day, 3 to 4 neighborhood

Table 2. "On Track" for Healthy and Ready to Learn Summary and Domain-Specific Measures by Child, Family, and Community, and Behavioral Characteristics, National Survey of Children's Health, 2022

	Sample Distribution (n=11,121)	Overall School Readiness* (n=11,121)			Early Learning Skills (n=10,885)			Social Emotional Development (n=10,977)			Self-Regulation (n=10,851)			Motor Development (n=10,909)			Health (n=11,121)		
	%	%	(95% CI)	p†	%	(95% CI)	p†	%	(95% CI)	p†	%	(95% CI)	p†	%	(95% CI)	p†	%	(95% CI)	p†
Total	100	63.6	(61.6 - 65.6)		68.8	(66.8 - 70.8)		82.9	(81.0 - 84.6)		72.6	(70.7 - 74.3)		68.2	(66.3 - 70.1)		88.9	(87.5 - 90.1)	
Weighted Population Size	11.8 million	7.5 million			7.8 million			9.5 million			8.3 million			7.8 million			10.5 million		
Child Characteristics																			
Sex				0.00			0.00			0.00			0.00			0.00			0.0144
Male	51.2	57.4	(54.5 - 60.2)		65.6	(62.6 - 68.5)		78.7	(75.9 - 81.2)		68.9	(66.2 - 71.5)		61.6	(58.8 - 64.3)		87.3	(85.3 - 89.1)	
Female	48.8	70.1	(67.4 - 72.7)		72.2	(69.5 - 74.8)		87.3	(84.8 - 89.4)		76.4	(73.9 - 78.7)		75.2	(72.6 - 77.6)		90.5	(88.6 - 92.2)	
Age				0.61			0.83			0.54			0.48			0.29			0
3 y	33.1	63.0	(59.1 - 66.7)		68.3	(64.3 - 72.1)		81.5	(77.9 - 84.7)		71.5	(68.3 - 74.6)		70.4	(66.9 - 73.7)		92.3	(90.6 - 93.6)	
4 y	33.6	63.2	(59.8 - 66.4)		68.5	(65.1 - 71.8)		83.2	(79.8 - 86.1)		72.1	(68.8 - 75.1)		67.2	(63.8 - 70.4)		89.0	(86.4 - 91.2)	
5 y	33.3	64.7	(61.5 - 67.8)		69.7	(66.5 - 72.7)		84.0	(81.1 - 86.4)		74.1	(70.9 - 77.0)		67.1	(64.0 - 70.0)		85.4	(82.6 - 87.8)	
Race and Ethnicity				0.00			0.00			0.00			0.00			0.01			0.0035
Asian, non-Hispanic	4.8	64.7	(57.9 - 70.9)		80.9	(75.3 - 85.5)		81.5	(75.3 - 86.4)		74.4	(67.8 - 80.0)		72.0	(65.9 - 77.4)		83.3	(76.7 - 88.2)	
Black, non-Hispanic	11.3	52.2	(45.6 - 58.8)		62.3	(55.2 - 68.9)		75.1	(67.9 - 81.1)		60.5	(53.4 - 67.2)		56.3	(49.3 - 62.9)		84.1	(77.1 - 89.2)	
Hispanic	27.8	55.2	(50.3 - 60.1)		58.6	(53.4 - 63.5)		76.6	(71.5 - 81.0)		70.1	(65.5 - 74.3)		68.5	(63.6 - 73.1)		87.5	(84.4 - 90.1)	
Indigenous, non-Hispanic	0.8	63.5	(49.6 - 75.5)		70.3	(56.0 - 81.5)		86.9	(75.1 - 93.5)		68.9	(54.3 - 80.5)		66.7	(52.8 - 78.2)		84.9	(71.5 - 92.6)	
Multiple Race, non-Hispanic	7.4	71.5	(66.4 - 76.1)		79.8	(75.3 - 83.7)		88.6	(84.9 - 91.4)		75.7	(70.7 - 80.1)		73.5	(68.2 - 78.2)		92.8	(89.5 - 95.2)	
White, non-Hispanic	47.8	69.9	(67.9 - 71.8)		73.3	(71.4 - 75.2)		87.5	(85.9 - 89.0)		76.2	(74.3 - 78.1)		69.7	(67.7 - 71.6)		90.9	(89.3 - 92.2)	
Special health care needs status and type				0.00			0.00			0.00			0.00			0.00	94.0	(92.8 - 94.9)	0
No Special Health Care Need (SHCN)	85.4	69.4	(67.2 - 71.5)		72.5	(70.3 - 74.6)		88.6	(86.6 - 90.2)		77.7	(75.9 - 79.5)		72.0	(69.9 - 73.9)				
SHCNS—overall	14.6	29.8	(25.9 - 34.1)		47.5	(42.7 - 52.4)		50.3	(45.4 - 55.2)		42.9	(38.3 - 47.7)		46.6	(41.8 - 51.5)		59.3	(54.2 - 64.2)	
SHCN, Prescription Medication Need/Use ONLY	3.4	58.3	(48.0 - 67.9)		74.0	(63.0 - 82.7)		88.4	(81.8 - 92.8)		65.0	(53.9 - 74.6)		74.7	(66.3 - 81.6)		78.5	(68.3 - 86.1)	
SHCN, Elevated Service Need/Use ONLY	3.6	35.5	(27.2 - 44.7)		57.2	(48.3 - 65.6)		58.5	(49.5 - 67.0)		44.2	(35.4 - 53.4)		52.2	(43.3 - 61.0)		78.3	(69.3 - 85.3)	
SHCN, Elevated Service Need/Use + Prescription Medication Need/Use	1.9	36.5	(27.6 - 46.4)		61.5	(49.9 - 72.0)		65.5	(52.7 - 76.5)		51.2	(40.1 - 62.2)		52.7	(41.6 - 63.6)		58.7	(47.3 - 69.3)	
SHCN, Functional Limitations	5.7	7.0	(4.5 - 10.6)		20.7	(15.5 - 27.3)		17.1	(12.7 - 22.6)		25.9	(19.8 - 33.2)		24.5	(18.1 - 32.1)		35.8	(28.3 - 44.2)	
Child in school (including homeschool)				0.00			0.00			0.00			0.01			0.00			0.8053
Yes (preschool, kindergarten, or first grade)	66.5	69.0	(66.7 - 71.2)		75.7	(73.4 - 77.8)		86.0	(83.9 - 87.9)		74.3	(72.3 - 76.3)		72.0	(70.0 - 74.0)		89.1	(87.5 - 90.5)	
No	33.5	51.9	(48.2 - 55.7)		55.2	(51.3 - 59.0)		77.2	(73.5 - 80.5)		69.2	(65.6 - 72.6)		60.5	(56.6 - 64.2)		88.7	(85.9 - 91.1)	

Table 2. (Continued)

	Sample Distribution (n=11,121)	Overall School Readiness* (n=11,121)			Early Learning Skills (n=10,885)			Social Emotional Development (n=10,977)			Self-Regulation (n=10,851)			Motor Development (n=10,909)			Health (n=11,121)		
	%	%	(95% CI)	$p^{\dagger}$	%	(95% CI)	$p^{\dagger}$	%	(95% CI)	$p^{\dagger}$	%	(95% CI)	$p^{\dagger}$	%	(95% CI)	$p^{\dagger}$	%	(95% CI)	$p^{\dagger}$
Family and Community Characteristics																			
Primary household language				0.00			0.00			0.00			0.29			0.01			0.0017
English	84.0	66.4	(64.4 - 68.3)		71.9	(70.0 - 73.8)		85.0	(83.3 - 86.6)		73.0	(71.1 - 74.9)		69.7	(67.9 - 71.5)		90.1	(88.6 - 91.3)	
Non-English	16.0	48.3	(42.1 - 54.6)		51.7	(45.0 - 58.3)		71.8	(64.7 - 77.9)		69.9	(64.1 - 75.2)		59.7	(52.8 - 66.1)		83.2	(78.6 - 86.9)	
Highest caregiver educational attainment				0.00			0.00			0.00			0.00			0.00			0
≤High school/General Educational Development (GED) test	25.9	45.9	(41.1 - 50.7)		51.6	(46.5 - 56.8)		71.5	(66.0 - 76.4)		64.3	(59.4 - 68.9)		57.2	(52.0 - 62.3)		81.7	(77.8 - 85.1)	
Some college/ associate degree	18.8	60.6	(56.3 - 64.7)		62.7	(58.4 - 66.8)		84.1	(80.7 - 87.0)		68.9	(64.5 - 73.0)		69.6	(65.7 - 73.2)		87.3	(84.2 - 89.9)	
Bachelor's degree or higher	55.4	72.9	(71.0 - 74.8)		78.6	(76.8 - 80.4)		87.7	(86.0 - 89.1)		77.5	(75.6 - 79.4)		72.7	(70.8 - 74.5)		92.8	(91.4 - 93.9)	
Family income-to-poverty ratio, % poverty				0.00			0.00			0.00			0.00			0.00			0
<100% Poverty	19.1	45.5	(40.0 - 51.2)		53.2	(47.1 - 59.2)		71.2	(64.4 - 77.1)		64.1	(57.9 - 69.9)		60.3	(53.6 - 66.7)		80.7	(75.6 - 85.0)	
100-199% Poverty	19.6	55.2	(49.7 - 60.6)		58.8	(53.6 - 63.9)		78.7	(72.5 - 83.8)		67.1	(61.7 - 72.1)		63.9	(58.4 - 69.2)		85.9	(81.5 - 89.4)	
200-399% Poverty	27.8	66.7	(62.6 - 70.6)		71.3	(67.5 - 74.8)		85.7	(82.5 - 88.4)		73.4	(69.9 - 76.7)		70.3	(67.1 - 73.4)		89.3	(87.0 - 91.2)	
400%+ Poverty	33.5	76.2	(73.8 - 78.5)		81.1	(78.9 - 83.2)		89.5	(87.4 - 91.3)		79.6	(77.1 - 81.8)		73.3	(70.9 - 75.6)		94.9	(93.3 - 96.2)	
Food sufficiency				0.00			0.00			0.00			0.00			0.00			0
Could always afford to eat good nutritious meals	68.0	70.6	(68.3 - 72.8)		74.1	(71.8 - 76.3)		86.3	(84.1 - 88.3)		77.7	(75.6 - 79.6)		71.4	(69.4 - 73.4)		92.7	(91.4 - 93.8)	
Could not afford enough to eat or not always nutritious meals	32.0	49.7	(45.8 - 53.6)		58.2	(54.1 - 62.2)		76.2	(72.5 - 79.5)		62.5	(58.7 - 66.2)		61.1	(57.1 - 65.0)		81.8	(78.6 - 84.7)	
Housing instability				0.00			0.00			0.00			0.00			0.01			0
Stable housing	83.0	67.3	(65.2 - 69.3)		71.6	(69.5 - 73.6)		84.8	(82.9 - 86.6)		74.7	(72.7 - 76.5)		69.6	(67.7 - 71.4)		90.8	(89.4 - 92.1)	
Could not pay mortgage on time or lived in 3+ places in past year OR ever experienced homelessness	17.0	47.4	(41.7 - 53.2)		57.3	(51.1 - 63.2)		75.2	(69.4 - 80.1)		63.4	(58.0 - 68.4)		61.3	(55.0 - 67.2)		81.0	(76.6 - 84.7)	
Caregiver mental health[‡]				0.00			0.00			0.00			0.00			0.00			0
Excellent or Very Good	59.7	71.6	(69.3 - 73.7)		75.7	(73.5 - 77.7)		87.6	(85.8 - 89.2)		77.7	(75.5 - 79.9)		72.5	(70.3 - 74.6)		92.8	(91.4 - 94.0)	
Good/Fair/Poor	40.3	53.6	(50.3 - 56.9)		60.1	(56.7 - 63.5)		77.4	(74.1 - 80.3)		65.1	(61.9 - 68.1)		61.4	(58.0 - 64.7)		83.5	(80.7 - 86.0)	
Adverse childhood experiences (ACEs)[§]				0.00			0.00			0.00			0.00			0.00			0
No ACEs	69.7	70.0	(67.8 - 72.1)		74.1	(71.9 - 76.2)		86.5	(84.4 - 88.3)		78.0	(76.1 - 79.8)		71.1	(69.2 - 73.0)		91.8	(90.4 - 93.0)	
1 or more ACEs	30.3	49.7	(45.7 - 53.6)		57.1	(52.8 - 61.2)		75.2	(71.2 - 78.8)		60.4	(56.3 - 64.3)		61.5	(57.2 - 65.5)		82.9	(79.7 - 85.7)	

Table 2. (Continued)

	Sample Distribution (n=11,121)	Overall School Readiness* (n=11,121)			Early Learning Skills (n=10,885)			Social Emotional Development (n=10,977)			Self-Regulation (n=10,851)			Motor Development (n=10,909)			Health (n=11,121)		
	%	%	(95% CI)	p†	%	(95% CI)	p†	%	(95% CI)	p†	%	(95% CI)	p†	%	(95% CI)	p†	%	(95% CI)	p†
Presence of neighborhood amenities‖				0.00			0.00			0.00			0.08			0.00			0
0-2 Amenities	40.5	57.4	(54.1 - 60.7)		62.3	(58.9 - 65.7)		78.7	(75.0 - 82.0)		70.8	(67.7 - 73.7)		63.7	(60.5 - 66.8)		85.2	(82.5 - 87.5)	
3-4 Amenities	59.5	68.5	(66.0 - 70.9)		73.7	(71.2 - 76.0)		86.1	(84.3 - 87.8)		74.2	(71.9 - 76.4)		71.3	(68.9 - 73.6)		91.8	(90.4 - 93.1)	
Rural urban residence				0.00			0.00			0.41			0.37			0.26			0.56
Metropolitan or Urban	87.5	64.7	(62.5 - 66.8)		70.2	(68.0 - 72.3)		83.2	(81.2 - 85.0)		72.9	(70.9 - 74.7)		68.6	(66.5 - 70.6)		89.0	(87.5 - 90.4)	
Non-Metropolitan or Rural	12.5	56.3	(51.2 - 61.3)		59.5	(54.3 -64.6)		80.8	(74.7 - 85.6)		70.5	(65.4 - 75.1)		65.5	(60.4 - 70.2)	87.9		(84.0 - 90.9)	
Medical home				0.00			0.00			0.00			0.00			0.00			0
Yes	47.8	73.7	(71.4 - 75.9)		77.3	(75.1 - 79.4)		89.0	(87.1 - 90.7)		79.5	(77.2 - 81.6)		72.8	(70.5 - 74.9)		93.5	(92.0 - 94.8)	
No	52.2	54.3	(51.3 - 57.2)		61.0	(57.9 - 64.1)		77.2	(74.2 - 80.0)		66.1	(63.3 - 68.9)		64.0	(61.1 - 66.9)		84.6	(82.3 - 86.6)	
Behavioral Characteristics																			
Screen time (avg. weekday)¶				0.00			0.00			0.00			0.00			0.00			0.0044
≤1 hour	41.8	71.1	(68.6 - 73.5)		76.1	(73.7 - 78.4)		87.3	(85.2 - 89.2)		77.1	(74.5 - 79.4)		73.2	(70.7 - 75.5)		91.1	(89.3 - 92.6)	
2+ hours	58.2	58.4	(55.6 - 61.3)		63.8	(60.8 - 66.6)		79.8	(76.9 - 82.3)		69.5	(66.9 - 72.0)		65.0	(62.3 - 67.7)		87.4	(85.3 - 89.2)	
Hours of sleep (avg. day in past week)				0.00			0.00			0.00			0.00			0.03			0
≤9 hours	33.8	55.3	(51.9 - 58.7)		63.0	(59.4 - 66.3)		76.8	(73.3 - 79.9)		66.8	(63.5 - 70.0)		65.1	(61.7 - 68.4)		84.0	(81.0 - 86.6)	
10+ hours	66.2	67.8	(65.3 - 70.2)		71.8	(69.2 - 74.2)		86.0	(83.8 - 88.0)		75.4	(73.3 - 77.5)		69.7	(67.4 - 71.9)		91.6	(90.2 - 92.8)	
Number of days read to/sung to or told stories (past week)				0.00			0.00			0.00			0.00			0.00			0.0001
Both 0-3 days	30.5	48.0	(43.9 - 52.2)		53.6	(49.2 - 58.0)		72.2	(67.7 - 76.3)		67.0	(63.1 - 70.7)		58.2	(53.9 - 62.4)		84.3	(81.1 - 87.1)	
Either/Both 4-6+ days	69.5	70.4	(68.4 - 72.4)		75.4	(73.5 - 77.3)		87.6	(85.9 - 89.1)		75.0	(72.9 - 77.0)		72.6	(70.7 - 74.5)		90.9	(89.5 - 92.2)	
Outdoor play (avg. weekday and weekend)				0.00			0.00			0.00			0.00			0.00			0.0001
≤1 hour	40.5	56.1	(52.8 - 59.4)		62.3	(58.8 - 65.7)		77.1	(73.9 - 80.0)		67.8	(64.6 - 70.8)		63.9	(60.5 - 67.1)		85.4	(82.7 - 87.8)	
2+ hours	59.5	68.3	(65.8 - 70.7)		73.2	(70.8 - 75.5)		86.8	(84.4 - 88.8)		75.9	(73.7 - 78.0)		71.2	(69.0 - 73.3)		91.3	(89.9 - 92.6)	

* Defined as "on track" in 4 to 5 domains with no domain that "needs support."

† Determined by the chi-square test for independence.

‡ Mental health status of survey respondent.

§ Includes hard to cover the basics, like food or housing, on family's income; parent or guardian divorced or separated; parent or guardian died; parent or guardian served time in jail; witnessed domestic violence; victim or witness of neighborhood violence; lived with anyone who was mentally ill, suicidal, or severely depressed; lived with anyone who had a problem with alcohol or drugs; treated or judged unfairly because of their race or ethnic group; and/or treated or judged unfairly because of because of a health condition or disability.

‖ Includes presence of sidewalks or walking paths, park or playground, recreation/community center or boys/girls club, or library or book mobile.

¶ Includes watching TV, videos, or playing video games, utilizing a computer, cell phone or other electronic device not for school.

Table 3. Adjusted Associations With Being "On Track" for Healthy and Ready to Learn Pilot Summary and Domain-Specific Measures, National Survey of Children's Health, 2022

	Overall School Readiness* (n = 10,344)		Early Learning Skills (n = 10,342)		Social Emotional Development (n = 10,343)		Self-Regulation (n = 10,334)		Motor Development (n = 10,326)		Health (n = 11,344)	
	aPR	(95% CI)	aPR	(95% CI)	aPR	(95% CI)	aPR	(95% CI)	aPR	(95% CI)	aPR	(95% CI)
Child Characteristics												
Sex												
Female	Ref		Ref		Ref		Ref		Ref		Ref	
Male	**0.87**	**(0.83–0.91)**	**0.95**	**(0.91–1.00)**	**0.95**	**(0.92–0.98)**	**0.93**	**(0.89–0.98)**	**0.84**	**(0.80–0.89)**	0.99	(0.97–1.02)
Age												
3 y	Ref		Ref		Ref		Ref		Ref		Ref	
4 y	0.97	(0.91–1.03)	0.95	(0.90–1.00)	1.01	(0.97–1.06)	1.05	(0.99–1.11)	0.95	(0.89–1.00)	0.99	(0.96–1.02)
5 y	0.95	(0.88–1.02)	**0.91**	**(0.85–0.98)**	0.97	(0.93–1.02)	1.06	(0.99–1.14)	0.93	(0.85–1.00)	**0.94**	**(0.90–0.98)**
Child in school (including homeschool)												
Yes (preschool, kindergarten, or first grade)	**1.23**	**(1.14–1.32)**	**1.30**	**(1.21–1.40)**	**1.12**	**(1.06–1.17)**	1.01	(0.95–1.07)	**1.17**	**(1.08–1.27)**	1.01	(0.97–1.04)
No	Ref		Ref		Ref		Ref		Ref		Ref	
School by age†												
3 y—school (Yes vs No)	**1.17**	**(1.08–1.28)**	**1.22**	**(1.13–1.31)**	1.06	(1.00–1.12)	1.01	(0.93–1.10)	**1.10**	**(1.02–1.19)**	0.98	(0.94–1.01)
4 y—school (Yes vs No)	**1.21**	**(1.09–1.35)**	**1.33**	**(1.20–1.47)**	1.05	(0.99–1.12)	0.98	(0.90–1.07)	**1.28**	**(1.15–1.43)**	0.99	(0.95–1.03)
5 y—school (Yes vs No)	**1.30**	**(1.08–1.56)**	**1.36**	**(1.13–1.64)**	**1.26**	**(1.12–1.42)**	1.04	(0.91–1.19)	1.16	(0.94–1.41)	1.05	(0.96–1.15)
Race and Ethnicity												
Asian, non-Hispanic	0.90	(0.80–1.02)	**1.12**	**(1.03–1.21)**	0.93	(0.85–1.01)	0.92	(0.83–1.02)	1.06	(0.96–1.16)	**0.89**	**(0.81–0.98)**
Black, non-Hispanic	0.95	(0.87–1.05)	1.01	(0.93–1.10)	0.97	(0.91–1.02)	0.92	(0.84–1.02)	**0.88**	**(0.80–0.98)**	1.02	(0.98–1.06)
Hispanic	0.96	(0.89–1.04)	0.99	(0.93–1.06)	0.97	(0.93–1.02)	0.99	(0.93–1.06)	**1.08**	**(1.01–1.16)**	1.02	(0.99–1.05)
Indigenous, non-Hispanic	1.06	(0.91–1.23)	1.08	(0.93–1.24)	**1.09**	**(1.02–1.17)**	1.03	(0.91–1.16)	1.02	(0.82–1.26)	1.02	(0.94–1.12)
Multiple race, non-Hispanic	0.99	(0.91–1.07)	**1.08**	**(1.01–1.15)**	1.00	(0.96–1.04)	0.99	(0.93–1.06)	1.04	(0.95–1.13)	1.02	(0.99–1.06)
White, non-Hispanic	Ref		Ref		Ref		Ref		Ref		Ref	
Special health care needs status and type												
No special health care need (SHCN)	Ref		Ref		Ref		Ref		Ref		Ref	
SHCN, prescription medication need/ use ONLY	**0.86**	**(0.75–0.99)**	1.01	(0.91–1.13)	0.98	(0.92–1.05)	**0.84**	**(0.71–0.98)**	1.05	(0.94–1.16)	**0.86**	**(0.78–0.95)**
SHCN, elevated service need/use ONLY	**0.61**	**(0.48–0.77)**	**0.85**	**(0.74–0.98)**	**0.71**	**(0.62–0.83)**	**0.62**	**(0.51–0.76)**	**0.80**	**(0.69–0.94)**	**0.88**	**(0.80–0.96)**
SHCN, elevated service need/use + prescription medication need/use	**0.58**	**(0.48–0.71)**	0.87	(0.72–1.05)	**0.78**	**(0.67–0.89)**	**0.72**	**(0.60–0.86)**	**0.79**	**(0.65–0.97)**	**0.65**	**(0.54–0.78)**
SHCN, functional limitations	**0.18**	**(0.12–0.26)**	**0.41**	**(0.32–0.52)**	**0.28**	**(0.22–0.36)**	**0.48**	**(0.39–0.60)**	**0.41**	**(0.32–0.52)**	**0.53**	**(0.46–0.63)**
Family and Community Characteristics												
Primary household language												
English	Ref		Ref		Ref		Ref		Ref		Ref	
Non-English	**0.89**	**(0.80–0.98)**	**0.88**	**(0.80–0.96)**	0.95	(0.89–1.01)	1.00	(0.91–1.09)	**0.87**	**(0.78–0.96)**	**0.95**	**(0.91–0.99)**
Household educational attainment												
≤High school/General Educational Development test	**0.88**	**(0.80–0.96)**	**0.90**	**(0.83–0.97)**	0.97	(0.92–1.02)	**0.92**	**(0.85–1.00)**	**0.89**	**(0.82–0.97)**	**0.96**	**(0.93–1.00)**
Some college/associate degree	0.99	(0.93–1.05)	**0.92**	**(0.87–0.98)**	1.02	(0.98–1.06)	0.99	(0.93–1.05)	1.02	(0.96–1.09)	0.98	(0.95–1.01)
≥Bachelor's degree	Ref		Ref		Ref		Ref		Ref		Ref	
Family income-to-poverty ratio, % poverty												
<100% poverty	0.94	(0.84–1.04)	0.96	(0.89–1.05)	0.98	(0.92–1.05)	1.00	(0.91–1.10)	1.06	(0.96–1.17)	**0.94**	**(0.89–0.99)**
100%–199% poverty	0.99	(0.90–1.08)	0.94	(0.87–1.02)	0.99	(0.93–1.05)	0.99	(0.92–1.08)	1.04	(0.96–1.13)	0.97	(0.93–1.02)
200%–399% poverty	1.00	(0.94–1.07)	0.99	(0.94–1.05)	1.01	(0.97–1.05)	0.99	(0.93–1.06)	1.05	(0.98–1.12)	**0.96**	**(0.93–0.99)**
400%+ poverty	Ref		Ref		Ref		Ref		Ref		Ref	
Food sufficiency												
Could always afford to eat good nutritious meals	Ref		Ref		Ref		Ref		Ref		Ref	
Could not afford enough to eat or not always nutritious meals	**0.93**	**(0.87–1.00)**	0.99	(0.94–1.05)	1.00	(0.96–1.04)	**0.93**	**(0.87–0.99)**	0.97	(0.91–1.04)	**0.97**	**(0.94–1.00)**
Housing instability												

Table 3. (Continued)

	Overall School Readiness* (n = 10,344)		Early Learning Skills (n = 10,342)		Social Emotional Development (n = 10,343)		Self-Regulation (n = 10,334)		Motor Development (n = 10,326)		Health (n = 11,344)	
	aPR	(95% CI)	aPR	(95% CI)	aPR	(95% CI)	aPR	(95% CI)	aPR	(95% CI)	aPR	(95% CI)
Could not pay mortgage on time or lived in 3+ places in past year OR ever experienced homelessness	0.97	(0.89–1.04)	1.02	(0.95–1.08)	1.01	(0.96–1.05)	1.05	(0.98–1.12)	1.02	(0.94–1.10)	0.98	(0.95–1.01)
Stable housing	Ref		Ref		Ref		Ref		Ref		Ref	
Caregiver mental health‡												
Excellent or very good	Ref		Ref		Ref		Ref		Ref		Ref	
Good/Fair/Poor	**0.87**	**(0.83–0.92)**	**0.89**	**(0.85–0.93)**	**0.94**	**(0.91–0.97)**	**0.92**	**(0.88–0.97)**	**0.90**	**(0.86–0.95)**	**0.95**	**(0.93–0.98)**
Adverse childhood experiences (ACEs)§												
No ACEs	Ref		Ref		Ref		Ref		Ref		Ref	
1 or more ACEs	**0.93**	**(0.87–0.99)**	**0.94**	**(0.89–0.99)**	0.98	(0.95–1.02)	**0.89**	**(0.84–0.96)**	0.99	(0.93–1.05)	1.01	(0.98–1.04)
Presence of neighborhood amenities‖												
0-2 Amenities	Ref		Ref		Ref		Ref		Ref		Ref	
3-4 Amenities	**1.08**	**(1.02–1.13)**	**1.05**	**(1.01–1.10)**	**1.04**	**(1.00–1.07)**	1.02	(0.97–1.07)	**1.07**	**(1.02–1.13)**	**1.04**	**(1.01–1.07)**
Medical home												
Yes	**1.08**	**(1.03–1.14)**	**1.06**	**(1.01–1.11)**	1.02	(0.98–1.05)	**1.09**	**(1.04–1.14)**	1.01	(0.96–1.06)	1.02	(1.00–1.05)
No	Ref		Ref		Ref		Ref		Ref		Ref	
Rural urban residence												
Metropolitan or urban	Ref		Ref		Ref		Ref		Ref		Ref	
Nonmetropolitan or rural	**0.91**	**(0.84–0.98)**	**0.91**	**(0.85–0.98)**	0.95	(0.89–1.02)	0.97	(0.91–1.04)	0.99	(0.92–1.07)	1.00	(0.97–1.04)
Behavioral Characteristcs												
Screen time (avg. weekday)¶												
≤1 h	Ref		Ref		Ref		Ref		Ref		Ref	
2+ h	0.96	(0.91–1.01)	**0.95**	**(0.91–0.99)**	1.00	(0.97–1.03)	0.98	(0.94–1.03)	**0.95**	**(0.91–0.99)**	1.00	(0.98–1.03)
Hours of sleep (avg. day in past week)												
≤9 h	Ref		Ref		Ref		Ref		Ref		Ref	
10+ h	1.02	(0.96–1.08)	0.99	(0.94–1.04)	1.03	(0.99–1.07)	1.04	(0.98–1.09)	0.95	(0.90–1.00)	1.02	(0.99–1.05)
Number of days read to/sung to or told stories (past week)												
Both 0–3 d	Ref		Ref		Ref		Ref		Ref		Ref	
Either/Both 4–7 d	**1.16**	**(1.08–1.24)**	**1.15**	**(1.09–1.22)**	**1.09**	**(1.04–1.14)**	1.02	(0.97–1.08)	**1.16**	**(1.08–1.24)**	1.02	(0.99–1.05)
Outdoor pay (avg. weekday and weekend)												
≤1 h	Ref		Ref		Ref		Ref		Ref		Ref	
2+ h	**1.10**	**(1.04–1.16)**	**1.08**	**(1.03–1.14)**	**1.05**	**(1.01–1.09)**	1.05	(0.99–1.10)	1.05	(0.99–1.10)	1.02	(1.00–1.05)
R^2	0.24		0.19		0.22		0.13		0.13		0.18	

The US Census Bureau reviewed this data product for unauthorized disclosure of confidential information and approved the disclosure avoidance practices applied to this release. CBDRB-FY24-POP001-0016.

aPR, adjusted risk ratio.

Statistically significant association are bolded.

* Defined as "on track" in 4 to 5 domains with no domain that "needs support."

† Stratified results obtained with an interaction; main effects for age and school are averaged across categories.

‡ Mental health status of survey respondent.

§ Includes hard to cover the basics, like food or housing, on family's income; parent or guardian divorced or separated; parent or guardian died; parent or guardian served time in jail; witnessed domestic violence; victim or witness of neighborhood violence; lived with anyone who was mentally ill, suicidal, or severely depressed; lived with anyone who had a problem with alcohol or drugs; treated or judged unfairly because of their race or ethnic group; and/or treated or judged unfairly because of because of a health condition or disability.

‖ Includes presence of sidewalks or walking paths, park or playground, recreation/community center or boys/girls club, or library or book mobile.

¶ Includes watching TV, videos, or playing video games, utilizing a computer, cell phone or other electronic device not for school.

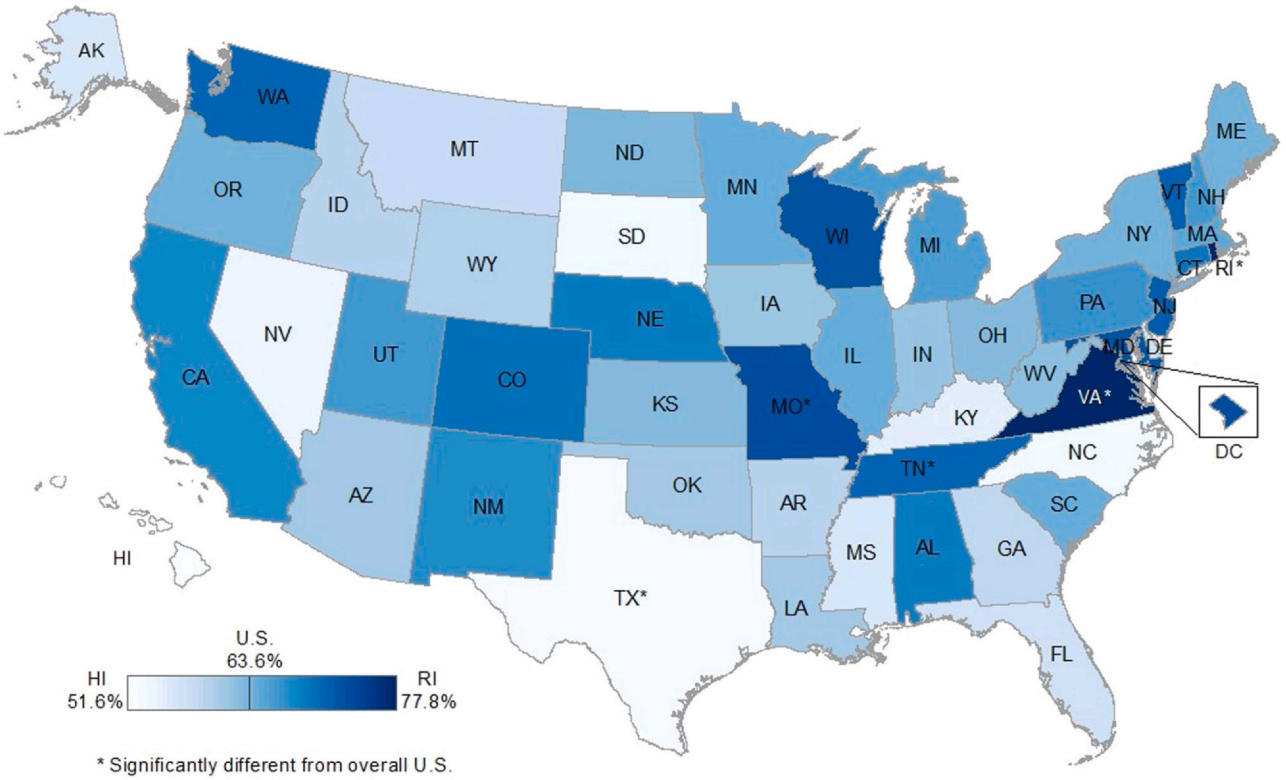

Figure 2. *Proportion of 3 to 5-year-olds healthy and ready to learn, by state, 2022 National Survey of Children's Health.*

amenities, and medical home access were also positively and independently associated with an 8% to 10% increase in HRTL with differences by domain; medical home access was associated with early learning skills and self-regulation.

The risk factor with the largest independent decrease in being HRTL was having SHCN, particularly functional limitations or elevated need or use of services; these children were about 80% and 40% less likely to be HRTL, respectively, with significant disparities seen in every domain. CSHCN who needed/used prescription medication(s) only were 15% less likely to be HRTL and less likely to be "on track" in self-regulation and health but were otherwise no different from their non-CSHCN counterparts. Male sex, home language other than English, lower parental education, and lower parental mental health were other risk factors negatively associated with being HRTL and "on track" in most domains but adjusted differences were generally within 5% to 10%. Food insufficiency and experiencing any ACEs were both independently associated with a 7% reduction in HRTL but were negatively associated with only 2 domains each. Although screen time exceeding AAP recommendations was not independently associated with HRTL, it was associated with a 5% reduction in being "on track" in early learning skills and motor development. After adjustment, rural children also remained around 10% less likely to be HRTL and "on track" in early learning skills.

State-level prevalence estimates for HRTL ranged from a low of 51.6% in Hawaii to a high of 77.8% in Rode Island. Overall, 4 states had rates significantly higher than the national average and 2 states had rates significantly lower (Fig. 2). However, due to small state-level sample sizes, 22 states had imprecise estimates with confidence intervals that exceeded 20% points.

DISCUSSION

Using the latest population-level data, we found that just under two thirds of US children ages 3 to 5 years were HRTL in 2022, indicating that they were "on track" in 4 to 5 domains without needing support in any domain based on parent/caregiver report. Concurrently, 9.0% of this population was identified as "needs support" overall as they were rated as "needs support" in 2 or more individual domains. The proportion of children rated as "on track," "emerging," and "needs support" varied by domain. Most young children (89%) were "on track" with respect to health, with less than 2% needing support, followed by social emotional development (83%). In contrast, approximately 70% were "on track" for early learning skills, self-regulation, and motor development with about 10% "needs support." These findings suggest that opportunities exist to target interventions to populations most in need of support and to focus programs on factors most likely to drive change. Importantly, we found that longstanding economic and racial and ethnic disparities in school readiness were generally absent after accounting for other family and community factors, indicating that disparities are not inevitable and could be eliminated by promoting equity in the environments of young children.

In terms of protective factors, our results strongly underscore the importance of early childhood education

(ECE). Across all 3 age groups, children who were reported to be in school, including preschool, were 20% to 30% more likely to be HRTL, and 20% to 40% more likely to be "on track" with respect to early learning skills, in particular. The benefits of investing early in childhood generally[5] and through ECE programs specifically[23] have been studied extensively, particularly in relation to improving outcomes for at-risk and disadvantaged children. A review of center-based ECE programs reported significant short- and long-term benefits related to health, cognition, and learning as well as evidence for longer-term economic benefits associated with ECE participation.[23] The overall cost-effectiveness of such programs, particularly as a means of supporting those children and families at greatest risk for suboptimal educational, economic, and social trajectories, suggests that increasing ECE participation may yield important benefits for children, families, and their communities.[5,11,12,24] Indeed, the Community Preventive Services Task Force recommends center-based ECE programs to improve educational, social, and health outcomes with a particular emphasis on reducing socioeconomic and racial/ethnic disparities.

Second, at least 2 modifiable behaviors, being read/sung/or told stories to and engaging in outdoor play, were positively associated with being HRTL and "on track" across selected domains. The former replicates findings from our original study and our recommendations regarding the promotion of early literacy behaviors stand. Data on outdoor play were recently added to the NSCH and provide a new lens through which to consider program and policy opportunities. Although much of the research to date on the benefits of physical activity for children has focused on school-aged populations, a 2019 review found significant cognitive and motor development benefits for preschool aged children.[25]

Finally, at the community level, both neighborhood amenities and medical home access were independently associated with being HRTL overall and across multiple domains. The former is consistent with previous research[15,26] and underscores current findings for outdoor play and home- and family-based language development activities. The benefits of the medical home model for children's health care (and related outcomes) have been studied extensively,[27,28] but this is the first time, to our knowledge, that the model has been associated with early learning gains. Of note, we found that, in addition to an increased likelihood of being HRTL, receipt of care in a medical home was associated with being "on track" in both early learning skills and self-regulation. It is possible that these results are a testament to the particular benefits associated with care coordination between service providers within different systems, for example, early childhood professionals, educational centers, and the clinical setting. More work is needed to assess which medical home components may have the greatest leverage and for whom.

The most significant risk factor at the child-level was the presence and type of SHCN. CSHCN with functional difficulties were 50% to 80% less likely to be HRTL and "on track" across individual domains. Of note, they were most likely to be "on track" in health and least likely to be "on track" in social emotional development suggesting that physical health challenges may not be the primary barrier to school readiness for this population. We observed a strong gradient among CSHCN with respect to readiness overall and by domain, such that CSHCN with elevated service utilization (with or without prescription medication use) fared better than those with functional limitations but worse than those who reported medication use only. This latter group varied little from their non-SHCN peers, except with respect to self-regulation and health. Additional research is needed to better elucidate the specific risk and protective factors for school readiness within subpopulations of CSHCN, for example, those with developmental and behavioral conditions, and assess the extent to which they are getting needed services both before and after school entry (eg, early intervention, Individualized Education Program). Findings from a recent analysis by Schlichting and colleagues[29] underscore the connection between the presence of early developmental and/or behavioral concerns and later academic performance. Future programmatic and research efforts could capitalize on developmental screenings commonly administered within the medical home model to identify children who may be less likely to be HRTL, providing referrals and care coordination (and monitoring) to ensure school success.

Children living in households with lower levels of adult educational attainment, where English was not the primary language, or where the family could not always afford nutritious food or enough to eat were less likely to be HRTL. However, the mechanisms through which these factors impact early childhood learning and development are likely varied. For example, we found that food quality and availability were only associated with a decreased likelihood of being "on track" in self-regulation and health. Research has shown that food insecurity can impact children's learning directly through developmental, emotional, and behavioral problems and indirectly through related parental stress and depression.[30–32] The relationship between primary household language and early childhood learning may be even more complex, reflecting both foundational differences in language development trajectories between monolingual and dual-language-learners as well as individual differences in the development of language competencies related to the age of acquisition of the second language and the quality and quantity of exposure to multiple languages, as well as broader socioeconomic and cultural contexts.[33]

While the state-level prevalence of overall HRTL varied by about 25% points, few differences were statistically significant with relatively small state sample sizes. Compared to our prior results, Missouri was the lone state with a consistently higher rate of overall HRTL. State variation will be explored in greater detail, overall and by domain, and with more confidence with additional years of data and sample size.

This study is not without limitations. Causal inferences cannot be drawn due to the cross-sectional nature of NSCH data. Additionally, the data are self-reported and are subject to reporting biases. Lack of familiarity with the skills or competencies assessed, opportunity to observe skills or behaviors, or a suitable comparison against which to evaluate the subject child's mastery of skills may have impacted reporters' assessments. The weighted overall response rate for the survey was 39.1% which may indicate nonresponse bias. However, the nonresponse bias analysis, conducted by the US Census Bureau, found no strong or consistent evidence of nonresponse in the 2022 NSCH.[34] We presented state-level estimates in the interest of full transparency; however, many states had imprecise estimates that should be interpreted with caution. Notably, while extensive work was completed to refine and validate the new survey items, and summary and domain measures, additional work is needed to establish the predictive validity of the HRTL measure in relation to school-based assessments after kindergarten entry. While not necessarily a limitation, it is also important to note that these data were closely preceded by the COVID-19 pandemic and attendant impacts to learning and early childhood experiences. Future monitoring that indicates HRTL improvement could be suggestive of COVID impact and subsequent postpandemic recovery. Finally, future analyses with additional sample from subsequent survey administrations should investigate more detailed domain- and population-specific patterns and pathways that can inform targeted interventions for those less likely to be HRTL.

This study provides an updated estimate of the proportion of young children in the United States who are healthy and ready to learn, reflecting a multiyear effort to refine the first standardized, multidimensional population-level measure of school readiness available at both the national and state levels. While most young children were HRTL, achievement of key age-appropriate skills and abilities varied widely by domain as well as child, family, community, and behavioral characteristics. These results highlight the importance of modifiable risk and protective factors and suggest opportunities for multisector partnerships and innovative interventions to help all children enter kindergarten healthy and ready to learn.

Disclaimer

The views expressed in this article are those of the authors and do not necessarily reflect the official policies of the US Department of Health and Human Services or the Health Resources and Services Administration, nor does mention of the department or agency names imply endorsement by the US government.

Declaration of Competing Interest

The authors declared no potential conflicts of interest with respect to the research, authorship, and/or publication of this article.

Supplementary Data

Supplementary data associated with this article can be found in the online version at doi:10.1016/j.acap.2024.02.013.

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