

Pediatric ACE Screening Clinical Workflow

1. **Registration** or **clinical staff** reviews patient's record to determine if PEARLS screen indicated during visit.* Staff provides PEARLS tool to caregiver (0-19 years) and/or patient (12-19 years) in private setting.

2. **Caregiver** (0-9 years) and/or **patient** completes PEARLS.

2a. If screen is incomplete: Provider provides education about how practices and interventions can affect health and offers patient opportunity to discuss and/or complete PEARLS screen. Once complete, provider moves to step 3.

2b. If screen is complete, provider moves to step 3.

3. Provider or Medical Assistant transcribes ACE score (top box of PEARLS tool) into EMR.

4. Provider reviews screen with patient and follows appropriate risk assessment algorithm: incomplete or at low, intermediate, or high risk for toxic stress.

5. Provider documents ACE score, billing code[†], treatment plan, and follow-up in visit note.

6. Provider reviews ACE score, treatment plan, and follow-up prior to next visit; updates as needed.

*PEARLS to be completed once per year, and no less often than every 3 years

[†]Healthcare Common Procedure System (HCPCS) billing codes for ACE scores:

G9919: ACE score ≥ 4 , high risk for toxic stress

G9920: ACE score of 0 – 3, lower risk for toxic stress. For purposes of coding, scores of 1-3 with ACE-associated health conditions should be coded as G9920, even though patient falls into the high-risk category of the clinical algorithm.

	<u>Low Risk</u>	<u>Intermediate Risk</u>	<u>High Risk</u>	<u>High Risk</u>	<u>Unknown Risk</u>
ACE screen (top box)	Score of 0	Score of 1-3	Score of 1-3	Score of 4+	Score unknown (incomplete)
Assess for associated health conditions	↓	↓ Without associated health conditions	↓ With associated health conditions	↓ With <u>or</u> without associated health conditions	↓
Determine response and follow-up	Provide education, anticipatory guidance on ACEs, toxic stress, and buffering factors.	Provide education, anticipatory guidance on ACEs, toxic stress, and buffering factors. Assess for protective factors and jointly formulate treatment plan. Link to support services and interventions, as appropriate.	Provide education about toxic stress, its likely role in patient's health condition(s), and buffering. Assess for protective factors and jointly formulate treatment plan. Link to support services and interventions, as appropriate.	Provide education about toxic stress, its likely role in patient's health condition(s), and buffering. Assess for protective factors and jointly formulate treatment plan. Link to support services and interventions, as appropriate.	Provide education on ACEs, toxic stress, and buffering factors. Re-offer at next physical.

This algorithm pertains to the ACE score (top box of PEARLS), whose associations with health conditions are most precisely known. Social determinants of health (bottom box) may also increase risk for a toxic stress response and should be addressed with appropriate services, but should NOT be added to the ACE score for this algorithm. Partial completion may indicate discomfort or lack of understanding. If partial response indicates patient is at intermediate or high risk, follow the guidelines for that category.

If the ACE score is 0, the patient is at “low risk” for toxic stress. The provider should offer education on the impact of ACEs and other adversities on health and development as well as on buffering factors and interventions. If the ACE score is 1-3 without ACE-associated health conditions, the patient is at “intermediate risk” for toxic stress. If the ACE score is 1-3 and the patient has at least one ACE-associated condition, or if the ACE score is 4 or higher, the patient is at “high risk” for toxic stress. In both cases, the provider should offer education on how ACEs may lead to toxic stress and associated health conditions, as well as practices and interventions demonstrated to buffer the toxic stress response, such as sleep, exercise, nutrition, mindfulness, mental health, and healthy relationships. The provider should also assess for protective factors, jointly formulate a treatment plan, and link to supportive services and interventions, as appropriate.

ACE-Associated Health Conditions: Pediatrics

Symptom or Health Condition	For $\geq X$ ACEs (compared to 0)	Odds Ratio
Asthma ^{26, 33}	4	1.7 - 2.8
Allergies ³³	4	2.5
Dermatitis and eczema ³⁹	3*	2.0
Urticaria ³⁹	3*	2.2
Increased incidence of chronic disease, impaired management ²⁵	3	2.3
Any unexplained somatic symptoms ²⁵ (eg, nausea/vomiting, dizziness, constipation, headaches)	3	9.3
Headaches ³³	4	3.0
Enuresis; encopresis ⁵	--	--
Overweight and obesity ³	4	2.0
Failure to thrive; poor growth; psychosocial dwarfism ^{5, 2, 41}	--	--
Poor dental health ^{16, 22}	4	2.8
Increased infections ³⁹ (viral, URIs, LRTIs and pneumonia, AOM, UTIs, conjunctivitis, intestinal)	3*	1.4 - 2.4
Later menarche ⁴⁰ (≥ 14 years)	2*	2.3
Sleep disturbances ^{5, 31}	5**	PR 3.1
Developmental delay ³⁰	3	1.9
Learning and/or behavior problems ³	4	32.6

*Odds ratio represents at least one ACE, but also includes other adversities

**Prevalence ratio represents at least one ACE, but also includes other adversities

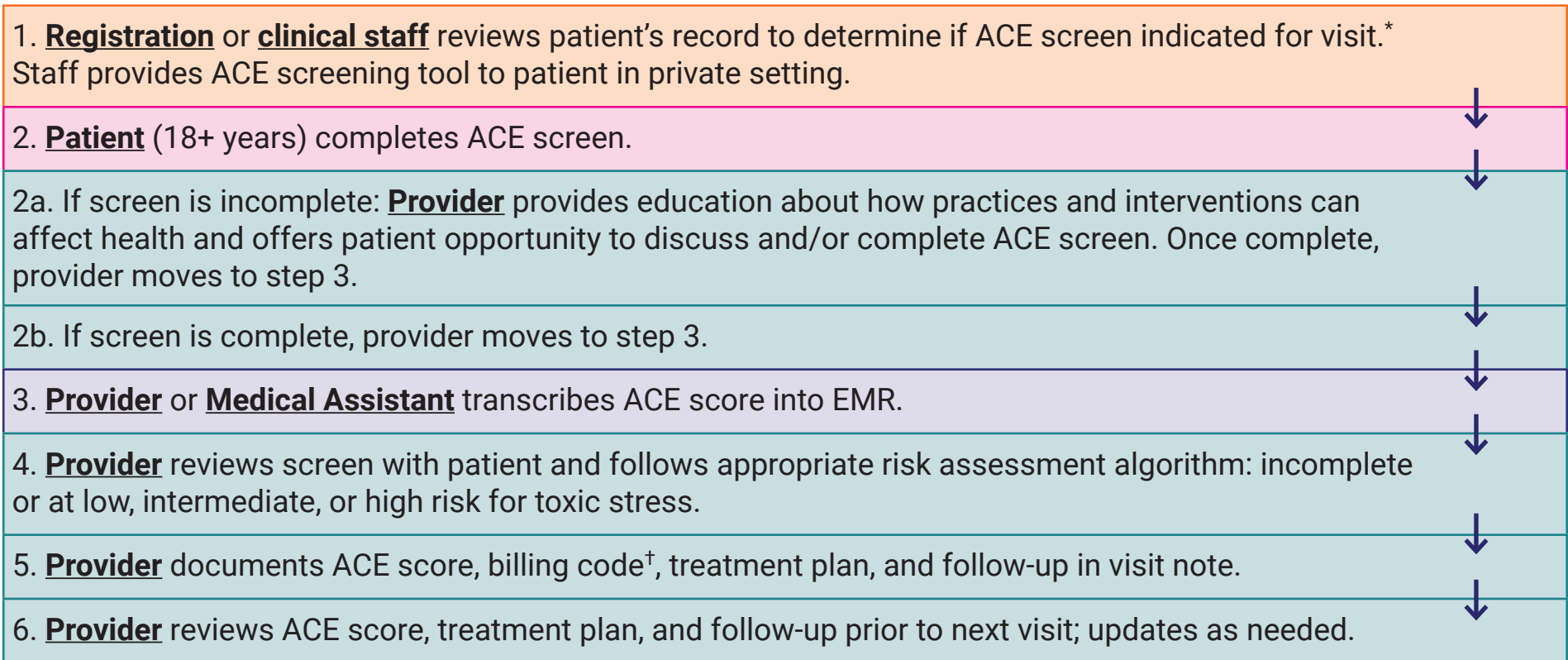
ACE-Associated Health Conditions: Pediatrics

Symptom or Health Condition	For ≥ X ACEs (compared to 0)	Odds Ratio
Repeating a grade ¹⁵	4	2.8
Not completing homework ¹⁵	4	4.0
High school absenteeism ³³	4	7.2
Graduating from high school ²⁹	4	0.4
Aggression; physical fighting ²⁸	For each additional ACE	1.9
Depression ²⁹	4	3.9
ADHD ⁴²	4	5.0
Any of: ADHD, depression, anxiety, conduct/behavior disorder ³⁰	3	4.5
Suicidal ideation ²⁸	For each additional ACE	1.9
Suicide attempts ²⁸	For each additional ACE	1.9 - 2.1
Self-harm ²⁸	For each additional ACE	1.8
First use of alcohol at < 14 years ⁷	4	6.2
First use of illicit drugs at < 14 years ¹⁰	5	9.1
Early sexual debut ²¹ (<15-17 y)	4	3.7
Teenage pregnancy ²¹	4	4.2

*Odds ratio represents at least one ACE, but also includes other adversities

**Prevalence ratio represents at least one ACE, but also includes other adversities

Adult ACE Screening Clinical Workflow



***ACE tool to be completed** once per adult per lifetime

[†]**Healthcare Common Procedure System (HCPCS) billing codes for ACE scores:**

G9919: ACE score ≥ 4 , at high risk for toxic stress.

G9920: ACE score of 0 – 3, at lower risk for toxic stress (on algorithm, at either low or intermediate risk).

Adverse Childhood Experiences (ACEs) and Toxic Stress Risk Assessment Algorithm

Adults

	<u>Low Risk</u>	<u>Intermediate Risk</u>	<u>High Risk</u>	<u>Unknown Risk</u>
ACE screen (top box)	Score of 0-3 ↓	Score of 1-3 ↓	Score of 4+ ↓	Score unknown (incomplete) ↓
Assess for associated health conditions	Without associated health conditions ↓	With associated health conditions ↓	With or without associated health conditions ↓	↓
Determine response and follow-up	Provide education about ACEs, toxic stress, and resilience. Assess for protective factors.	Provide education about toxic stress, its likely role in patient's health condition(s), and resilience. Assess for protective factors and jointly formulate treatment plan. Link to support services and treatment, as appropriate.	Provide education about toxic stress, its likely role in patient's health condition(s), and resilience. Assess for protective factors and jointly formulate treatment plan. Link to support services and treatment, as appropriate.	Provide education on ACEs/ toxic stress and buffering/ resilience. Re-offer at next physical.

Partial completion may indicate discomfort or lack of understanding. If partial response indicates patient is at intermediate or high risk, follow the guidelines for that category.

If the **ACE score is 0-3** without ACE-associated health conditions, the patient is at “low risk” for toxic stress physiology. The provider should offer education on the impact of ACEs and other adversities on health (including reviewing patient’s self-assessment of ACEs’ impact on health), buffering/protective factors, and interventions that can mitigate health risks. If the **ACE score is 1-3** with ACE-associated health conditions, the patient is at “intermediate risk.” If the **score is 4 or higher**, even without ACE-associated health conditions, the patient is at “high risk” for toxic stress physiology. In both cases, the provider should offer education on how ACEs may lead to a toxic stress response and associated health conditions, as well as practices and interventions demonstrated to buffer the toxic stress response, such as sleep, exercise, nutrition, mindfulness, mental health, and healthy relationships. The provider should also assess for protective factors, jointly formulate a treatment plan and link to supportive services and interventions, as appropriate.

ACE-Associated Health Conditions: Adults

Symptom or Health Condition	Odds Ratio (excluding outliers)
Cardiovascular disease ²¹ (CAD, MI, ischemic heart disease)	2.1
Tachycardia ³⁷	≥ 1 ACE: 1.4
Stroke ²⁰	2.0
Chronic obstructive pulmonary disease (emphysema, bronchitis) ²¹	3.1
Asthma ⁴³	2.2
Diabetes ²¹	1.4
Obesity ²⁰	2.1
Hepatitis or jaundice ¹	2.4
Cancer, any ²¹	2.3
Arthritis ^{32,7} (self-reported)	3 ACEs, HR: 1.5 ≥ 1 ACE: 1.3
Memory impairment ²⁰ (all causes, including dementias)	4.9
Kidney disease ⁴³	1.7
Headaches ¹¹	≥ 5 ACEs: 2.1
Chronic pain, any ³⁸ (using trauma z-score)	1.2
Chronic back pain ³⁸ (using trauma z-score)	1.3
Fibromyalgia ³⁷	≥ 1 ACE: 1.8
Unexplained somatic symptoms, including somatic pain, headaches ^{20,2}	2.0 - 2.7
Skeletal fracture ¹	1.6 - 2.6 ²⁰
Physical disability requiring assistive equipment ²³	1.8

Odds ratios compare outcomes in individuals with > 4 ACEs to those with 0 ACEs, except where specified

ACE-Associated Health Conditions: Adults

Symptom or Health Condition	Odds Ratio (excluding outliers)
Depression ²¹	4.7
Suicide attempts ²¹	37.5
Suicidal ideation ²⁰	10.5
Sleep disturbance ²⁰	1.6
Anxiety ²¹	3.7
Panic and anxiety ²⁰	
Post-traumatic stress disorder ³⁷	4.5
Illicit drug use ²¹ (any)	5.2
Injected drug, crack cocaine, or heroin use ²¹	10.2
Alcohol use ²¹	6.9
Cigarettes or e-cigarettes use ³⁵	6.1
Cannabis use ³⁵	11.0
Teen pregnancy ²¹	4.2
Sexually transmitted infections, lifetime ²¹	5.9
Violence victimization ²¹ (intimate partner violence, sexual assault)	7.5
Violence perpetration ²¹	8.1

Odds Ratios for individuals with > 4 ACEs, except where specified otherwise, all compared to 0 ACEs

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