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CASE REPORT **cme**

Recurrent Eye Bruising: A Red Flag For Infant Neuroblastoma

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CASE REPORT

11 An Infant with Neuroblastoma Presenting as Intermittent Eye Bruising: A Pediatric Case Report

The differential diagnosis for periorbital ecchymosis includes metastatic neuroblastoma, which should be further investigated with advanced imaging. In this case, the patient had multiple prior visits for recurring periorbital ecchymosis and was ultimately diagnosed with metastatic neuroblastoma after computed tomography imaging and biopsy confirmation.

Alejandro Lopez, BS; Julia Gamache, BS; Ella Weiss, BS; Aaron J. Maki, MD, PhD

ORTHOPEDIC CASE SERIES

15 Urgent Care Diagnosis and Management of Toddler's Fracture



fracture.

Identifying fall mechanism, while also relying on caregiver narratives, can help clinicians rule out severe pathologies and diagnose a toddler's

Connor Osmond, BA; Thomas Seebacher, DO

CASE REPORT

22 Peripheral Neuropathy Induced by Nitrous Oxide Misuse: A Case Report

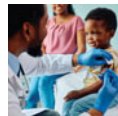


Nitrous oxide-associated peripheral neuropathy may present similarly to Guillain-Barré syndrome, and clinicians are encouraged to conduct a careful clinical assessment of patients with neurological symptoms.

Ivan Koay, MBChB, MRCS, FCUCM, FRNZCUC, MD; Cameron Olphert, BSc (Hons), MSc

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27 Pediatric Vaccine Hesitancy in Families Seeking Care in Urgent Care Centers



population.

This assessment presents parents' perceptions of vaccination and the scope of undervaccination in a pediatric urgent care

Stacy B. Buchanan, DNP, APRN, CPNP-PC; Brooke Cherven, PhD, MPH, RN; Betsy Dye, MS, CPNP-PC, NPD-BC, EBP-C; Temima Oratz, BSN, RN, EBP-C; Margaret Gettis, DNP, APRN, CPNP-PC, EBP-C

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41 Mandated Paid Sick Leave, FMLA, and the Complex Landscape of Absence Management



To avoid financial liabilities, urgent care operators must master the complex patchwork of federal and state employee-leave laws to design paid-time-off policies.

Alan A. Ayers, MBA, MAcc

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LETTER FROM THE EDITOR-IN-CHIEF

We Must Meet Our Patients Where They Are

In this issue of *JUCM*, you will find an original research article exploring parental vaccine hesitancy. Vaccine hesitancy is a challenging issue because it frequently triggers charged emotions in patients and clinicians alike. While there have always been strong opinions regarding vaccines, from the clinician perspective, the degree amplified significantly during the COVID-19 pandemic. I will never forget reading about front-line physicians who regularly experienced severe compassion fatigue while treating patients with serious cases of COVID-19 who chose not to receive a vaccine.¹

Six years later, vaccine uncertainty remains at the forefront of many patients' minds. Childhood vaccination rates are continuing to decline across the United States

despite the daily reports highlighting a sharp rise in measles—a vaccine-preventable disease—and the possibility of the country losing its decades-long measles elimination status.^{2,3} Many adults have come across false claims about vaccines. In a recent national survey, 66% of adults report they have heard the inaccurate claim that the measles, mumps, and rubella (MMR) vaccine causes autism in children.⁴ While less than 1 in 10 believe these false claims about the MMR vac-

cine are true, that small number is still a meaningful proportion of the communities who come to our urgent care centers every day.⁴

Not infrequently, our patients fail to follow recommended medical advice or interventions. For example, patients don't always get their cancer screenings, and who can blame them for avoiding screening tests that are quite unpleasant experiences. Patients don't always stop smoking even after many bouts of chronic obstructive pulmonary disease exacerbations that prevent them from attending work or family events. Patients

don't always agree to a viral respiratory diagnostic test or an x-ray in urgent care that might help determine a clear diagnosis. Certainly, there are many reasons patients decline recommendations, however, when it is a patient's ideological hesitation, clinicians wish for a better way to influence their patient.

Building Trust With Our Patients

One of the key factors that appears to impact vaccine-related beliefs in adults is having a relationship with a trusted healthcare clinician, according to the national survey. If a relationship is established, patients are less likely to believe false claims regarding vaccines.⁴ To build trust, patients must believe that their clinician has good intentions and is operating from a place of beneficence.⁵ However, adults who use social media and artificial intelligence chatbots for health information are more likely to believe the myths about vaccines.⁴ And parents make decisions for their children based on their own beliefs. So, the question facing us clinicians is, "Who do our patients trust?"

Most clinicians will agree that we were called to this profession to serve. And to serve, we must effectively and authentically become a trusted healthcare resource. While we all may not be administering MMR vaccines in urgent care, trust is critical in any patient-clinician interaction. We can build trust quickly with our first encounter, and we can gain more trust over time as patients return to our centers after that initial positive experience. And what is the first and most critical step? Meet the patient where they are.

Foundation of Trust

"Seek first to understand, then to be understood," a concept popularized by author Stephen R. Covey, but widely attributed to the Prayer of St. Francis, is the foundation of trust between us and our patients.⁶ Lean into the patient and their understanding—what they believe, why they believe it, who they heard it from, what they are afraid of, and what causes them the most concern. Be curious. If you actually stop, listen, reflect back what you are hearing, and seek to understand, you can build that trust.



"So, the question facing us clinicians is, 'Who do our patients trust?'"

To cultivate a trusting relationship in a new patient urgent care encounter, lean toward the patient while they speak, make eye contact, tune in with 100% focus, and tune out everything else. Be fully present. When you completely understand the patient, only then seek to be understood in the context of high-quality care. Not with disregard to what the patient just said. Not from your high horse as the clinician. Not from your position of power and authority. Not with defensiveness or condescension. Instead, seek to be understood as a partner, coming from a place of wanting to do good.

Describe how you want to help. Express your caring. Provide a clear and concise explanation for your recommendation—why it matters, what the evidence demonstrates, and the positive impact it will have on them. Be simple, direct, kind, and supportive.

Our patients need us now more than ever. Let us meet them where they are and walk together with them. ■

Lindsey E. Fish, MD, FCUCM

Editor-in-Chief, The Journal of Urgent Care Medicine

Email: editor@jucm.com

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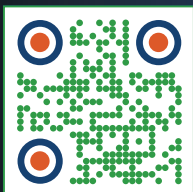
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URGENT INTERACTIONS



“Our patients say ‘thank you’ all the time. It is usually quick, and we may perceive it as a formality. However, they actually mean it. As a clinician, pause and take in their gratitude. Doing something for another person can help with burnout if we are able to absorb that ‘thank you’ and the true meaning behind it.”

— **Lindsey E. Fish, MD, FCUCM**
JUCM Editor-in-Chief



“Your differential diagnosis is always dynamic—changing as additional data is obtained.”

— **Michael Weinstock, MD**
JUCM Senior Clinical Editor



“Neuroblastoma may present with seemingly benign findings such as periorbital ecchymosis (“raccoon eyes”), making a careful history and thorough physical examination essential. This case report highlights how recognizing subtle clinical clues can prompt urgent confirmatory testing, expedite diagnosis, and improve outcomes for children with an otherwise easily overlooked malignancy.”

— **Aaron J. Maki, MD, PhD**
Author of “An Infant with Neuroblastoma Presenting as Intermittent Eye Bruising: A Pediatric Case Report” (page 11)



A WORD OF THANKS

The Journal of Urgent Care Medicine would like to thank the dedicated group of urgent care professionals listed below who graciously contributed their time and insight to review recent articles for publication. The peer reviewer status is worthy of inclusion on your curriculum vitae, so if you're interested in becoming a peer reviewer, reach out to the JUCM team at: editor@jucm.com.

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Opportunity Is Knocking. We Need to Answer.

■ Steve Sellars

Over the past year, I've written about telling our story, strengthening our voice, proving our value, and, most recently, Urgent Care's evolution from a convenient alternative to an essential part of everyday healthcare. As I look at where we stand today, I believe we're entering another important chapter.

Healthcare is changing rapidly, and nearly every trend points in the same direction. Primary care physicians are retiring faster than they can be replaced. New physicians aren't entering primary care in sufficient numbers to close the gap. Patients are waiting weeks, and sometimes months, for appointments. At the same time, employers continue searching for better ways to provide affordable, high-quality healthcare for their workforce while healthcare costs continue to rise. These aren't isolated challenges. Together, they're reshaping how patients access care.

Every day, more than half a million patients choose Urgent Care because we're accessible, convenient, affordable, and trusted. Our clinicians diagnose illnesses, treat injuries, provide occupational health services, perform diagnostic testing, and help patients navigate an increasingly complex healthcare system with quality, efficiency, and compassion.

Increasingly, Urgent Care has become the front door to everyday healthcare.

Healthcare's Front Door

This concept was reinforced during The Urgent Care Association (UCA) Assembly in Washington, D.C., where clinical and executive leaders came together to discuss the future of our field. Throughout those conversations, one message surfaced repeatedly: Healthcare needs Urgent Care more than ever, but we must continue helping poli-

cymakers, employers, payers, and the public better understand the value we bring to the healthcare system.

The release of the Centers for Medicare & Medicaid Services' proposed 2027 Medicare Physician Fee Schedule only strengthened that conviction. While we were disappointed that the proposal did not recognize the enhanced role Urgent Care can play in caring for Medicare beneficiaries, it reminded us that meaningful policy change requires persistence, credible data, strong relationships, and a field willing to speak with one voice.

The same is true beyond Washington.

UCA is expanding its work with employer coalitions and other healthcare stakeholders because employers are looking for more than lower costs. They're searching for partners who can improve access, reduce unnecessary emergency department utilization, keep employees healthy, and help people return to work more quickly. Those are the needs Urgent Care is uniquely positioned to meet.

Stay Engaged

You may be asking, "What can I do?" The answer is simple: Stay engaged, share your stories, and participate in the conversations shaping our future. We may compete in our local markets, but we're united by the common purpose of strengthening Urgent Care for the benefit of our patients, our communities, and our profession.

No single organization can accomplish this alone. UCA exists to convene our field, amplify our collective voices, and ensure Urgent Care is represented where important decisions are being made. The more engaged we are, the greater our influence and the stronger our future.

I've never been more optimistic about where Urgent Care is headed. The need has never been greater, and neither has the opportunity. Now is the time to join forces, shape the future together, and ensure Urgent Care continues earning its place as the front door to everyday healthcare. ■



Steve Sellars is Chief Executive Officer of the Urgent Care Association.



CONTINUING MEDICAL EDUCATION

Release Date: September 1, 2026

Expiration Date: August 30, 2028

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This continuing medical education (CME) program is intended for urgent care physicians, primary care physicians, resident physicians, nurse practitioners, and physician assistants currently practicing, or seeking proficiency in, urgent care medicine.

Learning Objectives

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1. Provide best practice recommendations for the diagnosis and treatment of common conditions seen in urgent care
2. Review clinical guidelines wherever applicable and discuss their relevance and utility in the urgent care setting
3. Provide unbiased, expert advice regarding the management and operational success of urgent care practices
4. Support content and recommendations with evidence and literature references rather than personal opinion

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An Infant with Neuroblastoma Presenting as Intermittent Eye Bruising: A Pediatric Case Report (page 11)

1. What is the most common primary site of neuroblastoma?

- a. Adrenal glands
- b. Stomach
- c. Liver
- d. Optic nerve

2. Which imaging modality was used in this case during the initial evaluation?

- a. Plain radiography
- b. Computed tomography
- c. Magnetic resonance imaging
- d. Ultrasound

3. In this case, which clinical finding helped to support the suspected diagnosis of neuroblastoma?

- a. Sluggish pupillary reflex
- b. Periorbital ecchymosis (raccoon eyes)
- c. Palpable right abdominal mass with abdominal distension
- d. All of the above

Urgent Care Diagnosis and Management of Toddler's Fracture (page 15)

1. What is a toddler's fracture?

- a. Rib fracture unique to young children
- b. Spiral tibial fracture unique to young children
- c. Hamate fracture
- d. Midshaft ulna fracture

2. Why is toddler's fracture often difficult to diagnose?

- a. Can be radiographically occult
- b. Can present with subtle symptoms
- c. Mechanism of injury may not be known
- d. All of the above

3. What is the typical prognosis for a child with toddler's fracture?

- a. Return to unassisted ambulation immediately
- b. Return to unassisted ambulation in 2–4 weeks
- c. Return to unassisted ambulation in 6–8 weeks
- d. Permanently diminished ambulation

Peripheral Neuropathy Induced by Nitrous Oxide Misuse: A Case Report (page 22)

1. Which condition can mimic nitrous oxide misuse?

- a. Guillain-Barré syndrome
- b. Polycystic ovary syndrome
- c. Axenfeld-Rieger syndrome
- d. Wolff-Parkinson-White syndrome

2. Which deficiency may be present in patients who frequently inhale nitrous oxide?

- a. Iron
- b. Vitamin A
- c. Vitamin B₁₂
- d. Vitamin C

3. What is the recommended treatment for neuropathy associated with nitrous oxide misuse?

- a. Intravenous immunoglobulin
- b. Cessation of use and vitamin B₁₂ supplementation
- c. Cessation of use and oral buprenorphine
- d. Cessation of use and injectable tirzepatide



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An Infant with Neuroblastoma Presenting as Intermittent Eye Bruising: A Pediatric Case Report

Urgent Message: Recurrent or unexplained periorbital ecchymosis ('raccoon eyes') in an infant should prompt consideration of metastatic neuroblastoma and escalation for appropriate imaging.

Alejandro Lopez, BS; Julia Gamache, BS; Ella Weiss, BS; Aaron J. Maki, MD, PhD

Citation: Lopez A, Gamache J, Weiss E, Maki AJ. An Infant with Neuroblastoma Presenting as Intermittent Eye Bruising: A Pediatric Case Report. *J Urgent Care Med.* 2026;20(11):11-14

Keywords: neuroblastoma; metastatic neuroblastoma; periorbital ecchymosis; orbital metastasis; suprarenal mass; pediatric malignancy

Abstract

Introduction: The presenting symptoms of pediatric neuroblastoma are highly variable. Patients may first present to urgent care for what they perceive as a minor complaint. These symptoms can include periorbital ecchymosis, which can appear to be trauma-induced. These findings and other presenting symptoms of neuroblastoma can often be due to underlying metastatic disease.

Clinical Presentation: A 10-month-old male presented with a 7-month history of bilateral intermittent eye bruising unrelated to injury. Left upper eyelid bruising had been present for 11 days and right lower eyelid bruising for 2 days. The presenting episode was the 7th known occurrence. The distribution of the bruising had varied between episodes and had typically included the inner upper eyelids and had occasionally spread to lower lids. A raised nodule above the left eyebrow had been present for 3 weeks. No eyelid edema was noted



during episodes. The patient had multiple prior visits to a primary care physician and an emergency department (ED) for this concern.

Case Resolution: The patient was transferred to the ED for imaging workup due to suspected oncologic etiology. Initial head computed tomography showed aggressive

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osseous lesions of the left superior orbital margin and anterior lateral roof of the left orbit. Additional imaging noted a large calcified right suprarenal mass concerning for neuroblastoma. Further findings included a moth-eaten, lucent appearance of the left ankle and right tibia concerning for metastatic disease. A biopsy confirmed the suspected diagnosis of neuroblastoma. The patient received chemotherapy, surgical resection, autologous bone marrow transplantation, and radiation therapy.

Conclusion: For pediatric patients with recurrent cases of eye bruising or cases without known mechanisms of injury, neuroblastoma should be considered in the differential diagnosis.

Introduction

Neuroblastoma is a cancer of neural crest cells, which are found in many areas of the body, commonly in the adrenal glands, abdomen, or spine. This condition can occur anywhere within the sympathetic nervous system with the majority of cases presenting in the adrenal glands. Neuroblastoma is the most common form of cancer in children under the age of 1 year,¹ and 66% of cases are metastatic at the time of diagnosis.² Because the majority of cases present in the adrenal glands, a palpable abdominal mass is often the earliest sign. However, the presentation of neuroblastoma can be variable, which can make it difficult to diagnose.¹

Patients with localized neuroblastoma are often asymptomatic at presentation, while patients with metastatic disease can present with systemic symptoms, such as bone pain, painless subcutaneous nodules, and periorbital ecchymosis (“raccoon eyes”).^{3,4} Periorbital ecchymosis results from the tumor bleeding into the soft tissues of the eyelids and can often be mistaken for trauma. Imaging, primarily computed tomography (CT) scans, is used to diagnose neuroblastomas along with lab tests and surgical biopsies.³ Stage of malignancy remains the most important prognostic factor, and infants aged less than 1 year have significantly better survival rates than older children with the same disease stage.⁵ Low-risk neuroblastoma is usually treated with surgery alone. Intermediate-risk neuroblastoma is treated with a combination of surgical resection and moderate-dose chemotherapy.⁶ High-risk neuroblastoma is largely responsive to chemotherapy, yet only 30% to 40% of patients survive long term.⁷

Case Presentation

A 10-month-old male presented to urgent care (UC)

with a 7-month history of bilateral intermittent periorbital bruising. The current episode was the 7th known occurrence. Left upper eyelid bruising had been present for 11 days with onset of right lower eyelid bruising for 2 days. The distribution of the bruising had been variable and typically included inner upper eyelids and occasionally spread to lower lids. A raised nodule above the left eyebrow had been present for 3 weeks. No eyelid edema was noted during episodes. The patient’s mother denied known injury and reported the infant had normal behavior and appetite. She denied appearance of eye pain or distress. Family history revealed a history of brain tumors in a maternal uncle and paternal grandmother.

The mother reported multiple prior visits to a primary care physician (PCP) and emergency department (ED) for this concern. She was told “the patient is a boy and hitting himself in the eyes with toys” despite this behavior not being witnessed. The patient was seen by his PCP for assessment of the recurrent left upper eyelid ecchymosis and was referred to ophthalmology. The first available appointment was 21 days later. Due to the length of the current episode, the parent did not want to wait, and the patient was brought into UC for further evaluation.

“Periorbital ecchymosis results from the tumor bleeding into the soft tissues of the eyelids and can often be mistaken for trauma.”

Physical Exam Findings

The patient presented alert and responsive. Vital signs included: a temperature of 36.2°C; a heart rate of 108 beats per minute; a respiratory rate of 36 breaths per minute; and a blood pressure of 99/80 mmHg (82nd percentile / 99th percentile), which was noted to be elevated. There was a palpable nodule present above the patient’s left eyebrow. Left upper and right lower eyelid ecchymoses were present. The patient’s pupils were equal, round, and reactive to light bilaterally, and his red reflex was intact. No respiratory distress was noted, and nostrils were free from obstruction. Bilateral capillary refill was measured at 2 seconds.

Medical Decision Making

Given the recurrent nature of the symptoms, the pro-

longed duration of the current episode, and the presence of a palpable nodule above the eyebrow, the patient was transferred to the ED. This decision was prompted by the potential of severe exacerbation and progression of disease with a high clinical suspicion for malignancy. Of note, neuroblastoma can often present with elevated blood pressures due to the catecholamine release by the tumor due to its neural crest origin as was seen in this patient. It is important to note that there is also an association of involuntary rapid eye movements (opsoclonus) and brief twitching (myoclonus) with neuroblastoma.⁴ However, these findings were not present for this patient.

Therapeutic Intervention

In the ED, physical examination demonstrated bilateral eye ecchymosis and palpable right abdominal mass with abdominal distension. Pupillary reflex showed a sluggish reaction to light with the red reflex intact bilaterally. This prompted an early working differential including neuroblastoma, non-accidental trauma (NAT), bleeding disorders, and retinoblastoma.

ED workup included the following:

- **Head CT scan:** Indicated for evaluation of tumor vs trauma; revealed aggressive osseous lesions of the left superior orbital margin and anterior lateral roof of the left orbit
- **X-ray skeletal survey:** Indicated for evaluation of NAT; revealed a moth-eaten, lucent appearance of the left ankle and right tibia concerning for metastatic disease
- **Complete blood count:** White blood count, 16.5×10^3 cells/uL; absolute neutrophil count, 1.8×10^3 cells/mm³; hemoglobin, 10.5 g/dL; platelets, 493×10^3 cells/uL
- **Chemistry:** Sodium, 137 mmol/L; potassium, 4.6 mmol/L; chloride, 105 mmol/L; bicarbonate, 21 mmol/L; blood urea nitrogen, 6 mg/dL; creatinine, 0.23 mg/dL; glucose, 99 mg/dL
- **Coagulation studies:** Prothrombin time, 13.2 seconds; activated partial thromboplastin clotting time, 28 seconds; international normalized ratio, 1.0
- **Urine:** Vanillylmandelic acid / creatinine ratio, 360.8 mg/g (elevated); homovanillic acid / creatinine ratio, 367.7 mg/g (elevated)
- **Other Labs:** Lipase, 54 U/L; aspartate aminotransferase, 60 U/L; alanine aminotransferase, 21 U/L; alkaline phosphatase, 141 U/L; total bilirubin, 0.6 mg/dL; indirect bilirubin, 0.5 mg/dL; direct bilirubin, 0.1 mg/dL

Diagnosis

Exam findings and radiology results were suggestive of metastatic neuroblastoma. The patient was admitted to oncology for further evaluation and management. A CT scan of the chest, abdomen, and pelvis was completed to assess for primary and metastatic disease:

- **Abdomen and pelvis CT scan:** Large right suprarenal mass consistent with neuroblastoma
- **Chest CT scan:** No evidence of pulmonary metastatic disease; however, concerns remained for diffuse marrow infiltration secondary to metastatic disease

The patient underwent an interventional radiology biopsy of the abdominal mass. The final pathology report demonstrated poorly differentiated neuroblastoma with intermediate mitotic-karyorrhectic index and favorable International Neuroblastoma Pathology Classification (INPC) histology, transcription factor *MYCN* amplified positive. Subsequent meta-iodobenzylguanidine (MIBG) single-photon emission computed tomography (SPECT/CT) showed a Curie score of 18, which is a semi-quantitative tool used by oncologists to measure the extent of neuroblastoma.⁸ A Curie score of 0 indicates tumor remission with a maximum score of 30 possible. The patient then obtained a bilateral posterior iliac crest bone marrow biopsy. The patient was enrolled in a clinical trial (ANBL2131), and induction of chemotherapy was initiated. The patient was discharged.

Follow-Up and Outcomes

At discharge, the parents received education and were instructed to continue with regular well-child visits. Over the course of 3 months, the patient underwent 5 cycles of chemotherapy followed by right adrenal neuroblastoma resection. Pathology demonstrated treated neuroblastoma with 30% treatment effect, and the patient went on to receive additional chemotherapy.⁹ He underwent another MIBG SPECT/CT, which demonstrated residual disease in the left frontal orbital region with a complete response at the primary site (suprarenal mass). The patient underwent a tandem autologous bone marrow transplant. Proton radiation therapy was recommended for residual skull lesions.

Discussion

This case reinforces that recurrent periorbital ecchymosis in infants without a clear traumatic mechanism should not be considered benign until proven otherwise. The intermittent nature of the bruising and lack of witnessed injury could have prompted earlier consideration of non-accidental trauma or pathologic eti-

“This case emphasizes the critical role of urgent care providers in identifying red-flag symptoms that warrant escalation of care.”

ologies, including malignancy. The identification of aggressive orbital osseous lesions on head CT was critical, leading to comprehensive imaging that revealed a large suprarenal mass and widespread metastatic disease. By the time of diagnosis, the patient had extensive skeletal involvement, including long bones and frontal skull, consistent with the known tendency of neuroblastoma to metastasize to bone and bone marrow.

Despite advanced disease, the patient's age was associated with a relatively favorable prognosis. Nevertheless, the *MYCN* amplification and high Curie score placed him in a high-risk category, requiring intensive multimodal therapy, including chemotherapy, surgical resection, tandem autologous stem cell transplantation, as well as proton radiation therapy. This case emphasizes the critical role of urgent care providers in identifying red-flag symptoms that warrant escalation of care. While urgent care settings often manage lower-acuity conditions, providers should remain alert for variable presentations of severe disease. Early recognition and timely referral can significantly affect disease trajectory, potentially reducing complications and treatment intensity.

Presenting symptoms of neuroblastoma depend on the location of the primary tumor, presence of metastatic lesions, and systemic symptoms from catecholamine secretion.¹⁰ For the primary tumor, an abdominal mass may be palpable. Metastatic lesions may result in the appearance of periorbital ecchymosis (raccoon eyes) or a palpable bone mass as seen in this patient. Significant eye involvement can lead to opsoclonus-myoclonus. Systemic catecholamine release by the neuroblastoma tumor itself can lead to vital sign abnormalities including prolonged hypertension and tachycardia. Given this patient's specific presentation of periorbital ecchymosis and hypertension, prompt referral to the emergency department for imaging and oncologic evaluation was essential. Increased awareness of this presentation among urgent care, emergency, and primary care providers may help reduce diagnostic delays and improve outcomes for patients with neuroblastoma.

Ethics Statement

Informed consent for publication was obtained from the patient's mother. She said she hoped that reporting about her son's condition would help others to see fewer healthcare providers before obtaining a diagnosis.

Takeaway Points

- Recurrent eye bruising or bruising without a clear cause should prompt immediate referral or ED transfer for imaging and full oncologic assessment.
- Early recognition of neuroblastoma and timely referral can significantly affect disease trajectory, potentially reducing complications and treatment intensity.
- Urgent care providers should remain alert for neuroblastoma in presentations of recurrent periorbital ecchymosis in infants without a clear traumatic mechanism. ■

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Urgent Care Diagnosis and Management of Toddler's Fracture

Urgent Message: Identifying fall height and mechanism, while also relying on caregiver narratives, can help urgent care clinicians rule out severe pathologies and diagnose a toddler's fracture in ambulatory pediatric patients after a fall.

Connor Osmond, BA; Thomas Seebacher, DO

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Keywords: fractures, bone; tibial fractures; gait disorders, neurologic; radiography; accidental falls

Editor's Note: While the images presented here are authentic, the patient case scenario is hypothetical.

Abstract

A toddler's fracture is a nondisplaced spiral fracture of the distal tibia known to occur in pediatric patients between the ages of 9 months and 3 years old. Toddler's fractures are typically seen in ambulatory pediatric patients showing a sudden refusal to bear weight or presenting with an acute onset of limp after an unwitnessed fall. These fractures result from low-energy pivoting, twisting, or rotational injury when the foot is planted, causing a spiral fracture along the distal tibia. Fibular involvement is uncommon in toddler's fractures and generally indicates a different fracture pattern. A toddler's fracture commonly presents with normal radiographs at the initial visit; however, the physical exam will show tenderness with palpation and painful passive dorsiflexion of the ankle.

Clinical Scenario

A previously healthy 20-month-old boy was brought to the urgent care (UC) center by his parents after refusing to bear weight on his right leg since earlier that afternoon. His mother reported that he was running

Questions for the Clinician at the Bedside

1. Which mechanisms and patient features are associated with a toddler's fracture?
2. What are the red flag signs that should be considered in patients with a suspected toddler's fracture?
3. What radiographic findings are suggestive of a toddler's fracture, and why are x-rays often negative?
4. Which patients require immobilization vs immediate emergency department referral?
5. What are the complications of missing the diagnosis of a toddler's fracture?

on the carpeted living room floor when he tripped and fell. The mother did not witness the fall directly, but her son reportedly began crying immediately. He had been crawling—rather than walking—since the incident. He had no fever, no recent illness, and no other injuries.

On arrival at UC, the child was in no acute distress and sat comfortably in his mother's lap. He refused to bear weight on his right leg even with support. Vital signs and growth chart were within normal limits for the child's age. The right lower extremity revealed no deformity, swelling, or bruising; however, the patient had focal tenderness over the distal one-third of the right tibia upon palpation and pain upon passive dorsiflexion of the ankle.

There was full passive range of motion at the hip and knee, and the neurovascular exam was normal in-

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Image 1. Radiograph of Tibia With Toddler's Fracture



Image Credit: Experity Teleradiology

Image 2. Radiograph of Tibia With Toddler's Fracture



Image Credit: Experity Teleradiology

cluding normal capillary refill in the toes. The x-ray performed in UC appeared normal. The patient was discharged with a controlled ankle motion (CAM) boot and follow-up was scheduled in 3 weeks.

Epidemiology

Toddler's fracture, also called childhood accidental spiral tibial (CAST) fracture, is a fracture unique to ambulatory infants and young children.¹ These injuries are most commonly seen in children with a median age of 22 months, typically presenting during the peak age range

of 1–3 years as they master independent walking.² Although they represent a significant portion of early childhood limping presentations, up to 40% of these cases are initially radiographically occult, meaning no clear fracture line is visible during the first emergency department visit.³ Radiographically occult toddler's fractures often become more visible on repeat radiographs obtained 1–2 weeks after the initial injury.⁴ Thus, misdiagnosis is common during the initial exam, which can result in incorrectly attributing the mechanism to nonaccidental trauma (NAT) or systemic problems.

Understanding the Anatomy

Flexibility, bone density, and growth plate fusion can all weigh into the physician's consideration for diagnoses of acute fractures, sprains, strains, or NAT. In toddler's fractures, the primary bone affected is the tibia, typically presenting as a spiral or oblique fracture in the diaphyseal region and often cortical rather than extending into the growth plate (**Images 1–2**). The fibula, the bone located lateral to the tibia, is rarely involved and usually indicates more significant trauma that would be identified as a different fracture type.⁵

The physis, a cartilaginous structure located between the metaphysis and epiphysis, is often spared as well. The presence of open growth plates helps reflect the overall immature skeletal structure, a key component depicting the nature of these fractures.¹

Toddler bones contain a higher proportion of collagen compared to adult bones, making them more flexible and able to absorb more energy without cortical disruption, but they have lower mineral density than mature bone, reducing the resistance against torsional loading.⁶

The thicker periosteum in toddlers provides additional stabilization and limits displacement, which is why toddler's fractures may be radiographically occult on initial imaging. A periosteal reaction refers to a bone formation stimulated by injury to the periosteum.^{1,3} In toddler's fractures, a periosteal reaction may not be visible until 7–14 days after injury, thus causing difficulty in initial diagnosis.

History

Toddler's fractures most often result from low-energy pivoting or rotational mechanisms—such as tripping, stumbling, or twisting—with minimal physical exam distinctions.^{1,7} Caregivers often describe a trivial fall, frequently without visible swelling or deformity, with a presentation of the child's sudden refusal to bear weight or acute limping. Falls are typically from ground level or less than 1 meter, and caregivers frequently describe the event as minor or insignificant.^{1,3,8}

Systemic symptoms such as fever, weight loss, or severe pain are usually absent. Their presence raises concern for more serious conditions like osteomyelitis, septic arthritis, or malignancy, which may also cause refusal to bear weight but involve systemic signs and progressive disease.^{8,9,10} Therefore, fall height, mechanism, and caregiver narratives are essential inputs to help rule out severe pathologies or disease and determine a true toddler's fracture. Although spiral fractures in ambulatory toddlers are generally benign, similar patterns in non-

ambulatory children or in the presence of unclear caregiver narratives may warrant further investigation for NAT, such as child abuse.¹¹

“A toddler's fracture will often present with an antalgic gait, toe-walking, complete refusal to bear weight, or increased irritability with handling of the affected limb.”

Physical Examination

UC clinicians should observe the pain threshold and perform a complete physical examination including a gait evaluation. General assessment includes examination of both lower extremities, pelvis, and hips, as toddler's fractures often present with nonspecific findings.^{3,8} Evaluation of the affected extremity will show localized point tenderness over the distal one-third of the tibial shaft, minimal or absent swelling, and lack of ecchymosis or deformity.¹² A toddler's fracture will often present with an antalgic gait, toe-walking, complete refusal to bear weight, or increased irritability with handling of the affected limb.¹³ Even if the patient can ambulate, pain or tenderness along the shin can indicate a fracture.¹⁴

Excluding alternative diagnoses will be one of the most important parts of the physical exam. An ankle sprain or foot contusion may present with localized tenderness and swelling along the foot or ankle but lacks pain with tibial rotation.⁸ Referred pain from the hip, from diagnoses including osteomyelitis, transient synovitis, and septic arthritis, should always be considered in an injured pediatric patient with gait abnormalities or refusal to bear weight.⁹ When there is suspected infection, fever, or severe pain of the lower extremity, urgent evaluation is necessary; however, these features often rule out a toddler's fracture.

Diagnostic Testing

Plain radiographs should include anteroposterior (AP) and lateral tibial views.³ Note that there is a high false-negative rate of around 39% on initial imaging, thus the fracture may be radiographically occult at initial presentation.^{4,15}

In a suspected toddler's fracture, additional imaging rarely changes management. Therefore, escalation to advanced imaging, such as computed tomography (CT), is rarely indicated and exposes the child to unnecessary radiation.² When radiographs are negative for a tibial spiral fracture, the next priority for management is to rely on physical exam and plan for outpatient follow-up.¹⁶

Delayed radiographic diagnosis is not known to worsen outcomes for toddler's fractures and does not alter clinical recovery. Therefore, the patient's caregivers may need reassurance if diagnosis is achieved on repeat radiograph imaging or outpatient follow-up. Follow-up imaging may demonstrate periosteal reaction or callus formation along the tibial cortex.^{2,17}

Differential Diagnosis

A child presenting with a limp may have a wide spectrum of causes, from benign injuries to serious conditions.⁵ To develop a differential diagnosis, clinical examination should include examination of the legs for bruising, deformity, scars, and skin discoloration as well as a gait evaluation. Additionally, neurologic, abdominal, and lymphadenopathy examinations should be performed as part of the physical assessment to identify other pathologies.¹⁸

The differential diagnoses include:

- Normal toddler refusal to walk after a minor fall
- Tibial contusion
- Ankle sprain (less common in toddlers)
- Occult foot fracture
- Septic arthritis (hip/knee)
- Transient synovitis (hip)
- Osteomyelitis
- NAT (child abuse)

Indications for Emergency Department Referral

Septic arthritis and osteomyelitis in pediatric patients represent true emergencies and often present subtly with vague pain or refusal to bear weight. These concerns should prompt emergency department (ED) referral.¹⁹

Additionally, refer the patient immediately with concern for:

- Inability to bear weight and suspicion of systemic infection (eg, fever, toxic appearance)
- Neurovascular compromise (ie, diminished distal pulses)
- Concern for NAT
- Multiple injuries or uncertain mechanism
- Severe swelling suggesting compartment syndrome (rare)

“Delayed radiographic diagnosis is not known to worsen outcomes for toddler's fractures and does not alter clinical recovery.”

Urgent Care Management

Immobilization and Pain Management

Preferred initial management is immobilization in a CAM boot with referral to a pediatric orthopedist.²⁰ The boot can be removed at least once a day to check the skin. Pain can be managed with ibuprofen and acetaminophen as needed, and weight-bearing is encouraged per patient comfort.²⁰ Of note, when the toddler's fracture was first described, standard practice included immobilization of the affected leg in a long-leg plaster splint, however that is no longer the recommendation.¹³

Repeat Imaging

Caregivers should follow up with orthopedics 1 week after injury and again at 3–4 weeks. However, x-rays are only needed at the 3–4 week visit to confirm periosteal reaction and proper healing of the spiral fracture. X-ray at 1 week after injury may not yield a periosteal reaction; therefore, this visit is to monitor patient pain and ambulation ability. It is important to note that follow-up is variable depending on provider preference, as some providers don't require a follow-up appointment after the initial 1-week visit. Most patients are encouraged to bear weight as tolerated in an immobilization device immediately after the injury and return to full unassisted ambulation 2–4 weeks post-fracture.^{1,7} Altered gait is common up to 8 weeks post fracture, but it does not warrant physical therapy. Healing of a toddler's fracture typically has an excellent prognosis.^{4,10}

Red Flags and Legal Pitfalls

Systemic symptoms, the presence of fever, fatigue, generalized malaise, and headache warrant consideration of more severe diseases including septic arthritis and malignancies. Additionally, it is important to note bruising or petechiae, which can indicate underlying causes such as idiopathic thrombocytopenic purpura, Henoch-Schoenlein purpura, leukemia, or nonaccidental injury.¹⁸

NAT events are crucial to consider and may have a similar history of injury. Concerns for NAT include inconsistent or implausible injury mechanisms, abnormal

child-caregiver interaction, delayed presentation, signs of child neglect, frequent visits with injuries, metaphyseal corner fracture, multiple fractures in different healing stages, abnormal bruising, burns, or marks from an object.¹⁸ A spiral fracture does not automatically rule in NAT, as no single fracture pattern is pathognomonic for abuse; clinical context is essential.¹¹

Failure to appropriately evaluate fractures in children can create legal issues, especially when NAT is suspected, as clinicians are legally mandated to report suspected child abuse. Clinicians should follow applicable state mandatory-reporting requirements whenever child abuse is suspected.¹¹

To avoid pitfalls in managing toddler's fractures, recommendations include:

- Prioritize clinical findings over imaging
- Immobilize when a toddler's fracture is suspected
- Obtain appropriate imaging
- Schedule/refer orthopedics follow-up visit(s)
- Implement a broad differential

Clinical Scenario Conclusion

In the clinical scenario above, the history and age range of the toddler led to a high suspicion for a toddler's fracture. Physical exam of the right lower extremity demonstrated classic findings for a toddler's fracture with focal tenderness over the distal one-third of the right tibia, pain upon right ankle passive dorsiflexion, normal neurovascular exam, negative systemic symptoms, and no concern for NAT.

The patient ultimately returned to normal activity after 1 week with the CAM boot. A nondisplaced spiral fracture of the distal tibia was identified in a repeat x-ray at a subsequent orthopedic follow-up visit, confirming a toddler's fracture.

Takeaway Points

- A toddler's fracture is a nondisplaced spiral fracture of the distal tibia, also called a childhood accidental spiral tibial fracture or CAST fracture.
- Radiographs are commonly obtained for diagnoses, including AP and lateral tibial radiographs, but emphasis on the history and physical exam will yield greater suspicion for a toddler's fracture.
- If a clinician suspects a toddler's fracture, they should obtain radiographs, perform a physical exam, schedule a follow-up visit, and prescribe a CAM boot.
- Systemic symptoms or abnormal physical examination findings warrant consideration of a more severe pediatric diagnosis or NAT.
- Early diagnosis and treatment for a toddler's fracture

minimize unnecessary testing, financial burden, and parental concern. ■

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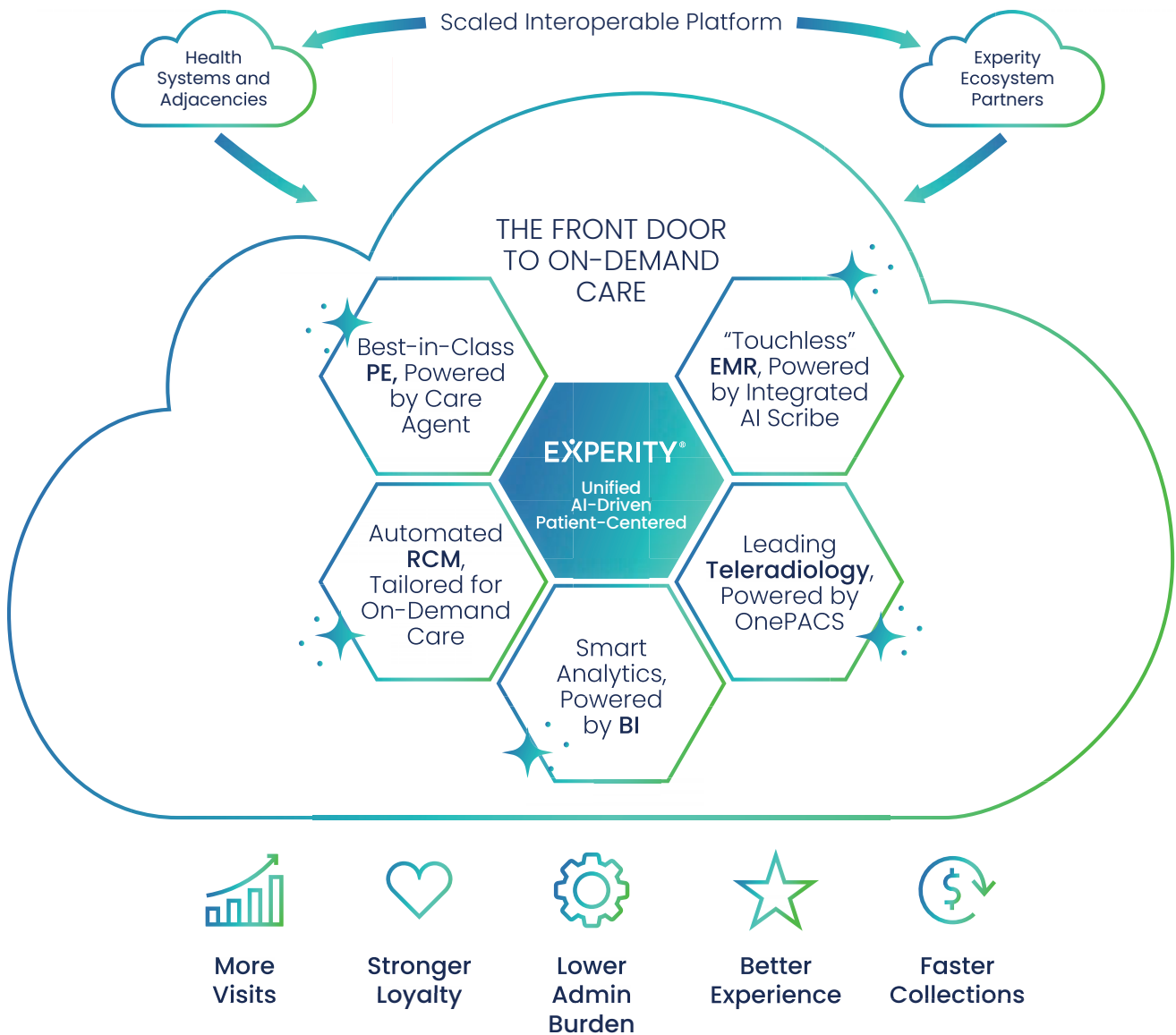
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Peripheral Neuropathy Induced by Nitrous Oxide Misuse: A Case Report

Urgent Message: Nitrous oxide-associated peripheral neuropathy may present similarly to Guillain-Barré syndrome, and clinicians are encouraged to conduct a careful clinical assessment of patients with neurological symptoms.

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Keywords: nitrous oxide toxicity; vitamin B₁₂ deficiency; peripheral neuropathy; myeloneuropathy; Guillain-Barré syndrome; paresthesia

Abstract

Introduction: Although often regarded as “safe,” repeated exposure to nitrous oxide can result in serious neurological sequelae, most notably functional vitamin B₁₂ deficiency.

Clinical Presentation: A 20-year-old male with a 2-week history of paresthesia in all 4 limbs presented to urgent care. He reported recreational nitrous oxide use 1-2 times per week over the previous 18 months, using on average 1 tank per session. For the previous 2 weeks, he noticed paresthesia from knees to toes, which progressed to numbness in response to cold stimuli. He reported some issues with coordination but continued to move around on his own.

Physical Examination: On examination, the patient's gait was narrow-based, and he was only able to take 2 steps in tandem gait. The Romberg test was negative. His muscle tone was normal throughout the upper and lower limbs. He had mild weakness in bilateral ankle dorsiflexion. His reflexes were brisk in the upper limbs, but both knee and ankle reflexes were absent bilaterally,



even with distraction. His plantar reflexes were equivocal. His sensory examination revealed reduced pinprick sensation up to the superior aspect of both knees and normal pinprick sensation in the upper limbs. His vibration sense and joint position sense were preserved in all 4 limbs. The patient's cranial nerves were intact with no relative afferent pupillary defect and no facial weakness or sensory deficit.

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Case Resolution: Following extensive workup, the diagnosis of nitrous oxide-associated peripheral neuropathy was made. Guillain-Barré syndrome (GBS) remained high on the differential diagnosis throughout the patient evaluation.

Conclusion: The patient was referred to neurology where a diagnosis of B₁₂ deficiency secondary to nitrous oxide use was made. He recovered following administration of B₁₂ injections.

Introduction

Nitrous oxide misuse and abuse have emerged as a significant public health concern, particularly among young adults, where its low cost, ease of access, and perception as a “safe” recreational substance have contributed to rising use.¹ Common street names for nitrous oxide include “hippy crack,” “smart whip,” and “galaxy gas.”² Although often regarded as benign, repeated exposure can result in serious neurological sequelae, most notably functional vitamin B₁₂ deficiency leading to subacute combined degeneration of the spinal cord and peripheral neuropathy.^{3,4,5} Presentations may be insidious and heterogeneous, posing diagnostic challenges in urgent care (UC) settings where early neurological signs can be subtle and overlap with other acute neuropathic conditions.⁶

Frontline clinicians must maintain a high index of suspicion for nitrous oxide-associated neurotoxicity, particularly when evaluating young patients with paresthesia, gait disturbance, or mixed upper and lower motor neuron signs.^{4,7} Failure to recognize the condition promptly may delay treatment and risk progression to irreversible neurological deficit.^{3,4} Moreover, the differential diagnosis frequently includes time-sensitive and life-threatening conditions such as Guillain-Barré syndrome (GBS), requiring careful clinical assessment and appropriate escalation of care.⁶

Case Presentation

A 20-year-old male presented to UC with paresthesia in all 4 limbs and instability when walking over the previous 2 weeks. His symptoms were worsening. He stated that he noticed the paresthesia initially starting in his toes, progressing up to his knees. He was also starting to feel some paresthesia symptoms in the tips of his fingers. He reported feeling uncoordinated at times, particularly in the night, but was able to walk without needing the help of additional walking aids (eg, crutches).

He was previously fit and well, worked in retail and was in school part-time. He denied any family history

“Given the presentation of lower limb paresthesia and reduced sensation after excessive nitrous oxide use, the differential diagnosis included nitrous oxide-associated myeloneuropathy and GBS.”

of neurological issues. He denied any chest pain, shortness of breath, fevers, or other infectious symptoms. He had not traveled abroad (outside the United Kingdom) in the previous few months. He reported no other sensory symptoms, back pain, weakness, diplopia, visual changes, or bladder or bowel continence issues. On social history, he denied smoking or using any other illicit substances. However, he did state that he would inhale nitrous oxide from canisters when partying with his friends. He reported using nitrous oxide 1–2 times a week and used 1 tank per session for the last 18 months. He stated that he stopped using nitrous oxide when his symptoms started.

Physical examination revealed his gait to be narrow based, and he could only take 2 steps in tandem. The Romberg test was negative. His muscle tone was normal throughout his upper and lower limbs with full strength (5/5) in all muscle groups—except for mild weakness in bilateral ankle dorsiflexion. His reflexes were brisk in his upper limbs; however, both knee and ankle reflexes were absent bilaterally, even with distraction. The sensory examination revealed reduced pinprick sensation up to the superior aspect of both knees, with normal sensation in his upper limbs. His vibration sense and joint position sense were preserved in all 4 limbs. His cranial nerves were intact with full extraocular movements, and his pupils were equal and reactive to light with no relative afferent pupillary defect, facial weakness, or sensory deficit.

Medical Decision Making

Given the presentation of lower limb paresthesia and reduced sensation after excessive nitrous oxide use, the differential diagnosis included nitrous oxide-associated myeloneuropathy and GBS. As such, his case was discussed with both the emergency department (ED) phys-

Table 1. Key Features Of Nitrous Oxide Neuropathy and Guillain-Barré Syndrome ^{5,6}		
Feature	Nitrous Oxide Neuropathy	Guillain-Barré Syndrome
Cause	Functional vitamin B ₁₂ deficiency due to nitrous oxide inactivating the vitamin.	Autoimmune response, often triggered by a prior infection.
Typical Age	Younger adults (mean age around 22 years).	Older adults (mean age around 51 years).
Cranial Nerve Involvement	Rare or absent.	Common (over 50% of cases), causing issues like facial weakness or swallowing difficulties.
Respiratory Weakness	Rare.	More frequent (around 21% of cases).
Vitamin B ₁₂ Levels	Often low, or normal but functionally deficient (high homocysteine and methylmalonic acid levels).	Usually normal (though some studies note potential correlation with B ₁₂ deficiency in GBS severity).
Electrophysiology	Typically shows axonal or mixed axonal-demyelinating neuropathy, with absent or very rare conduction blocks.	Usually a primary demyelinating polyneuropathy with frequent conduction blocks.
Cerebrospinal Fluid Analysis	Albumin cytologic dissociation (high protein with normal cell count) is less common.	Albumin cytologic dissociation is a classic finding.
Treatment	Immediate cessation of nitrous oxide use and parenteral (intramuscular) vitamin B ₁₂ supplementation.	Intravenous immunoglobulin or plasmapheresis.

ician and a neurologist. They both agreed that the patient required additional same-day work-up, and he was sent to the ED for further assessment.

Differential Diagnosis and Final Diagnosis

Given the progressive, ascending pattern of sensory disturbance, the top 2 diagnoses considered were nitrous oxide-associated myeloneuropathy and GBS. Diagnoses also considered were diabetes mellitus, which can cause chronic or acute-onset peripheral neuropathy, and nutritional deficiencies, particularly of vitamins B₆ and B₁₂, due to his symmetrical distal paresthesia and sensory loss.⁸ Additional considerations included alcohol-related neuropathy, hereditary neuropathies such as Charcot-Marie-Tooth disease, and infectious causes, notably HIV/AIDS, which can manifest with a range of neuropathic syndromes.⁹

Blood tests done in the ED revealed a complete blood count that was normal with normal renal and liver function tests. However, the patient had low vitamin B₁₂ levels of 179 pg/mL (normal range 200–900 pg/mL), low folate levels of 2.7 µg/L (normal range 3.1–20.5 µg/L), and an elevated homocysteine at 120 µmol/L (normal range 5–15 µmol/L). An urgent whole spine magnetic resonance imaging (MRI) demonstrated no evidence of myelopathic signal change.

A final diagnosis of vitamin B₁₂ deficiency secondary to nitrous oxide use was made. The treatment plan was discussed with the patient and involved B₁₂ injections 3 times a week. Follow-ups were scheduled at 1 and 2 weeks to ensure symptoms were not rapidly changing. The patient was advised to present to the ED if he was experiencing any rapidly worsening symptoms or weakness.

Discussion

Nitrous oxide is a colorless gas used medically as an anesthetic and pain reliever. It is also commonly used to create a frothing agent for whipped cream and other cuisine foams. In the last 5 years, recreational use of nitrous oxide has rapidly increased; it is now the second most popular recreational drug in the United Kingdom after cannabis.¹ Following 1 inhalation, usually from a balloon, a euphoric and sometimes hallucinogenic effect is rapidly induced and disappears within minutes.¹ Typical side effects of nitrous oxide use include dizziness, dissociation, disorientation, loss of balance and weakness in the legs.¹ It has been shown that sustained use of nitrous oxide inactivates vitamin B₁₂, resulting in B₁₂ deficiency. This causes numbness in the fingers and toes which can further progress to peripheral neuropathy and other neurological effects.^{3,4,5}

The neuropathy from nitrous oxide use mimics GBS clinically and electrophysiologically, potentially leading to misdiagnosis and incorrect treatment. As the conditions have different underlying mechanisms and treatments, accurate differentiation is crucial.^{5,6} While both conditions present with symptoms such as weakness, numbness, and areflexia (absent reflexes), particularly in the lower limbs, several key features help distinguish them (Table 1).⁵

Blood tests for homocysteine and methylmalonic acid (MMA) are highly sensitive biomarkers for distinguishing nitrous oxide neuropathy from GBS, with high levels strongly indicating nitrous oxide neuropathy.^{3,4} Because of the symptom overlap between these 2 diagnoses, a detailed patient history—including recreational drug use—is vital for proper diagnosis, as patients may initially hide their nitrous oxide use.^{1,5} Misdiagnosis can lead to incorrect and expensive treatments (like unnecessary intravenous immunoglobulin for nitrous oxide patients), and delay necessary B₁₂ treatment, leading to long-term, irreversible neurologic damage.^{1,4,5}

Disposition, Final Diagnosis and Follow-Up

At the 2-week follow-up visit, the patient reported improvement of symptoms that began about a week after starting B₁₂ injections. He had not missed any doses and remained abstinent from nitrous oxide. His paresthesia had resolved in his fingertips and in his lower legs, while still present in his toes. He was still a bit unsteady but was ambulating faster.

Clinical examination revealed slight feet stomping gait and the ability to take 3-4 tandem steps (previously 2). There was normal muscle tone in upper and lower extremities. Strength was unchanged (4+/5 in ankle dorsiflexion bilaterally and otherwise 5/5 throughout). Reflexes remained absent in the lower extremities despite distraction and were present with distraction in the upper extremities. His plantar reflexes were downgoing. There was altered pinprick sensation up to the ankles bilaterally (previously up to knees). Otherwise, a normal sensory exam was noted.

The clinical phenotype was in keeping with nitrous oxide-related peripheral neuropathy. As his symptoms were improving with B₁₂ treatment, he was advised to continue injections for an additional 2 weeks.

Ethics Statement

The patient was unable to be contacted as he was lost to follow-up in the urgent care system. Therefore demographics and some details of the case were changed to protect patient anonymity and confidentiality.

Takeaway Points

- Nitrous oxide misuse is increasingly prevalent among young adults and can cause significant neurological harm despite its perception as a “low-risk” recreational drug.
- Functional vitamin B₁₂ deficiency is the key pathological mechanism, leading to peripheral neuropathy, myelopathy, or a mixed myeloneuropathy.
- Early symptoms may be subtle, including distal paresthesia, sensory change triggered by cold, or mild gait disturbance.
- GBS remains an important diagnosis in the differential, particularly in patients presenting with progressive sensory symptoms and areflexia.
- Urgent care clinicians play a key role in early identification and appropriate escalation of care for suspected nitrous oxide-associated neurotoxicity. ■

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Pediatric Vaccine Hesitancy in Families Seeking Care in Urgent Care Centers

Urgent Message: Despite national recommendations regarding childhood vaccination, some parents are hesitant or refuse to vaccinate their child. This survey assessment presents parents' perceptions of vaccination and the scope of undervaccination in a pediatric urgent care population.

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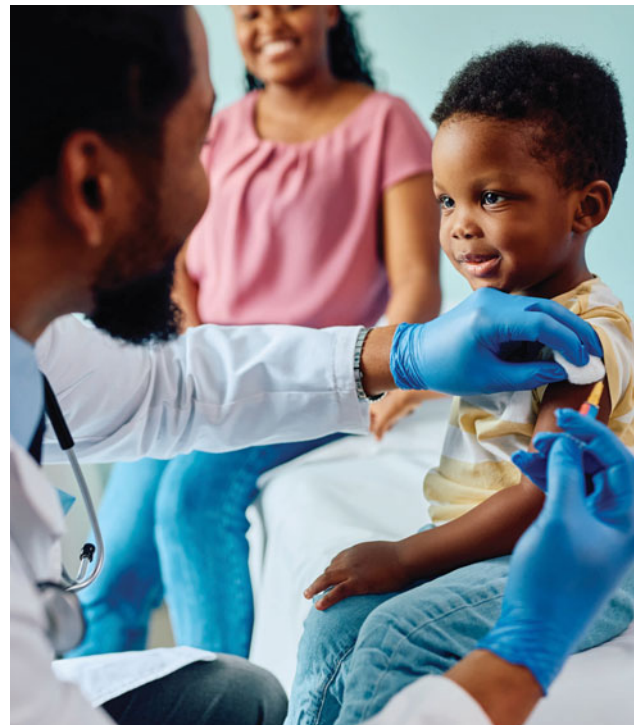
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Keywords: vaccine hesitancy; childhood immunization; undervaccination; measles-mumps-rubella vaccine; varicella vaccine; pediatric urgent care

Abstract

Background: Adherence with the standard practice of vaccinating pediatric patients remains a challenge for healthcare providers. Despite national recommendations regarding childhood vaccination, some parents are hesitant or refuse to vaccinate their child. In this assessment, vaccine hesitancy is defined as a refusal, delay, or modification of the recommended vaccine schedule.

Aims: The primary aim of this assessment was to understand parent perceptions of their child's immunization status, barriers to vaccination, and utilization of a primary care provider (PCP). The secondary aim was to



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assess the scope of undervaccination in the pediatric urgent care population.

Methods: Parents who presented with their child (birth–21.99 years of age) at either of 2 urgent care centers between May 2024–July 2024 were invited to complete a web-based 7-item questionnaire assessing their child's immunization status, perception of and barriers to vaccination, and the primary medical care source for their child. Convenience sampling was used, and parents were approached while in the urgent care waiting room; non-English-speaking parents were excluded. To assess the scope of undervaccination in the urgent care population, an electronic health record review was completed including all urgent care visits for patients 6.00–21.99 years of age during the same period to assess vaccination status for the measles, mumps, rubella (MMR) and varicella vaccine series.

Results: Of 91 parents approached for participation: 64 completed the survey; 12 were excluded due to non-English speaking language; and 15 declined participation. Nearly all (93%) parents who completed the survey reported routinely vaccinating their child, and most had not declined (91%) or delayed (89%) recommended vaccines. Eighty-eight percent of patients had a medical home or PCP. When their child needs routine acute care, 81% of parents reported taking their child to the PCP, 19% to the emergency department (ED), and 61% to urgent/immediate care clinics. Most parents were uncertain whether their PCP would or would not see their child if they refused vaccinations (64%). Reasons for declining/delaying vaccines were: too many vaccines at once; prematurity; concerns related to autism; or immunocompromised child. Of the 10,043 urgent care encounters during the project time period, 9.47% and 8.39% were incomplete for MMR and varicella vaccine series, respectively.

Conclusion: Most parents had their child vaccinated at the recommended time and had a PCP. Opportunities exist to inform parents about the importance of vaccines for unimmunized or underimmunized children seeking care at urgent care clinics.

Introduction

Immunizations for vaccine-preventable diseases have been one of the most successful public health accomplishments in medical science according to the World Health Organization (WHO) and the Centers for Disease Control and Prevention (CDC).¹ The introduction of

“Opportunities exist to inform parents about the importance of vaccines for unimmunized or underimmunized children seeking care at urgent care clinics.”

vaccinations for children has resulted in the prevention of serious illness for an estimated 322 million people, hospitalizations for 21 million, and death for 732,000 from 1994–2013.² Vaccines have long been the standard of care for all communities; however, the pediatric population receives the most immunizations, often within the first 3 years of their lives and often receiving multiple vaccinations in a single visit.³

Parents often feel the burden of healthcare decision-making with a desire to protect their children from perceived harm. This has led substantial numbers of parents to delay immunizations or decline them altogether.⁴ While this is not an entirely new phenomenon, there is growing reluctance on the part of parents to adhere to vaccine recommendations.^{4–6} Developments that may be driving reluctance include a flawed study claiming a link between the measles, mumps and rubella (MMR) vaccine and autism (the 1998 study was retracted and its results were discredited).⁷ Fear of the MMR vaccine persists to this day.⁸ More recently, the WHO has documented vaccine hesitancy as a worldwide issue that threatens previous eradication of certain diseases. Unfortunately, the growing public distrust of immunizations that coincided with the COVID-19 pandemic has exacerbated the vaccine hesitancy issue.¹ Fear of potential side effects, adverse events, or long-term impacts are some of the reasons parents express for not wanting to follow the standard guidelines and have their children immunized.^{3,8} Online, accessible health information that may or may not be accurate as well as skepticism about healthcare providers and the legitimacy of medical science, including the guidance from CDC, compounds the issue.^{8,9}

Health needs in children may be addressed in a visit to a pediatric primary care provider (PCP). However, parents also utilize local urgent/immediate care centers or emergency departments (EDs) for their child's healthcare needs. Pediatric primary care settings are well suited for immunizations as they can align the recommended

vaccine schedule with comprehensive well-child visits or sick visits. In contrast, urgent and immediate care centers often provide discrete acute care services for mild-to-moderately ill patients, and EDs are designed to offer the highest levels of care. In both urgent care and ED settings, nonacute/preventive services such as immunizations may not be offered even if desired.^{3,10} Meanwhile, childhood immunization rates remain sub-optimal.^{4,6,8,10,14} However, there may be opportunities in the urgent/immediate care setting to identify unimmunized or underimmunized children and offer vaccine information as a strategy for improving childhood vaccination rates.

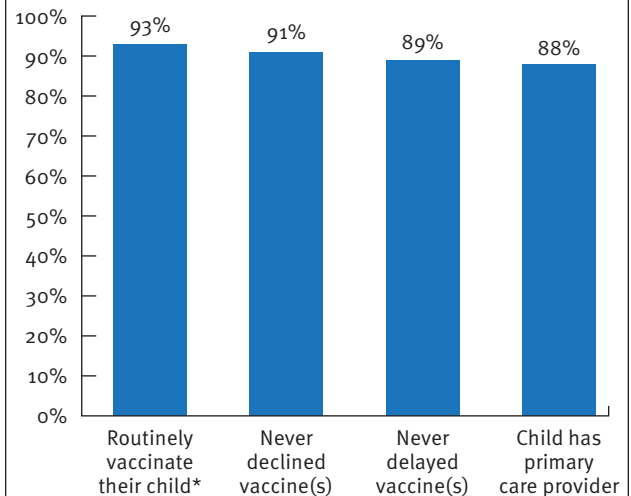
The goal of this initiative was to explore caregiver vaccine hesitancy and vaccination status in the urgent care population as an initial step toward development of future quality improvement or process improvement strategies. In this assessment, vaccine hesitancy is defined as a refusal, delay, or modification of the recommended vaccine schedule. The primary aim was to survey families in the urgent/immediate care setting about their decisions regarding their child's immunization status. The secondary aim was to identify the number of encounters where patients had documentation of fewer than the age-based recommended doses of the MMR and varicella vaccine series. Lastly, we also sought to identify sociodemographic factors associated with incomplete vaccination in this population.

Methods

This initiative included 2 metropolitan urgent care centers that are part of a large pediatric healthcare organization located in the southeastern United States with multiple hospitals and urgent care locations serving pediatric patients up to the age of 21.99 years. One center sees an average of 30,000 visits/year, and the other averages 18,000 visits/year. The impetus for this initiative was the observed increasing number of parents answering “no” when queried by the healthcare provider regarding their child's vaccine status. The institutional review board (IRB) reviewed the project and gave it a non-human subject determination (IRB# 00001863).

In collaboration with urgent care leaders, we developed a plan to assess parental perspectives on vaccination for children presenting to the urgent care. Using a 7-item investigator-developed questionnaire, the survey was conducted in the 2 urgent care locations from May 2024–July 2024. The questionnaire was developed to measure vaccine administration status, parents' perceptions, barriers, and the use of primary medical care for their child. Parents of patients presenting to the urgent

Figure 1. Parent-Reported Vaccine Practices For Their Child



N = 64; N = 61*

“The goal of this initiative was to explore caregiver vaccine hesitancy and vaccination status in the urgent care population as an initial step toward development of future quality improvement or process improvement strategies.”

care were eligible; however, non-English-speaking parents were excluded. This questionnaire was accessible to parents electronically via a QR code, and the results were stored in the organization's Research Electronic Data Capture (REDCap), a secure, password protected database.¹² Child age was abstracted from the medical record.

For the second aim of the study, data was abstracted from all encounters of patients aged 6.00–21.99 years with a completed visit to either of 2 urgent care centers during the timeframe of the survey. The age range for the chart review was limited to aged 6.00–21.99 years because the first 2 doses of MMR and varicella vaccines would have been administered by age 6, indicating up-

Table 1. Parent Rationales for Declining/Delaying Vaccines For Their Child

Survey Question	Yes/No	Stated Rationales (free-text option)
Do you routinely vaccinate your child?	No	“Has not gotten sick” “Concerned about side effects”
Have you ever declined a routine vaccine for your child?	Yes	“Hep B” “non required vaccines, covid vaccine” “Autistic” “Flu and covid”
Have you ever requested to delay a recommended vaccine for your child?	Yes	“Autistic” “Too many shots as toddler” “Immunosuppressed child” “24-week [old child] waited for age-adjusted for live vaccines” “HPV”

to-date vaccine status. Age at encounter, race/ethnicity, insurance type (public, private/military, self-pay), and documented PCP were abstracted from the medical record. Dates for doses of the MMR and varicella vaccines were also abstracted from the medical record, which is linked to the Georgia Registry for Immunization Transactions and Services (GRITS).¹³ All immunizations administered in the state of Georgia are required by law to be recorded in GRITS within 30 days of administration, and in 2023, >95% of children across the state were represented in the registry.¹³

Any patient encounter with <2 doses of either the MMR or varicella vaccine series documented was considered to represent underimmunization and an opportunity for vaccine counseling based on the Advisory Committee on Immunization Practices (ACIP) recommendation that both vaccine series be completed by 6 years of age.¹³ Multivariable logistic regression was performed to calculate odds ratios (OR) with 95% confidence intervals (95% CI) for demographic characteristics associated with underimmunization for MMR and varicella separately.

Results

Urgent Care Survey

A total of 91 parents were approached between the 2 urgent care locations. Sixty-four parents completed the survey; 12 were excluded due to a language barrier and 15 declined participation. The median age of the child

was 4 years and 10 months of age (range: 7 weeks–19 years). Most (n=57 [93%]) parents reported routinely vaccinating their child, and most parents had not declined (n=58 [91%]) or delayed (n=57 [89%]) recommended vaccines (**Figure 1**). Parents were asked if they had a medical home or pediatric PCP, and 56 (88%) responded yes. Regarding where parents take their child if they need care, 81% (n=52) of parents who responded to the survey said they take their child to a PCP, 19% (n=12) said the ED, and 61% (n=39) said an urgent/immediate care clinic. Most parents were uncertain whether their provider would or would not see their child if they refused vaccinations (n=41 [64%]). If parents responded no to routinely vaccinating their child or yes to delaying a vaccine, they were asked to provide a rationale. Reasons for declining/delaying vaccines included: too many vaccines; prematurity; immunosuppressed child; and autism-related concerns—although it is unclear in the free-text responses whether the parents' concerns were related to a perceived risk of autism from a vaccine or because the child had a current autism diagnosis (**Table 1**).

Most (n=52 [81%]) parents responding to the survey sought care for their child with the pediatric PCP. There were 8 parents who reported not having an identified primary medical home or pediatric PCP. Among this subset of parents, 2 of the 8 did not routinely vaccinate their child, and 1 parent reported declining a vaccine in the past.

Retrospective Chart Review

A total of 10,043 urgent care encounters occurred during the project time period. Of patients seen during these encounters: 51.5% were male; 45.1% were non-Hispanic white; 54.1% had private insurance; and 91.1% had a PCP documented within the urgent care medical record (**Table 2**). Among all encounters, 951 (9.47%) included patients undervaccinated for MMR with 568 (5.65%) having no documented MMR doses. Similarly, 843 encounters (8.39%) included patients undervaccinated for varicella, with 551 (5.48%) having no documented varicella vaccine doses.

Factors associated with MMR undervaccination included public insurance or self-pay (OR 1.57, 95% CI 1.34–1.83, $p<.001$ and OR 2.58, 95% CI 2.02–3.28, $p<.001$, respectively) and lack of documentation of a PCP (OR 3.88, 95% CI 3.25–4.62, $p<.001$) (**Table 3**). Older age and Hispanic ethnicity (compared to non-Hispanic white) were less likely to be associated with undervaccination (OR 0.95, 95% CI 0.93–0.97, $p<.001$ and OR 0.68, 95% CI 0.55–0.83, $p<.001$, respectively) (**Table 3**).

Table 2. Patient Characteristics For Urgent Care Encounters by MMR and Varicella Vaccination Status

Characteristic	Total Encounters N=10,043		≥2 Doses MMR N=9,092		<2 Doses MMR N=951		P value	≥2 Doses Varicella N=9,200		<2 Doses Varicella N=843		P value
Age	Mean	SD	Mean	SD	Mean	SD		Mean	SD	Mean	SD	
Years	11.0	3.5	11.1	3.5	10.5	3.5	<.001	11.2	3.5	10.0	3.1	<.001
	N	%	N	%	N	%		N	%	N	%	
Sex												
Male	5,177	51.5%	4,671	90.2%	506	9.8%	.297	4,723	91.2%	454	8.8%	.172
Female	4,866	48.5%	4,421	90.9%	445	9.1%		4,477	92.0%	389	8.0%	
Race/ethnicity												
Non-Hispanic white	4,533	45.1%	4,133	91.2%	400	8.8%	.001	4,163	91.8%	370	8.2%	.147
Black/African American	2,319	23.1%	2,053	88.5%	266	11.5%		2,095	90.3%	224	9.7%	
Hispanic	2,047	20.4%	1,879	91.8%	168	8.2%		1,896	92.7%	151	7.4%	
Asian	555	5.5%	504	90.8%	51	9.2%		508	91.5%	47	8.5%	
Other*	213	2.1%	186	87.3%	27	12.7%		196	92.0%	17	8.0%	
Unknown	376	3.7%	337	89.6%	39	10.4%		342	91.8%	34	8.2%	
Insurance type												
Private/Military	5,433	54.1%	5,029	92.7%	404	7.4%	<.001	5,081	92.5%	352	6.5%	<.001
Public	4,020	40.0%	3,598	89.5%	422	10.5%		3,651	90.8%	369	9.2%	
Self-pay	590	5.9%	465	78.8%	125	21.2%		468	79.3%	122	20.7%	
Documentation of primary care provider												
Yes	9,152	91.1%	8,440	92.2%	712	7.8%	<.001	8,538	93.3%	614	6.7%	<.001
No	891	8.9%	652	73.2%	239	26.8%		662	74.3%	229	25.7%	

*Other category includes American Indian, Native American, Hawaiian, and more than one race. MMR: measles, mumps, rubella

Similarly, factors associated with varicella undervaccination included public insurance or self-pay (OR 1.46, 95% CI 1.25–1.70, $p<.001$ and OR 2.64, 95% CI 2.09–3.32, $p<.001$, respectively) and lack of documentation of a PCP (OR 3.81, 95% CI 3.21–4.52, $p<.001$) (Table 4). For varicella vaccination, older age and Hispanic ethnicity (compared to non-Hispanic white) were less likely to be associated with undervaccination (OR 0.95, 95% CI 0.93–0.97, $p<.001$ and OR 0.73, 95% CI 0.60–0.89, $p=.002$, respectively) (Table 4).

Discussion

Most parents in the United States are vaccinating their children.^{14,15} Consistent with that trend, most pediatric patients in the chart review had documentation of recommended MMR and varicella series completion. While this is an encouraging statistic, it remains critical to

collaborate with parents who question vaccine safety and address their concerns whenever possible.^{15–17} For the MMR and varicella vaccine series, we found that 8%–9% of patients did not have documentation of series completion. For the MMR vaccine, it is recommended that 95% of the population is vaccinated to maintain community immunity.¹⁵ Any provider caring for pediatric populations is encouraged to assess the vaccine status of their patients, particularly with the resurgence of vaccine-preventable diseases.¹⁹

Children with a pediatric PCP are likely to see their provider when sick but may also visit an urgent/immediate care center or ED. Parents remain confident in their healthcare provider when these relationships are built on trust, which develops over time as the provider cares for the child and interactions with the parents accumulate.^{17,18} Vaccine conversations naturally occur in

Table 3. Multivariable Logistic Regression For Demographic Factors Associated With MMR Undervaccination (<2 doses)

Characteristic	Odds Ratio	95% Confidence Interval		P value
Age				
Years	0.95	0.93	0.97	<.001
Sex				
Female	Ref			
Male	1.10	0.96	1.27	.159
Race/ethnicity				
Non-Hispanic white	Ref			
Black/African American	1.07	0.90	1.28	.436
Hispanic	0.68	0.55	0.83	<.001
Asian	0.85	0.61	1.16	.316
Other*	1.15	0.73	1.74	.528
Unknown	0.97	0.67	1.37	.868
Insurance type				
Private/Military	Ref			
Public	1.57	1.34	1.83	<.001
Self-pay	2.58	2.02	3.28	<.001
Documentation of PCP				
Yes	Ref			
No	3.88	3.25	4.62	<.001
*Other category includes American Indian, Native American, Hawaiian, and more than one race; MMR: measles, mumps, rubella; N = 10,043				

*Other category includes American Indian, Native American, Hawaiian, and more than one race; MMR: measles, mumps, rubella; N = 10,043

a pediatric primary care office, however the opportunity to reinforce the need to vaccinate can also occur in other healthcare settings, such as urgent care.

Methods to reinforce the need to vaccinate include using electronic prompts to encourage provider conversations, leveraging clinician reminders, or including vaccine information sheets with discharge instructions.²⁰⁻²¹ Not all urgent care centers have access to a statewide vaccine registry; however, provider recommendation for vaccination via discussion or written handout is predictive of vaccine initiation.²²⁻²³ We believe there is opportunity for some of those on the vaccine hesitancy spectrum to be guided toward immunization through conversation with a healthcare professional.

As another option, a vaccine champion could be employed, or an existing staff member could serve as a champion in an urgent care setting.²¹⁻²³ Clinical leaders who serve as vaccine champions can provide peer education and real-time support to promote vaccination and/or recommendations to families.²⁴ The availability of a vaccine champion to identify and address missing

immunizations may help close the gaps in immunization rates for communities. The vaccine champion could have conversations with families about immunizations and potentially administer vaccines if the service is available, or otherwise, encourage them to seek vaccination from a PCP. Documentation of any vaccine administered could be completed in the immunization registry or updated vaccine records given to the parent as well.²⁰

Parental vaccine hesitancy often prevents children from maintaining up-to-date vaccine status. One of the major drivers of vaccine delay or refusal of the MMR vaccine continues to be concerns about autism. Debunked myths surrounding a causal link between the MMR vaccine and the development of autism led to a decline in MMR vaccine uptake, and this misinformation continues to impact parental decision making when questioned about acceptance of the MMR vaccine.⁷ Among our small survey project, autism concerns—whether fear of a vaccine causing autism or the child presenting with a current diagnosis—was one of

Table 4. Multivariable Logistic Regression For Demographic Factors Associated With Varicella Undervaccination				
Characteristic	Odds Ratio	95% Confidence Interval		P value
Age				
Years	0.95	0.93	0.97	<.001
Sex				
Female	Ref			
Male	1.10	0.96	1.26	.155
Race/ethnicity				
Non-Hispanic white	Ref			
Black/African American	1.03	0.87	1.23	.683
Hispanic	0.73	0.60	0.89	.002
Asian	0.91	0.67	1.22	.600
Other*	1.08	0.69	1.38	.735
Unknown	0.98	0.69	1.38	.933
Insurance type				
Private/Military	Ref			
Public	1.46	1.25	1.70	<.001
Self-pay	2.64	2.09	3.32	<.001
Documentation of PCP				
Yes	Ref			
No	3.81	3.21	4.52	<.001

*Other category includes American Indian, Native American, Hawaiian, and more than one race; N = 10,043

the cited reasons for a parent not to vaccinate their child in a free-text response in this small survey.

Limitations

The survey data was collected during the summer months when the urgent/immediate care centers were experiencing a lower-than-expected volume of patients. Conducting this survey in the fall/winter season when there is greater utilization of the urgent care center may reveal different results. Only 2 centers were used for survey recruitment, which limits the generalizability of results. Additionally, the small sample size is not representative of all patients seen systemwide in urgent care. This survey excluded non-English speaking populations and therefore may not be generalizable to these populations. Future studies should include larger sample sizes, more care sites and languages spoken as well as additional demographic factors (eg, parental education and income) to better identify underlying reasons for the differences in vaccine uptake observed in chart review.

Conclusion

Urgent/immediate care providers and staff have an opportunity to assess the vaccine status of each child under their care and remind parents about the need for a recommended vaccine. If parents express hesitancy, urgent care team members or a vaccine champion may address vaccine questions. While not every urgent care center may be able to administer scheduled pediatric vaccines, referral back to the pediatric PCP or other source could be an acceptable method to support efforts to bring a child's vaccine status up to date. ■

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ABSTRACTS IN URGENT CARE

Web-Based Pediatric Point-of-Care Ultrasound Cases

Take Home Point: Implementation of a web-based point-of-care ultrasound (POCUS) educational intervention was associated with improved learning outcomes and favorable participant evaluations among clinicians working in resource-limited settings.

Citation: Ricci A, Lindsay D, Schwanfelder C, et al. Web-Based Deliberate Practice of Pediatric Point-of-Care Ultrasound Cases in Resource-Limited Settings: A Multicenter Implementation and Effectiveness Study. *J Ultrasound Med.* 2025;44(7):1231-1244. doi:10.1002/jum.16679

Relevance: POCUS is an increasingly valuable tool in clinical practice, providing rapid bedside diagnostic and procedural support. For clinicians working in resource-limited settings, including many urgent care centers (UCCs), training in POCUS may improve the ability to deliver safe and efficient patient care.

Study Summary: This multicenter prospective cohort study evaluated clinicians working with the Médecins Sans Frontières (MSF) organization in resource-limited settings across Africa and the Middle East. Participants were recruited through convenience sampling and completed a standardized MSF curriculum that was adapted to each site's clinical experience, diagnostic scope, existing protocols, and common disease presentations. Training included individualized, intensive sessions lasting 6–8 days, supplemented by web-based deliberate practice cases covering 4 POCUS applications: soft tissue, cardiac, lung, and focused assessment with sonography in trauma (FAST). Two MSF coordinators reviewed participant performance for quality assurance.

A total of 110 clinicians began the program and completed 82,206 web-based cases. Of these, 93 (84.5%; 95% confidence interval [CI], 76.4%–90.7%) completed at least 60 cases, the threshold used to assess learning outcomes. Participants demonstrated significant improve-

ments in diagnostic accuracy (delta 14.2%; 95% CI 13.1%–15.2%), sensitivity (delta 13.2%; 95% CI 12.1%–14.2%), and specificity (delta 13.8%; 95% CI 12.7%–15.0%) across the 4 POCUS applications. Overall, 90 participants (81.8%; 95% CI 73.3%–88.5%) achieved the mastery learning standard in at least 1 application. Mastery standards were achieved by: 90 of 107 participants (84.1%; 95% CI 75.8%–90.5%) for soft tissue; 75 of 100 (75.0%; 95% CI 65.3%–83.1%) for cardiac; 88 of 100 (88.0%; 95% CI 74.2%–89.8%) for lung; and 89 of 110 (80.9%; 95% CI 72.3%–87.8%) for FAST.

Editor's Comments: Selection bias is possible because participants were highly motivated clinicians working with MSF. As a result, the findings may not be fully generalizable to other practice settings. Nonetheless, the study demonstrates that a structured, web-based POCUS educational program can produce meaningful learning gains and may be a practical model for larger urgent care organizations or those with limited resources seeking to expand clinician education and skills development. ■

Absorbable Sutures for Adult Facial Lacerations

Take Home Point: Absorbable sutures are an effective option for definitive closure of adult facial lacerations, providing cosmetic outcomes, complication rates, and patient satisfaction comparable to those of non-absorbable sutures.

Citation: Kelly M, Horner D. Absorbable sutures appear clinically effective and may be more cost-effective than non-absorbable sutures for definitive closure of adult facial lacerations. *Emerg Med J.* Published online April 22, 2026. doi:10.1136/emered-2026-216075

Relevance: Facial lacerations requiring suture closure are commonly encountered in UCCs. Identifying the most appropriate suture material to achieve favorable cosmetic outcomes while minimizing follow-up care can help optimize patient management.

Study Summary: This Best Evidence Topic report reviewed the highest-quality available evidence addressing the following clinical question: In adults with facial lacerations requiring definitive closure, do absorbable sutures provide



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better clinical and/or cost-effective outcomes than non-absorbable sutures? The authors searched MEDLINE, the Cochrane Library, and Embase for relevant studies.

Only 2 studies met the inclusion criteria, and the authors concluded that both the quantity and quality of the available evidence were limited. Overall, the findings suggest that absorbable sutures provide cosmetic outcomes comparable to those of non-absorbable sutures without increasing complications. They are also associated with high patient satisfaction. The available evidence likewise suggests the potential for reduced downstream healthcare utilization and lower overall treatment costs by eliminating the need for suture removal.

Editor's Comments: The available evidence is limited by the small number of studies, small sample sizes, and the predominance of procedures performed by surgical specialists, which may limit generalizability to the urgent care setting. Nevertheless, the findings support absorbable sutures as a reasonable option for selected adult facial lacerations and highlight an opportunity for urgent care clinicians to generate setting-specific evidence. ■

Risk of Heart Rhythm Abnormalities From Vaping in Adolescents and Young Adults

Take Home Point: Electronic cigarette (e-cigarette) use was associated with an increased risk of heart rhythm abnormalities among adolescents and young adults (AYA).

Citation: Tsalatsanis A, Johnson J, Abou-Assali O, et al. Increased Risk of Heart Rhythm Abnormalities in Adolescents and Young Adults Who Vape. *J Pediatr*. 2026;296:115183.

Relevance: Vaping, or the use of e-cigarettes, is common among AYA populations, yet its potential cardiovascular effects remain incompletely understood.

Study Summary: This retrospective study analyzed deidentified electronic health records from more than 150 million patients across 106 healthcare institutions in the United States. The authors identified adolescents and young adults aged 11–24 years who had interacted with a healthcare system and classified them into 2 groups based on International Classification of Diseases, Tenth Revision (ICD-10) codes: those who used e-cigarettes; and those

who did not. All eligible patients who vaped were included and propensity score matched 1:1 with controls. The primary outcome was the association between vaping and the development of heart rhythm abnormalities, defined by ICD-10 diagnosis codes.

The study included 57,202 patients who vaped and who were matched to 57,202 control patients. Patients who vaped had 82% higher odds of being diagnosed with a heart rhythm abnormality than those who did not vape (odds ratio [OR] 1.82; 95% CI 1.74–1.91; $p < 0.001$). They also had nearly twice the hazard of developing a heart rhythm abnormality during follow-up (hazard ratio [HR] 1.97; 95% CI 1.88–2.06; $p < 0.001$).

Editor's Comments: Because of its observational design, this study cannot establish a causal relationship between vaping and heart rhythm abnormalities. In addition, reliance on ICD-10 codes may have resulted in misclassification, and important confounding factors, such as illicit substance use, were not included in the analysis. Nevertheless, the study indicates a possible correlation between vaping and cardiac arrhythmias. Clinically, the findings underscore the importance of routinely assessing e-cigarette use during urgent care encounters, particularly in adolescents and young adults. When clinically indicated, appropriate diagnostic testing, such as electrocardiography, may help guide evaluation and management. ■

Delayed Presentation and Diagnosis In Patients With Subarachnoid Hemorrhage

Take Home Point: Patients who delayed seeking care for symptoms of subarachnoid hemorrhage (SAH) were more likely to experience a subsequent delay in diagnosis after presenting for medical evaluation.

Citation: Hall S, Suresh V, Bandyopadhyay S, et al. Prospective patient-reported reasons for delayed diagnosis of spontaneous subarachnoid haemorrhage. *Emerg Med J*. 2026;43:390–396.

Relevance: Although SAH often presents with dramatic symptoms, timely diagnosis can be challenging, particularly in patients with atypical presentations or those who delay seeking medical attention.

Study Summary: This prospective quality improvement project used structured interviews with patients to evaluate



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their presentations with spontaneous SAH at the Wessex Neurological Centre in the United Kingdom. Eligible patients had a diagnosis of spontaneous SAH confirmed by computed tomography (CT) or lumbar puncture. A delay was defined as a conscious or unconscious decision by the patient not to seek immediate medical attention after symptom onset.

The authors identified 550 patients with spontaneous SAH and identified 107 with a delayed diagnosis. Among these patients with delay, 80% attributed the delay in diagnosis to postponing their initial presentation for medical care. The most commonly reported reason for delaying care was waiting to see whether symptoms would resolve, despite most patients describing a classic thunderclap headache. Patients frequently attributed their symptoms to migraine or believed they were not severe enough to warrant medical evaluation. Among those who eventually sought care, 45% reported additional diagnostic delays due to misdiagnosis or errors in diagnostic testing.

Editor's Comments: The study's single-center design may limit the generalizability of its findings. In addition, the absence of outcome data prevented assessment of the clinical consequences associated with delayed diagnosis. Nevertheless, the findings reinforce the importance of obtaining a thorough history in patients presenting with headache. A history of thunderclap headache or neurological changes should prompt consideration of SAH even when presentation is delayed. ■

Multimodal Intervention to Reduce CT Use in Blunt Head Injury

Take Home Point: A multimodal intervention that combined evidence-based guidance, clinician education, feedback, and an electronic health record (EHR)-integrated clinical decision support tool was associated with a modest reduction in CT use for blunt head injury without reducing the detection of traumatic brain injury.

Citation: Berlyand Y, Smith Shain R, Savarino J, et al. A multimodal intervention reduces computed tomography use in blunt head injury. *Am J Emerg Med.* 2026;109:148-154. doi:10.1016/j.ajem.2026.07.005

Relevance: CT is the imaging modality of choice for evaluating blunt head injury. However, unnecessary imaging increases healthcare costs, radiation exposure, and oper-

ational inefficiencies. Thus, utilizing clinical decision tools to identify patients at sufficiently low risk to avoid unnecessary CT may be clinically and operationally beneficial.

Study Summary: This retrospective pre-post analysis evaluated the implementation of a multimodal intervention across 3 academic emergency departments (EDs) within a single United States health system. An interdisciplinary team of emergency physicians and trauma surgeons developed institutional guidance recommending use of either the National Emergency X-Radiography Utilization Study (NEXUS) Head CT decision instrument or the Canadian CT Head Rule (CCHR) when evaluating adults younger than 65 years with blunt head injury. Physicians, residents, and advanced practice providers received a brief educational session and follow-up email reminders. An optional clinical decision support tool integrated into the EHR was also utilized.

The analysis included 194,655 ED encounters, comprising 93,393 encounters before and 101,262 encounters after implementation of the intervention. CT utilization decreased from 9.6% before the intervention to 9.0% afterward. Logistic regression demonstrated a significant reduction in the odds of obtaining a head CT after implementation (adjusted OR 0.91; 95% CI 0.89–0.94). The proportion of CT examinations demonstrating radiographic traumatic brain injury remained unchanged at 1.9% during both study periods, with no significant difference in the odds of identifying traumatic brain injury after the intervention (OR 0.95; 95% CI 0.78–1.14).

Editor's Comments: The study did not assess clinician engagement with individual components of the intervention, making it difficult to determine which elements were most effective. In addition, 1 of the 3 participating sites did not experience a reduction in CT utilization, which may limit the generalizability of the findings. Nevertheless, the study illustrates how combining education, evidence-based guidelines, feedback, and clinical decision support can influence clinician behavior. Similar multimodal quality improvement strategies may be beneficial in urgent care settings. ■

AI-Powered Scribes Modestly Decrease Documentation Time

Take Home Point: Adoption of artificial intelligence (AI)-powered scribes was associated with a modest but statistically significant reduction in EHR documentation time and a small increase in weekly visit volume.

Citation: Rotenstein L, Holmgren A, Thombly R, et al. Changes in Clinician Time Expenditure and Visit Quantity With Adoption of Artificial Intelligence–Powered Scribes: A Multisite Study. *JAMA*. 2026;335(16):1408-1417. doi:10.1001/jama.2026.2253.

Relevance: AI tools are increasingly being integrated into clinical practice. Whether AI-powered scribes meaningfully reduce clinician workload while improving patient interaction remains an unanswered question.

Study Summary: This multisite longitudinal cohort study evaluated AI scribe adoption across 5 academic healthcare institutions in the United States. Sites provided data for clinicians who adopted AI scribes as well as clinicians who did not. The study population included ambulatory attending physicians, fellows, nurse practitioners, physician assistants, and resident physicians. Outcomes included changes in total EHR time, documentation time per 8 hours of work (DocTime), work outside of scheduled work hours (WoW), and weekly visit volume.

The study included 8,581 clinicians, including 1,809 AI scribe adopters and 6,772 nonadopters. AI scribe adoption was associated with 13.4 fewer minutes (95% CI 9.1–17.7) of total EHR time and 16.0 fewer minutes (95% CI 13.7–18.3) of DocTime. Changes in WoW were not statistically significant. AI scribe adoption was also associated with an increase of 0.49 additional weekly visits (95% CI 0.17–0.81). Relative reductions in total EHR time and DocTime were 3.0% and 10.0%, respectively. The authors estimated that AI scribe adoption was associated with a statistically significant small increase in evaluation-and-management revenue of \$167.37 per month.

Editor's Comments: Important limitations included the lack of randomization and inconsistent AI scribe use among some adopters. The findings also suggested that clinician workflow patterns impacted how efficiently these tools were used. As the associated revenue gains were relatively small, additional research is needed to determine organizational benefit. ■

A Shifting Paradigm for Acute Coronary Syndrome Diagnoses

Take Home Point: An occlusion-focused diagnostic approach to patients presenting with chest pain may facilitate earlier recognition of coronary artery occlusion and timelier

reperfusion in patients with acute coronary syndrome (ACS) compared with diagnosis based on electrocardiographic ST segment findings.

Citation: Umit T, Sogut O, Arslan M, et al. Diagnostic challenges in acute coronary syndrome: reconciling the STEMI–NSTEMI and OMI–NOMI paradigms. *BMC Cardiovasc Disord*. 2026;26:228. doi:10.1186/s12872-026-05612-3

Relevance: The diagnostic framework for ACS is evolving from the traditional classification of ST-elevation myocardial infarction (STEMI) and non-ST-elevation myocardial infarction (NSTEMI) toward an occlusion-based approach that distinguishes coronary vessel occlusion myocardial infarction (OMI) from non-occlusion myocardial infarction (NOMI).

Study Summary: This retrospective, single-center observational cohort study included adults aged 18 years and older who presented to the ED with ACS. Eligible patients were diagnosed with STEMI, NSTEMI, or unstable angina and subsequently underwent coronary angiography. At presentation, each electrocardiogram (ECG) was independently interpreted by both an emergency medicine physician and a cardiologist and classified as STEMI-positive (STEMI+) or STEMI-negative (STEMI–). Following coronary angiography, patients were classified as having either OMI or NOMI and stratified into 4 groups: STEMI–/OMI; STEMI–/NOMI; STEMI+/OMI; and STEMI+/NOMI.

The study included 482 patients: 222 (46.1%) were classified as STEMI–/OMI; 61 (12.7%) as STEMI–/NOMI; 193 (40.0%) as STEMI+/OMI; and 6 (1.2%) as STEMI+/NOMI. Patients with NOMI were significantly younger than those with OMI. Patients in the STEMI+/OMI group underwent coronary intervention sooner than those in the STEMI–/OMI group. Among patients with STEMI+/OMI, 80.3% had complete occlusion of the culprit artery, and 19.7% had near occlusion. In the STEMI–/OMI group, 45.9% had complete occlusion, and 54.1% had near occlusion.

Editor's Comments: This retrospective study from a single tertiary care center may have limited generalizability to other practice settings. In addition, classification of OMI and NOMI relied on angiographic findings and troponin concentrations, which may introduce interobserver variability. Nevertheless, the findings support the emerging OMI–NOMI framework, which emphasizes identification of coronary artery occlusion rather than relying solely on electrocardiographic criteria. Urgent care clinicians should be aware of this evolving concept when evaluating patients with suspected ACS, given that most centers only utilize electrocardiograms. ■

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Mandated Paid Sick Leave, FMLA, and the Complex Landscape of Absence Management

Urgent Message: To protect clinic continuity and avoid financial liabilities, urgent care operators must master the complex, overlapping patchwork of federal and state employee-leave laws to navigate paid-time-off traps, callouts, and defensible terminations.

Alan A. Ayers, MBA, MAcc

Citation: Ayers AA. Mandated Paid Sick Leave, FMLA, and the Complex Landscape of Absence Management. *J Urgent Care Med.* 2026;20(11):41-45

Keywords: Family and Medical Leave Act; paid sick leave; paid time off; employee absence management; Americans with Disabilities Act; attendance policy

The regulatory environment governing employee absence in the United States is a complex, overlapping patchwork of federal, state, and municipal laws. For urgent care operators—who must maintain precise staffing ratios—understanding the distinction between a vested vacation benefit and an unvested sick leave benefit, as well as the evidentiary requirements for medical absences, is a critical component of clinic management. They must also understand the parameters for terminating an employee for excessive absenteeism.

This article outlines the legal framework of the federal Family and Medical Leave Act (FMLA) versus state-mandated paid sick leave, the burden of proof required for illness, the implications of leave fraud, and how these laws uniquely impact the urgent care sector (Table 1).

The Federal Baseline: FMLA

Enacted in 1993, the FMLA serves as the foundational federal protection for employees requiring extended absences.¹ The defining characteristic of the FMLA is



that it provides job-protected, but strictly unpaid, leave. Eligible employees are entitled to up to 12 workweeks of unpaid leave within a 12-month period. During this time, their group health insurance must be maintained, and they must be reinstated to the same or an equivalent position upon return.

Federal Eligibility Thresholds

The FMLA is not universally applicable. To qualify, all of the following conditions must be met:

- **Employer Size:** The clinic must employ 50 or more employees within a 75-mile radius.

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- **Employee Tenure:** The employee must have worked for the employer for at least 12 months (not necessarily consecutive).
- **Hours Worked:** The employee must have accumulated at least 1,250 actual hours of service in the 12 months immediately preceding the leave (excluding paid time off [PTO], holidays, or previous leave).

Defining a ‘Serious Health Condition’

The FMLA does not cover minor illnesses like the common cold or a brief bout of the flu. It is reserved for “serious health conditions,” defined as an illness, injury, or impairment involving:

- Inpatient care in a hospital or medical facility.
- Continuing treatment by a healthcare provider (typically requiring incapacitation for more than 3 consecutive days plus subsequent treatment).
- Chronic conditions causing episodic incapacitation (eg, severe asthma, epilepsy) or pregnancy.

Intermittent Leave

Employees are not required to take their 12 weeks in a single block. The FMLA permits “intermittent leave” (eg, taking an hour off for physical therapy or working a reduced schedule) when medically necessary. While FMLA is unpaid, employers may require—or employees may elect—to substitute accrued PTO to run concurrently with the FMLA absence.

The Rise of State and Local Mandated Paid Sick Leave

In the absence of a federal paid sick leave mandate, individual states and municipalities have aggressively filled the void. Unlike the FMLA, which requires a 50-employee threshold and covers severe conditions, state-mandated paid sick leave laws are designed to be broadly accessible to protect public health and prevent “presenteeism” (sick employees coming to work).

As of 2026, 21 states plus the District of Columbia—along with several large municipalities—have enacted mandatory paid sick leave laws.

Broader Acceptable Uses

State and local leave laws frequently apply to employers of all sizes and rely on an accrual system (commonly 1 hour of paid sick time earned for every 30 hours worked). Acceptable uses extend far beyond the FMLA’s strict parameters:

- **Minor Illnesses:** Covers common colds, routine dental appointments, and preventative care.
- **Expanded Family Care:** While FMLA limits care-

giving to a spouse, child, or parent, state laws often include grandparents, siblings, domestic partners, and sometimes “chosen family” (any individual whose close association is the equivalent of a family relationship).

- **Safe Time:** Many states legally classify this as “sick and safe time,” allowing compensated leave for crises related to domestic violence, stalking, or sexual assault, including time for court appearances or relocation.

Legal Classifications: Sick Leave vs Vacation Time

From a compliance and financial perspective, sick leave and vacation time are fundamentally distinct. How an urgent care center classifies this time creates a financial liability at the time of an employee’s termination.

Vested vs Unvested Benefits

- **Vacation Time (Vested):** No state legally mandates paid vacation. However, once offered, state labor laws generally classify vacation time as a “vested” benefit—effectively deferred compensation or earned wages. In heavily regulated states (eg, California, Colorado, Illinois), “use-it-or-lose-it” vacation policies are illegal, and employers must pay out all accrued, unused vacation time in the employee’s final paycheck.
- **Sick Leave (Unvested):** Statutory paid sick leave is almost universally considered “unvested.” Because it is contingent upon a specific event (illness), it is not an earned wage. Employers are generally not required to pay out unused sick leave balances when an employee leaves the company.

The Danger of Combined PTO Policies

To simplify administration, many clinics combine vacation and sick days into a single PTO bank. This creates massive structural risk. In regulated states, bundling these benefits subjects the entire bank to the most stringent rules of both categories. The employer must allow the entire bank to be used for statutory sick reasons (often without doctor’s notes), *and* the state will classify the *entire* bank as vested earned wages. By failing to separate “Vacation” and “Sick Leave,” a clinic can unintentionally convert thousands of dollars of unvested sick leave per employee into vested, payable wages upon termination.

Burden of Proof: Doctor’s Notes and Medical Certifications

When operational continuity is threatened by sudden callouts, clinic managers naturally want proof of illness. However, the legal right to demand documentation varies drastically.



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Table 1. State Rules For Mandatory Paid Sick Leave

State / Jurisdiction	Covered Employers and Eligibility Threshold	Accrual Rate Mechanics	Maximum Annual Usage and Caps
Alaska	All private employers. (Effective July 2025)	1 hour for every 30 hours worked	56 hours per year for employers with 15+ employees; 40 hours for employers with <15 employees
Arizona	All private employers	1 hour for every 30 hours worked	40 hours per year for employers with 15+ employees; 24 hours for employers with <15 employees
California	All employers with 1 or more employees	1 hour for every 30 hours worked	40 hours or 5 days per year, whichever is greater. Accrual can be capped at 80 hours
Colorado	All private employers	1 hour for every 30 hours worked	48 hours per year. Up to 48 hours can be carried over annually
Connecticut	Employers with 11+ employees (expanding to all employers in 2027)	1 hour for every 30 hours worked	40 hours per year
Washington, D.C.	All private employers	Varies dynamically based on the total number of employees in the enterprise	7 days (100+ employees); 5 days (25-99 employees); 3 days (<25 employees)
Maryland	Employers with 15+ employees (paid); <15 employees (unpaid)	1 hour for every 30 hours worked	64 hours per year maximum accrual limit; usage capped at 64 hours
Massachusetts	Employers with 11+ employees (paid); <11 employees (unpaid)	1 hour for every 30 hours worked	40 hours per year
Michigan	All private employers	1 hour for every 30 hours worked	72 hours per year for employers with 11+ employees; 40 hours for employers with 1-10 employees
Minnesota	All private employers	1 hour for every 30 hours worked	48 hours per year
Nebraska	Employers with 11+ employees (Effective October 2025)	1 hour for every 30 hours worked	56 hours per year for employers with 20+ employees; 40 hours for employers with 11-19 employees
New Jersey	All private employers	1 hour for every 30 hours worked	40 hours per year
New Mexico	All private employers with 1+ employees	1 hour for every 30 hours worked	64 hours per 12-month period
New York State	Employers with 5+ employees (or <5 with >\$1 million net income)	1 hour for every 30 hours worked	56 hours (100+ employees); 40 hours (5-99 employees or <5 with high revenue)
Oregon	Employers with 10+ employees (paid); <10 employees (unpaid)	1 hour for every 30 hours worked	40 hours per year
Rhode Island	Employers with 18+ employees (paid); <18 employees (unpaid)	1 hour for every 35 hours worked	40 hours per year
Vermont	All private employers	1 hour for every 52 hours worked	40 hours per year
Washington State	All private employers	1 hour for every 40 hours worked	No maximum usage cap. Carryover to the next year is capped at 40 hours

The table provides a synthesized breakdown of the mandatory paid sick leave landscape for private employers in the United States as of 2026, detailing the specific employer thresholds, accrual mechanics, and annual usage caps established by state legislatures.

- **FMLA Proof:** The FMLA grants employers sweeping authority to demand rigorous medical proof. Employers can require a “medical certification” from a treating physician detailing the condition, expected duration, and explicit confirmation that the employee cannot perform essential job functions.
- **State Sick Leave Proof Restrictions:** State laws intentionally restrict bureaucratic barriers to minor sick leave. In progressive jurisdictions (eg, California, Washington, New York), *employers are legally prohibited from requiring a doctor’s note unless the employee has been absent for more than 3 consecutive*

workdays. Demanding a note for a single day off constitutes illegal interference and exposes the clinic to retaliation claims.

Leave Fraud

Because state laws restrict doctor's notes, employees may be tempted to exploit sick leave for unauthorized vacations. Utilizing statutory sick leave or FMLA for leisure travel is leave fraud.

If an employer uncovers credible, documented evidence of unauthorized use of sick leave—such as social media posts showing an employee at a resort while purportedly incapacitated or travel records contradicting a medical restriction—the employer is legally entitled to terminate the employee. Case law heavily supports employers who fire employees for demonstrably fraudulent leave, provided the investigation is objective.

Do not “unofficially” let employees dip into their sick leave bank to fund vacations just because they are out of PTO. Doing so can legally alter the nature of the benefit, converting unvested sick leave into a vested vacation benefit that must be paid out upon termination.

Operational Crises in Urgent Care

The interaction between mandated sick leave and the realities of urgent care creates severe friction. Clinics operate on optimized staffing models; a single absent radiologic technologist or medical assistant, for example, can drastically increase wait times or force a temporary closure.

- **The “Replacement Worker” Prohibition:** Historically, a manager might require an absent worker to find their own shift replacement. Modern state sick leave laws explicitly forbid this practice. The burden of maintaining operational continuity now falls entirely on clinic management.
- **No Healthcare Exemptions:** Unlike temporary COVID-19 emergency laws, standard state-mandated paid sick leave laws do not contain broad carve-outs for healthcare workers. A triage nurse has the exact same statutory right to take short-notice sick leave as a retail cashier. Punishing a healthcare worker for utilizing protected leave is unlawful retaliation.

To survive, urgent care centers must build structural redundancies, such as larger PRN (*pro re nata*, meaning “as the need arises”) worker pools, heavy cross-training, and automated shift-bidding software, rather than relying on punitive attendance policies.

A common misconception is that possessing a doctor's note or utilizing sick time guarantees absolute immunity from termination. While you cannot fire an employee *because* they used a protected benefit, they

can be terminated for excessive absenteeism if they can no longer perform the essential functions of their job.

- **No-Fault Point Systems:** Many clinics use point systems to track absences. This is legal, but protected absences (eg, FMLA, Americans with Disabilities Act [ADA], state sick leave) cannot legally generate points. Firing someone based on a tally that includes protected leave is a direct violation of anti-retaliation statutes.
- **Exhausting Leave and the ADA:** Once an employee depletes their 12 weeks of FMLA and their state sick leave, subsequent absences are generally unprotected. However, if the chronic absences stem from a severe condition qualifying as a disability under ADA, the clinic must engage in an “interactive process” to explore reasonable accommodations (eg, a temporary schedule modification).
- **Undue Hardship:** The ADA does not require clinics to tolerate infinite absenteeism. Physical attendance is an essential function of direct-care medical settings. If chronic absences place an “undue hardship” on the clinic's ability to safely treat patients, termination is legally justified.

The Mechanics of Defensible Termination

To execute a lawful termination for absenteeism, a clinic must meticulously document the process:

1. Maintain a clear, uniformly enforced attendance policy.
2. Accurately track absence dates and reasons.
3. Definitively confirm that the final, triggering absences were not protected by FMLA, ADA, or state law.
4. Show clear evidence of progressive discipline (verbal and written warnings) prior to termination.

Conclusion

Managing employee leave requires balancing clinic viability with an expanding matrix of worker protections. The divergence between federal rules (which permit rigorous medical scrutiny) and state laws (which heavily protect short-term, unverified absences) forces urgent care operators to maintain complex compliance protocols. By strictly separating vacation time from sick leave, investigating documented leave fraud, tracking the exhaustion of protected time, and maintaining clear attendance policies, urgent care operators can protect their business from liability while retaining the authority to manage their workforce effectively. ■

Reference

1. U.S. Department of Labor. Family and Medical Leave Act. Accessed July 21, 2026. <https://www.dol.gov/agencies/whd/fmla>

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CLINICAL IMAGE CHALLENGE

X-RAY

Editor's Note: While the images presented here are authentic, the patient cases are hypothetical.

79-Year-Old Female With Acute Back Pain



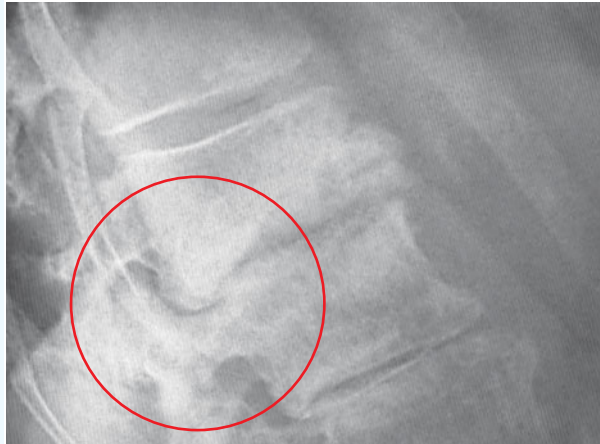
Figure 1: Initial X-ray

A 79-year-old female presents to urgent care complaining of sharp, severe lower back pain for the past 2 months. The pain began when she was bending over to pick something up from the floor and has not improved. The pain occasionally radiates to her flank area but not down her legs, and she denies any bowel or bladder pattern changes. She tried acetaminophen, cold and warm compresses, and rest without any relief. The pain worsens when she sits for long periods of time with slight improvement with rest. Her main

complaint is persistent difficulty with bending, lifting, reaching, walking downstairs, and cooking. Physical examination reveals normal vital signs and bony tenderness to her lumbar spine spinous processes, most notably to L1 – L2. Neurologic exam shows normal sensation and 4/5 strength to all extremities.

View the x-ray images taken and consider what your diagnosis and next steps would be. Resolution of the case is described on the following page.

Acknowledgment: Images and case provided by Experity Teleradiology (www.experityhealth.com/teleradiology).



Differential Diagnosis

- Acute discogenic pain
- Vertebral compression fracture
- Soft tissue back injury
- Cauda equina syndrome
- Spondylolisthesis exacerbation

Diagnosis

The radiographic findings include an anterior wedge compression deformity of L1 with loss of anterior vertebral body height, consistent with a vertebral compression fracture. It also shows diffuse osteopenia and intense sclerosis with irregularity of the inferior endplate of L1, which raises concern for pathologic fracture. Multilevel degenerative changes are also visible including disc space narrowing, anterior osteophyte formation, and possible grade I degenerative spondylolisthesis at L4-L5.

Osteoporotic fractures are those occurring from a low-impact injury, such as a fall from a standing height or less. Vertebral compression fractures are the most common type of osteoporotic fracture and most often occur at the mid-thoracic (T7-T8) spine and the thoracolumbar junction (T12-L1). These types of fractures can cause significant back pain, limit physical functioning and activities of daily living, and lead to loss of independence, depression, and chronic pain. A history of an osteoporotic fracture is the most important risk factor for subsequent fractures; approximately 19% of patients who have a vertebral compression fracture will have another fracture in the next year.

What to Look For

- Neurologic abnormalities (such as dermatomal sensory deficits, focal weakness, or clonus) may indicate the presence of bone fragments in the spinal canal or foramina, which may require urgent surgical intervention.
- Ask about changes in height. Each vertebral compression fracture causes approximately ≥ 1 cm loss in height;

kyphosis may be an indicator of multiple past vertebral compression fractures.

- In any patient presenting with fever or other signs of infection, a complete blood count and blood cultures should be obtained immediately.

Pearls For Urgent Care Management

- In patients with severe pain and/or suspected fracture-related complications, prompt referral to the emergency department for magnetic resonance imaging is indicated.
- Initial management of osteoporotic vertebral compression fractures should include pain control and activity modification. Patients with mild to moderate pain can be treated initially with nonopioid oral analgesics, considering risks of nonsteroidal anti-inflammatory drug use in older patients.
- Intranasal calcitonin has been shown to hasten the relief of pain from osteoporotic vertebral fracture when initiated early.
- Patients with a tolerable pain level should be encouraged to resume physical activity as quickly as possible. Complete bed rest is not recommended and can lead to further bone loss and deconditioning. Physical therapy and aquatic therapy are recommended for strengthening and pain management.
- Patient Education: fractures may take up to 3 months to heal, and pain and activity intolerance should diminish gradually.
- Bracing and muscle relaxants are not recommended.
- Encourage follow-up with primary care provider for long-term evaluation and management of osteoporosis.
- Consider referral to orthopedic and/or spine specialist, as patients who continue to have refractory pain may sometimes be candidates for surgical interventions for vertebral fractures. ■



CLINICAL IMAGE CHALLENGE

DERMATOLOGY

8-Year-Old Male with Facial Rash



An 8-year-old male is brought to urgent care by his mother reporting a widespread, itchy facial rash. The patient says that the rash is severely painful and pruritic, and that he feels tingling and pain in his lips. The facial rash presented 3 days prior, and the mother states that her son repeatedly scratches the lesions. The patient and his family are from Honduras; they deny any recent travel. The patient is otherwise well and

denies any systemic symptoms. No treatments were tried for symptoms at home. Physical exam reveals normal vitals, and widespread scaly, eroded, and crusted plaques are visible on the child's face and upper lip.

View the image taken and consider what your diagnosis and next steps would be. Resolution of the case is described on the following page.

Acknowledgment: Image and case presented by VisualDx (www.VisualDx.com/jucm).

**Differential Diagnosis**

- Arthropod bites
- Excoriated eczema
- Actinic prurigo
- Polymorphous light eruption
- Prurigo nodularis
- Seborrheic dermatitis
- Solar urticaria

Diagnosis

The correct diagnosis is actinic prurigo (AP), also called Hutchinson's summer prurigo, which is a rare, photo-induced skin eruption triggered by exposure to ultraviolet (UV) radiation. AP is a delayed-type hypersensitivity reaction, although its precise pathogenesis remains unclear. Both UVA and UVB radiation have been implicated in triggering symptoms. AP is most frequently seen in indigenous populations of North, Central, and South America and usually first presents during childhood. It is more common in females, although studies from Asia report a male predominance in adult-onset disease.

The diagnosis of AP is often based on history and clinical findings. Up to 50% of patients report a family history of similar eruptions. Additional evaluation may include biopsy, phototesting and laboratory testing including serum immunoglobulin E (IgE), which is nearly always elevated in moderate to severe cases.

What To Look For

- The hallmark symptoms of AP are symmetrically distributed excoriated, pruriginous papules and nodules in photo-exposed areas (especially the face) which are intensely pruritic. Hemorrhagic crusts, eczematous patches, lichenification and/or scarring may also be present.
- Many patients also experience perioral tingling and pain, conjunctivitis, photophobia, and increased lacrimation.
- The onset of AP typically occurs in the spring, when more time is spent outdoors and more skin is exposed; the lesions can persist through the summer.
- AP may have a protracted course that extends into the winter months. Patients with childhood onset may spontaneously improve in adolescence, but the condition can persist into adulthood, with a major impact on the patient's quality of life.

Pearls for Urgent Care Management

- Sun-avoidance and sun-protective practices, including broad-spectrum sunscreens and protective clothing, are the mainstay of the management of AP.
- Mild to moderate disease: Topical corticosteroids and topical calcineurin inhibitors can offer symptomatic relief in mild cases.
- Severe disease: Patients with severe AP require treatment with systemic immunomodulators, immunosuppressants or phototherapy, and should be referred to primary care or dermatology specialists. ■



CLINICAL IMAGE CHALLENGE

POCUS

64-Year-Old With Acute Posterior Ankle Pain

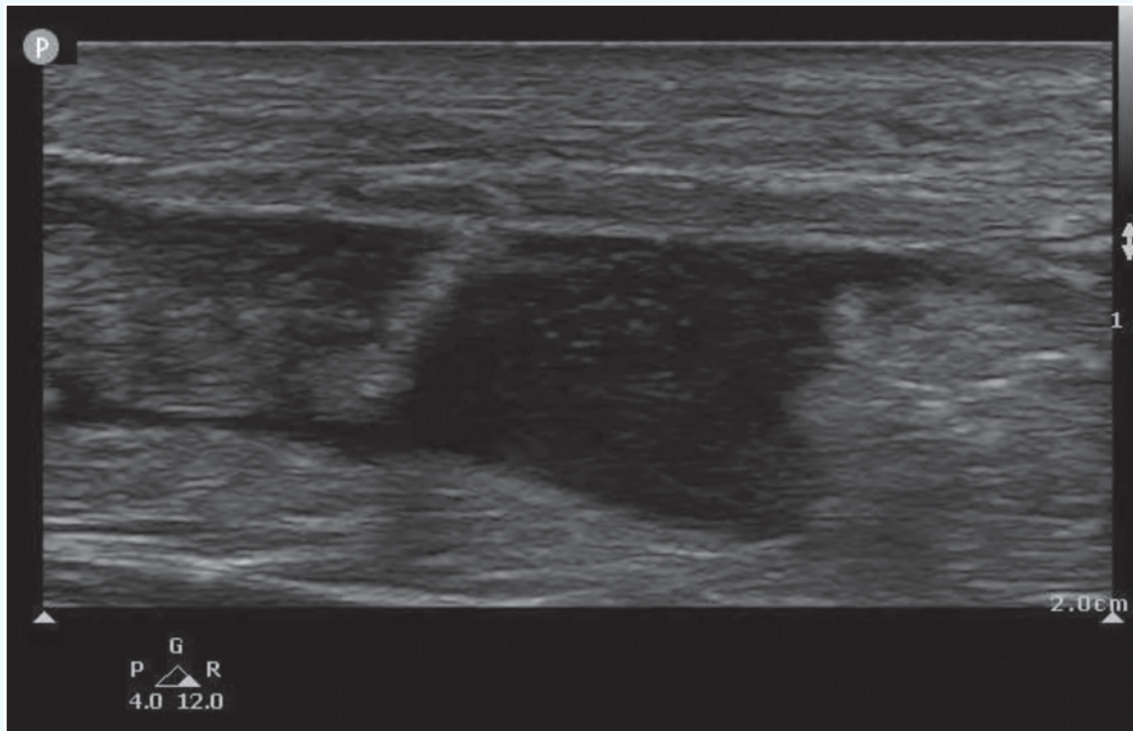


Image 1

A 64-year-old woman with a history of chronic obstructive pulmonary disease, diabetes mellitus, osteoarthritis, and obesity presents to urgent care with acute right posterior ankle pain after stumbling on a curb earlier that day. She says she felt a sudden sharp pain in the back of her ankle and experienced immediate difficulty walking and climbing stairs. She reports 10 days of mild posterior ankle discomfort before this event, which she treated with ice, an elastic wrap, and intermittent crutch use. Approximately 2 weeks prior to presentation, she was treated with levofloxacin for a urinary tract infection.

On examination, there is ecchymosis along the posterior right ankle extending toward the lateral foot. She has tenderness over the distal calf, with only mild tenderness over the foot and bilateral malleoli. She is unable to actively plantarflex her foot or perform a single-leg heel raise. The Thompson test is inconclusive. Point-of-care ultrasound (POCUS) of the posterior right ankle is performed.

View the image above and consider the likely diagnosis and next steps. The resolution of the case is described on the following page.

Acknowledgment: Case presented by Tatiana Havryliuk, MD, an emergency physician based in New York, New York, and the founder of Hello Sono. Case and images provided courtesy of Hello Sono (www.hellosono.com).

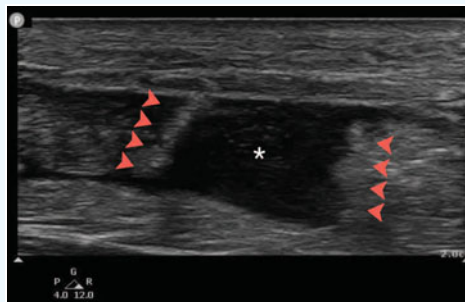


Image 2

Differential Diagnosis

- Ankle sprain
- Calf muscle injury
- Complete Achilles tendon rupture
- Partial Achilles tendon tear
- Achilles tendinopathy
- Deep vein thrombosis
- Calcaneal avulsion fracture
- Retrocalcaneal bursitis

Diagnosis

The correct diagnosis in this case is complete Achilles tendon rupture. This classically occurs after a sudden forceful push-off, often during sports, with acute posterior ankle or calf pain and an audible or palpable “pop.” However, presentations may be subtle, particularly when patients have preceding tendinopathy or subacute tendon pain before complete rupture. Misdiagnosis of an ankle sprain or calf strain may occur when pain partially improves or patients retain some plantarflexion through accessory muscles.

Discussion

This case highlights an important urgent care clinical pearl: Achilles tendon rupture should remain on the differential for posterior ankle pain or ecchymosis, loss of plantarflexion, or inability to perform a single-leg heel raise, even when the Thompson test is equivocal. Recent fluoroquinolone exposure further increases clinical suspicion. Other reported risk factors include steroid use, oral bisphosphonate use, male sex, obesity, diabetes mellitus, chronic kidney disease, hyperparathyroidism, and intermittent athletic activity in deconditioned individuals.¹

POCUS can rapidly confirm the diagnosis at the bedside. A high-frequency linear transducer should be used to evaluate the Achilles tendon in long- and short-axis views, scanning from the myotendinous junction to the calcaneal insertion. A normal tendon appears as a continuous fibrillar band, whereas a complete rupture demonstrates loss of fibrillar continuity, tendon retraction (arrowheads in image above), and a fluid-filled gap (asterisk). For complete Achilles tendon rupture, ultrasound has a reported sensi-

tivity of 94.8% and specificity of 98.7%.²

Partial tears are more challenging and may require comparison with the contralateral side or advanced imaging.³ Dynamic assessment with a real-time Achilles ultrasound Thompson test may also support the diagnosis when differentiating partial from complete rupture.⁴ The retrocalcaneal bursa should not be mistaken for a tendon rupture, as it may contain fluid in cases of bursitis.

Once a complete rupture is identified, or when clinical suspicion remains high despite an equivocal study, the patient should be splinted in plantarflexion, kept non-weight-bearing, and referred urgently for orthopedic evaluation.

What To Look For

- In complete tears, the tendon defect is usually readily apparent, with discontinuity of the Achilles tendon fibers and retraction of the tendon ends.
- Look for anechoic or hypoechoic fluid within the defect, consistent with hemorrhage.

Pearls For Urgent Care Management

- POCUS is easy to perform and highly sensitive for complete Achilles tendon ruptures, helping to quickly make the diagnosis.
- Scan the entire tendon in both the long- and short-axis views.
- Partial tears are more subtle. Compare with the contralateral tendon and use dynamic maneuvers to improve diagnostic accuracy.
- Patients with current or recent fluoroquinolone, steroids or oral bisphosphonate use are at increased risk for Achilles tendon rupture.

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CLINICAL IMAGE CHALLENGE

ECG

83-Year-Old Female With Palpitations

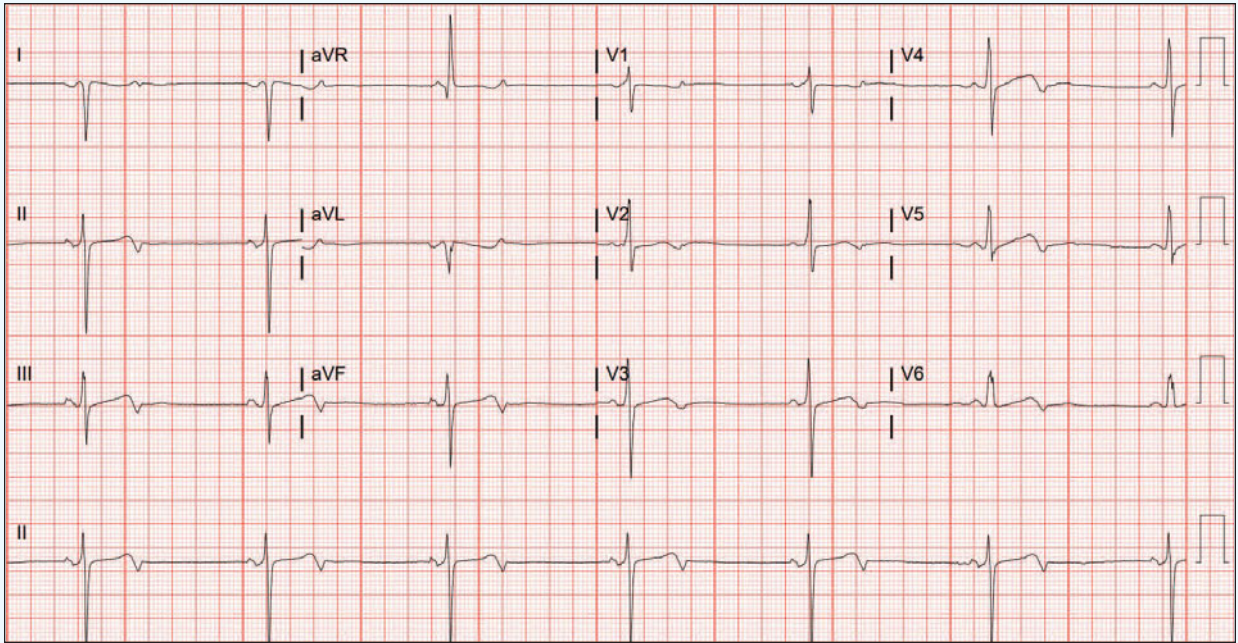


Figure 1: Initial ECG

An 83-year-old female with a past medical history of hypertension, diabetes mellitus, and hyperlipidemia presents to urgent care with palpitations and dizziness for the past 2 weeks. She does not have any family members present. An ECG is obtained.

View the ECG and consider what your diagnosis and next steps would be. Resolution of the case is described on the next page.

Case presented by Catherine Reynolds, MD, McGovern Medical School at UTHealth Houston.
Case courtesy of ECG Stampede (www.ecgstampede.com).

ECG  STAMPEDE

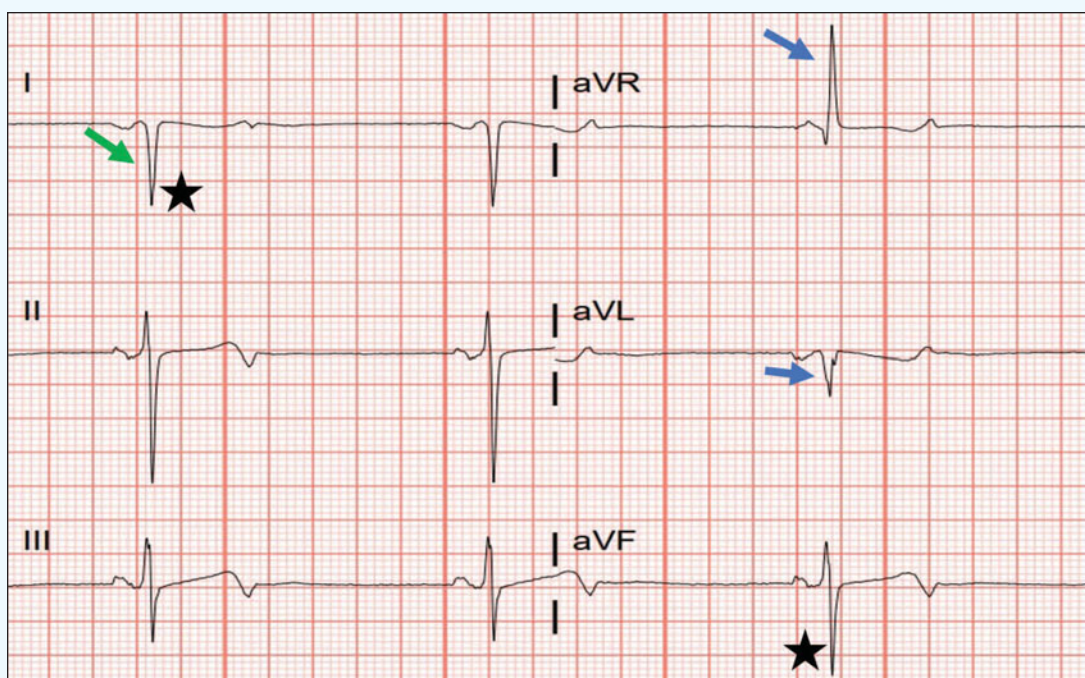


Figure 2: Inversion of lead I (green arrow), swapping of leads aVL and aVR (blue arrows), and marked right axis deviation with negative QRS complexes in lead I and aVF (stars).

Differential Diagnosis

- Acute coronary syndrome
- Left posterior fascicular block
- Dextrocardia
- Limb lead reversal
- Marked (extreme) right axis deviation

Discussion

The diagnosis in this case is limb lead reversal. The ECG shows a regular rhythm with visible P waves before each QRS complex, consistent with sinus rhythm. There are deep S waves and negatively deflected P waves in Lead I as well as a globally positive QRS complex in aVR. These findings should raise suspicion for a limb lead reversal, specifically right arm-left arm (RA–LA) reversal, which is the most common type of electrode misplacement.¹

The ECG changes seen with RA–LA reversal can be understood as a 180° horizontal rotation of Einthoven's triangle around the aVF axis.² This results in inversion of lead I, swapping of aVR and aVL, an apparent marked right axis deviation, and swapping of leads II and III (Figure 2).^{3,4} In addition, in limb lead reversal, the precordial leads typically retain normal morphology and R-wave progression, as chest lead placement remains unaffected. Electrode misplacement can lead to significant ECG misinterpretation and may result in unnecessary cardiac workup in patients without true pathology.⁵

A clinician may mistake this ECG for acute coronary syndrome given the T-wave inversions in leads I and aVL and the biphasic appearing T-waves in inferior and precordial leads. However, acute coronary syndrome would not cause global inversion of lead I along with a positive aVR. This pattern should alert the clinician to repeat the ECG and confirm proper lead placement prior to making an interpretation. Additionally, there are no acute ST elevations or ST depressions in contiguous leads, ruling out ST-segment elevation myocardial infarction.

Left posterior fascicular block may be considered, as the QRS complexes in leads I and aVL are negatively deflected, leading to the appearance of a marked right axis deviation. However, left posterior fascicular block does not cause the P wave in lead I to be inverted. Additionally, isolated left posterior fascicular block is rare in the general population, making this diagnosis less likely.⁶

RA-LA limb lead reversal can be mistaken for dextrocardia, as both can present with an inverted lead I and a positive aVR. However, the key distinguishing feature is the R-wave progression in the precordial leads. In dextrocardia, there is reversed R-wave progression, with leads V3–V6 showing predominantly negative QRS complexes.⁷ In contrast, RA-LA limb lead reversal affects only the limb leads, so the precordial leads remain normal, as seen in this patient's ECG. This finding supports limb lead reversal as the correct diagnosis.

Marked (extreme) right axis deviation may be considered given the negative QRS complexes in lead I and aVF. However, limb lead reversals are known to mimic axis abnormalities and true marked right axis deviation does not cause global inversion of lead I or a positive aVR. Therefore, this ECG does not reflect true physiological axis deviation. Clinicians should consider repeating the ECG and confirm that all leads are placed in their proper position.

What To Look For

- The key ECG clues for RA-LA lead misplacement include positive P wave, QRS complex, and T wave in aVR, apparent marked right axis deviation, and global inversion of the P wave, QRS complex, and T wave in lead I.
- If limb lead reversal is suspected, repeat the ECG and confirm proper lead placement before making an interpretation.

Pearls For Initial Management, Considerations For Transfer

- Limb lead reversal can mimic myocardial infarction and other serious pathologies. Clinical judgement is essential, and providers should have a low threshold

to repeat the ECG when findings do not match the clinical picture.

- If concern for acute coronary syndrome persists after correcting lead placement, then escalating transfer to an emergency department is imperative. Recognizing limb lead reversal can help avoid unnecessary workup and inappropriate transfers.

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Coding Mistakes That Quietly Cost You Money

■ Brad Laymon, PA-C, CPC, CEMC

Every clinician I work with wants to do right by their patients and their charts. Yet across the urgent care systems I consult with, the same quiet leaks show up repeatedly. None of these are dramatic errors. They may never trigger an audit flag. They simply shave a level off the visit, encounter after encounter, until the lost revenue becomes real.

The most common leak I see is an abnormal vital sign that never gets considered for diagnosis. For example, a heart rate of 128 beats per minute gets recorded, noted, and ignored. The clinician absolutely thought about it. They just never wrote down what they thought. Unless that tachycardia is documented as a finding with a plan attached, the chart cannot reflect the clinical reasoning that actually happened, and the encounter defaults to a lower complexity than the care deserved.

Chronic illness exacerbation is another quiet loss. A patient with hypertension comes in for a cough, and their blood pressure happens to be 168/97 mm Hg. If that number never gets acknowledged as a condition that is not at goal, and there is no plan for managing it, the visit looks like a simple cough rather than the dual problem it actually was.

Documented Risk Decision

Prescription drug management may be the single easiest fix to consider. Clinicians manage medications constantly—starting them, adjusting them, continuing them, or deciding not to prescribe at all.¹ Almost none of that gets written down in a way that shows the risk-and-benefit thinking behind it. A sentence as short as, “continued current antihypertensive regimen, benefits outweigh risks given

stable readings,” turns a generic plan into a documented risk decision. And risk decisions are exactly what move a visit toward a higher level.

Tests considered but not ordered fall into the same trap.² A clinician weighs whether to order a chest x-ray, for example, decides the exam does not support it, and moves on. That thinking is real diagnostic work. Guidelines specifically credit a test that was considered and discussed, even if it was never ordered, as long as the discussion is documented. Skipping that sentence to document the thinking means skipping credit for work the clinician already did.

Then there is the independent historian, which is the most overlooked data point in pediatric and altered mental status visits. For pediatric visits, a parent gives the history because the child cannot. For an altered mental status visit, perhaps a spouse engages in the discussion to fill in details because the patient is confused. That conversation took real time and added real complexity to the visit, but if the note does not say where the history came from and why, none of that complexity counts.

None of these suggested fixes add much documentation time. They redirect a few seconds of typing/dictating toward capturing thinking that already happened. The chart should tell the same story the clinician was actually living through during the visit. When it does, coding accuracy follows naturally, and so does the reimbursement that reflects the real complexity of the care provided. Always aim for documentation excellence! ■

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Brad Laymon, PA-C, CPC, CEMC, is a Physician Associate with 27 years of continuous urgent care clinical experience and dual certification in medical coding—Certified Professional Coder (CPC) and Certified Evaluation and Management Coder (CEMC). He is also the founder of Coding Excellence, a national consulting and education practice serving healthcare organizations across multiple specialties, and Laymon Medical Expert Consulting.



Retail Clinics Shrink By 33%

■ Alan A. Ayers, MBA, MAcc

RETAIL CLINIC ROOFTOPS BY HOST

Rank	Retail Host	Clinics	% of Total	Hospital-Affiliated
1	CVS Health (MinuteClinic)	805	69.0%	0
2	Kroger Co. (The Little Clinic)	170	14.6%	0
3	Walgreen Co.	100	8.6%	100
4	Target Corp.	35	3.0%	35
5	Hy-Vee, Inc.	18	1.5%	13
6	Meijer, Inc.	8	0.7%	7
7	Walmart Inc.	5	0.4%	5
8	Fruth Pharmacy	4	0.3%	2
9	Publix Super Markets	3	0.3%	3
Unclassified				
	Regional grocery chains	4	0.3%	4
	Independent pharmacies	14	1.2%	2
	Total	1,166	100.0%	171

Data as of June 19, 2026. Sources: National UC Realty and retailer websites. Hospital-affiliated data includes clinics operated by or clinically linked to a hospital or health system. Percentages may not total 100% due to rounding.

Between May 2023 and June 2026, the number of health clinics hosted in retail settings in the United States fell from 1,750 to 1,166. This represents a 33% overall decline from the 2023 peak.¹

The contraction began when CVS, Walgreens, and Walmart announced closures and has continued with no offsetting growth. MinuteClinic's 805 rooftops (down from 875) and The Little Clinic's 170 rooftops (down from 220) represent notable declines over the period among the 2 largest self-operated chains.

Consolidation has intensified even as the field has contracted. The top 5 hosts now account for 96.7% of all in-store clinics, up from 95% just 18 months ago. CVS alone operates 69% of the national total, and CVS and Kroger together hold 83.6% of the retail clinic rooftops. By comparison, independent pharmacies and regional supermarket

chains represent just 1.5% of clinics.

CVS and Kroger have maintained a stronghold on the self-operated model, and for players outside the top 2, the format has transitioned into a health-system outpatient channel. All 35 Target Clinics—which operate exclusively in California—are run by Kaiser Permanente, and Walgreens' 100 sites are spread across 11 different health-system partners. Meanwhile, Walmart's 5 surviving clinics are each operated by a different system. Every Meijer, Publix, and Target retail clinic carries a health-system affiliation. In all, 171 of 1,166 rooftops (14.7%) are health-system-affiliated, spanning more than 30 distinct systems.

Much like the broader consumerization of healthcare, where success requires highly specialized, lean operations to maintain throughput, only the largest retail giants have the scale to operate independently.² For the rest of the market, the retail clinic is no longer a retail venture at all, but rather a leased physical touchpoint for traditional hospital systems. ■



Alan A. Ayers, MBA, MAcc is President of Urgent Care Consultants and Senior Editor of *The Journal of Urgent Care Medicine*.

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