

Contribution of an under-recognized adversity to child health risk: large-scale, population-based ACEs screening.

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2 • **What's Known on This Subject**
3 Whereas ACEs correlate with neurodevelopmental and physical health of children at the
4 population level, ACEs scales (e.g., PEARLS) are only weakly predictive at the level of the
5 individual child. Are important elements of early-life adversity missed by these scales?

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7 • **What This Study Adds**
8 Because unpredictable signals constitute a unique ACE, we developed the Questionnaire of
9 Unpredictability in Childhood (QUIC-5). Administering QUIC-5 and PEARLS to 30,000
10 families identified youth at risk for depression, obesity and other health problems, who would be
11 missed by PEARLS alone.

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Abstract

Background and Objectives: Whereas adverse early life experiences (ACEs) correlate with cognitive, emotional and physical health at the population level, existing ACEs screens are only weakly predictive of outcomes for an individual child. This raises the possibility that important elements of the early-life experiences that drive vulnerability and resilience are not being captured. We previously demonstrated that unpredictable parental and household signals constitute an ACE with cross-cultural relevance. We created the 5-item Questionnaire of Unpredictability in Childhood (QUIC-5) that can be readily administered in pediatric clinics. Here, we tested if combined screening with the QUIC-5 and an ACEs measure in this real-world setting significantly improved prediction of child health outcomes.

Methods: Leveraging existing screening with the Pediatric ACEs and Related Life Events Screener (PEARLS) at annual well-child visits, we implemented QUIC-5 screening in 19 pediatric clinics spanning the diverse sociodemographic constituency of Orange County, CA. Children (12yr+) and caregivers (for children 0-17years) completed both screens. Health diagnoses were abstracted from electronic health records (N=29,305 children).

Results: For both screeners, increasing exposures were associated with a higher probability of a mental (ADHD, anxiety, depression, externalizing problems, sleep disorder) or physical (obesity abdominal pain, asthma, headache) health diagnosis. Across most diagnoses, PEARLS and QUIC provided unique predictive contributions. Importantly, for three outcomes (depression, obesity, sleep disorders) QUIC-5 identified vulnerable individuals that were missed by PEARLS alone.

49 **Conclusions:** Screening for unpredictability as an additional ACE in primary care is feasible,
50 acceptable and provides unique, actionable information about child psychopathology and
51 physical health.

52 Introduction

53 The Centers for Disease Control and Prevention-Kaiser Permanente study¹ focusing on
54 Adverse Childhood Experiences (ACEs) documented cumulative effects of exposure to
55 potentially traumatic experiences (e.g. abuse, neglect, violence exposure) on a wide range of
56 physical and mental health conditions. This seminal work prompted studies examining the
57 enduring role of ACEs in health and disease² and it is now estimated the economic burden of
58 exposure to ACEs in the US adult population is \$14.1 trillion annually³. Given the accumulating
59 evidence regarding the human and fiscal toll of ACEs, calls to address the prevalence and
60 consequences of ACEs are rapidly increasing^{4,5} and the vast majority of states have enacted some
61 form of legislation to address the burden of ACEs⁶. At the forefront of these efforts, in 2020,
62 California became the first state to implement a publicly supported screening program
63 comprising guidelines for trauma-informed care coupled with reimbursement for ACEs screening
64 for the State's 15 million individuals supported by Medicaid. While California intends to
65 dramatically reduce the burden of ACEs on its citizens through this program^{7,8}, the value of this
66 public health initiative has been questioned on several grounds⁹. First, whereas ACEs screens
67 identify risk at the population level, they are limited in the ability to do so at the level of the
68 individual¹⁰. In addition, in the absence of established means for the prevention or mitigation of
69 the effects of ACEs, the value of screening is unclear¹¹.

70 There are several potential explanations for why ACEs scores are limited in their ability to
71 detect health risk for an individual child. One possibility is that significant sources of stress and

72 trauma occurring in childhood are missed with existing screeners¹². One such early life exposure
73 that is not currently included in standard screening instruments is unpredictability of the family
74 and environmental signals received by the child, which activate the brain's stress responses. It
75 has now been demonstrated in prospective longitudinal studies across diverse cultures and
76 sociodemographic groups that unpredictable parental care (independent from parental support
77 and sensitivity) and lack of structure in the family and home environment strongly predict
78 cognitive and emotional development¹³. Notably, the concept that unpredictable signals to the
79 developing brain disrupt brain maturation is well supported by experimental animal studies¹⁴⁻¹⁷.
80 Specifically, unpredictability in childhood has been linked to decreased self-regulation, a slower
81 trajectory of cognitive development and poorer memory, as well as increased risk for anxiety,
82 depression, anhedonia, PTSD, and poorer self-reported physical health in children and adults¹⁸⁻²².
83 These associations persist after consideration of other well-established ACEs (e.g. poverty,
84 abuse, neglect), suggesting that unpredictable experience is a robust risk factor for adverse
85 developmental and health outcomes, and its absence from existing assessments of early-life
86 adversity may account for some of their shortcomings in predicting an individual child's risk
87 profile.

88 Here we test the relative and cumulative contributions of both ACEs and unpredictability
89 as risk factors for child mental and physical health in a large, diverse pediatric population. We
90 leverage the existing ACEs screening implemented in the Children's Hospital of Orange County
91 (CHOC) primary care network²³ together with a well-validated 5-item screening instrument for
92 unpredictability to address the following critical questions: 1. When employed in routine
93 pediatric primary care, does ACEs screening identify children at increased risk of mental and

94 physical health problems? 2. Does screening for unpredictability in the home environment
95 provide additional predictive power to current ACEs screening recommendations?

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98 **Methods**

99 *Study Setting and Participants*

100 This study took place in 19 pediatric primary care clinics affiliated with Children’s Hospital of
101 Orange County (CHOC), which serve a diverse community of children in Orange County, CA
102 (see Table 1 for an overview of demographics). In 2020, the primary care clinics implemented
103 routine ACEs screening for all children at their annual well-child visits. As part of the California
104 Initiative to Advance Precision Medicine²⁴, in 2021, optional screening for unpredictability was
105 initiated. For both screens all caregivers provided information and the screens were also
106 administered to children aged 12 and over. Inclusion criteria for the current study included: 1.
107 Completion of the QUIC-5 screener. 2. Child ages 0 to 17 years. 3. English or Spanish language
108 preference. Here we present data for the first 29,305 children screened for ACEs and
109 unpredictability. All study procedures were approved by the CHOC institutional review board.

110 *Assessment of ACEs*

111 ACEs were assessed with the face-valid Pediatric and Related Life Events Scale
112 (PEARLS²⁵). Following current state screening recommendations, we examined the score for
113 Part 1, which focuses on 10 ACEs yielding a potential score of 0 to 10. Current protocols at the
114 CHOC Pediatric Primary care clinics utilize the aggregated or deidentified version of the

115 PEARLS in which the respondent provides a count of the number of items positively endorsed
116 without specification of the individual items contributing to these scores. PEARLS scores are
117 available in electronic health records (EHR).

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120 *Assessment of Unpredictability*

121 Unpredictability was assessed with the 5-item version of the Questionnaire of
122 Unpredictability in Childhood (QUIC-5^{20,26}). At the well-child visit, caregiver and child (as
123 appropriate based on age) were given the opportunity to complete the unpredictability screen.
124 The QUIC, which broadly assesses unpredictability in the social, emotional and physical
125 environments demonstrates robust psychometric properties. The scale was validated against
126 prospective longitudinal assessments of early life unpredictability and exhibits strong content
127 and discriminant validity as well as excellent test-retest reliability²⁰. The QUIC-5, on which
128 scores range from 0 to 5, is correlated on average .84 with the full-length version and predicts
129 mental health outcomes effects sizes comparable to the original scale²⁶.

130 *Child Health*

131 Mental and Physical health conditions were selected based on those that have strong stress-
132 related and behavioral components and have been previously identified as common outcomes of
133 exposure to early life adversity in pediatric populations²⁷. Presence or absence of the following
134 conditions in each child's EHR prior to or concurrent with the well-child visit at which the screen
135 was conducted were obtained: abdominal pain, ADHD, anxiety, asthma, depression,

136 externalizing problems, headache, obesity and sleep disorders. Specific ICD-10 codes for each
137 diagnosis can be seen in Table S1 and the incidence of each diagnosis in Table S2.

138 *Analysis Plan*

139 First, distributions of caregiver and youth endorsements on the PEARLS and QUIC were
140 examined. Bivariate correlations were then used to determine the degree of association between
141 youth and caregiver reports for each screener, as well as the correlation between the PEARLS
142 and QUIC-5. For both QUIC-5 and PEARLS separate binary logistic regressions were
143 conducted to examine the associations between caregiver and youth reports with mental and
144 physical health outcomes. In these regressions, scores on both screeners were categorized as 0,
145 1, 2, 3 and 4+. To determine whether the QUIC adds predictive power to the PEARLS, we
146 employed two approaches: 1. QUIC and PEARLS scores (continuous) were entered
147 simultaneously into binary logistic regressions predicting mental and physical health outcomes.
148 2. In a second set of binary logistic regressions, we examined the independent contributions of
149 all possible combinations of QUIC (0, 1, 2, 3 and 4+) and PEARLS scores (0, 1, 2, 3 and 4+)
150 with 0-0 as the reference for mental and physical health outcomes. All regression models
151 adjusted for child gender and age (with both linear and quadratic age terms considered as
152 appropriate).

153 Results

154 *Exposures to ACEs and Unpredictability*

155 Figure 1 shows the distribution of caregiver endorsement for exposures on PEARLS and
156 QUIC among children ages 0 to 17 years. On average older children experienced more
157 exposures to both ACEs and unpredictability, as expected. However, exposures to at least one

158 ACE (13%) or at least one form of unpredictability (23%) were observed even among the
159 youngest children ages 0-4 (means and standard deviations by age group are provided in Table
160 S3).

161 Comparing self-report by the children to caregiver reports within the same dyads, youths
162 reported more exposures to both ACEs and unpredictability than did caregivers (Figure 2; means
163 and standard deviations provided in Table S4). The correlation between youth and caregiver
164 reports on the PEARLS was .64 and for the QUIC the association was .54 (both p 's = .00). The
165 two scales were also associated: among youth, the correlation between the QUIC-5 and PEARLS
166 was .51, and the correlation of caregiver reports on the two screeners was of a similar magnitude
167 ($r = .43$; both p 's = .00).

168 *Exposures To ACEs and Unpredictability Predict Child Mental and Physical Health*

169 For both ACEs assessed with PEARLS and unpredictability measured with QUIC-5,
170 increasing exposures were associated with a higher probability of a mental (ADHD, anxiety,
171 depression, externalizing problems, sleep disorder) or physical (abdominal pain, asthma,
172 headache, obesity) health diagnosis. This was true for reports by both caregiver and youth
173 (Figures 3 and 4). Across diagnoses, the associations were generally dose-dependent, with odds
174 ratios increasing with each additional exposure (ORs and CIs are provided in Tables S5-8). For
175 caregiver report of mental health outcomes, the odds ratios for those with 4 or more exposures
176 compared to those with zero ranged from 2.4 to 5.9 for the PEARLS and 1.9 to 3.4 for the QUIC.
177 Similarly, the odds ratios for the physical health outcomes ranged from 1.4 to 1.9 and 1.8 to 2.0
178 for PEARLS and QUIC, respectively. The range of odds ratios for the youth self-reports were
179 similar in magnitude (see Table S8).

180 *Testing the Added Value of Unpredictability*

181 The correlation between PEARLS and QUIC-5 scores raised the question of whether
182 including the assessment of unpredictability adds value for predicting child health outcomes
183 beyond that obtained for PEARLS alone. Therefore, we determined the adjusted ORs for both
184 the QUIC and PEARLS in logistic regressions in which continuous scores for both were
185 concurrently included as predictors of youth mental and physical health (Figure 5; Tables S9 and
186 S10). For most mental and physical health diagnoses examined, both the PEARLS and QUIC
187 provided unique predictive contributions, and the predictive power (odds ratios) were similar,
188 whether reported by caregiver or youth. For sleep disorders and obesity the QUIC was a stronger
189 predictor of the increased probability of a diagnosis than was the PEARLS (Figure 5).

190 The QUIC identified significant risk for health problems that is not captured by the
191 PEARLS screen alone also when a second analytic approach was used (Figure 6). For example,
192 examining risk for depression, Figure 6 shows the odds ratios associated with all possible
193 combinations of QUIC and PEARLS scores. Children with a score of 4 or more on the PEARLS
194 had an increased risk of depression. For example, the odds ratio for a PEARLS score of 4 or
195 more and a QUIC score of zero was 7.9. However, a child with a score of zero on the PEARLS
196 and 4 on the QUIC is 11.8 more likely to have a depression diagnosis than a child who scores a
197 zero on both screens. This indicates that the QUIC-5 identifies a significant population of
198 children with mental health vulnerabilities derived from unpredictable environments that would
199 be missed by restricting screening to current ACEs tools.

200 This observation was not unique to depression. For example, a child with a “high score” on
201 the PEARLS (4 or more) and with a score of 1 on the QUIC, is not at increased risk of a sleep
202 disorder. However, a child who meets this criterion on the PEARLS and has a QUIC score of 4

203 or more is 5.4 times more likely to have a sleep disorder diagnosis than a child with a zero score
204 on both screens (similar heatmaps for all diagnoses can be found in Table S11).

205 Discussion

206 The principal findings of this study conducted in more than 29,000 children at 19 pediatric
207 primary care clinics are: (a) Widespread, systematic screening for ACEs and early-life
208 unpredictability is feasible in primary care clinics serving diverse communities. (b) Exposure to
209 adversity measured with both the QUIC and PEARLS is prevalent even among the youngest
210 children and increases with age. (c) Although parent and youth reports are in general agreement
211 and both predict health risks, youth report more exposures. (d) The unpredictability screen
212 (QUIC-5) portends child outcomes at least as well, and in some cases better, than currently
213 recommended ACEs screens. (e) Crucially, for some health problems (e.g. depression, obesity),
214 the QUIC-5 identifies risk for mental and physical health problems that is not captured by the
215 PEARLS screen.

216 Our study was conducted in Orange County, California (CA) which is home to the third
217 largest child population in the state (after Los Angeles and San Diego counties). The youth
218 served by CHOC are representative of the diverse socioeconomic, ethnic and cultural
219 constituency of both the county and of California more broadly. Underscoring the representative
220 nature of the sample is the fact that our race and ethnic distributions largely mirror that of both
221 the county and state²⁸. This indicates that both the feasibility and uptake of the screening as well
222 as the associations we observed with child health outcomes are highly likely to generalize.

223 A concerning observation was the prevalence of adversity exposures even among the
224 youngest children, with 13 percent already having experienced at least one ACE and 27 percent

225 exposed to at least one form of unpredictability before 5 years of age. As children aged, both
226 caregivers and youth reported more exposures. On average, youths reported more exposures to
227 both ACEs and unpredictability than did caregivers, highlighting the importance of obtaining
228 youth self-report in addition to caregiver report when possible. According to self-reports, by late
229 adolescence 27 percent of youth had been exposed to one or more ACE and 49 percent at least
230 one form of unpredictability.

231 For both mental and physical health outcomes, exposure to more ACEs and unpredictability
232 exhibited a graded relationship with risk of diagnosis. Additionally, the predictive power of
233 unpredictability was similar in magnitude to ACEs for the range of mental and physical health
234 outcomes examined. The results strongly suggest that consideration of unpredictability enhances
235 the ability to identify children at risk of a mental or physical health condition beyond that of the
236 PEARLS: First, when modeling the two screens together, each predicted risk independently from
237 the other for the mental and physical health outcomes examined. Furthermore, high QUIC scores
238 predicted significant risk for many diagnoses even when the PEARLS score was low. These risks
239 (in some cases, odds ratios greater than 10) would be missed if PEARLS scores alone were used
240 for screening.

241 For two health conditions, obesity and sleep disorders, the QUIC was superior in risk
242 identification compared to the PEARLS. This observation regarding obesity mirrors findings
243 from a study of 367 children receiving care at a safety net practice in Northern California that
244 documented positive associations between caregiver reports with the PEARLS and asthma, but
245 not obesity²⁹. This is not entirely surprising as healthy eating and sleep hygiene are both
246 dependent on structure and routines^{30,31}. Delineating both the shared and unique contributions of
247 different forms of early life adversity to individual disease burden, as done here, paves the path

248 for more precise understanding of individual exposures, and the mechanisms through which
249 those exposures operate, enabling true precision medicine.

250 An additional strength of the current study was the examination of the utility of youth self-
251 report of exposure to adversity. Following State of California recommendations for the PEARLS,
252 children aged 12 and above completed both screens. In general, the dose-response patterns
253 associated with both mental and physical health outcomes were comparable for youth and
254 caregiver reports, including the findings that the QUIC was a better predictor of sleep disorders
255 and obesity than the PEARLS. These similarities underscore the validity of youth report on the
256 QUIC and PEARLS and increase confidence in the validity of both screening instruments. A
257 limitation of the study lies in the reliance on child health diagnoses derived from electronic
258 health records. Given the study design, it is not possible to disentangle the temporal relations
259 between exposures and diagnoses. Further, particularly for the mental health outcomes, we are
260 unable to probe the associations between exposures and subclinical symptom profiles, which are
261 highly likely. Future studies will explore how structural and social determinants of health
262 influence exposures to unpredictability and their associations with health, to better identify
263 inequities which exist. This is of particular importance because structural determinants of ACEs
264 and unpredictability are not evenly distributed and individuals of historically and currently
265 marginalized and systematically excluded backgrounds are at disproportionate risk for these
266 exposures³²⁻³⁶.

267 There are several features of unpredictability that distinguish it from many other forms of
268 early life adversity, rendering it a promising target for prevention and intervention: (1) There are
269 multiple opportunities for prevention and intervention, including the prospect of multilevel
270 intervention^{37,38}. These range from the level of the individual (e.g. altering caregiver attitudes

271 regarding the importance of predictability), to the family systems level (e.g. implementing family
272 routines) and at the public policy level (e.g. adoption of Fair Workweek regulations that address
273 precarious parental work schedules). Addressing the full range of ACEs such as poverty and
274 abuse should be a top priority to improve the well-being of children and families. However, a
275 parallel and attainable goal is increasing predictability in children's lives, for example through
276 the encouragement of family routines, which have the additional advantage of being relatively
277 low cost. (2) In conceptualizing high unpredictability as a form of early life adversity, it is
278 notable that low unpredictability (i.e., predictable environments) may exert protective influences
279 on child development and buffer children from adversity. For example, in families experiencing
280 poverty, parental substance use disorders, chronic illness or divorce, family routines predict child
281 resilience³⁹⁻⁴¹. In addition, predictability protected child mental health in the context of societal-
282 level disruptions such as the COVID-19 pandemic^{42,43}. (3) Community perspectives obtained
283 from pediatricians, allied health care providers and parents indicate that screening in pediatric
284 primary care with the QUIC-5 may be more acceptable than screening with the PEARLS⁴⁴. (4)
285 Finally, interventions seeking to promote predictability should and can incorporate culturally-
286 responsive, person-centered, and community inclusive approaches with the acknowledgment that
287 the promotion of predictability requires consideration of the unique needs of each child and
288 family.

289

290 *Conclusion*

291 In sum, we demonstrate that large-scale systematic screening for ACES and early-life
292 unpredictability is feasible in primary care clinics serving diverse communities. Exposures to
293 these types of adversity are prevalent even among the youngest children, and both predict health

294 outcomes. The unpredictability screen (QUIC-5) portends child outcomes at least as well, and in
295 some cases better, than current ACEs screening (PEARLS-tool) and for some health problems,
296 the QUIC-5 identifies risk for mental and physical health problems that are not captured by the
297 ACEs screen. These findings suggest that consideration of unpredictability will (1) identify
298 children at risk for health problems that will be otherwise missed and (2) may provide a tractable
299 target for prevention and intervention in the pediatric primary care setting with the potential to
300 make meaningful positive impacts on child and life-span health.

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Table 1. Participant Characteristics (N = 29,305).

	n	%
Child Age		
<i>0-4</i>	5,833	19.9
<i>5-9</i>	7,909	30.0
<i>10-14</i>	9,278	31.7
<i>15-17</i>	6,285	21.4
Child Race		
<i>Asian</i>	2,892	9.9
<i>Black</i>	506	1.7
<i>Native American or Alaskan</i>	114	0.4
<i>Native Hawaiian</i>	22	0.1
<i>White</i>	7,400	25.3
<i>More than one race or other</i>	9,219	30.4
<i>Unknown</i>	9,152	31.2
Child Ethnicity		
<i>Hispanic/Latino/a</i>	17,472	58.5
<i>Not Hispanic/Latino/a</i>	8,903	29.8
<i>Unknown</i>	3,486	11.7
Preferred Language		
<i>English</i>	24,263	82.8
<i>Spanish</i>	5,042	17.2
Child Gender		
<i>Female</i>	14,169	48.4
<i>Male</i>	15,136	51.6
Insurance		
<i>Public</i>	20,112	68.7
<i>Private</i>	9,041	30.9
<i>Self or Other</i>	152	0.5

Note: Demographic data were retrieved from electronic health records. Race, ethnicity, and gender were collected from the caregiver at initial registration. Preferred language indicates the language in which the screens were administered. Insurance status was determined from the visit concurrent with screening.

Figure 1. Distribution of ACEs (PEARLS) and unpredictability (QUIC-5) by child age.

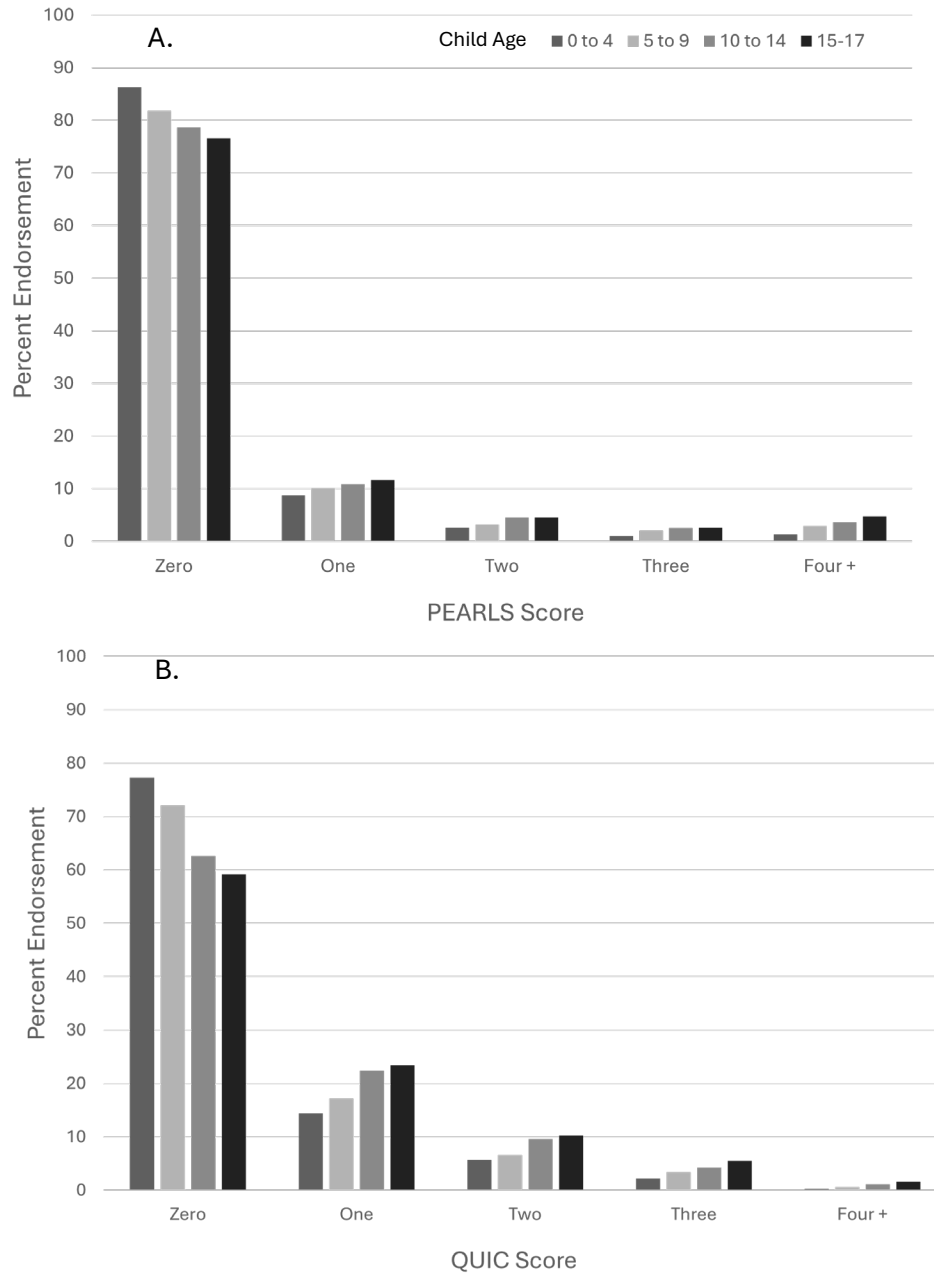


Figure 2. Distribution of ACEs (PEARLS; Panel A) and unpredictability (QUIC-5; Panel B) by caregiver report and youth self-report.

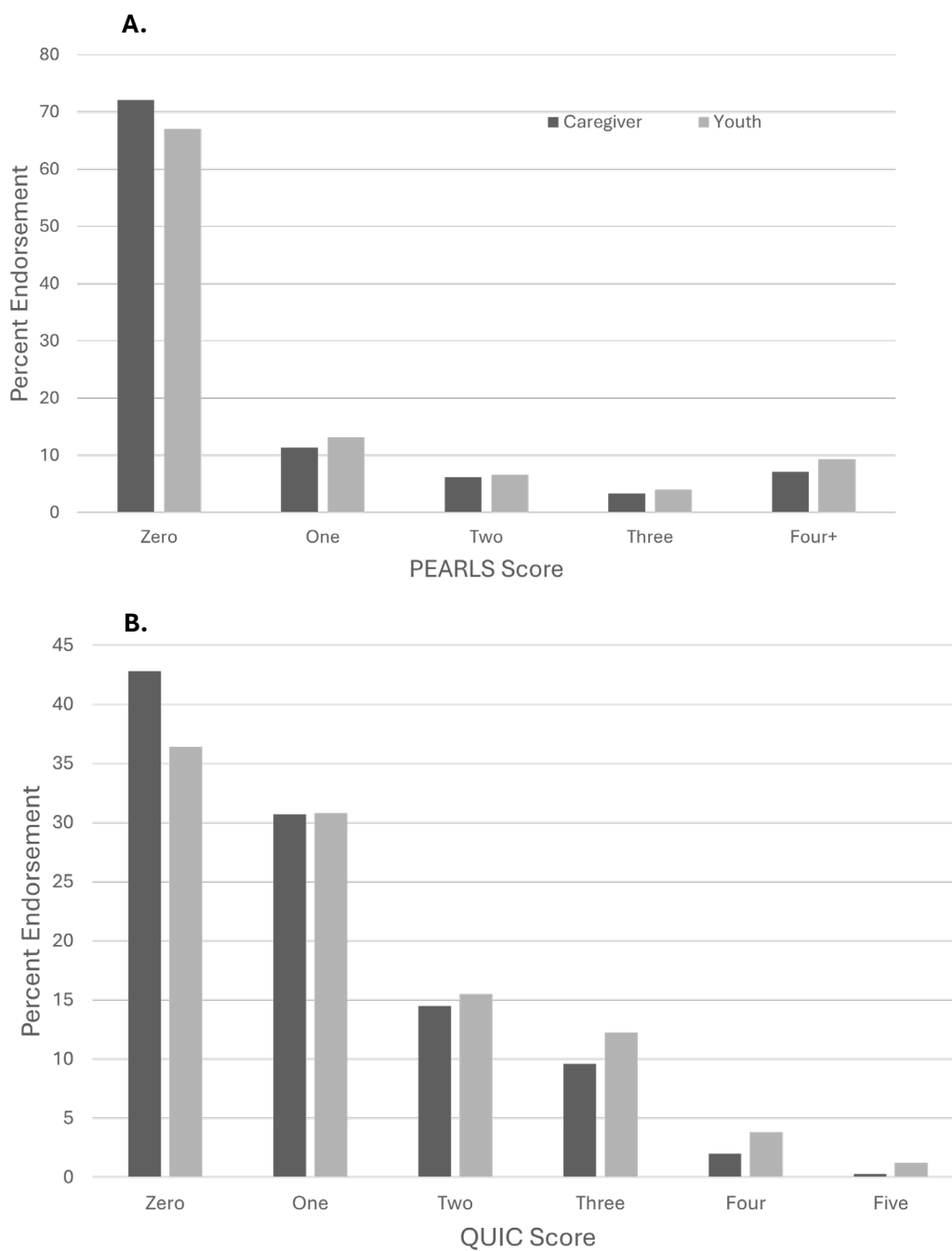


Figure 3. ACEs (PEARLS) and unpredictability (QUIC-5) screens predict child mental health outcomes. Odds ratios and 95% confidence intervals. Panels A-B show associations for caregiver reports. Youth self-report in panels C-D.

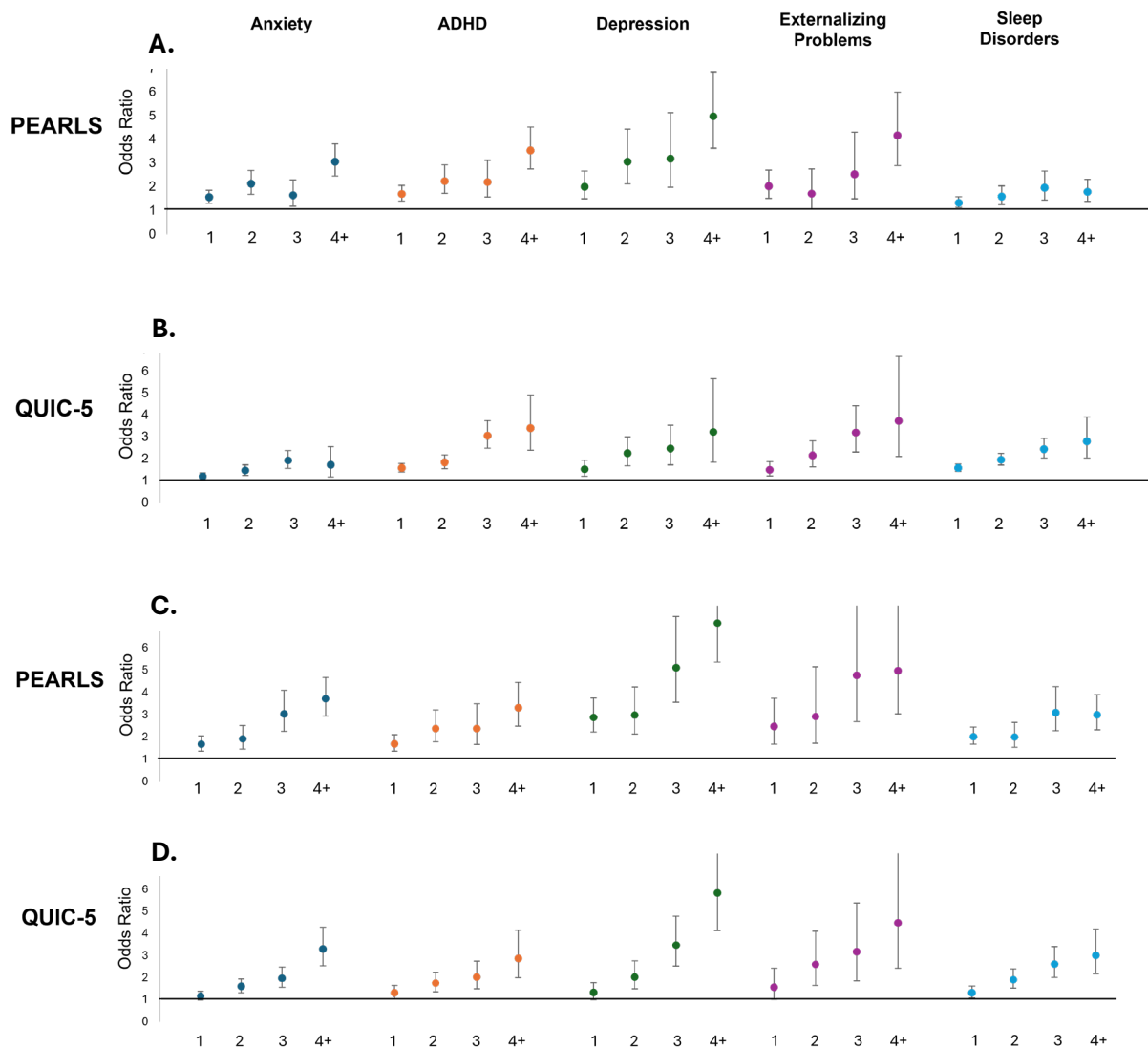


Figure 4. ACEs (PEARLS) and unpredictability (QUIC-5) screens predict child physical health outcomes. Odds ratios and 95% confidence intervals. Panels A-B show associations for caregiver reports. Youth self-report in panels C-D.

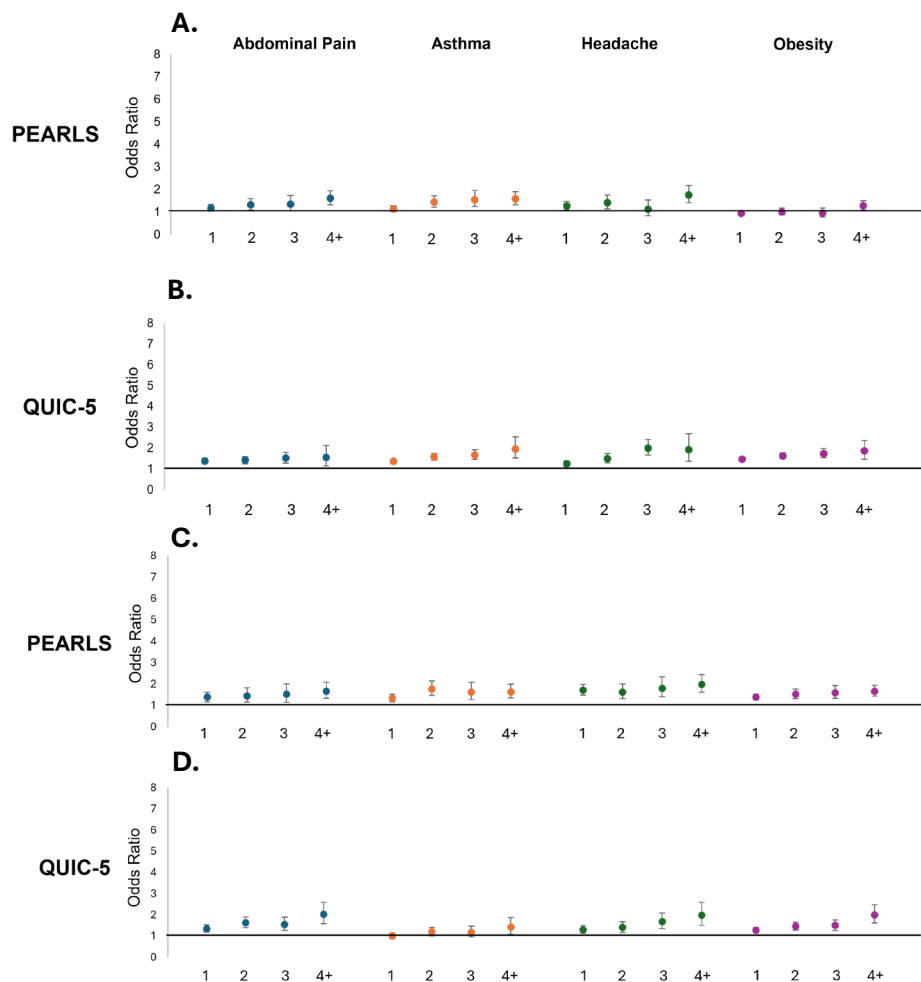


Figure 5. ACEs (PEARLS) and unpredictability (QUIC-5) screens independently predict child mental and physical health outcomes. Odds ratios and 95% confidence intervals. Panels A-B show associations for caregiver reports. Youth self-report in panels C-D.

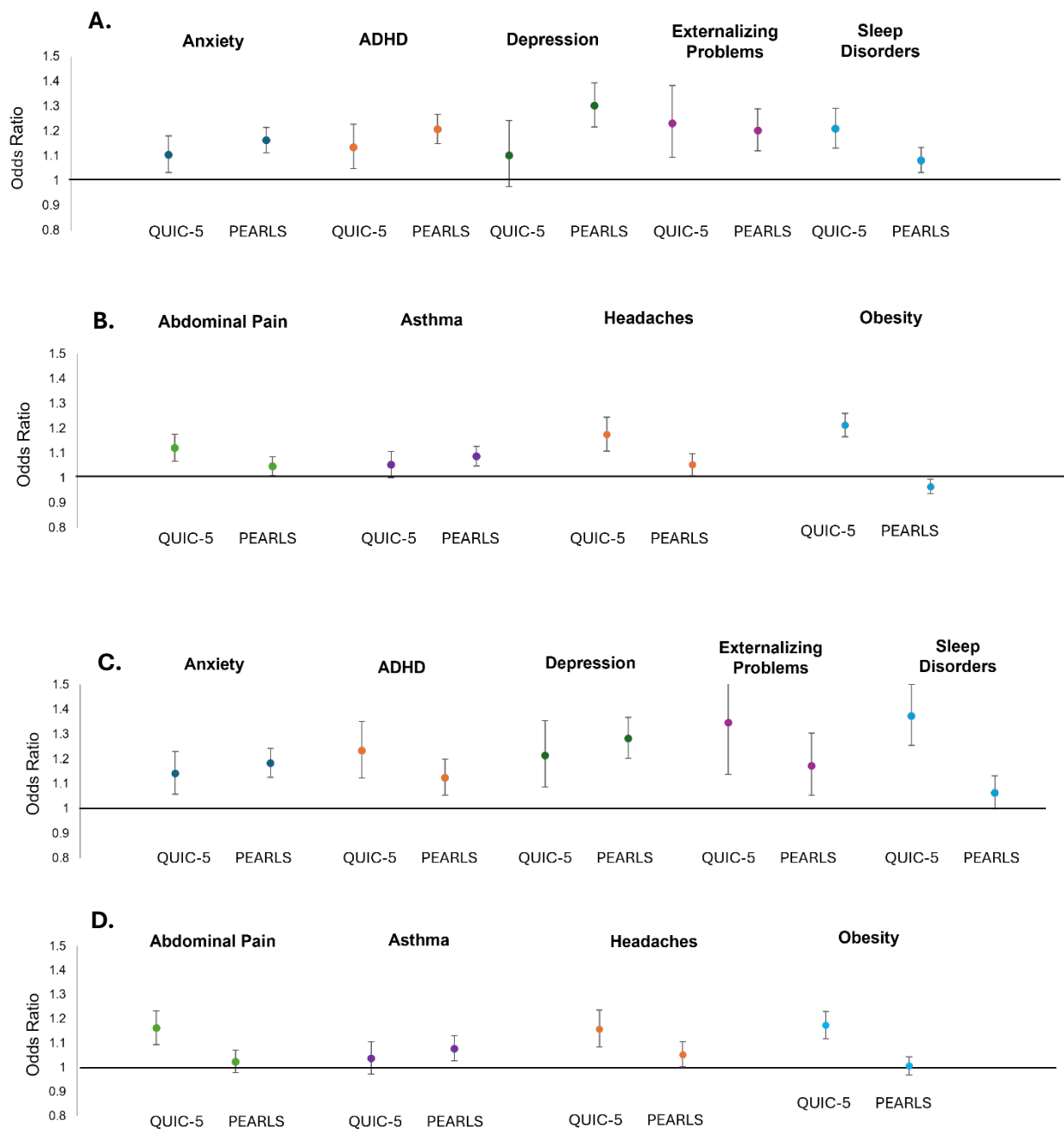


Figure 6. Evaluation of the independent and combined predictive power of ACEs (PEARLS) and unpredictability (QUIC) screens. Examples shown here are for youth self-report. Results for both youth and caregiver reports for all diagnoses can be found in Table S11.

Depression						
QUIC SCORE	4+	11.8 (5.1-27.2)	3.6 (.83-15.9)	5.2 (1.7-15.5)	5.9 (1.7-20.6)	13.0 (7.8-21.7)
	3	1.1 (.34-3.6)	1.3 (.32-5.6)	3.3 (1.2-9.6)	14.0 (7.0-28.0)	8.4 (5.0-14.1)
	2	2.0 (1.2-3.4)	2.3 (1.0-5.2)	2.9 (1.1-7.6)	4.3 (1.6-11.3)	6.4 (2.7-15.0)
	1	1.3 (.84-2.0)	4.4 (2.6-7.4)	3.0 (1.2-7.1)	2.7 (.82-9.2)	9.5 (4.0-23.0)
	0	Ref	3.2 (1.9-5.3)	3.3 (1.4-8.0)	7.8 (2.5-23.9)	7.9 (2.1-28.7)
		0	1	2	3	4+
PEARLS SCORE						

	OR
	LE 1.0
	1.1-1.9
	2.0-2.9
	3.0-3.9
	GE 4.0

Sleep Disorders						
QUIC SCORE	4+	2.5 (.89-7.1)	5.1 (2.1-12.4)	3.2 (1.1-9.3)	4.8 (1.6-14.1)	5.4 (3.2-9.2)
	3	4.0 (2.4-6.4)	2.4 (1.0-5.7)	1.8 (.65-5.1)	5.7 (2.8-11.6)	4.1 (2.4-6.9)
	2	2.2 (1.5-3.2)	2.0 (1.1-3.8)	2.0 (.84-4.6)	4.4 (2.0-9.4)	2.1 (.74-5.9)
	1	1.3 (.93-1.8)	2.6 (1.6-4.1)	2.7 (1.3-5.6)	1.8 (.54-5.7)	1.3 (.31-5.4)
	0	Ref	1.6 (.98-2.7)	1.7 (.68-4.3)	1.8 (.43-7.7)	0.0 (0.0)
		0	1	2	3	4+
PEARLS SCORE						

Obesity						
QUIC SCORE	4+	2.6 (1.5-4.6)	1.6 (.87-3.1)	2.6 (1.4-4.8)	1.8 (.85-3.8)	2.0 (1.4-2.9)
	3	1.7 (1.3-2.3)	1.5 (.97-2.4)	1.3 (.82-2.2)	1.4 (.86-2.4)	1.5 (1.1-2.1)
	2	1.5 (1.3-1.8)	1.6 (1.2-2.2)	1.3 (.83-1.9)	1.2 (.69-2.0)	1.9 (1.2-3.2)
	1	1.3 (1.1-1.5)	1.2 (.91-1.5)	1.2 (.78-1.8)	2.2 (1.3-3.7)	1.1 (.59-2.0)
	0	Ref	1.0 (.82-1.3)	1.5 (.95-2.2)	1.8 (.92-3.6)	.90 (.35-2.4)
		0	1	2	3	4+
PEARLS SCORE						