

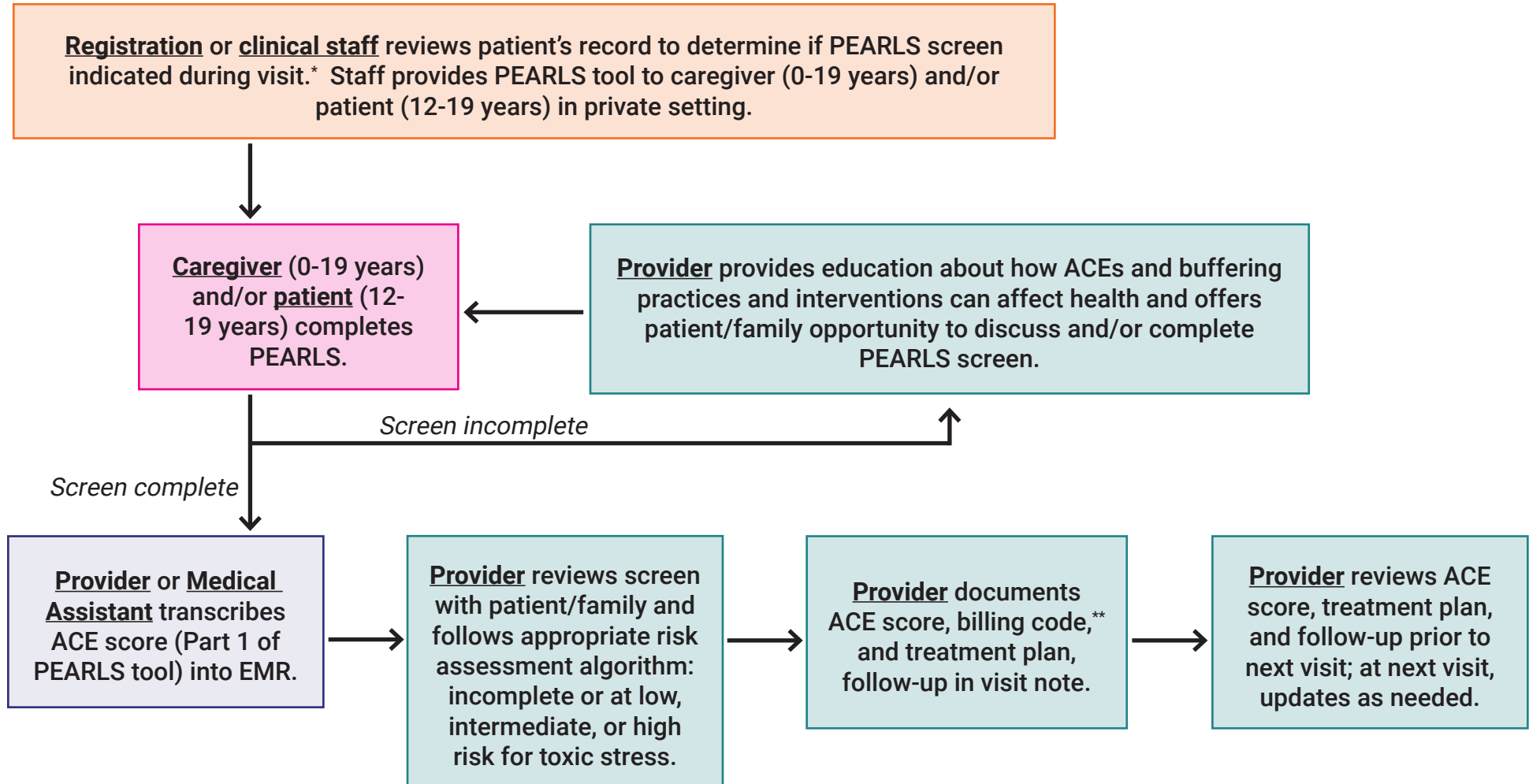
**ACE Screening Clinical Workflows,
ACEs and Toxic Stress Risk Assessment Algorithm, and
ACE-Associated Health Conditions:
For Pediatrics and Adults**

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Pediatric ACE Screening Clinical Workflow



*PEARLS is recommended to be completed once per year.

**Healthcare Common Procedure Coding System (HCPCS) billing codes for ACE scores:

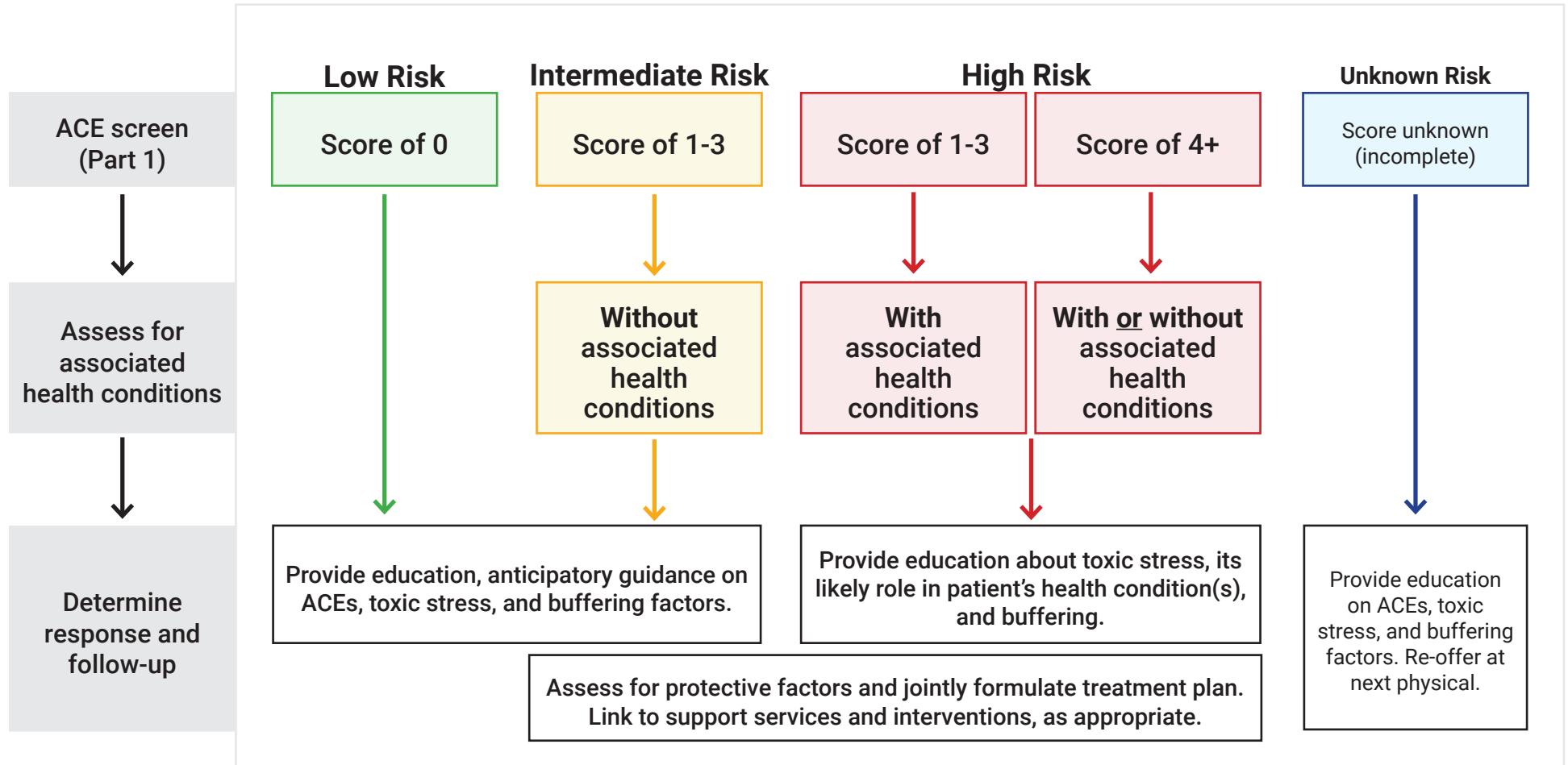
G9919: ACE score ≥ 4 , high risk for toxic stress

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.

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

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

Pediatrics



This algorithm pertains to the ACE score (Part 1 of PEARLS), whose associations with health conditions are most precisely known. Social determinants of health (Part 2 of PEARLS) 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.

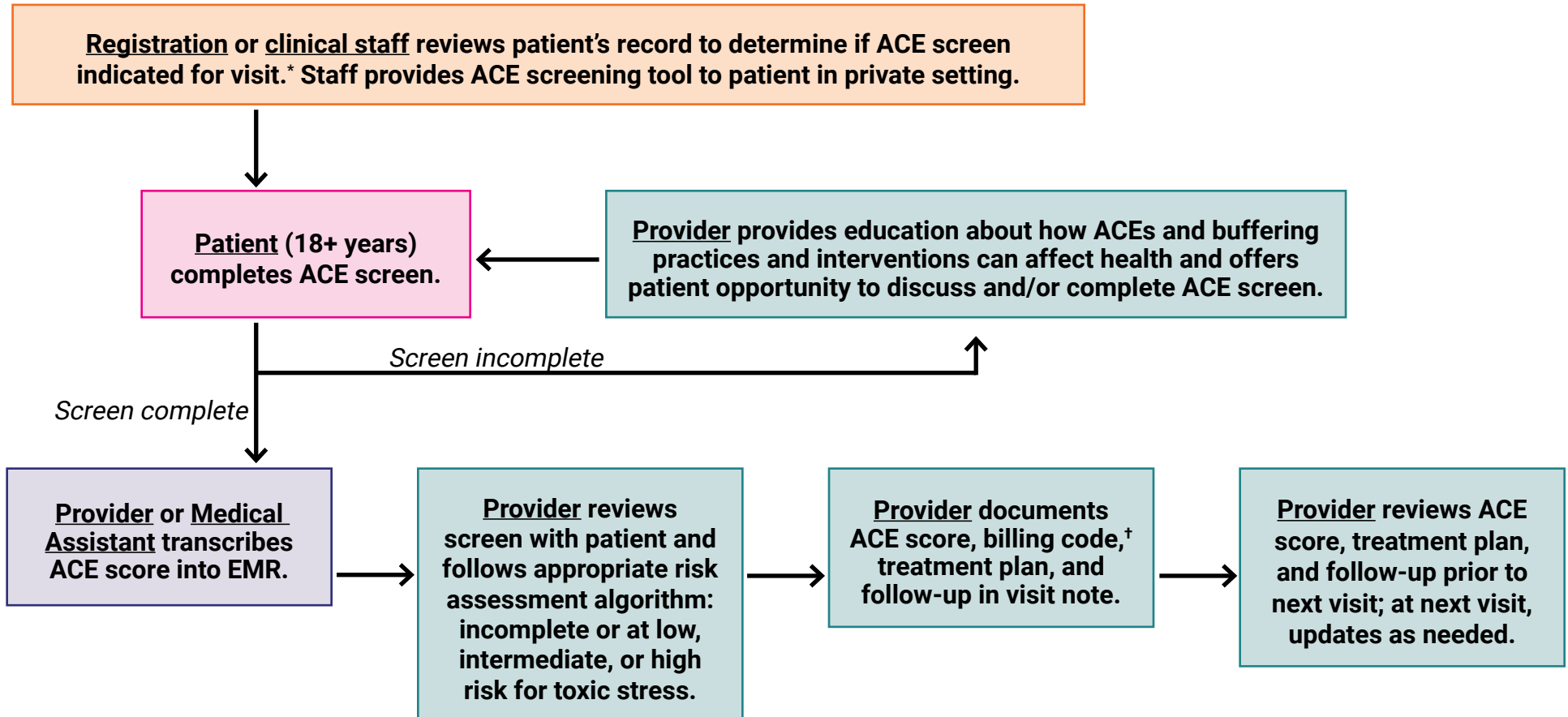
ACE-Associated Health Conditions: Pediatrics

Symptom or Health Condition	For ≥ 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
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		1.9
Suicide attempts ²⁸	For each additional ACE	1.9 - 2.1
Self-harm ²⁸		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 is recommended to be completed once per adult, per lifetime.

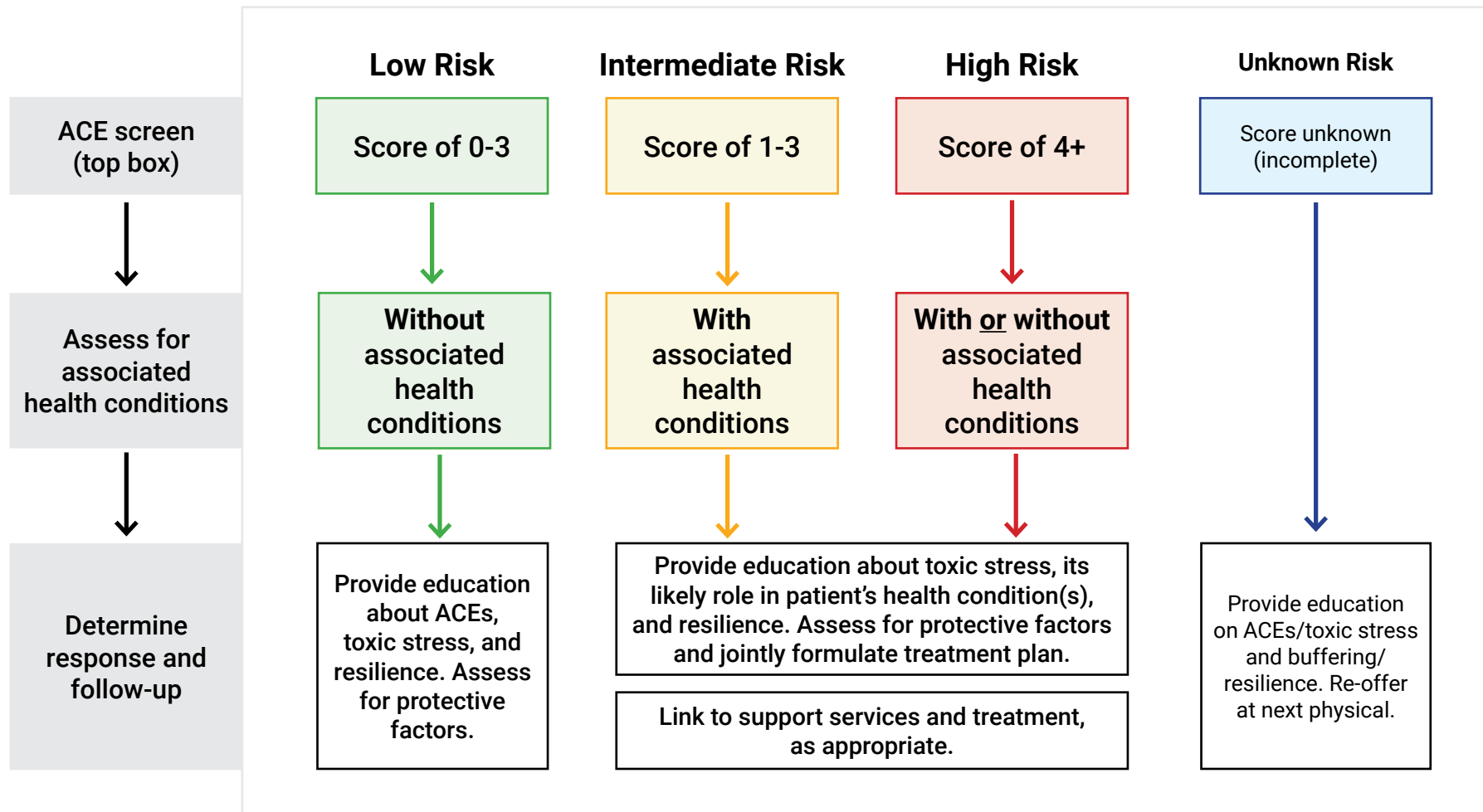
†Healthcare Common Procedure Coding System (HCPCS) billing codes for ACE scores:

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



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

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