EAST TENNESSEE STATE UNIVERSITY

Hidden in Plain Sight

Secondary Substance Exposure in Pediatric Practice

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I have no financial relationships to disclose.

About This Program

This initiative is conducted through OneCare of SW VA and East Tennessee State University, in partnership with Department of Social Services agencies across Southwest Virginia, to identify and respond to environmental substance exposure in children and adolescents.

1. Substance Exposure Hair Testing
2. Community-Based Substance Resources (Narcan education, harm reduction, community events)
3. Advocacy
4. Mental Health First Aid Training
5. Trauma-Informed Care Education
6. Addressing Systemic Barriers to Recovery

LEARNING OBJECTIVES

At the End of This Activity, Participants Will Be Able To:

KNOWLEDGE	Understand the prevalence of substance exposure across development.
KNOWLEDGE	Identify resources for dissemination regarding the impact of substance exposure on childhood development.
KNOWLEDGE	Describe the impact of parental substance use on children in the home.
COMPETENCE	Accurately identify behavioral and developmental presentations that warrant further inquiry into household substance use, and determine when hair toxicology testing is an appropriate diagnostic step.
PERFORMANCE	Incorporate substance exposure screening questions into clinical encounters with pediatric patients presenting unexplained behavioral or developmental concerns.
PATIENT OUTCOMES	Contribute to earlier identification of at-risk children, more timely referrals, and improved care coordination for families affected by parental substance use in rural practice settings.

DOCUMENTING THE NEED

Why This Matters in Your Practice Today

1 in 4

U.S. children (~19 million) live with a parent who meets criteria for a substance use disorder

McCabe et al., 2025, JAMA Pediatrics

1,194%

increase in nonfatal pediatric fentanyl exposures reported to U.S. poison centers, 2015–2023

Palamar et al., 2025, Am J Drug Alcohol Abuse

62%

of 432 DSS-referred children across 14 SW Virginia counties/municipalities tested positive for at least one substance (2020–2025)

Hedrick & Trull, 2026

Practice gap: clinicians frequently lack training in recognizing environmental substance exposure, ordering/interpreting hair toxicology, and connecting families to services — a gap this activity is designed to close.

CLINICAL BACKGROUND

What Is Environmental Substance Exposure?

Children can become exposed to illicit substances through:

- Inhalation
- Residue on surfaces
- Sweat
- Direct ingestion / injection

Detection Thresholds (hair)

Marijuana	**1 pg/mg**
Cocaine	**500 pg/mg**
Opiates	**200 pg/mg**
Amphetamines (incl. methamphetamine)	**500 pg/mg**
Phencyclidine (PCP)	**300 pg/mg**

SAMHSA (2004) proposed guidelines, as applied in Hedrick & Trull (2026)

Clinical caveat: interpret with care

Validated pediatric reference ranges do not yet exist — adult cutoffs cannot be directly applied to children. A 2025 hair-analysis study of children and adolescents found detection patterns vary widely by age (highest concentrations in infants) and recommends case-by-case clinical interpretation rather than reliance on fixed cutoffs alone.

Cestonaro et al., 2025, Drug Testing and Analysis

REGIONAL PARTNERSHIP

Department of Social Service Collaborators

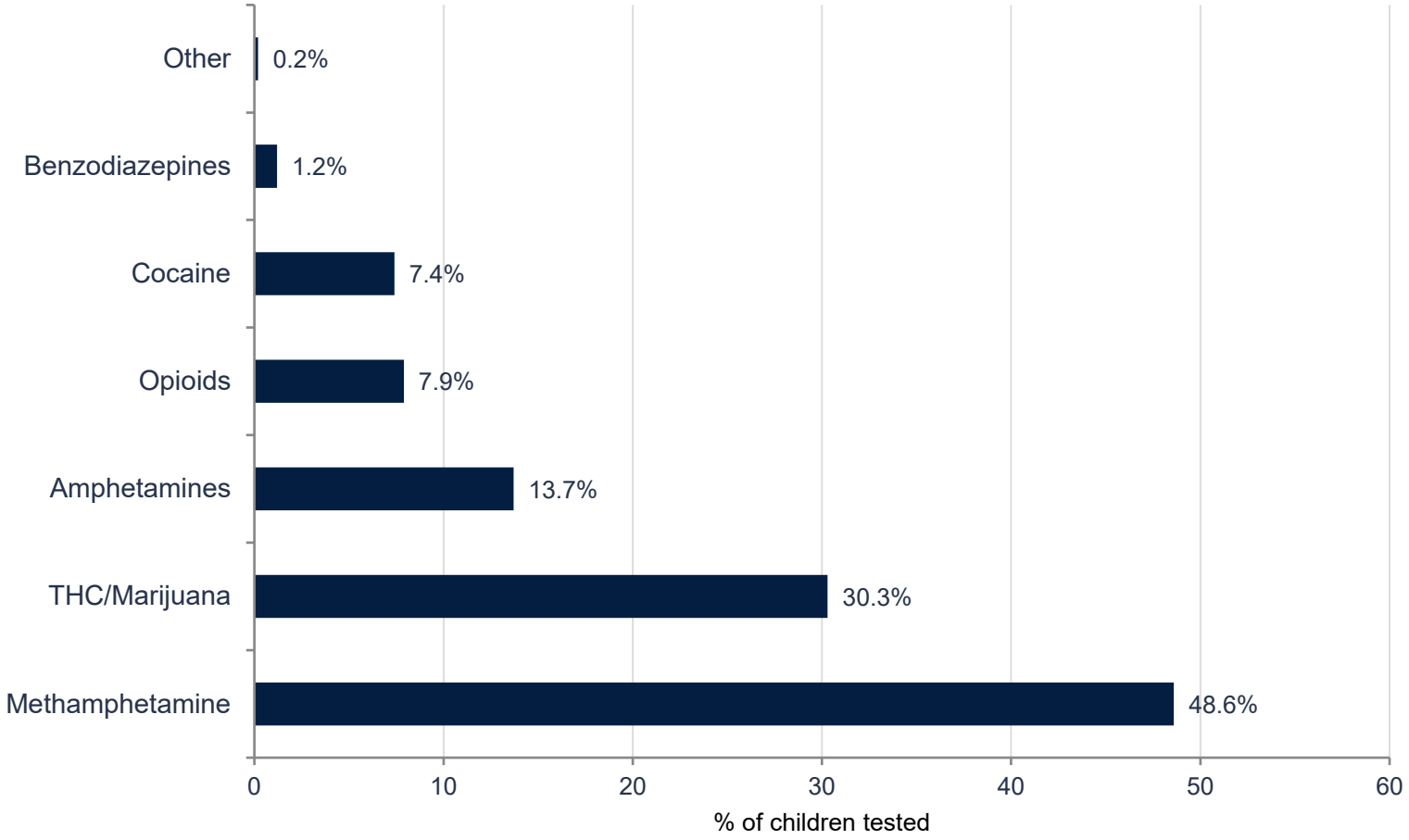
- Galax City
- Radford City
- Scott County
- Wythe County
- Carroll County
- Grayson County
- Bristol City
- Montgomery County
- Washington County
- Bland County

10 of the 14 Southwest Virginia counties and municipalities represented in the underlying study data — these DSS/DCS partners give the program direct Director-level access and form the regional referral backbone.

REGIONAL STUDY DATA

Substance-Specific Detection Rates

Percent of all children tested (n = 432); Southwest Virginia, 2020–2025



432

children tested across 285 households (2020–2025)

62.0%

tested positive for at least one substance (n=268)

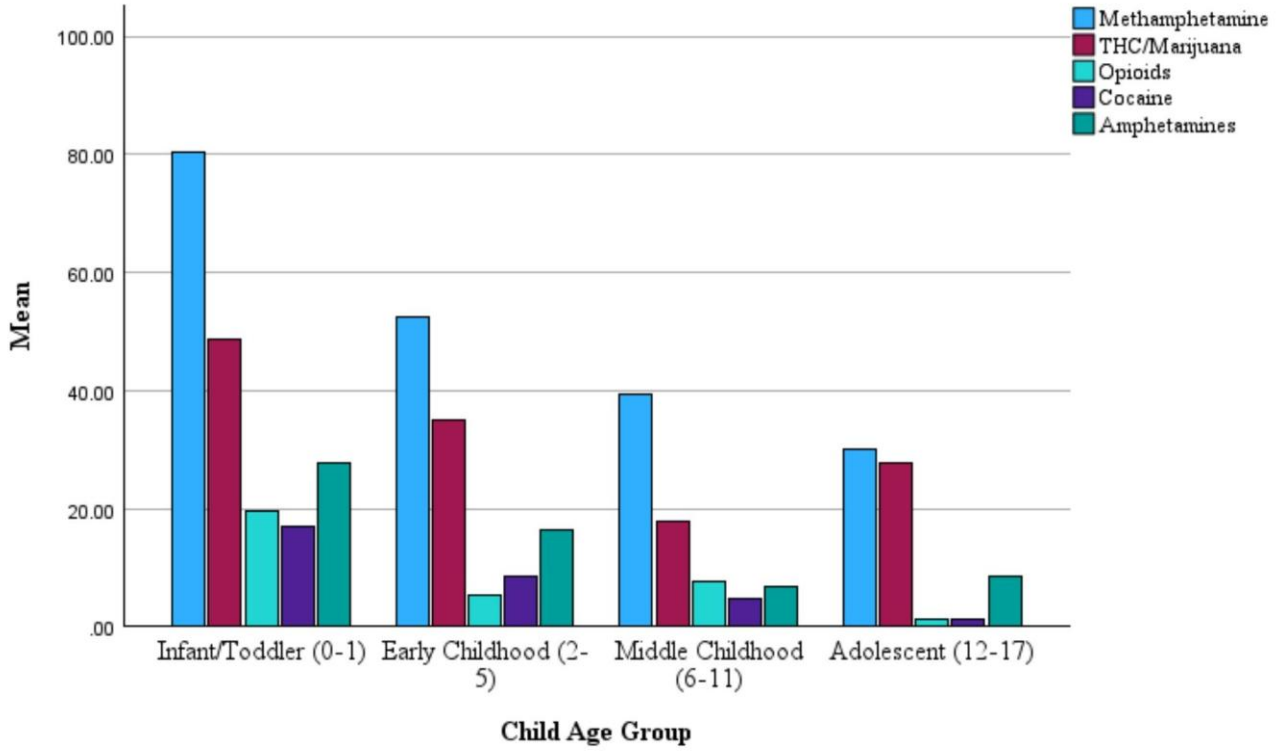
54.3%

of exposed children — 33.6% of the full sample — showed poly-substance exposure (2+ substances)

Hedrick & Trull (2026), Figure 1

REGIONAL STUDY DATA

The Age Gradient: Youngest Children Bear the Greatest Burden



Reproduced from Hedrick & Trull (2026), Figure 2

Infants & toddlers (0–1) show the highest detection across all substances:

- Methamphetamine — 80.3%
- THC/Marijuana — 48.7%
- Amphetamines — 27.6%
- Opioids — 19.7%
- Cocaine — 17.1%

Age-group associations were statistically significant for methamphetamine, THC/marijuana, opioids, cocaine, and amphetamines (all $p < .001$); no significant association was found for benzodiazepines.

RESOURCE SPOTLIGHT

Substance Exposed Minors Toolkit

What do you do after discovering a minor has been exposed to substances?

We've developed a printed guide and two training/introductory videos to share with foster parents, guardians, teachers, administrators, and clinical staff.

Printed Guide

Introductory Video

Training Video

NEURODEVELOPMENTAL IMPACT

Methamphetamine

Stimulant — exposed through the air or ingestion

Forebrain

- Motivation
- Planned movement
- Decision making
- Reward processing
- Cognitive control deficits

Midbrain

- Emotions (anxiety)
- Regulation (hyperactive)

Hindbrain

- Rapid heartbeat
- Fever
- Hunger
- Sleep disruption

Sources: Jan et al., 2012; Castaneto et al., 2013; Chu et al., 2020; Kuhn et al., 2023

NEURODEVELOPMENTAL IMPACT

Marijuana

Hallucinogen — exposed through the air or ingestion

Forebrain

- Poor decision making
- Learning, attention & concentration deficits
- Executive function: problem-solving, planning/reasoning
- Associated with schizophrenia risk

Midbrain

- Prolonged crying
- Pulling away from / clinging to caregiver
- Lower fine motor skills

Hindbrain

- Disrupted sleep schedule

Sources: Baranger et al., 2022; NIDA, 2023; Tweet et al., 2023; Tripathi et al., 2025

EVIDENCE SPOTLIGHT

Marijuana Exposure Research

Stoner et al., 2022 — The Negative Impacts of Cannabis Use

1. Cannabis consumption has a notable impact on cognitive abilities, including learning, attention, concentration, memory, and performance.

2. Impaired psychomotor functions (reaction time, fine motor control) and executive functions (decision-making, problem-solving, planning, reasoning) have also been observed.

3. Although causation is difficult to establish, some experts believe childhood cannabis consumption is an independent causal factor in developing schizophrenia.

4. Cannabis use is associated with lower educational attainment and increased likelihood of consuming other drugs.

5. Evidence on whether abstinence reverses these harms is mixed — some studies suggest the impact is irreversible in developing brains.

NEURODEVELOPMENTAL IMPACT

Cocaine / Crack

Stimulant — exposed through the air or ingestion

Forebrain

- Fussiness / anger
- High alert
- Difficulty calming down

Midbrain

- Emotion dysregulation
- Habit formation & reward disruption

Hindbrain

- Tremors / shaking
- Sucking reflex changes
- High-pitched crying
- Achiness

Sources: Bauer et al., 2005; Garza-Villarreal et al., 2017; Eiden et al., 2023; Cestonaro, Carollo et al., 2025

NEURODEVELOPMENTAL IMPACT

Opioids

Depressant — exposed through the air, ingestion, or injection

Forebrain

- Disruptions in social relationships
- Struggling to bond

Midbrain

- Emotion regulation (long term)
- Lack of self-soothing / learning

Hindbrain

- Shakiness
- Pain
- Diarrhea
- Chills / goosebumps

Beyond neonatal abstinence syndrome (NAS): a 2024 cohort study found health and developmental outcomes through age 7 differ for children with prenatal opioid exposure regardless of whether NAS was diagnosed at birth — supporting long-term follow-up for all opioid-exposed children, not only those treated for NAS. (Lambert et al., 2024)

Sources: Kosten & George, 2002; Lambert et al., 2024; Palamar et al., 2025

CLINICAL APPLICATION

Recognizing Clinical Red Flags

Behavioral and developmental presentations that warrant further inquiry into household substance use

Behavioral presentations

- Aggression or acting out inconsistent with developmental stage
- Excessive fearfulness, hypervigilance, or exaggerated startle response
- Difficulty forming/maintaining attachments; indiscriminate affection-seeking
- Withdrawal, flat affect, or emotional numbing
- Inconsistent, vague, or shifting caregiver explanations for symptoms or injuries

Developmental & physical presentations

- Unexplained delays in motor, language, or cognitive development
- Growth concerns or failure to thrive without a clear medical cause
- Feeding difficulties or disrupted sleep patterns in infants
- Withdrawal-like symptoms in infants (tremors, irritability, poor feeding)
- Poor hygiene or supervision inconsistent with caregiver report

Screening consideration

Ask it as part of routine social history for any child presenting with unexplained behavioral or developmental concerns — using open-ended, non-stigmatizing framing (e.g., "Who else is in the home day to day?"). Consistent, low-key inquiry beats ad hoc questioning.

Sources: Smith et al., 2016 (AAP Clinical Report); Forkey et al., 2021

CLINICAL APPLICATION

A Clinical Pathway: Recognize → Test → Document → Refer

1

Recognize

Screen for the behavioral and developmental red flags on the previous slide, plus known household substance use, erratic caregiving, or DSS/foster involvement. Include exposure in your differential for unexplained behavioral, developmental, or feeding concerns.

2

Test (when indicated)

Consider hair toxicology for a longer detection window than urine. Order with a clear clinical rationale; interpret case-by-case — pediatric reference ranges are not yet standardized.

3

Document

Record findings, clinical reasoning, and communication with caregivers using trauma-informed, non-judgmental language. Note disclosures per your institution's mandated-reporting and consent policies.

4

Refer

Connect families to DSS/DCS, mental health services, and harm-reduction resources (e.g., Narcan education). Use warm hand-offs when possible.

Sources: Smith et al., 2016; NIDA, Words Matter; Cestonaro, Terranova et al., 2025; SAMHSA, 2023

CLINICAL APPLICATION

When & How to Consider Hair Testing

Reasonable indications

- Known household substance use with unexplained symptoms
- DSS/CPS request as part of a safety assessment
- Suspected chronic/cumulative exposure (vs. a single acute event)
- Supporting placement or reunification decision-making

Know the limitations

- No validated pediatric cutoffs — interpret case-by-case, not by adult thresholds
- Cannot reliably distinguish environmental exposure from active use on its own
- Requires correlation with history, exam, and psychosocial context
- Obtain appropriate consent and follow your institution's DUA / confidentiality requirements

Bottom line for practice

Hair toxicology is one data point in a broader clinical and psychosocial assessment — not a stand-alone diagnostic verdict. Pair a positive or negative result with clinical judgment, collateral history, and referral, per Cestonaro et al. (2025) and the Society of Hair Testing (Favretto et al., 2023).

Sources: Favretto et al., 2023 (Society of Hair Testing consensus); Cestonaro, Terranova et al., 2025; Cestonaro, Carollo et al., 2025

What Can We Do About This?

It's important to remember that trauma also impacts many of the same brain areas. Substances could be the reason for behavior — or circumstances could also contribute.

When children experience fear, they focus on surviving and seeking: safety, food and water, rest, escaping a scary situation, making hurts go away, and staying in control.

Sources: Forkey et al., 2021; SAMHSA, 2023

TRAUMA-INFORMED RESPONSE

Creating a Safe Environment & Building Trust



In every interaction, reduce fear by communicating that the child — and you — are safe.

These are all needs — with more critical ones at the base of the pyramid. Adapted from Maslow (1943); Purvis et al. (2007).

Creating a Safe Environment (continued)

Offer consistent care

"A safe adult will take care of me and protect me. My needs matter to this adult."

Offer warm interactions

"I do not need to be afraid of this adult. I am a valuable person."

Be responsive

"This adult understands what I need and feel."

Sources: Purvis et al., 2007; Purvis et al., 2013

Measuring Success in Your Practice

Success is measured by demonstrated improvement in attendees' self-reported knowledge of secondary substance exposure — including recognition of clinical red flags and familiarity with available screening considerations.

Competence

- Accurately identify behavioral and developmental presentations that warrant further inquiry into household substance use
- Determine appropriate use of hair toxicology testing
- Interpret results within their known limitations

Performance

- Incorporate substance exposure screening questions into encounters with pediatric patients presenting unexplained behavioral or developmental concerns
- Document findings using trauma-informed, non-stigmatizing language
- Initiate referrals consistently, not case-by-case ad hoc

Patient Outcomes

- Earlier identification of at-risk children who might otherwise go undetected in routine practice
- More timely referrals to appropriate services
- Improved coordination of care for families affected by parental substance use in rural practice settings

CLINICAL APPLICATION

Deliverables & Resources for Your Practice

1

Substance Exposed Minors Toolkit

Printed guide + 2 training videos for clinical and caregiving staff — available for your team.

2

Regional Referral Directory

Direct DSS/DCS contacts across 10 SW Virginia jurisdictions (see collaborator list, this deck). (Handout 1).

3

Trauma-Informed Communication Reference

Language and approach for discussing suspected exposure with caregivers and children. (Handout 2).

4

Hair Testing Consult Line

Direct consultation on test indications, interpretation, and next steps. Email oliver@etsu.edu (Handout 3).

Questions?

Please don't hesitate to reach out.

oliver@etsu.edu

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