Technical Appendix

Toward Measurement for a Whole Child Health Policy: Validity and National and State Prevalence of the Integrated Child Risk Index

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NOTE: References noted are the same as included in the main paper and numbered the same as well. See the main paper for specific references.

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Appendix A: Methods Notes

<u>Part A1:</u> **Details about the 2016, 2017, 2018 National Survey of Children's Health (NSCH) (3 years combined) sample size and response rate**

The 2016, 2017 and 2018 NSCH used address-based sampling and was self-administered (paper or online) by the parent or guardian of a randomly selected child in a sampled household.[41,42] Between July 2016 and February 2017, the 2016 NSCH sampled 364,150 households, resulting in 50,212 completed questionnaires for children ages 0-17. Here "caregiver" refers to a child's parent or guardian. Between August 2017 and February 2018, the 2017 NSCH sampled 156,675 households, resulting in 21,599 completed questionnaires. Between June 2018 and January 2019, the 2018 NSCH sampled 176,052 households, resulting in 30,530 completed questionnaires for children ages 0-17. Combined, the 2016-2018 NSCH data includes 102,341 completed questionnaires. The combined 2016-2017 NSCH data includes 71,811 completed questionnaires.

For the 2016 NSCH, the weighted response rate was 40.7% and the interview completion rate, defined as the probability that a household initiating the survey will complete it, was 69.7%. For the 2017 NSCH, the weighted response rate was 37.4%, and the interview completion rate was 70.9%. For the 2018 NSCH, the weighted response rate was 43.1%, and the interview completion rate was 78.0%. For more information on the 2016, 2017 and 2018 NSCH methodology, visit the CAHMI's Data Resource Center website: https://www.childhealthdata.org/learn-about-the-nsch/methods.

<u>Part A2:</u> **Details about missing values for study variables in the 2016, 2017 and 2018 NSCH**

For this analysis, missing values were counted when responses were missing to survey questions that were meant to be answered. Missing values were not counted if responses were missing because a respondent appropriately skipped a question or because a respondent exited the survey before viewing a question. Table one shows the missing value rates across study outcome variables and each of the 12 Integrated Child Risk Index items/measures are included in Table A1. Missing value rates from a low of 0% to 2.8% for the "treated or judged unfairly due to race or ethnicity." Additional analyses were conducted to evaluate differences in ICRI item/measure prevalence between children with or without responses to this item. Results are available upon request and are not shown here since 2.8% is within the acceptable range of missing values using standards in the field.

Table A1: Missing values across outcome variables and Integrated Child Risk Index items.

	Missing values from the 2016, 2017 and 2018 NSCH (3 years combined)		Missing values from the 2016- 2017 (2 years combined)	
	n	Unweighted %	n	Unweighted %
Child Demographics, Insurance Status/Type				
Age	0	0%	0	0%
Sex (imputed)	0	0%	0	0%
Race (imputed)	0	0%	0	0%
Household poverty level (FPL) (imputed)	0	0%	0	0%
Insurance status and type	1484	1.5%	1062	1.5%
Study Outcomes				
Hospital emergency room utilization	407	0.5%	282	0.4%
School engagement, 6-17 years	N/A	N/A	698	1.4%
Child Flourishing Index (CFI) criteria, 6 months-17 years	N/A	N/A	143	0.2%
Integrated Child Risk Index				
Integrated Child Risk Index – (ICRI) (missing to any domain)	1481	1.4%	1045	1.5%
Medical Health Risk – 4 criteria				
Medical Health Risk – (missing to 2 or more criteria)	0	0%	0	0%
Children with more complex special health care needs	0	0%	0	0%
Overall health status	284	0.3%	202	0.3%
Chronic conditions (25 conditions)	0	0%	0	0%
Functional difficulties - 11 difficulties	162	0.2%	114	0.2%
Social Health Risk - 4 criteria				
Social Health Risk – (missing to 2 or more criteria)	1461	1.4%	1030	1.4%
Food insufficiency	1966	1.9%	1447	2.0%
Economic hardship	1825	1.8%	1303	1.8%
Neighborhood safety/exposure to violence	1713	1.7%	1202	1.7%
Treated of judged unfairly due to race/ethnicity	2811	2.7%	1998	2.8%
Relational Health Risk - 4 criteria				
Relational Health Risk – (missing to 2 or more criteria)	728	0.7%	504	0.7%
Adverse Childhood Experiences (ACEs) – 6 ACEs items	2293	2.2%	1597	2.2%
Parental aggravation	929	0.9%	642	0.9%
Caregiver mental health	1949	1.9%	1372	1.9%
Parental coping/ emotional support	722	0.7%	492	0.7%

Part A3: Measurement details for Integrated Child Risk Index risk criteria measures (with references)

Medical Health Risk (MHR)	
The Medical Health Risk domain of the Integrated Child Risk Index assesses medical health risks that have been associated in prior studies with greater likelihood of having needs for complex health and related services, poorer physical, mental and educational outcomes. The criteria included the medical health risk domain assess medical complexity risks beyond diagnoses in order to more accurately assess health risks that have implications for outcomes as well as health care utilization.	
Children with More Complex Special Health Care Needs: Child met "more complex" CSHCN Screener criteria	Using the validated Children with Special Health Care Needs (CSHCN) Screener, children are classified as having an ongoing condition requiring more than routine health services.[42,56] The 5-item CSHCN Screener identifies children with special health needs based on the definition provided by the federal Maternal and Child Health Bureau (MCHB). CSHCN experience "more complex health care needs" if they qualify on one or more of the four screening criteria addressing elevated need or use of specialized services, therapies, or functional limitations. Children in this group may need or use prescription medications, but also meet one of the four other CSHCN Screener criteria. CSHCN with "less complex' needs experience chronic health conditions that are managed primarily through prescription medication.
Multiple Chronic Conditions: Child had two or more chronic or lifelong condition diagnoses	Having two or more of the chronic or life-long conditions was assessed by whether children had two or more of the following conditions included in the NSCH. Chronic allergies (including food, drug, insect or other), arthritis, asthma, blood disorders (such as sickle cell disease, thalassemia, or hemophilia), brain injury, concussion or head injury, cerebral palsy, cystic fibrosis, diabetes, Down Syndrome, epilepsy or seizure disorder, genetic or inherited condition, heart condition, frequent or severe headaches including migraine, Tourette Syndrome, anxiety problems, depression, behavioral or conduct problems, substance abuse disorder, developmental delay, intellectual disability/mental retardation, speech or other language disorder, learning disability, other mental health condition, Autism or Autism Spectrum Disorder (ASD), or ADD or ADHD.[42,56,57]
Functional Difficulties: Child had one or more of eleven frequent, chronic and/or serious functional difficulties	Children experience "one or more of eleven frequent, chronic and/or serious functional difficulties" if their caregiver reported on any one or more of the following eleven functional difficulties with: "breathing or other respiratory problems," "eating or swallowing," "digesting food," "repeated or chronic physical pain, including headaches," "using hands (age 0-5 years)," "coordinating or moving around (age 0-5 years)," "serious difficulty concentrating, remembering, or making decisions (age 6-17 years)," "serious difficulty walking or climbing stairs (age 6-17 years)," "difficulty doing errands along (age 12-17 years)," "hearing problems," "vision problems." These functional difficulties correlate with the International Classification of Functioning, Disability and Health: Children and Youth version (ICF-CY).[58] Nearly all children meeting CSHCN Screener criteria also experience functional difficulties.[56] Yet, some children not meeting the "more complex" CSHCN Screener criteria may still have substantial functional difficulties so this is maintained in the ICRI. In addition, the detail on functional difficulties can be valuable for clinical and program decisions.[56,57]

Overall Health Status: Child had poor/fair overall health status	Children we categorized as having "fair or poor health status" based on caregiver report to a single item on overall health status.[59] Due to the high positivity bias in parent response to this question, a very low prevalence of children in the US are expected to qualify as "fair or poor" overall health. One scale of "Excellent, Very Good, Good, Fair, Poor", typically responses of "good, fair or poor" indicate child health problems.[59]
Social Health Risk (SHR)	
The Social Health Risk domain assesses social risks that have been previously associated with physical, mental and educational outcomes. The criteria included in the Social Health Risk domain align with prominent models of social determinants of health[64,65] and particularly requiring a societal/community response.	
Food Insecurity: Sometimes or often could not afford enough to eat	Children experience food insecurity if caregiver reported "sometimes we could not afford enough to eat" or "often we could not afford enough to eat" to the item: "Which of these statements best describes your household's ability to afford the food you need DURING THE PAST 12 MONTHS?".[10,11,42]
Economic Hardship: Somewhat often/ very often hard to cover costs of basic needs, like food, housing	The NSCH item for economic hardship in the 2016 and 2017 NSCH, was, "since this child was born, how often has it been very hard to get by on your family's income – hard to cover the basics like food or housing?" In 2018, the NSCH item was "since this child was born, how often has it been very hard to cover the basics, like food and housing, on your family's income?" Response options remained the same throughout all 2016, 2017 and 2018 NSCH. Also note that the "economic hardship" item included in the ICRI is not the same as poverty. Nearly 70% (68.8%) of children whose caregiver reported "economic hardship" have household incomes less than 200% of the FPL. 36.8% reporting "economic hardship" report poverty level income (0-99% FPL). This means that over 30% reporting economic hardship (31.2%) have incomes greater than 200% FPL and 7.7% have incomes 400% or above FPL.[29,30,42]
Neighborhood Safety/Violence: Lived in an unsafe neighborhood or where the child was a victim of or witnessed violence	Children experience this risk if caregiver reported "somewhat or definitely disagree" to item: "Does this child live in a safe neighborhood?" or if caregiver reported child has ever been a "victim of violence or witnessed violence in neighborhood."[13,39,42]
Disadvantaged Due to Racism: Child has been treated or judged unfairly due to their race/ethnic group	Children experience this risk if caregiver reported child has "ever experienced the following: treated or judged unfairly because of his or her race or ethnic group." This item refers to specific instances where caregivers have witnessed child treated unfairly due to race/ethnicity, beyond systemic racism or microaggressions.[14,31,42] While prevalence is low, it is significantly higher for black, non-Hispanic children (10%) than for Hispanic (4.3%) and white (1.2%) children. This item has been validated and is continually included in the NSCH. For more details, visit the CAHMI's Data Resource Center: www.childhealthdata.org.
Relational Health Risk (RHR)	
The Relational Health Risk domain includes criteria from research-based models of social determinants of health that specifically assess risks to the safety, stability and nurturing qualities of the relationships children experience in the household/family. These items differ from the Social Health Risk domain in that they require individual and family level and often also at the societal/community level interventions.[1-4]	
Multiple Adverse Childhood Experiences (ACEs): Exposed to two or more household level ACEs	Children experience this risk if caregiver reported at least two categories of exposure to adverse childhood experiences (ACEs) based on the ACEs indicator included in the National Survey of Children's Health (NSCH).[60] Topics included here are: parent/guardian divorced or separated; parent/guardian died; parent/guardian served time in jail; child saw or heard

	physical violence in the home; child lived with anyone who was mentally ill, suicidal, or severely depressed; child lived with anyone who had a problem with alcohol or drugs. These items align with the CDC Kaiser study[32] on ACEs and relate to household-level adverse experiences, with the exception of parental death which we included as well.[60] Research strongly supports ACEs as a risk factor for early and lifelong well-being of children.[16,17,19]
Low Parental Mental Health: One or two caregivers reported poor or fair mental health	Children experience this risk if caregiver reported having "fair or poor" to the item: "what is the status of mother's/father's mental and emotional health, in general?" [35,42,54]
High Parental Aggravation: Child's caregiver usually/always felt aggravated with child	Caregivers who "usually or often feel aggravated" are defined as those who reported that during the last month, on average, they "usually or always felt their child was much harder to care for than other children," or were "usually or always bothered a lot by their child's behavior," or "usually or always felt angry with their children."[42,61,62]
Low Parent Coping/Emotional Support: Child's caregiver is not coping well and/or lacks emotional support for parenting	Children experience this risk if caregiver reported "not very well" or "not very well at all" to item: "how are you coping with day-to-day demands of raising children" or if caregiver reported "no" to item: "do you have someone to turn to for day- to-day emotional support with parenting or raising children."[20,35,63]

Part A4: Correlations across the 12 Integrated Child Risk Index criteria

Pearson's correlations were calculated across all binomial criteria included in the Integrated Child Risk Index. Pearson's correlations coefficients ranged from 0.018 to 0.596, with only 5 cases where correlation was greater than 0.30. These findings show that overall ICRI criteria are not highly redundant.

	Children with More Complex Special Health Care Needs	Poor, Fair Overall Health Status	2+ Chronic Conditions	Serious, Frequent, Ongoing Functional Difficulties	Food Insufficiency, Insecurity	Economic Hardship to Meet Basic Needs	Neighborhood Safety/ Exposure to Violence	Treated or Judged Unfairly Due to Race or Ethnicity	2+ Adverse Childhood Experiences	Poor, Fair Caregiver Mental Health	High Aggravation with Parenting	Low Parent Coping/ Emotional Support-
Children with More Complex Special Health Care Needs	x	0.201	0.596	0.407	0.086	0.138	0.131	0.060	0.175	0.143	0.327	0.028
Poor, Fair Overall Health Status	x	x	0.156	0.162	0.061	0.087	0.068	0.018	0.052	0.080	0.177	0.041
2+ Chronic Conditions	x	x	x	0.446	0.094	0.144	0.126	0.074	0.183	0.144	0.273	0.020
Serious, Frequent, Ongoing Functional Difficulties	x	x	x	x	0.104	0.161	0.122	0.071	0.152	0.155	0.212	0.046
Food Insufficiency, Insecurity	x	x	x	x	x	0.373	0.141	0.063	0.159	0.178	0.065	0.071
Economic Hardship to Meet Basic Needs	x	x	x	x	x	x	0.173	0.079	0.221	0.256	0.101	0.074

	Children with More Complex Special Health Care Needs	Poor, Fair Overall Health Status	2+ Chronic Conditions	Serious, Frequent, Ongoing Functional Difficulties	Food Insufficiency, Insecurity	Economic Hardship to Meet Basic Needs	Neighborhood Safety/ Exposure to Violence	Treated or Judged Unfairly Due to Race or Ethnicity	2+ Adverse Childhood Experiences	Poor, Fair Caregiver Mental Health	High Aggravation with Parenting	Low Parent Coping/ Emotional Support-
Neighborhood Safety/ Exposure to Violence	x	x	x	x	x	x	x	0.153	0.256	0.142	0.104	0.056
Treated or Judged Unfairly Due to Race/Ethnicity	x	x	x	x	x	x	x	x	0.126	0.070	0.045	0.028
2+ Adverse Childhood Experiences	x	x	x	x	x	x	x	x	x	0.212	0.107	0.040
Poor, Fair Caregiver Mental Health	x	x	x	x	x	x	x	x	x	x	0.118	0.094
High Aggravation with Parenting	x	x	x	x	x	x	x	x	x	x	x	0.089
Low Parent Coping/ Emotional Support	x	x	x	x	x	x	x	x	x	x	x	x

Part A5: Measurement details for study ICRI validation outcome measures

Hospital Emergency Room Utilization	Children are considered to have hospital emergency room utilization if caregiver reported "1 or more hospital emergency room visits for any health reason in the past 12 months."[42]
Forgone Health Care	Children are considered to have forgone needed health care if caregiver reported "did not receive needed health care" to item: "during the past 12 months, was there any time when this child needed health care but it was not received?"[42] While this item has been validated, it is often under-reported due to caregiver bias. Due to this, sample size did not allow for regression analyses using forgone needed health care variable. More information is available at the CAHMI's Data Resource Center's website: http://childhealthdata.org/browse/survey?s=2&y=24&r=1
Child Flourishing Index (CFI), age 6 months-17 years	For children 6 months-5 years, this index was constructed based on the number of "definitely true" responses by caregivers to four survey items (possible score of 0-4). Caregivers are asked how well each of the three items describes their child: "bounces back quickly when things don't go their way," "are affectionate and tender with parent," "show interest and curiosity in learning new things," "smile and laugh a lot." Those with an index of 4 were classified as flourishing.[17,42] For children age 6-17 years, this index was constructed based on the number of "definitely true" responses by caregivers to three survey items (possible score 0-3). Caregivers are asked how well each of the three items describes their child: "shows interest and curiosity in learning new things," "works to finish tasks he or she starts," and "stays calm and in control when faced with a challenge." Those children with an index of 3 were classified as flourishing ("definitely true" for all three descriptions). This index has been validated and documented elsewhere.[17,66]
Ready to Engage in School (3-5 years)	Children age 3-5 years met criteria to be ready to engage in school if their caregivers reported they were "very confident" to the question "how confident are you that this child will be successful in elementary or primary school?" (2016 NSCH) or "completely confident" to the question "how confident are you that this child is ready to be in school?" (2017 and 2018 NSCH).[42] This item was found to be highly correlated with the robust "Healthy and Ready to Learn" measure derived from 18 individual NSCH survey items. The "Healthy and Ready to Learn" measure considers age-relevant attainment of cognitive skills, as well as social, emotional and physical aspects of a young child's readiness to learn in school.[67] For more information, view Child Trend's report on the Healthy and Ready to Learn Measure: https://www.childtrends.org/wp-content/uploads/2019/08/NOM-FAQ_ChildTrends_Aug2019.pdf
Child School Engagement (6-17 years)	Children met criteria for being engaged in school if their caregiver reported "definitely true" to both of the following items: their child "cares about doing well in school" and "does all required homework."[42] This item was combined with the above item "Ready to Engage in School" to create a composite "Engaged/Ready to Engage in School" variable for children ages 3 -17 years.[42]

Appendix B: Mapping of the Integrated Child Risk Index risk criteria measures to standardized social determinants of health measurement instruments being used in the field

Part B1: A conceptual crosswalk between the Integrated Child Risk Index and the Accountable Health Communities (AHC) Health-Related Social Needs (HRSN) Screening Tool

The mapped by domain to the AHC HRSN Screening Tool domains (13 domains, 26 total items).[63] The 12-item ICRI reflected aspects of all domains included in the AHC HRSN except for housing instability, physical activity and education. Items related to housing instability and physical activity (caregiver or child) are not included in the NSCH.

Accountable Health Communities (AHC) Health-Related Social Needs (HRSN) Screening Tool from the Centers for Medicare & Medicaid Services (CMS)[63]	*Integrated Child Risk Index* Check mark indicate if each domain contains an item that reflects (R) or contributes to *(C)* each item in the AHC HRSN.		
	Medical Health Risk domain	Social Health Risk domain	Relational Health Risk domain
Housing instability		✓ R, C	
Food insecurity		✓ R	
Transportation problems		✓ R	
Utility help needs		✓ R	
Interpersonal safety		✓ R	✓ R
Financial strain		✓ R	
Employment		✓ R	
Family and community support			✓ R
Education			
Physical activity			
Substance use			✓ R
Mental health			✓ R, C
Disabilities	✓ R		

Part B2: A conceptual crosswalk between the Integrated Child Risk Index social health risk and relational health risk criteria to prominent measures of social determinants of health (SDOH) used in the field today

Summary of ten overlapping domains of social determinants of health included across eight prominent measures of SDOH[2,26,36,37,64,65,76]	Social Health Risk Domain Items				Relational Health Risk Domain Items			
	Check mark indicates if item reflects (R), *contributes to (C)* or is a *precursor for (P)* each social determinant of health domain.				Check mark indicates if item reflects (R), *contributes to (C)* or is a *precursor for (P)* each social determinant of health domain.			
	Sometimes/often could not afford enough to eat	Somewhat often/ very often hard to cover costs of basic needs, like food, Housing	Lived in an unsafe neighborhood or where the child had been a victim or witness of violence	Saw child being treated or judged unfairly due to his or her race or ethnic group	Two or more household level adverse childhood experiences have been present	One or two caregivers reported poor or fair mental health	Child's caregiver usually/always felt aggravated with child	Child's caregiver is not coping well and/or lacks emotional support for parenting
Housing Instability: homelessness, unsafe housing quality, inability to pay mortgage/rent, eviction		✓ C, R						
Food Insecurity: limited or uncertain access to adequate & nutritious food	✓ R	✓ C						
Financial Strain: Unemployment, difficulty paying bills, medication/ healthcare underuse due to cost, struggle with basic needs		✓ R						
Discrimination: racism, stigmatization, hostility and unemployment			✓ P, C	✓ R				
Social Isolation & Supports: lack of family and/or friend networks, minimal community contacts, social engagement			✓ P		✓ C	✓ C		✓ R

Summary of ten overlapping domains of social determinants of health included across eight prominent measures of SDOH[2,26,36,37,64,65,76]	Social Health Risk Domain Items Check mark indicates if item reflects (R), *contributes to (C)* or is a *precursor for (P)* each social determinant of health domain.				Relational Health Risk Domain Items Check mark indicates if item reflects (R), *contributes to (C)* or is a *precursor for (P)* each social determinant of health domain.			
	Sometimes/often could not afford enough to eat	Somewhat often/ very often hard to cover costs of basic needs, like food, housing	Lived in an unsafe neighborhood or where the child had been a victim or witness of violence	Saw child being treated or judged unfairly due to his or her race or ethnic group	Two or more household level adverse childhood experiences have been present	One or two caregivers reported poor or fair mental health	Child's caregiver usually/always felt aggravated with child	Child's caregiver is not coping well and/or lacks emotional support for parenting
Addiction: alcohol, tobacco and substance use/addiction					✓ R	✓ C		
Exposure to Violence: intimate partner violence, community violence			✓ R		✓ R			
Stress: daily, chronic stress in any aspect of life (work, school, home, etc.)	✓ C	✓ C	✓ C	✓ C	✓ R	✓ R	✓ C	✓ C
Parent Personal Well-Being maternal/caregiver well-being; caregiver tobacco, alcohol and/or drug use/addiction	✓ P	✓ P	✓ P	✓ P	✓ R	✓ R		✓ C
Parent Relationship Well-Being: ability to provide safe, stable, nurturing relationships; bonding and attachment; knowledge of parenting and development; relationship security, stability					✓ R	✓ C	✓ R	✓ R

Appendix C: Additional findings regarding analysis of associations across Integrate Child Risk Index (ICRI) domains

Part C1: Associations between children experiencing each study outcome (emergency room visits, forgone health care, child flourishing, school engagement/ready to engage in school) and their Integrate Child Risk Index (ICRI) individual medical, social and relational health risk component scores[a]

	All children[a]	Children age 0-17 who experienced 1+ hospital emergency room visits in the past 12 months[a]		Children age 0-17 who experienced forgone health care in the past 12 months[a]		Children age 6 months -17 years who met Child Flourishing Index criteria[b]		Children age 3-17 who met criteria for being engaged (age 6-17) or caregiver was confident child was ready to engage (age 3-5) in school[b]	
	Percent	Percent	Adjusted odds ratio[c]	Percent	Adjusted odds ratio[c]	Percent	Adjusted odds ratio[c]	Percent	Adjusted odds ratio[c]
All US children	100%	19.9%	N/A	3.1%	N/A	47.8%	N/A	69.1%	N/A
Medical Health Risk ICRI Component: criteria count[d]									
0	66.4%	15.5%	Ref	1.4%	Ref	56.0%	4.14 (3.69 – 4.64)	77.2%	3.84 (3.45 – 4.27)
1	17.4%	23.8%	1.60 (1.45 – 1.77)	3.6%	2.35 (1.79 – 3.09)	42.5%	2.38 (2.07 – 2.74)	65.2%	2.19 (1.91 – 2.50)
2 to 4	16.2%	33.7%	2.81 (2.55 – 3.09)	9.3%	6.69 (5.32 – 8.40)	20.3%	Ref	44.1%	Ref
Social Health Risk ICRI Component: criteria count[d]									
0	71.8%	16.9%	Ref	1.5%	Ref	52.7%	1.77 (1.50 – 2.09)	73.8%	2.20 (1.87 – 2.58)
1	19.5%	25.2%	1.40 (1.27 – 1.54)	4.8%	2.91 (2.26 – 3.75)	38.7%	1.13 (0.95 – 1.34)	61.8%	1.36 (1.15 – 1.62)
2 to 4	8.7%	32.1%	1.74 (1.52 – 2.01)	12.0%	7.15 (5.61 – 9.12)	33.0%	Ref	52.8%	Ref
Relational Health Risk ICRI Component: criteria count[d]									
0	60.5%	17.8%	Ref	1.5%	Ref	54.2%	2.70 (2.25 – 3.24)	74.4%	2.96 (2.54 – 3.44)
1	31.3%	21.2%	1.08 (0.98 – 1.18)	3.9%	1.90 (1.51 – 2.40)	41.8%	2.00 (1.65 – 2.43)	66.4%	2.23 (1.90 – 2.61)
2 to 4	8.3%	30.2%	1.70 (1.50 – 1.93)	11.6%	6.06 (4.74 – 7.73)	24.6%	Ref	45.1%	Ref

NOTES All percentages are weighted to represent the child population nationally and in each state. [a]Data source: 2016-2018 (3 years combined) National Survey of Children's Health; [b]Data source: 2016-2017 (2 years combined) National Survey of Children's Health; [c]Adjusted Odds Ratios (aORs) are adjusted for age, sex, race/ethnicity, income and insurance coverage type. See Appendix A5[44] for detailed description of each study outcome variable. See Technical Appendix D1[44] for the prevalence of US children who experienced Integrated Child Risk Index criteria by child responses to each outcome measure. See Technical Appendix D2[44] for the prevalence of study outcomes by child's age, race/ethnicity and household income and insurance status and type groups. See Technical Appendix D3-D9[44] for regression analysis details. [d]aORs are not adjusted for other domains.

Part C2: National and across-state prevalence of children experiencing Integrated Child Risk Index (ICRI) criteria for each ICRI scoring options, individual domains (medical, social and/or relational health risk) and by each ICRI risk criteria: by child's age, sex and income[a]

	All children, age 0-17 years		Child age			Child sex		Household income (Federal Poverty Level-FPL)			
	Percent	State range (%)	0-5 years	6-11 years	12-17 years	Male	Female	0%-99% FPL	100-199% FPL	200-399% FPL	400%+ FPL
All US children	100%	N/A	32.2%	33.8%	33.9%	51.1%	48.9%	20.7%	21.8%	27.0%	30.5%
Experienced 1+ ICRI criteria[b]	63.7%	54.7 – 72.4	55.3%	65.3%	70.2%	65.1%	62.3%	81.6%	74.2%	60.6%	47.3%
Scoring Option 1. Domain Count: Number of domains in which any risks are experienced[b]											
0	36.3%	27.6 - 45.3	44.7%	34.7%	29.8%	34.9%	37.7%	18.4%	25.8%	39.4%	52.7%
1	34.9%	29.5 - 38.5	33.0%	35.4%	36.3%	35.2%	34.6%	34.6%	36.5%	36.0%	33.1%
2	20.0%	14.8 - 26.1	17.2%	20.4%	22.3%	20.7%	19.3%	29.9%	25.5%	17.8%	11.5%
3	8.8%	5.3 - 12.3	5.2%	9.5%	11.6%	9.3%	8.4%	17.2%	12.1%	6.8%	2.8%
Scoring Option 2. Domain Combinations: Mutually exclusive groups[b]											
No ICRI risks experienced	36.3%	27.6 - 45.3	44.7%	34.7%	29.8%	34.9%	37.7%	18.4%	25.8%	39.4%	52.7%
Only Medical Health Risks	12.0%	9.8 - 15.9	11.4%	12.1%	12.5%	12.8%	11.2%	7.7%	9.6%	12.8%	15.9%
Only Social Health Risks	7.5%	5.5 - 10.8	9.2%	6.7%	6.6%	7.3%	7.7%	9.4%	10.2%	8.4%	3.4%
Only Relational Health Risks	15.4%	9.2 - 20.6	12.4%	16.5%	17.2%	15.0%	15.8%	17.5%	16.7%	14.8%	13.7%
Only Medical & Social Risks	4.7%	2.8 - 7.1	4.6%	4.5%	5.0%	5.0%	4.4%	6.7%	6.4%	4.7%	2.2%
Only Medical & Relational Risks	8.1%	5.2 - 11.3	6.7%	7.9%	9.6%	8.7%	7.4%	9.3%	8.6%	7.8%	7.1%
Only Social & Relational Risks	7.2%	4.1 - 9.6	5.9%	8.0%	7.8%	7.1%	7.4%	13.9%	10.6%	5.3%	2.1%
Medical, Social & Relational Risks	8.8%	5.3 - 12.3	5.2%	9.5%	11.6%	9.3%	8.4%	17.2%	12.1%	6.8%	2.8%
Scoring Option 3. Criterion Count: Number of ICRI criteria experienced[b]											
0	36.3%	27.6 - 45.3	44.7%	34.7%	29.8%	34.9%	37.7%	18.4%	25.8%	39.4%	52.7%
1	27.4%	21.2 - 32.9	27.7%	27.2%	27.4%	26.9%	28.0%	27.0%	28.8%	28.8%	25.5%
2	15.0%	11.3- 19.8	14.5%	14.5%	15.8%	15.3%	14.7%	19.0%	18.1%	14.7%	10.3%

	All children, age 0-17 years		Child age			Child sex		Household income (Federal Poverty Level-FPL)			
	Percent	State range (%)	0-5 years	6-11 years	12-17 years	Male	Female	0%-99% FPL	100-199% FPL	200-399% FPL	400%+ FPL
3 to 4	14.3%	11.2 - 18.3	10.1%	15.7%	16.7%	15.1%	13.4%	21.8%	17.9%	11.8%	8.9%
5 to 12	7.1%	3.9 - 9.7	3.0%	7.9%	10.2%	7.9%	6.3%	13.8%	9.4%	5.3%	2.6%
Medical Health Risk ICRI Domain: criteria count & individual criteria [b]											
1+	33.6%	27.1 - 42.7	28.0%	34.0%	38.6%	35.8%	31.4%	40.7%	36.8%	32.0%	28.0%
0	66.4%	57.3 - 72.9	72.0%	66.0%	61.4%	64.2%	68.6%	59.3%	63.2%	68.0%	72.0%
1	17.4%	13.4 - 21.6	19.9%	15.2%	17.1%	17.4%	17.4%	19.2%	19.1%	17.4%	14.9%
2	8.2%	6.0 - 10.8	5.2%	8.6%	10.6%	8.9%	7.5%	9.6%	8.4%	8.0%	7.3%
3 to 4	8.0%	4.9 - 10.5	2.9%	10.2%	10.8%	9.6%	6.4%	12.0%	9.3%	6.6%	5.7%
Met "more complex" CSHCN Screener criteria[b]	13.3%	9.2 - 17.0	7.6%	15.3%	16.8%	15.4%	11.1%	16.8%	14.4%	11.8%	11.4%
Had poor/fair overall health status [b,c]	1.6%	0.6[d] - 2.8	1.1%	1.4%	2.2%	1.7%	1.5%	3.4%	1.8%	1.0%	0.6%
Had two or more chronic or lifelong condition diagnoses[b]	17.5%	12.0 -24.2	6.8%	20.8%	24.4%	20.0%	14.9%	21.4%	18.7%	16.2%	15.1%
Had one or more of eleven frequent, chronic and/or serious functional difficulties[b]	26.4%	21.3 - 32.8	24.0%	26.2%	28.9%	27.6%	25.1%	34.5%	29.8%	24.6%	20.1%
Social Health Risk ICRI Domain: criteria count & individual criteria[b,c]											
1+	28.2%	21.7 - 35.1	24.8%	28.8%	30.9%	28.6%	27.9%	47.1%	39.3%	25.2%	10.5%
0	71.8%	64.9 - 78.3	75.2%	71.2%	69.1%	71.4%	72.1%	52.9%	60.7%	74.8%	89.5%
1	19.5%	16.1 - 24.4	18.0%	19.9%	20.5%	19.8%	19.2%	28.2%	25.9%	19.7%	9.0%
2	6.7%	3.3 - 10.5	5.8%	6.8%	7.7%	6.9%	6.6%	14.0%	10.3%	4.6%	1.3%
3 to 4	2.0%	0.6[d] -3.3	1.1%	2.1%	2.7%	1.9%	2.1%	4.9%	3.1%	1.0%	0.2%
Food insecurity: Sometimes or often could not afford enough to eat[b,c]	6.1%	2.6 - 8.7	5.8%	6.0%	6.6%	6.2%	6.1%	14.7%	9.8%	3.1%	0.6%

	All children, age 0-17 years		Child age			Child sex		Household income (Federal Poverty Level-FPL)			
	Percent	State range (%)	0-5 years	6-11 years	12-17 years	Male	Female	0%-99% FPL	100-199% FPL	200-399% FPL	400%+ FPL
Economic hardship: Somewhat often/ very often hard to cover costs of basic needs, like food, housing[b,c]	21.3%	17.7 - 26.7	20.2%	21.7%	22.0%	21.8%	20.9%	38.5%	31.4%	18.5%	5.3%
Neighborhood safety/violence: Lived in an unsafe neighborhood or where the child was a victim of or witnessed violence[b,c]	8.3%	4.1 - 19.5	5.9%	8.8%	10.0%	8.1%	8.4%	14.0%	11.2%	7.0%	3.6%
Racism: Child has been treated or judged unfairly due to their race/ethnic group[b,c]	3.8%	1.3 - 6.7	1.2%	3.8%	6.2%	3.7%	3.8%	5.2%	4.2%	3.5%	2.7%
Relational Health Risk ICRI Domain: criteria count & individual criteria[b,c]											
1+	39.5%	32.2 - 48.8	30.1%	42.0%	46.0%	39.9%	39.1%	57.9%	47.7%	34.7%	25.6%
0	60.5%	51.2 - 67.8	69.9%	58.0%	54.0%	60.1%	60.9%	42.1%	52.3%	65.3%	74.4%
1	31.3%	22.7 - 40.0	25.5%	33.4%	34.6%	31.2%	31.3%	43.5%	37.6%	27.8%	21.5%
2	6.5%	4.3 - 9.5	3.9%	6.6%	9.0%	6.9%	6.1%	11.0%	7.8%	5.5%	3.4%
3 to 4	1.8%	0.7[d] - 3.7	0.8%	2.0%	2.5%	1.9%	1.7%	3.3%	2.3%	1.4%	0.7%
Adverse Childhood Experiences (ACEs): Exposed to two or more household level ACEs[b,c,e]	13.2%	7.3 - 20.4	6.2%	14.4%	18.6%	13.1%	13.3%	21.0%	16.6%	12.1%	6.5%
Parental Mental Health: One or two caregivers reported poor or fair mental health[b,c,f]	7.3%	5.3 - 11.4	6.5%	7.5%	7.8%	7.2%	7.4%	12.1%	8.9%	6.0%	4.1%
Parental Aggravation: Child's caregiver usually/always felt aggravated with child[b,g]	4.9%	3.2 - 6.7	3.5%	5.2%	5.9%	5.8%	3.9%	6.8%	4.5%	4.6%	4.1%
Parent Coping/Support: Child's caregiver is not coping well and/or lacks emotional support for parenting[b,c]	24.9%	13.8 - 32.7	19.7%	26.1%	28.7%	25.1%	24.7%	37.4%	31.1%	20.6%	15.9%

NOTES All percentages are weighted to represent the US child population.

[a]Data source: 2016-2018 (3 years combined) National Survey of Children's Health; [b]Variations within child subgroups are statistically significant unless otherwise noted. [c]Variations within sex subgroup are not statistically significant. Statistical significance of differences is set at p<0.05 and is based on tests of independence comparing the percentage of children meeting ICRI scoring option criteria by children's age, sex and household income. [d]Estimate has a 95% confidence interval width exceeding 30 percentage points or 1.3 times the estimate and may not be reliable. [e]The adverse childhood experiences (ACEs) measure used in this study only includes topics aligned with the original CDC/Kaiser study on ACEs: witnessed violence in home, loss of caregiver due to death, divorce/separation, incarceration, household alcohol or drug abuse or serious depression, suicidality, mental illness. [f]Child had one or two caregivers reporting poor or fair overall mental health status. [g]Child's caregiver reported that they usually/always felt the child is difficult to care for, does things that bother them, or is angry with child.

Part C3: National and across-state prevalence of children experiencing Integrated Child Risk Index (ICRI) criteria for each of the three ICRI domains (medical, social and/or relational health risk) and by each ICRI risk criteria: by child's insurance status/type and race/ethnicity[a,b]

	All children, age 0-17 years	Insurance status and type			State range for publicly insured children (%)	Child race/ethnicity						
		Publicly insured[c]	Privately insured	Uninsured		Hispanic	White, Non-Hispanic	Black-Non-Hispanic	Asian, Non-Hispanic	American Indian/Alaska Native, Non-Hispanic	Native Hawaiian/Other Pacific Islander, Non-Hispanic	Multi-race, Non-Hispanic
All US children	100	35.9%	57.8%	6.3%	N/A	24.9%	51.1%	13.2%	4.6%	0.4%	0.1%	5.0%
Medical Health Risk ICRI Domain: criteria count & individual criteria												
0	66.4%	57.8%	71.6%	68.1%	45.0 - 71.6	65.5%	68.1%	59.9%	73.1%	63.2%	63.2%	64.0%
1	17.4%	19.0%	15.9%	20.3%	13.8 - 26.7	19.2%	16.0%	18.3%	19.3%	16.5%	20.0%	18.2%
2	8.2%	9.9%	7.4%	6.0%	5.3 - 15.8	7.4%	8.4%	10.4%	4.7%	9.2%	6.2%	8.6%
3 to 4	8.0%	13.3%	5.1%	5.7%	4.4 - 20.7	8.0%	7.6%	11.4%	2.9%	11.0%	10.5%[d]	9.2%
Met "more complex" CSHCN Screener criteria	13.3%	19.2%	10.1%	9.2%	9.8 - 27.1	12.3%	13.2%	17.7%	7.0%	17.7%	13.4%	14.2%
Had poor/fair overall health status	1.6%	2.8%	0.7%	2.5%	0.9[d] - 6.5	2.3%	1.0%	2.8%	0.7%	1.7%[d]	5.7%[d]	1.2%
Had two or more chronic or lifelong condition diagnoses	17.5%	23.3%	14.5%	12.1%	10.8 - 32.8	15.0%	18.1%	22.6%	7.7%	19.9%	17.6%	20.0%
Had one or more of eleven frequent, chronic and/or serious functional difficulties	26.4%	35.2%	21.0%	26.4%	23.6 - 44.1	29.2%	23.7%	32.0%	22.3%	29.8%	32.4%	28.2%
Social Health Risk ICRI Domain: criteria count & individual criteria												
0	71.8%	54.6%	83.2%	65.7%	42.9 - 62.1	67.0%	77.5%	58.3%	81.8%	56.4%	52.7%	64.2%
1	19.5%	28.3%	13.5%	22.8%	20.4 - 37.3	22.3%	16.8%	26.1%	13.4%	20.6%	26.4%	21.1%
2	6.7%	12.8%	2.9%	8.1%	8.9 - 20.4	8.3%	4.6%	11.8%	3.9%	17.3%	16.8%[d]	9.9%
3 to 4	2.0%	4.3%	0.4%	3.4%	1.9[d] - 8.9	2.4%	1.1%	3.8%	0.8%[d]	5.6%[d]	4.1%[d]	4.6%

	All children, age 0-17 years	Insurance status and type			State range for publicly insured children (%)	Child race/ethnicity						
		Publicly insured[c]	Privately insured	Uninsured		Hispanic	White, Non-Hispanic	Black-Non-Hispanic	Asian, Non-Hispanic	American Indian/Alaska Native, Non-Hispanic	Native Hawaiian/Other Pacific Islander, Non-Hispanic	Multi-race, Non-Hispanic
Food insecurity: Sometimes or often could not afford enough to eat	6.1%	12.5%	1.8%	9.5%	6.4 - 20.5	7.7%	4.2%	10.5%	3.1%	14.0%	18.2%[d]	9.0%
Economic hardship: Somewhat often/ very often hard to cover costs of basic needs, like food, housing	21.3%	36.1%	11.7%	25.0%	26.9 - 46.6	24.0%	18.5%	28.8%	10.5%	33.9%	37.2%	26.3%
Neighborhood safety/violence: Lived in an unsafe neighborhood or where the child was a victim of or witnessed violence	8.3%	14.2%	4.2%	12.1%	8.5 - 27.0	10.8%	5.7%	13.3%	5.6%	15.1%	10.5%[d]	11.5%
Racism: Child has been treated or judged unfairly due to their race/ethnic group	3.8%	5.1%	3.0%	3.8%	1.0[d]- 10.9	4.3%	1.1%	10.2%	5.0%	10.0%	6.7%[d]	9.6%
Relational Health Risk ICRI Domain: criteria count & individual criteria												
0	60.5%	44.5%	72.3%	46.4%	34.6 - 56.0	46.4%	70.2%	54.3%	47.3%	51.1%	46.6%	61.2%
1	31.3%	41.8%	23.0%	42.9%	30.5 - 53.7	44.9%	22.8%	33.7%	46.8%	29.6%	37.8%	28.2%
2	6.5%	10.4%	3.8%	8.7%	6.6 - 16.6	6.9%	5.6%	9.0%	5.0%	17.3%	13.6%[d]	7.7%
3 to 4	1.8%	3.2%	0.8%	2.0%	1.4[d] - 7.7	1.8%	1.4%	3.1%	1.0%[b]	2.1%	2.0%[d]	2.9%
Adverse Childhood Experiences (ACEs): Exposed to two or more household level ACEs[e]	13.2%	22.1%	7.7%	13.7%	11.7 - 35.8	11.9%	12.8%	18.1%	3.4%	32.6%	12.3%	19.1%

	All children, age 0-17 years	Insurance status and type			State range for publicly insured children (%)	Child race/ethnicity						
		Publicly insured[c]	Privately insured	Uninsured		Hispanic	White, Non-Hispanic	Black-Non-Hispanic	Asian, Non-Hispanic	American Indian/Alaska Native, Non-Hispanic	Native Hawaiian/Other Pacific Islander, Non-Hispanic	Multi-race, Non-Hispanic
Parental Mental Health: One or two caregivers reported poor or fair mental health[f]	7.3%	10.8%	5.1%	7.8%	7.1 - 18.5	6.6%	6.9%	9.4%	4.4%	11.4%	13.9%[d]	10.9%
Parental Aggravation: Child's caregiver usually/always felt aggravated with child[g]	4.9%	7.1%	3.6%	4.5%	3.4[d] - 12.2	5.2%	4.3%	6.2%	4.0%	5.7%	8.8%[d]	5.9%
Parent Coping/Support: Child's caregiver is not coping well and/or lacks emotional support for parenting	24.9%	33.7%	17.1%	41.7%	15.9 - 44.9	41.1%	14.7%	28.4%	48.3%	22.4%	36.4%	17.1%

NOTES All percentages are weighted to represent the US child population.

[a]Data source: 2016-2018 (3 years combined) National Survey of Children's Health; [b] Variations within child subgroups are all statistically significant. Statistical significance of differences is set at $p<0.05$ and is based on tests of independence comparing the percentage of children meeting ICRI scoring option criteria by insurance status/type and race/ethnicity. [c]Includes children with any public health insurance, even if they also had some form of private insurance as well; [d]Estimate has a 95% confidence interval width exceeding 30 percentage points or 1.3 times the estimate and may not be reliable. [e]The adverse childhood experiences (ACEs) measure used in this study only includes topics aligned with the original CDC/Kaiser study on ACEs: witnessed violence in home, loss of caregiver due to death, divorce/separation, incarceration, household alcohol or drug abuse or serious depression, suicidality, mental illness.

[f]Child had one or two caregivers reporting poor or fair overall mental health status. [g]Child's caregiver reported that they usually/always felt the child is difficult to care for, does things that bother them, or is angry with child.

Part C4: Logistic regression analysis details (associated with Figure 2 in the main paper). **Dependent variable:** Children age 0-17 who experienced 1 or more ICRI medical health risks, all children and stratified by Relational Health Risk criteria count. **Key independent variable:** ICRI Domain: Social Health Risk criteria count

Independent variables	Adjusted Odd Ratio (95% CI)			
	All Children	0 Relational Health Risks	1 Relational Health Risk	2-4 Relational Health Risks
Age				
0-5 years	REF	REF	REF	REF
6-11 years	1.33 (1.22 - 1.44)	1.40 (1.27 - 1.54)	0.97 (0.82 - 1.16)	1.55 (1.13 - 2.13)
12-17 years	1.61 (1.49 - 1.75)	1.66 (1.51 - 1.83)	1.08 (0.92 - 1.27)	1.96 (1.49 - 2.57)
Sex				
Male	1.22 (1.15 - 1.30)	1.25 (1.16 - 1.35)	1.15 (1.02 - 1.29)	1.28 (1.03 - 1.60)
Female	REF	REF	REF	REF
Race/Ethnicity				
Hispanic	0.92 (0.83 - 1.01)	1.02 (0.90 - 1.16)	0.73 (0.62 - 0.85)	0.89 (0.66 - 1.22)
Black, Non-Hispanic	1.05 (0.95 - 1.16)	1.11 (0.97 - 1.27)	0.87 (0.73 - 1.03)	1.15 (0.83 - 1.58)
Other, Non-Hispanic	0.91 (0.84 - 1.00)	1.00 (0.89 - 1.14)	0.76 (0.66 - 0.88)	0.60 (0.45 - 0.81)
White, Non-Hispanic	REF	REF	REF	REF
Household Income (Federal Poverty Level-FPL)				
0%-99% FPL	1.00 (0.90 - 1.12)	1.03 (0.89 - 1.20)	0.93 (0.76 - 1.13)	0.73 (0.51 - 1.04)
100%-199% FPL	0.93 (0.84 - 1.03)	0.95 (0.83 - 1.08)	0.93 (0.76 - 1.13)	0.68 (0.48 - 0.95)
200%-399% FPL	1.01 (0.95 - 1.09)	1.01 (0.93 - 1.09)	0.99 (0.86 - 1.14)	0.94 (0.71 - 1.26)
400%+ FPL	REF	REF	REF	REF
Insurance status and type				
Publicly insured	1.52 (1.39 - 1.66)	1.50 (1.33 - 1.68)	1.25 (1.07 - 1.46)	1.56 (1.19 - 2.03)
Uninsured	1.04 (0.88 - 1.21)	0.90 (0.72 - 1.12)	1.02 (0.78 - 1.33)	1.02 (0.69 - 1.52)
Privately insured	REF	REF	REF	REF
ICRI Domain: Social Health Risk criteria count				
0	REF	REF	REF	REF
1	1.82 (1.67-1.97)	1.55 (1.39 - 1.73)	1.80 (1.55 - 2.08)	1.57 (1.20-2.05)
2-4	2.88 (2.54-3.26)	2.19 (1.76 - 2.73)	2.62 (2.13 - 3.24)	1.94 (1.44-2.63)

Appendix D: Additional findings on convergent and divergent validity analyses

Part D1: Prevalence of US children who experienced Integrated Child Risk Index criteria by child responses to each outcome measure

	All children	Prevalence of children who experienced ICRI domain counts				Prevalence of children experienced ICRI mutually exclusive combinations					
		Did not experience any domains	1 domain	2 domains	All 3 Domains	Only MHR	Only SHR	Only RHR	Only MHR & SHR	Only MHR & RHR	Only SHR & RHR
All children	100%	36.3%	34.9%	20.0%	8.8%	12.0%	7.5%	15.4%	4.7%	8.1%	7.2%
Hospital emergency room (ER) visits, 0-17 years											
1+ hospital ER visits	19.9%	24.5%	33.4%	26.8%	15.3%	14.2%	7.2%	12.0%	8.2%	10.6%	8.1%
No hospital ER visit	80.1%	39.2%	35.3%	18.3%	7.2%	11.5%	7.5%	16.3%	3.8%	7.4%	7.0%
Forgone health care, 0-17 years											
Did not receive needed health care	3.1%	6.2%	24.2%	29.8%	39.8%	9.4%	5.7%	9.1%	8.8%	10.8%	10.2%
Did not need health care or received needed health care	96.9%	37.2%	35.3%	19.6%	7.9%	12.1%	7.5%	15.6%	4.6%	8.0%	7.1%
Child Flourishing Index, 6 months-17 years											
0-1	23.4%	18.4%	31.3%	29.5%	20.8%	13.4%	6.7%	11.1%	7.3%	13.7%	8.5%
2-3 (or 2)	28.8%	32.0%	36.4%	22.3%	9.3%	11.8%	8.6%	16.0%	5.8%	7.5%	9.1%
All 4 (or 3)	47.8%	45.8%	35.0%	14.9%	4.3%	9.6%	9.0%	16.4%	4.0%	4.2%	6.7%
Engaged or reported to be ready to engage in school, 3-17 years											
Very/completely confident or engaged in school	69.1%	39.3%	36.4%	17.7%	6.5%	10.8%	8.3%	17.4%	4.1%	5.7%	7.9%
Mostly, somewhat, not at all confident or do not engage in school	30.9%	21.2%	31.2%	28.9%	18.8%	12.9%	6.7%	11.6%	7.3%	12.5%	9.1%

NOTE: All prevalence rates are weighted to represent the US child population. See Appendix A5[44] for detailed description of each study outcome variable.

Part D2: Prevalence of study outcomes (emergency room visits, forgone health care, child flourishing, school engagement/ready to engage in school) by child's age, sex, race/ethnicity and household income and insurance status and type. See Table 2 in the paper and Appendix Part C1 for findings on associations between study outcomes and their Integrated Child Risk Index (ICRI) and ICRI individual Medical, Social and Relational Health Risk component scores and individual ICRI risk criteria.

	All children	Children age 0-17 who experienced 1+ hospital emergency room visits in the past 12 months	Children age 0-17 who experienced forgone health care in the past 12 months	Children age 6 months -17 years who met Child Flourishing Index criteria	Children age 3-17 who met criteria for being engaged (age 6-17) or caregiver was confident child was ready to engage (age 3-5) in school
All US children	100.0%	19.9%	3.1%	47.8%	69.1%
Child age					
0-5 years[b]	32.2%	25.7%	1.6%	64.7%	77.7%
6-11 years	33.8%	17.4%	3.3%	38.7%	71.4%
12-17 years	33.9%	16.9%	4.2%	42.0%	62.8%
p value (test of independence)		<0.001	<0.001	<0.001	<0.001
Child sex					
Male	51.1%	21.4%	3.0%	44.9%	62.8%
Female	48.9%	18.3%	3.2%	50.8%	75.8%
p value (test of independence)		<0.001	0.61	<0.001	<0.001
Household income (Federal Poverty Level-FPL)					
0%-99% FPL	20.7%	29.1%	4.8%	40.1%	64.4%
100-199% FPL	21.8%	21.8%	4.4%	44.5%	67.4%
200-399% FPL	27.0%	16.7%	2.8%	48.7%	68.1%
400%+ FPL	30.5%	15.1%	1.2%	54.8%	74.7%
p value (test of independence)		<0.001	<0.001	<0.001	<0.001
Child race/ethnicity					
Hispanic	24.9%	21.8%	4.0%	45.9%	70.9%
White, Non-Hispanic	51.1%	17.1%	2.3%	50.1%	69.5%

	All children	Children age 0-17 who experienced 1+ hospital emergency room visits in the past 12 months	Children age 0-17 who experienced forgone health care in the past 12 months	Children age 6 months -17 years who met Child Flourishing Index criteria	Children age 3-17 who met criteria for being engaged (age 6-17) or caregiver was confident child was ready to engage (age 3-5) in school
Black-Non-Hispanic	13.2%	28.9%	4.9%	40.7%	63.3%
Asian, Non-Hispanic	4.6%	14.9%	1.5%	51.0%	74.4%
American Indian/Alaska Native, Non-Hispanic	0.4%	22.4%	2.1%[a]	41.2%	60.9%
Native Hawaiian/Other Pacific Islander, Non-Hispanic	0.1%	13.8%	5.1%[a]	42.4%	68.5%
Multi-race	5.0%	19.6%	3.3%	50.4%	68.3%
p value (test of independence)		<0.001	<0.001	<0.001	<0.001
Insurance status and type					
Publicly insured[c]	35.9%	28.9%	4.2%	40.0%	63.4%
Privately insured	57.8%	14.6%	1.6%	53.5%	73.7%
Uninsured	6.3%	15.6%	9.8%	41.5%	61.9%
p value (test of independence)		<0.001	<0.001	<0.001	<0.001

NOTES All percentages are weighted to represent the US child population

[a]Estimate has a 95% confidence interval width exceeding 30 percentage points or 1.3 times the estimate and may not be reliable.

[b]6 months -5 years for Child Flourishing Index criteria; 3-5 years for school engagement.

[c]Includes children with both public and private health insurance. See Appendix A5[44] for detailed description of each study outcome variable.

Part D3: Logistic regression analysis details for four outcome measures. **Key independent variable:** Scoring option 1 - Domain Count: Number of ICRI domains experienced

Independent variables	Adjusted Odd Ratio (95% CI)			
	Children age 0-17 who experienced 1+ hospital emergency room visits in the past 12 months	Children age 0-17 who experienced forgone health care in the past 12 months	Children age 6 months -17 years who met Child Flourishing Index criteria	Children age 3-17 who met criteria for being engaged (age 6-17) or caregiver was confident child was ready to engage (age 3-5) in school
Age				
0-5 years	REF	REF	REF	REF
6-11 years	0.54 (0.49 - 0.59)	1.52 (1.15 - 2.00)	0.35 (0.31 - 0.39)	0.75 (0.66 - 0.86)
12-17 years	0.52 (0.47 - 0.57)	1.81 (1.39 - 2.34)	0.43 (0.39 - 0.47)	0.52 (0.46 - 0.60)
Sex				
Male	1.20 (1.11 - 1.30)	0.97 (0.80 - 1.18)	0.80 (0.74 - 0.87)	0.52 (0.48 - 0.57)
Female	REF	REF	REF	REF
Race/ethnicity				
Hispanic	1.04 (0.93 - 1.16)	1.01 (0.80 - 1.28)	1.11 (0.98 - 1.25)	1.37 (1.20 - 1.57)
Black, Non-Hispanic	1.49 (1.33 - 1.66)	1.20 (0.91 - 1.59)	0.94 (0.83 - 1.08)	1.05 (0.90 - 1.21)
Other, Non-Hispanic	0.87 (0.78 - 0.96)	0.87 (0.67 - 1.14)	1.12 (1.00 - 1.25)	1.19 (1.06 - 1.35)
White, Non-Hispanic	REF	REF	REF	REF
Household income (Federal Poverty Level-FPL)				
0%-99% FPL	1.17 (1.02 - 1.33)	1.38 (0.99 - 1.93)	0.92 (0.79 - 1.06)	1.04 (0.89 - 1.22)
100%-199% FPL	0.93 (0.82 - 1.04)	1.67 (1.25 - 2.24)	0.97 (0.85 - 1.11)	1.05 (0.91 - 1.21)
200%-399% FPL	0.92 (0.84 - 1.01)	1.48 (1.13 - 1.94)	0.90 (0.83 - 0.97)	0.86 (0.78 - 0.95)
400%+ FPL	REF	REF	REF	REF
Insurance status and type				
Publicly insured	1.66 (1.50 - 1.83)	1.14 (0.93 - 1.41)	0.79 (0.71 - 0.89)	0.78 (0.69 - 0.88)
Uninsured	0.83 (0.69 - 1.00)	4.04 (2.98 - 5.48)	0.82 (0.66 - 1.02)	0.67 (0.52 - 0.85)
Privately insured	REF	REF	REF	REF
Scoring Option 1: Domain count: Number of ICRI domains experienced				
0	REF	REF	4.81 (3.98 - 5.81)	4.87 (4.11 - 5.78)
1	1.43 (1.30 - 1.57)	3.08 (2.11 - 4.48)	3.08 (2.56 - 3.72)	3.21 (2.74 - 3.77)
2	2.05 (1.83 - 2.29)	7.21 (5.01 - 10.36)	1.84 (1.51 - 2.24)	1.70 (1.44 - 2.01)
3	2.92 (2.55 - 3.35)	22.15 (15.50 - 31.65)	REF	REF

Part D4: Logistic regression analysis details for four outcome measures. **Key independent variable:** Scoring Option 2: Domain Combinations: Mutually exclusive combinations

Independent variables	Adjusted Odd Ratio (95% CI)			
	Children age 0-17 who experienced 1+ hospital emergency room visits in the past 12 months	Children age 0-17 who experienced forgone health care in the past 12 months	Children age 6 months -17 years who met Child Flourishing Index criteria	Children age 3-17 who met criteria for being engaged (age 6-17) or caregiver was confident child was ready to engage (age 3-5) in school
Age				
0-5 years	REF	REF	REF	REF
6-11 years	0.54 (0.49 - 0.60)	1.55 (1.17 - 2.05)	0.34 (0.31 - 0.38)	0.75 (0.65 - 0.86)
12-17 years	0.52 (0.48 - 0.57)	1.85 (1.42 - 2.41)	0.42 (0.38 - 0.46)	0.51 (0.45 - 0.59)
Sex				
Male	1.18 (1.10 - 1.28)	0.97 (0.80 - 1.17)	0.81 (0.75 - 0.88)	0.52 (0.48 - 0.57)
Female	REF	REF	REF	REF
Race/ethnicity				
Hispanic	1.08 (0.97 - 1.21)	1.06 (0.84 - 1.34)	1.07 (0.95 - 1.21)	1.32 (1.15 - 1.50)
Black, Non-Hispanic	1.50 (1.34 - 1.68)	1.20 (0.91 - 1.59)	0.93 (0.81 - 1.06)	1.03 (0.89 - 1.19)
Other, Non-Hispanic	0.90 (0.81 - 1.00)	0.90 (0.69 - 1.18)	1.08 (0.97 - 1.20)	1.13 (1.00 - 1.28)
White, Non-Hispanic	REF	REF	REF	REF
Household income (Federal Poverty Level-FPL)				
0%-99% FPL	1.23 (1.07 - 1.40)	1.39 (1.00 - 1.94)	0.86 (0.74 - 1.00)	0.98 (0.84 - 1.14)
100%-199% FPL	0.96 (0.85 - 1.08)	1.67 (1.24 - 2.25)	0.92 (0.81 - 1.05)	0.99 (0.86 - 1.14)
200%-399% FPL	0.93 (0.85 - 1.02)	1.47 (1.12 - 1.93)	0.87 (0.80 - 0.95)	0.83 (0.75 - 0.92)
400%+ FPL	REF	REF	REF	REF
Insurance status and type				
Publicly insured	1.71 (1.54 - 1.89)	1.16 (0.94 - 1.43)	0.77 (0.68 - 0.86)	0.76 (0.67 - 0.85)
Uninsured	0.88 (0.73 - 1.05)	4.19 (3.10 - 5.68)	0.78 (0.63 - 0.97)	0.63 (0.49 - 0.80)
Privately insured	REF	REF	REF	REF
Scoring Option 3: Domain Combinations: Mutually exclusive combinations				
No ICRI Risks Experienced	REF	REF	4.59 (3.80 - 5.54)	4.63 (3.90 - 5.48)
Only Medical Health Risks	2.03 (1.82 - 2.27)	3.87 (2.57 - 5.84)	2.12 (1.74 - 2.60)	2.20 (1.83 - 2.63)
Only Social Health Risks	1.25 (1.07 - 1.46)	3.63 (2.22 - 5.93)	3.20 (2.59 - 3.96)	3.29 (2.66 - 4.07)
Only Relational Health Risks	1.07 (0.92 - 1.23)	2.24 (1.31 - 3.84)	3.73 (3.02 - 4.61)	4.08 (3.38 - 4.93)
Only Medical and Social Risks	2.81 (2.35 - 3.35)	9.65 (6.38 - 14.61)	1.81 (1.41 - 2.34)	1.51 (1.19 - 1.92)
Only Medical and Relational Risks	2.07 (1.81 - 2.38)	6.64 (4.46 - 9.88)	1.23 (0.98 - 1.55)	1.26 (1.04 - 1.53)
Only Social and Relational Risks	1.45 (1.22 - 1.73)	6.12 (3.77 - 9.93)	2.57 (2.03 - 3.25)	2.41 (1.94 - 3.00)
Medical, Social, and Relational Risks	2.80 (2.44 - 3.22)	21.81 (15.26 - 31.15)	REF	REF

Part D5: Logistic regression analysis details for four outcome measures. **Key independent variable:** Scoring Option 3: Cumulative Risk: Number of ICRI criteria experienced

Independent variables	Adjusted Odd Ratio (95% CI)			
	Children age 0-17 who experienced 1+ hospital emergency room visits in the past 12 months	Children age 0-17 who experienced forgone health care in the past 12 months	Children age 6 months -17 years who met Child Flourishing Index criteria	Children age 3-17 who met criteria for being engaged (age 6-17) or caregiver was confident child was ready to engage (age 3-5) in school
Age				
0-5 years	REF	REF	REF	REF
6-11 years	0.51 (0.47 - 0.57)	1.33 (1.00 - 1.75)	0.36 (0.32 - 0.40)	0.79 (0.69 - 0.90)
12-17 years	0.49 (0.44 - 0.53)	1.53 (1.18 - 1.99)	0.45 (0.40 - 0.49)	0.55 (0.48 - 0.63)
Sex				
Male	1.18 (1.10 - 1.28)	0.93 (0.77 - 1.13)	0.81 (0.75 - 0.88)	0.53 (0.48 - 0.58)
Female	REF	REF	REF	REF
Race/ethnicity				
Hispanic	1.07 (0.96 - 1.19)	1.12 (0.88 - 1.41)	1.08 (0.95 - 1.22)	1.32 (1.16 - 1.51)
Black, Non-Hispanic	1.49 (1.33 - 1.67)	1.19 (0.90 - 1.58)	0.95 (0.83 - 1.09)	1.06 (0.91 - 1.23)
Other, Non-Hispanic	0.87 (0.78 - 0.97)	0.87 (0.67 - 1.14)	1.10 (0.99 - 1.23)	1.17 (1.03 - 1.32)
White, Non-Hispanic	REF	REF	REF	REF
Household income (Federal Poverty Level-FPL)				
0%-99% FPL	1.17 (1.02 - 1.33)	1.45 (1.04 - 2.01)	0.92 (0.79 - 1.06)	1.04 (0.89 - 1.22)
100%-199% FPL	0.93 (0.83 - 1.05)	1.79 (1.35 - 2.39)	0.96 (0.84 - 1.09)	1.03 (0.89 - 1.19)
200%-399% FPL	0.93 (0.85 - 1.01)	1.58 (1.21 - 2.06)	0.88 (0.81 - 0.96)	0.84 (0.76 - 0.92)
400%+ FPL	REF	REF	REF	REF
Insurance status and type				
Publicly insured	1.60 (1.45 - 1.77)	1.04 (0.84 - 1.28)	0.82 (0.73 - 0.92)	0.83 (0.73 - 0.93)
Uninsured	0.84 (0.70 - 1.01)	4.23 (3.10 - 5.77)	0.80 (0.65 - 1.00)	0.65 (0.51 - 0.83)
Privately insured	REF	REF	REF	REF
Scoring Option 4: Criterion Count: Number of ICRI criteria experienced				
0	REF	REF	7.12 (5.73 - 8.84)	6.65 (5.53 - 8.02)
1	1.26 (1.13 - 1.40)	2.52 (1.66 - 3.82)	5.10 (4.10 - 6.35)	5.20 (4.33 - 6.25)
2	1.75 (1.55 - 1.97)	4.28 (2.78 - 6.58)	3.45 (2.75 - 4.33)	3.35 (2.75 - 4.08)
3 to 4	2.45 (2.17 - 2.76)	9.19 (6.43 - 13.15)	2.27 (1.80 - 2.86)	1.89 (1.57 - 2.28)
5 to 12	3.54 (3.07 - 4.07)	29.10 (20.27 - 41.77)	REF	REF

Part D6: Logistic regression analysis details for four outcome measures. **Key independent variable:** ICRI Component: Medical Health Risk criteria count

Independent variables	Adjusted Odd Ratio (95% CI)			
	Children age 0-17 who experienced 1+ hospital emergency room visits in the past 12 months	Children age 0-17 who experienced forgone health care in the past 12 months	Children age 6 months -17 years who met Child Flourishing Index criteria	Children age 3-17 who met criteria for being engaged (age 6-17) or caregiver was confident child was ready to engage (age 3-5) in school
Age				
0-5 years	REF	REF	REF	REF
6-11 years	0.52 (0.47 - 0.57)	1.56 (1.18 - 2.06)	0.35 (0.32 - 0.39)	0.76 (0.66 - 0.86)
12-17 years	0.50 (0.46 - 0.55)	1.88 (1.45 - 2.44)	0.43 (0.39 - 0.47)	0.51 (0.45 - 0.58)
Sex				
Male	1.17 (1.08 - 1.26)	0.91 (0.75 - 1.11)	0.81 (0.75 - 0.88)	0.54 (0.49 - 0.59)
Female	REF	REF	REF	REF
Race/ethnicity				
Hispanic	1.12 (1.00 - 1.25)	1.21 (0.95 - 1.52)	1.03 (0.91 - 1.16)	1.27 (1.11 - 1.44)
Black, Non-Hispanic	1.53 (1.37 - 1.71)	1.38 (1.03 - 1.85)	0.90 (0.79 - 1.03)	0.98 (0.85 - 1.13)
Other, Non-Hispanic	0.94 (0.85 - 1.05)	1.04 (0.81 - 1.34)	1.01 (0.91 - 1.12)	1.07 (0.95 - 1.20)
White, Non-Hispanic	REF	REF	REF	REF
Household income (Federal Poverty Level-FPL)				
0%-99% FPL	1.31 (1.15 - 1.49)	2.11 (1.51 - 2.96)	0.77 (0.67 - 0.89)	0.84 (0.72 - 0.98)
100%-199% FPL	1.02 (0.91 - 1.15)	2.33 (1.73 - 3.13)	0.84 (0.74 - 0.95)	0.87 (0.76 - 1.00)
200%-399% FPL	0.96 (0.88 - 1.05)	1.86 (1.41 - 2.44)	0.83 (0.76 - 0.90)	0.76 (0.69 - 0.84)
400%+ FPL	REF	REF	REF	REF
Insurance status and type				
Publicly insured	1.74 (1.57 - 1.92)	1.44 (1.17 - 1.77)	0.71 (0.64 - 0.80)	0.71 (0.63 - 0.80)
Uninsured	0.96 (0.80 - 1.14)	5.27 (3.89 - 7.14)	0.69 (0.56 - 0.85)	0.57 (0.45 - 0.72)
Privately insured	REF	REF	REF	REF
ICRI Component: Medical Health Risk criteria count				
0	REF	REF	4.14 (3.69 - 4.64)	3.84 (3.45 - 4.27)
1	1.60 (1.45 - 1.77)	2.35 (1.79 - 3.09)	2.38 (2.07 - 2.74)	2.19 (1.91 - 2.50)
2-4	2.81 (2.55 - 3.09)	6.69 (5.32 - 8.40)	REF	REF

Part D7: Logistic regression analysis details for four outcome measures. **Key independent variable:** ICRI Component: Social Health Risk criteria count

Independent variables	Adjusted Odd Ratio (95% CI)			
	Children age 0-17 who experienced 1+ hospital emergency room visits in the past 12 months	Children age 0-17 who experienced forgone health care in the past 12 months	Children age 6 months -17 years who met Child Flourishing Index criteria	Children age 3-17 who met criteria for being engaged (age 6-17) or caregiver was confident child was ready to engage (age 3-5) in school
Age				
0-5 years	REF	REF	REF	REF
6-11 years	0.58 (0.53 - 0.64)	1.79 (1.36 - 2.34)	0.33 (0.30 - 0.37)	0.71 (0.62 - 0.81)
12-17 years	0.57 (0.52 - 0.63)	2.22 (1.71 - 2.89)	0.38 (0.35 - 0.42)	0.48 (0.42 - 0.54)
Sex				
Male	1.22 (1.13 - 1.32)	1.01 (0.84 - 1.23)	0.78 (0.72 - 0.84)	0.52 (0.47 - 0.56)
Female	REF	REF	REF	REF
Race/ethnicity				
Hispanic	1.08 (0.97 - 1.20)	1.08 (0.85 - 1.37)	1.04 (0.92 - 1.16)	1.30 (1.14 - 1.48)
Black, Non-Hispanic	1.51 (1.34 - 1.69)	1.19 (0.89 - 1.58)	0.92 (0.81 - 1.05)	1.03 (0.89 - 1.19)
Other, Non-Hispanic	0.90 (0.80 - 1.00)	0.87 (0.66 - 1.14)	1.06 (0.95 - 1.18)	1.15 (1.02 - 1.29)
White, Non-Hispanic	REF	REF	REF	REF
Household income (Federal Poverty Level-FPL)				
0%-99% FPL	1.22 (1.07 - 1.39)	1.37 (0.96 - 1.97)	0.84 (0.73 - 0.97)	0.96 (0.83 - 1.12)
100%-199% FPL	0.95 (0.84 - 1.06)	1.58 (1.14 - 2.18)	0.93 (0.82 - 1.05)	1.00 (0.87 - 1.15)
200%-399% FPL	0.94 (0.85 - 1.03)	1.46 (1.09 - 1.95)	0.86 (0.80 - 0.94)	0.83 (0.75 - 0.92)
400%+ FPL	REF	REF	REF	REF
Insurance status and type				
Publicly insured	1.82 (1.64 - 2.01)	1.34 (1.08 - 1.66)	0.69 (0.61 - 0.77)	0.67 (0.60 - 0.75)
Uninsured	0.89 (0.75 - 1.07)	4.41 (3.24 - 6.01)	0.74 (0.59 - 0.91)	0.61 (0.48 - 0.77)
Privately insured	REF	REF	REF	REF
ICRI Component: Social Health Risk criteria count				
0	REF	REF	1.77 (1.50 - 2.09)	2.20 (1.87 - 2.58)
1	1.40 (1.27 - 1.54)	2.91 (2.26 - 3.75)	1.13 (0.95 - 1.34)	1.36 (1.15 - 1.62)
2-4	1.74 (1.52 - 2.01)	7.15 (5.61 - 9.12)	REF	REF

Part D8: Logistic regression analysis details for four outcome measures. **Key independent variable:** ICRI
Component: Relational Health Risk criteria count

Independent variables	Adjusted Odd Ratio (95% CI)			
	Children age 0-17 who experienced 1+ hospital emergency room visits in the past 12 months	Children age 0-17 who experienced forgone health care in the past 12 months	Children age 6 months -17 years who met Child Flourishing Index criteria	Children age 3-17 who met criteria for being engaged (age 6-17) or caregiver was confident child was ready to engage (age 3-5) in school
Age				
0-5 years	REF	REF	REF	REF
6-11 years	0.57 (0.51 - 0.62)	1.69 (1.28 - 2.22)	0.35 (0.31 - 0.39)	0.73 (0.64 - 0.83)
12-17 years	0.56 (0.51 - 0.61)	2.00 (1.54 - 2.59)	0.41 (0.37 - 0.45)	0.50 (0.44 - 0.57)
Sex				
Male	1.22 (1.13 - 1.32)	0.97 (0.80 - 1.18)	0.78 (0.72 - 0.84)	0.52 (0.48 - 0.57)
Female	REF	REF	REF	REF
Race/ethnicity				
Hispanic	1.08 (0.97 - 1.20)	1.02 (0.81 - 1.28)	1.09 (0.97 - 1.23)	1.34 (1.18 - 1.53)
Black, Non-Hispanic	1.53 (1.36 - 1.71)	1.36 (1.01 - 1.82)	0.90 (0.79 - 1.02)	0.98 (0.85 - 1.13)
Other, Non-Hispanic	0.90 (0.81 - 1.00)	0.86 (0.66 - 1.12)	1.08 (0.98 - 1.21)	1.17 (1.03 - 1.32)
White, Non-Hispanic	REF	REF	REF	REF
Household income (Federal Poverty Level-FPL)				
0%-99% FPL	1.30 (1.14 - 1.48)	1.86 (1.31 - 2.64)	0.80 (0.69 - 0.92)	0.88 (0.75 - 1.02)
100%-199% FPL	1.01 (0.89 - 1.13)	2.08 (1.52 - 2.85)	0.87 (0.77 - 0.98)	0.93 (0.81 - 1.06)
200%-399% FPL	0.97 (0.88 - 1.06)	1.72 (1.29 - 2.29)	0.84 (0.77 - 0.91)	0.79 (0.72 - 0.87)
400%+ FPL	REF	REF	REF	REF
Insurance status and type				
Publicly insured	1.87 (1.69 - 2.07)	1.44 (1.16 - 1.79)	0.70 (0.62 - 0.78)	0.68 (0.61 - 0.76)
Uninsured	0.91 (0.76 - 1.09)	4.24 (3.12 - 5.76)	0.74 (0.59 - 0.92)	0.63 (0.50 - 0.79)
Privately insured	REF	REF	REF	REF
ICRI Component: Relational Health Risk criteria count				
0	REF	REF	2.70 (2.25 - 3.24)	2.96 (2.54 - 3.44)
1	1.08 (0.98 - 1.18)	1.90 (1.51 - 2.40)	2.00 (1.65 - 2.43)	2.23 (1.90 - 2.61)
2-4	1.70 (1.50 - 1.93)	6.06 (4.74 - 7.73)	REF	REF

Part D9: Logistic regression analysis details for four outcome measures. **Key independent variable:** ICRI Components: Medical Health Risk, Social Health Risk and Relational Health Risk criteria counts (adjusted for other domains)

Independent variables	Adjusted Odd Ratio (95% CI)			
	Children age 0-17 who experienced 1+ hospital emergency room visits in the past 12 months	Children age 0-17 who experienced forgone health care in the past 12 months	Children age 6 months - 17 years who met Child Flourishing Index criteria	Children age 3-17 who met criteria for being engaged (age 6-17) or caregiver was confident child was ready to engage (age 3-5) in school
Age				
0-5 years	REF	REF	REF	REF
6-11 years	0.51 (0.47 - 0.57)	1.35 (1.02 - 1.80)	0.36 (0.32 - 0.40)	0.79 (0.69 - 0.90)
12-17 years	0.49 (0.44 - 0.54)	1.55 (1.18 - 2.04)	0.45 (0.40 - 0.49)	0.54 (0.48 - 0.62)
Sex				
Male	1.17 (1.08 - 1.26)	0.94 (0.77 - 1.14)	0.82 (0.76 - 0.89)	0.53 (0.48 - 0.58)
Female	REF	REF	REF	REF
Race/ethnicity				
Hispanic	1.12 (1.01 - 1.25)	1.14 (0.90 - 1.44)	1.05 (0.93 - 1.19)	1.28 (1.12 - 1.47)
Black, Non-Hispanic	1.51 (1.35 - 1.69)	1.18 (0.89 - 1.57)	0.93 (0.81 - 1.06)	1.04 (0.90 - 1.20)
Other, Non-Hispanic	0.92 (0.83 - 1.03)	0.91 (0.69 - 1.20)	1.06 (0.95 - 1.18)	1.12 (0.99 - 1.26)
White, Non-Hispanic	REF	REF	REF	REF
Household income (Federal Poverty Level-FPL)				
0%-99% FPL	1.24 (1.08 - 1.41)	1.34 (0.95 - 1.89)	0.85 (0.73 - 0.98)	0.97 (0.83 - 1.14)
100%-199% FPL	0.97 (0.86 - 1.10)	1.71 (1.26 - 2.32)	0.91 (0.79 - 1.03)	0.97 (0.84 - 1.12)
200%-399% FPL	0.94 (0.86 - 1.03)	1.50 (1.14 - 1.98)	0.86 (0.79 - 0.94)	0.82 (0.74 - 0.90)
400%+ FPL	REF	REF	REF	REF
Insurance status and type				
Publicly insured	1.66 (1.50 - 1.84)	1.04 (0.83 - 1.29)	0.79 (0.70 - 0.89)	0.79 (0.70 - 0.89)
Uninsured	0.89 (0.74 - 1.07)	4.41 (3.23 - 6.03)	0.76 (0.61 - 0.95)	0.61 (0.48 - 0.78)
Privately insured	REF	REF	REF	REF
ICRI components (adjusted for other domains)				
Medical Health Risk criteria count				
0	REF	REF	3.60 (3.20 - 4.06)	3.26 (2.92 - 3.64)
1	1.56 (1.40 - 1.72)	1.96 (1.47 - 2.60)	2.19 (1.90 - 2.53)	2.00 (1.74 - 2.30)
2-4	2.62 (2.37 - 2.90)	4.18 (3.32 - 5.27)	REF	REF
Social Health Risk criteria count				
0	REF	REF	1.22 (1.02 - 1.46)	1.45 (1.21 - 1.73)
1	1.23 (1.11 - 1.37)	2.12 (1.64 - 2.74)	0.92 (0.76 - 1.11)	1.10 (0.91 - 1.32)
2-4	1.37 (1.18 - 1.60)	3.96 (3.04 - 5.16)	REF	REF
Relational Health Risk criteria count				
0	REF	REF	1.88 (1.55 - 2.28)	1.95 (1.66 - 2.28)
1	1.00 (0.91 - 1.10)	1.54 (1.21 - 1.95)	1.48 (1.21 - 1.81)	1.61 (1.37 - 1.89)
2-4	1.16 (1.00 - 1.34)	2.71 (2.09 - 3.51)	REF	REF

Appendix E: Additional findings on the national and state prevalence of US children meeting Integrated Child Risk Index criteria

Part E1: Distribution of US children for each Integrated Child Risk Index scoring option by child characteristics (prevalence of ICRI by characteristics is in Table 2 and 3 in the main paper. This shows prevalence of child characteristics by ICRI scoring option)

	All children	Scoring Option 1. Domain count: Number of ICRI domains experienced				Scoring Option 2. Domain Combinations: Mutually exclusive combinations					
		Did not experience any domains	1 domain	2 domains	All 3 Domains	Only MHR	Only SHR	Only RHR	Only MHR & SHR	Only MHR & RHR,	Only SHR & RHR
All children	100%	36.3%	34.9%	20.0%	8.8%	12.0%	7.5%	15.4%	4.7%	8.1%	7.2%
Age groups											
0-5 years	32.2%	39.7%	30.4%	27.6%	18.8%	30.4%	39.6%	25.9%	31.4%	26.6%	26.2%
6-11 years	33.8%	32.4%	34.3%	34.5%	36.6%	34.2%	30.5%	36.2%	32.8%	33.1%	37.3%
12-17 years	33.9%	27.9%	35.3%	37.9%	44.6%	35.3%	29.8%	37.9%	35.8%	40.3%	36.5%
Child sex											
Male	51.1%	49.1%	51.4%	52.9%	53.6%	54.5%	49.8%	49.8%	53.8%	55.0%	49.8%
Female	48.9%	50.9%	48.6%	47.1%	46.4%	45.5%	50.2%	50.2%	46.2%	45.0%	50.2%
Race/ethnicity											
Hispanic	24.9%	17.4%	27.6%	32.0%	29.7%	18.2%	23.5%	36.9%	27.4%	31.4%	35.7%
White, non-Hispanic	51.1%	64.3%	48.2%	41.0%	39.6%	61.3%	48.0%	38.0%	43.5%	44.8%	35.0%
Black, non-Hispanic	13.2%	9.3%	13.2%	16.4%	20.9%	11.8%	18.5%	11.7%	20.0%	13.0%	17.9%
Asian, Non-Hispanic	4.6%	3.9%	6.2%	4.1%	2.7%	3.8%	2.8%	9.7%	2.5%	5.2%	3.8%
American Indian/Alaska Native, Non-Hispanic	0.4%	0.3%	0.3%	0.6%	0.6%	0.2%	0.5%[a]	0.3%	0.4%	0.5%	0.8%
Native Hawaiian/Other Pacific Islander, Non-Hispanic	0.1%	0.1%	0.1%	0.2%	0.2%[a]	0.1%[a]	0.2%[a]	0.2%[a]	0.3%[a]	0.1%[a]	0.2%[a]
Multi-race, Non-Hispanic	5.0%	4.7%	4.4%	5.8%	6.3%	4.6%	6.5%	3.3%	5.8%	5.1%	6.5%
Household income (Federally Poverty level - FPL)											

	All children	Scoring Option 1. Domain count: Number of ICRI domains experienced				Scoring Option 2. Domain Combinations: Mutually exclusive combinations					
		Did not experience any domains	1 domain	2 domains	All 3 Domains	Only MHR	Only SHR	Only RHR	Only MHR & SHR	Only MHR & RHR,	Only SHR & RHR
0-99% FPL	20.7%	10.3%	20.2%	30.4%	39.6%	13.0%	25.6%	23.1%	28.8%	23.5%	39.0%
100%-199% FPL	21.8%	15.5%	22.8%	27.8%	29.9%	17.5%	29.6%	23.6%	29.6%	23.2%	31.9%
200%-999% FPL	27.0%	29.5%	28.0%	24.2%	20.9%	28.9%	30.6%	26.0%	27.1%	26.2%	20.0%
400% + FPL	30.5%	44.7%	29.1%	17.6%	9.6%	40.7%	14.1%	27.3%	14.5%	27.1%	9.0%
Insurance status and type											
Publicly insured[b]	35.9%	18.6%	36.2%	53.5%	65.7%	25.4%	46.2%	39.8%	55.8%	45.0%	61.5%
Privately insured	57.8%	76.9%	56.9%	39.2%	25.8%	70.4%	47.0%	51.2%	39.9%	47.9%	28.9%
Uninsured	6.3%	4.5%	6.9%	7.3%	8.5%	4.2%	6.8%	9.0%	4.3%	7.0%	9.6%

NOTES All percentages are weighted to represent the US child population. See Table 3 in the paper for prevalence of ICRI and types of risks by race/ethnicity and insurance status/type. See Technical Appendix C2 for prevalence of ICRI and types of risks by age, sex and income.

[a]Estimate has a 95% confidence interval width exceeding 30 percentage points or 1.3 times the estimate and may not be reliable.
[b]includes children with both public and private health insurance.

Part E2: Table showing state by state prevalence (and comparison to the nation) of children age 0-17 experiencing two or more ICRI domains for (1) all children and (2) for children living in households with incomes that are below 200% of the Federal Poverty Level (FPL).
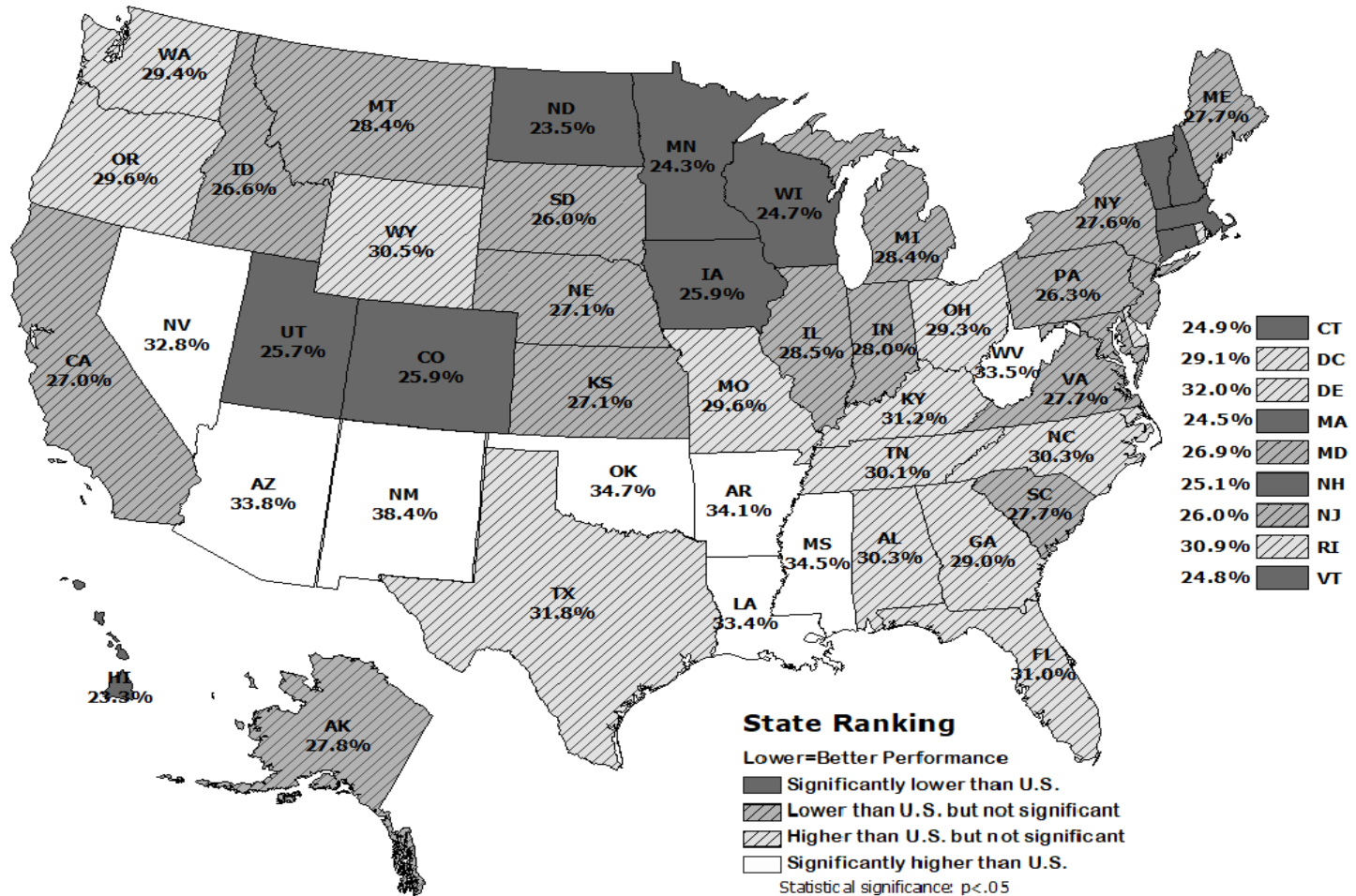
Significantly higher than nation
Higher than nation, but not statistically significant
Lower than nation, but not statistically significant
Significantly lower than nation
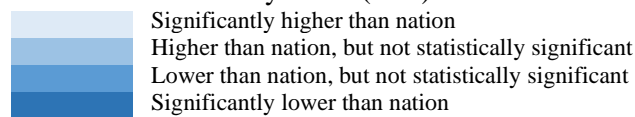
ST_NAME	All children	Children living in households with <200% FPL
Nation	**28.8%**	**42.2%**
State range	23.3% - 38.4%	35.6% - 53.2%
Alaska	27.8%	40.1%
Alabama	30.3%	44.3%
Arkansas	34.1%	48.3%
Arizona	33.8%	45.9%
California	27.0%	37.6%
Colorado	25.9%	41.3%
Connecticut	24.9%	36.4%
District of Columbia	29.1%	41.8%
Delaware	32.0%	51.0%
Florida	31.0%	40.2%
Georgia	29.0%	38.1%
Hawaii	23.3%	35.6%
Iowa	25.9%	43.7%
Idaho	26.6%	36.1%
Illinois	28.5%	43.1%
Indiana	28.0%	40.1%
Kansas	27.1%	41.5%
Kentucky	31.2%	43.5%
Louisiana	33.4%	44.9%
Massachusetts	24.5%	44.7%
Maryland	26.9%	42.0%
Maine	27.7%	38.6%
Michigan	28.4%	42.5%
Minnesota	24.3%	41.8%
Missouri	29.6%	46.5%
Mississippi	34.5%	44.9%
Montana	28.4%	44.4%
North Carolina	30.3%	42.0%
North Dakota	23.5%	37.3%
Nebraska	27.1%	47.1%
New Hampshire	25.1%	40.9%
New Jersey	26.0%	44.3%
New Mexico	38.4%	47.2%
Nevada	32.8%	46.2%
New York	27.6%	42.3%
Ohio	29.3%	43.1%
Oklahoma	34.7%	47.0%
Oregon	29.6%	45.9%
Pennsylvania	26.3%	39.5%
Rhode Island	30.9%	53.2%
South Carolina	27.7%	41.6%
South Dakota	26.0%	40.8%
Tennessee	30.1%	42.0%
Texas	31.8%	44.8%
Utah	25.7%	36.4%
Virginia	27.7%	47.1%
Vermont	24.8%	37.2%
Washington	29.4%	45.6%
Wisconsin	24.7%	40.4%
West Virginia	33.5%	47.4%
Wyoming	30.5%	47.6%

Part E3: US map showing state by state prevalence of all children age 0-17 years experiencing risks on two or more of the three Integrated Child Risk Index (ICRI) domains[a]

Nationwide prevalence of US children experiencing risks on at least two ICRI domains is 28.8%
(State range: 23.3% - 38.4%) Data: National Survey of Children's Health (2016-2018)

24.9%	CT
29.1%	DC
32.0%	DE
24.5%	MA
26.9%	MD
25.1%	NH
26.0%	NJ
30.9%	RI
24.8%	VT

WA 29.4%
MT 28.4%
ND 23.5%
MN 24.3%
ME 27.7%
OR 29.6%
ID 26.6%
WI 24.7%
NY 27.6%
SD 26.0%
WY 30.5%
MI 28.4%
IA 25.9%
PA 26.3%
NE 27.1%
OH 29.3%
NV 32.8%
UT 25.7%
IL 28.5%
IN 28.0%
WV 33.5%
CA 27.0%
CO 25.9%
KS 27.1%
MO 29.6%
KY 31.2%
VA 27.7%
NC 30.3%
TN 30.1%
AZ 33.8%
NM 38.4%
OK 34.7%
AR 34.1%
SC 27.7%
MS 34.5%
AL 30.3%
GA 29.0%
TX 31.8%
LA 33.4%
FL 31.0%
HI 23.3%
AK 27.8%

State Ranking

Lower=Better Performance

Significantly lower than U.S.
Lower than U.S. but not significant
Higher than U.S. but not significant
Significantly higher than U.S.

Statistical significance: p<.05

[a] Shading indicates results from nested t-tests comparing each state's prevalence to the nation (see legend).

Part E4: Table comparing NSCH 2016-2018 versus NSCH 2019 prevalence on the ICRI (domain count and domain combination scoring options), by the three ICRI domains and by specific ICRI risk criteria measures: by age and insurance type. NOTE: Economic hardship item changed in 2019

	All children, age 0-17 years		Child age						Insurance type			
			0-5	6-11	12-17	0-5	6-11	12-17	Public[e]	Private	Public[e]	Private
	2016-2018	2019	2016-2018			2019			2016-2018		2019	
All US children	100	100	32.2%	33.8%	33.9%	32.1%	33.6%	34.3%	35.9%	57.8%	36.8%	63.2%
Experienced 1+ ICRI domain	63.7%	63.2%	55.3%	65.3%	70.2%	53.0%	64.9%	70.9%	81.1%	51.6%	80.2%	52.1%
Scoring Option 1: Domain Count: Number of ICRI domains experienced												
0	36.3%	36.8%	44.7%	34.7%	29.8%	47.0%	35.1%	29.1%	18.9%	48.4%	19.8%	47.9%
1	34.9%	34.8%	33.0%	35.4%	36.3%	32.4%	35.4%	36.4%	35.2%	34.2%	34.5%	34.4%
2	20.0%	20.1%	17.2%	20.4%	22.3%	16.5%	19.9%	23.7%	29.7%	13.4%	30.0%	13.9%
3	8.8%	8.3%	5.2%	9.5%	11.6%	4.2%	9.6%	10.9%	16.2%	3.9%	15.6%	3.8%
Scoring Option 3: Domain Combinations: Mutually exclusive combinations												
No ICRI risks experienced	36.3%	36.8%	44.7%	34.7%	29.8%	47.0%	35.1%	29.1%	18.9%	48.4%	19.8%	47.9%
Only Medical Health Risks	12.0%	13.3%	11.4%	12.1%	12.5%	11.6%	13.5%	14.8%	8.5%	14.6%	9.9%	15.9%
Only Social Health Risks	7.5%	5.4%	9.2%	6.7%	6.6%	6.7%	5.1%	4.6%	9.6%	6.1%	6.6%	4.7%
Only Relational Health Risks	15.4%	16.0%	12.4%	16.5%	17.2%	14.1%	16.8%	16.9%	17.1%	13.6%	18.0%	13.8%
Only Medical & Social Risks	4.7%	4.5%	4.6%	4.5%	5.0%	4.1%	4.5%	4.9%	7.3%	3.2%	6.6%	3.4%
Only Medical & Relational Risks	8.1%	9.7%	6.7%	7.9%	9.6%	7.6%	9.7%	11.7%	10.1%	6.6%	13.2%	7.4%
Only Social & Relational Risks	7.2%	5.9%	5.9%	8.0%	7.8%	4.8%	5.7%	7.1%	12.3%	3.6%	10.2%	3.2%
Medical, Social & Relational Risks	8.8%	8.3%	5.2%	9.5%	11.6%	4.2%	9.6%	10.9%	16.2%	3.9%	15.6%	3.8%
Medical Health Risk ICRI Domain: criteria count & individual criteria												
1+	33.6%	35.9%	28.0%	34.0%	38.6%	27.8%	37.3%	42.2%	42.2%	28.4%	45.7%	30.5%
0	66.4%	64.1%	72.0%	66.0%	61.4%	72.2%	62.7%	57.8%	57.8%	71.6%	54.3%	69.5%
1	17.4%	19.2%	19.9%	15.2%	17.1%	20.2%	18.8%	18.7%	19.0%	15.9%	22.8%	16.9%
2	8.2%	8.5%	5.2%	8.6%	10.6%	4.8%	9.0%	11.6%	9.9%	7.4%	10.2%	7.7%
3 to 4	8.0%	8.2%	2.9%	10.2%	10.8%	2.8%	9.5%	12.0%	13.3%	5.1%	12.6%	6.0%
Met "more complex" CSHCN Screener criteria	13.3%	13.4%	7.6%	15.3%	16.8%	6.7%	15.2%	17.9%	19.2%	10.1%	19.3%	10.8%
Had poor/fair overall health status	1.6%	1.5%	1.1%	1.4%	2.2%	0.8%	1.6%	2.1%	2.8%	0.7%	2.7%	0.7%
Had two or more chronic or lifelong condition diagnoses	17.5%	18.3%	6.8%	20.8%	24.4%	7.1%	20.3%	26.7%	23.3%	14.5%	23.5%	16.1%

	All children, age 0-17 years		Child age						Insurance type			
			0-5	6-11	12-17	0-5	6-11	12-17	Public[e]	Private	Public[e]	Private
	2016-2018	2019	2016-2018			2019			2016-2018		2019	
Had one or more of eleven frequent, chronic and/or serious functional difficulties	26.4%	28.6%	24.0%	26.2%	28.9%	23.9%	29.1%	32.4%	35.2%	21.0%	37.6%	23.0%
Social Health Risk ICRI Domain: criteria count & individual criteria (one item changed)[a]												
1+	28.2%	24.2%	24.8%	28.8%	30.9%	19.8%	25.0%	27.4%	45.4%	16.8%	39.1%	15.0%
0	71.8%	75.8%	75.2%	71.2%	69.1%	80.2%	75.0%	72.6%	54.6%	83.2%	60.9%	85.0%
1	19.5%	16.7%	18.0%	19.9%	20.5%	15.0%	17.4%	17.4%	28.3%	13.5%	24.8%	12.0%
2	6.7%	5.7%	5.8%	6.8%	7.7%	4.1%	5.6%	7.2%	12.8%	2.9%	10.4%	2.5%
3 to 4	2.0%	1.8%	1.1%	2.1%	2.7%	0.6%	1.9%	2.8%	4.3%	0.4%	3.9%	0.5%
Food insecurity: Sometimes or often could not afford enough to eat	6.1%	5.4%	5.8%	6.0%	6.6%	4.5%	6.1%	5.4%	12.5%	1.8%	11.1%	1.6%
Item changed in 2019 & identifies fewer children: Economic hardship: Somewhat often/ very often hard to cover costs of basic needs, like food, housing	21.3%	15.4%	20.2%	21.7%	22.0%	13.9%	15.7%	16.6%	36.1%	11.7%	27.3%	8.2%
Neighborhood safety/violence: Lived in an unsafe neighborhood or where the child was a victim of or witnessed violence	8.3%	8.6%	5.9%	8.8%	10.0%	5.9%	8.5%	11.3%	14.2%	4.2%	13.9%	5.3%
Racism: Child has been treated or judged unfairly due to their race/ethnic group	3.8%	4.7%	1.2%	3.8%	6.2%	1.0%	4.6%	8.1%	5.1%	3.0%	6.5%	3.6%
Relational Health Risk ICRI Domain: criteria count & individual criteria												
1+	39.5%	39.9%	30.1%	42.0%	46.0%	30.7%	41.9%	46.4%	55.5%	27.7%	56.8%	28.2%
0	60.5%	60.1%	69.9%	58.0%	54.0%	69.3%	58.1%	53.6%	44.5%	72.3%	43.2%	71.8%
1	31.3%	30.9%	25.5%	33.4%	34.6%	25.0%	33.0%	34.2%	41.8%	23.0%	41.7%	23.2%
2	6.5%	7.1%	3.9%	6.6%	9.0%	4.3%	7.1%	9.8%	10.4%	3.8%	11.8%	4.2%
3 to 4	1.8%	1.9%	0.8%	2.0%	2.5%	1.4%	1.9%	2.3%	3.2%	0.8%	3.4%	0.7%

	All children, age 0-17 years		Child age						Insurance type			
			0-5	6-11	12-17	0-5	6-11	12-17	Public[e]	Private	Public[e]	Private
	2016-2018	2019	2016-2018			2019			2016-2018		2019	
Adverse Childhood Experiences (ACEs): Exposed to two or more household level ACEs[b]	13.2%	13.5%	6.2%	14.4%	18.6%	5.9%	14.0%	20.1%	22.1%	7.7%	23.7%	7.7%
Parental Mental Health: One or two caregivers reported poor or fair mental health[c]	7.3%	8.0%	6.5%	7.5%	7.8%	8.0%	8.0%	7.9%	10.8%	5.1%	12.3%	5.2%
Parental Aggravation: Child's caregiver usually/always felt aggravated with child[d]	4.9%	5.1%	3.5%	5.2%	5.9%	4.0%	5.1%	6.0%	7.1%	3.6%	7.3%	3.6%
Parent Coping/Support: Child's caregiver is not coping well and/or lacks emotional support for parenting	24.9%	25.0%	19.7%	26.1%	28.7%	20.2%	26.5%	28.0%	33.7%	17.1%	33.8%	17.5%

[a]"Economic hardship" item wording changed in 2018 resulting to decrease the prevalence of children whose family experienced economic hardship (25.4% in 2016, 23.0% in 2017, 15.5% in 2018 and 15.4% in 2019). See Appendix A Part A3 for details.

[b]The adverse childhood experiences (ACEs) measure used in this study only includes topics aligned with the original CDC/Kaiser study on ACEs: witnessed violence in home, loss of caregiver due to death, divorce/separation, incarceration, household alcohol or drug abuse or serious depression, suicidality, mental illness.

[c]Child had one or two caregivers reporting poor or fair overall mental health status.

[d]Child's caregiver reported that they usually/always felt the child is difficult to care for, does things that bother them, or is angry with child.

[e]Includes children with any public health insurance, even if they also had some form of private insurance as well.