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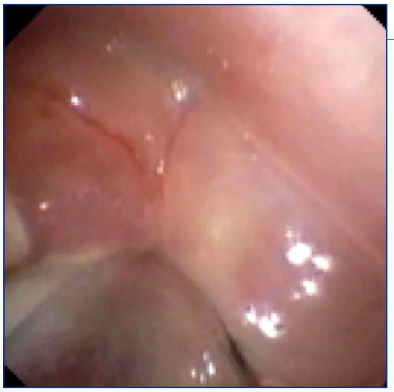

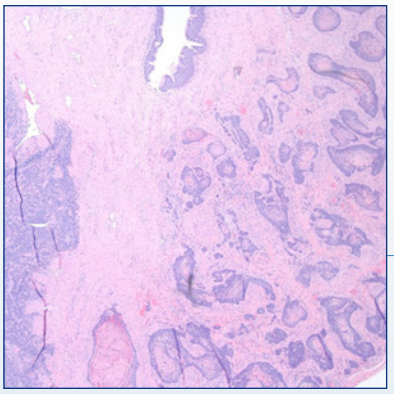

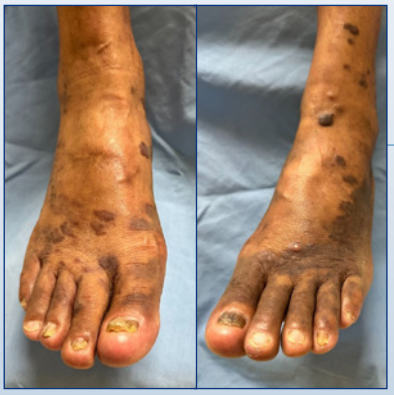

## CASE REPORTS



## IMAGES IN MEDICINE

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# A 77-Year-Old Woman with Dysphonia and Possible Antineutrophil Cytoplasmic Antibody (ANCA)-Associated Vasculitis Potentially Induced by Hydralazine

MERVE AKSOY, MD; HEINRICH-KARL GREENBLATT, MD; MAARIJ SIDDIQI, MD; NEHA BATRA, MD; KATARZYNA GILEK-SEIBERT, MD

## ABSTRACT

**BACKGROUND:** Hydralazine is the most common antihypertensive that causes drug-induced anti-neutrophil cytoplasmic antibody (ANCA)-associated vasculitis (AAV). Upper airway involvement including hoarseness is rare in AAV and mostly associated with drug-induced lupus erythematosus (DILE). This case describes a 77-year-old woman on hydralazine who developed bilateral upper extremity pain, periorbital swelling and hoarseness requiring emergent intubation.

**CASE REPORT:** Bloody secretions in bronchoscopy, joint pain and petechiae clinically suggested vasculitis. Anti-histone, myeloperoxidase (MPO) and anti-proteinase 3 (PR3) antibodies were positive and anti-nuclear antibodies (ANA) and imaging were negative. The patient was treated with high-dose steroids and hydralazine withdrawal. At one-year follow-up on azathioprine as a steroid-sparing agent, dysphonia had resolved.

**CONCLUSION:** Hoarseness is an atypical feature of hydralazine-induced AAV and may indicate life-threatening upper airway disease. Dual-ANCA and anti-histone positivity, negative ANA status, may potentiate further investigation for dysphonia and AAV while on hydralazine. Early recognition, withdrawal of medication and timely steroids are essential to prevent severe airway complications.

**KEYWORDS:** Antineutrophil Cytoplasmic Antibody (ANCA); vasculitis; hydralazine; hoarseness

## BACKGROUND

Antineutrophil cytoplasmic antibody (ANCA)-associated vasculitis (AAV) is a rare autoimmune disease characterized by small vessel inflammation leading to organ dysfunction. Although primarily idiopathic, it can be triggered by infections or medications such as hydralazine being the antihypertensive agent most strongly associated with AAV.[1] Although it has been available since the 1950s, the first reported case of hydralazine-induced AAV was in the 1980s.[2] The incidence of hydralazine-induced vasculitis is 5.4% at 100 mg/day and 10.4% at 200 mg/day over three years.[3] Symptoms typically appear within the first five years of use, ranging from six months to 13 years.[4] The risk increases with prolonged use and cumulative dosing, and is higher in slow acetylators, women, and individuals with thyroid disease.[5]

Hydralazine-induced AAV commonly presents with glomerulonephritis (81%), fever, arthralgia (24%), rash (25%), and pulmonary involvement (19%), often as diffuse alveolar hemorrhage.[6] Less frequently, the upper airway (9%), eyes, gastrointestinal tract, and peripheral nerves (3%) may be affected.[6] Laryngeal involvement can present with dyspnea, cough, wheezing, or stridor, typically caused by ulcers, edema, or stenosis.[7] Hoarseness is typically associated with drug-induced lupus erythematosus (DILE), rather than AAV.[8,9] This report describes a 77-year-old woman with ANCA-associated vasculitis and dysphonia while on hydralazine.

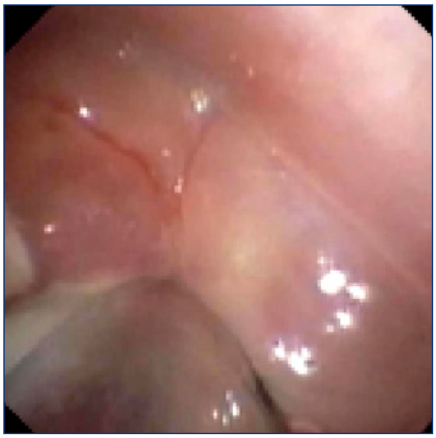
## CASE REPORT

A 77-year-old woman with hypertension, gout, chronic thrombocytopenia, left renal artery stenosis, and an atrophic left kidney presented with one month of joint pain, swelling, and myalgia. Initially, she was treated with prednisone (20–40 mg) for suspected polymyalgia rheumatica without improvement. Outpatient work-up revealed elevated myeloperoxidase (MPO) (6 AI, normal <1 AI) and anti-proteinase 3 (PR3) (3.5 AI, normal <1 AI), with negative anti-nuclear antibodies (ANA), erythrocyte sedimentation rate (ESR) and C-reactive protein (CRP). A recent computed tomography (CT) scan of the neck and chest showed no evidence of vasculitis. She was taking atenolol-chlorthalidone (100/25 mg), amlodipine-valsartan (5/320 mg), and hydralazine (100 mg twice daily), which had been initiated a year prior for resistant hypertension. She had no history of smoking, alcohol, or recreational drug use.

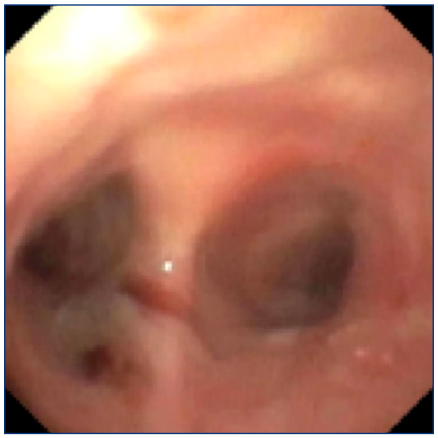
Five days later after the diagnostic work-up, she presented to the emergency room with worsening bilateral wrist and shoulder pain. Within 48 hours, she developed periorbital swelling (right>left), tongue ulcers, sore throat, progressive hoarseness and stridor with suspected laryngeal edema leading to emergency intubation. She was treated with methylprednisolone (60 mg three times daily) for suspected anaphylaxis or angioedema. The CT scan and bronchoscopy findings showed swelling of the aryepiglottic folds significantly

**Figure 1. Bronchoscopy findings**

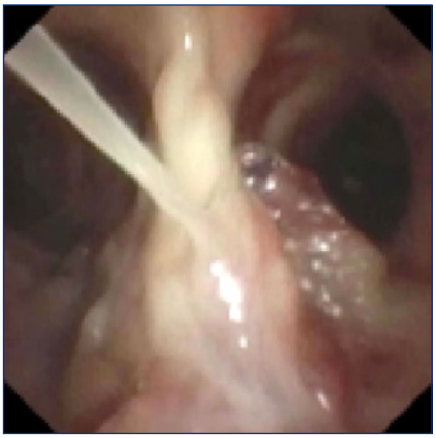
**[A]** Vestibule with bilateral swelling of Arytenoids



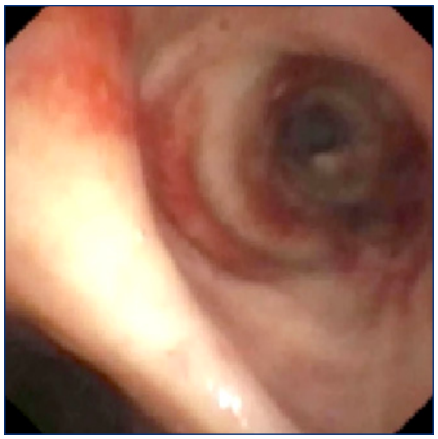
**[B]** Mucoid and white secretions in carina



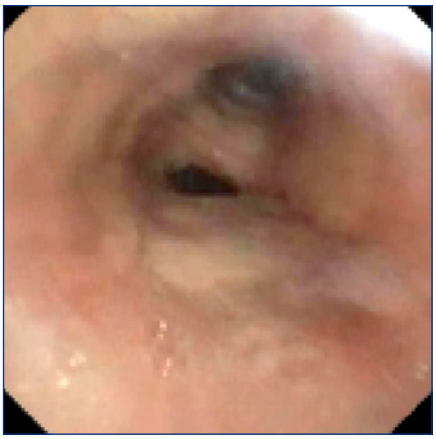
**[C]** Mucoid and white secretions in carina



**[D]** Carina after therapeutic suctioning



**[E]** Edematous left mainstem bronchus



narrowing the airway and bloody secretions, with no orbital mass. She developed a few non-blanching petechial lesions on her knees and hips, prompting hydralazine discontinuation for suspected drug-induced vasculitis. Endotracheal cultures grew Haemophilus influenzae necessitating piperacillin-tazobactam for possible tracheitis. Viral swabs for Herpes simplex virus were negative. Bradykinin-mediated angioedema was deemed unlikely given borderline complement component (C)1q levels of 4.2 mg/dl (normal 5–8.6), and normal C1 esterase inhibitor levels and function. Repeat bronchoscopy three days after intubation revealed reduced airway swelling, but residual blood clots [**Figures 1A–E**]. Further tests confirmed persistently high MPO (3.5 AI), PR3 (2 AI), anti-histone antibodies (1.8U, negative <1U), elevated CRP (>125 mg/L) and low C3 levels (8 mg/dl). ANA and anti-double stranded DNA (anti-dsDNA) were negative. Due to mucosal friability and bleeding risk, an upper airway biopsy was inadvisable, and a skin biopsy was not performed.

The primary diagnosis of hydralazine-induced AAV was considered likely. The patient was started on prednisone (1mg/kg/d) with a slow taper (5 mg every other week) and hydralazine was permanently discontinued. She was extubated within a week and discharged the following week. At three months, azathioprine (100 mg/day) was started for new lower extremity petechiae. At one year, her hoarseness, presumed secondary to laryngeal edema, had fully resolved, with no further vasculitis manifestations.

## DISCUSSION

In summary, this case broadens dysphonia as a potential presentation of hydralazine-induced AAV. The diagnosis was challenging, given the absence of classic systemic findings, such as glomerulonephritis or diffuse pulmonary hemorrhage. Dual ANCA and anti-histone positivity with a negative ANA may raise suspicion for life-threatening airway inflammation in hydralazine-induced AAV, particularly when presenting with hoarseness.

Hydralazine or drug-induced vasculitis primarily affects mucocutaneous tissues, joints, kidneys, and lungs. Skin manifestations include palpable purpura, non-blanching maculopapular eruptions, and hemorrhagic blisters/ulcers affecting the nasal septum, lips, and uvula causing otalgia, odynophagia, and sore throat.[4,10,11] Ocular symptoms include conjunctival injection, episcleritis, and retinal vasculitis. Joint involvement typically presents as arthralgia or arthritis, while peripheral neuropathy may manifest as distal numbness or tingling. Pulmonary involvement often leads to cough, dyspnea and focal or diffuse alveolar hemorrhage, requiring bronchoscopy.[12] Renal manifestations include

necrotizing crescentic or rapidly progressive glomerulonephritis, with extrarenal involvement being rare.[6]

Patients with hydralazine-induced vasculitis often exhibit a mixed serologic profile, displaying characteristics of DILE and AAV.[6] Patients test positive for ANA, ANCA (including MPO, PR3, or dual positivity), dsDNA, and anti-histone antibodies, with low C3 and C4 levels.[6] MPO is the most common (60–100%),[2] with titers up to 12 times higher than the controls.[13] Dual ANCA positivity is 40%, while isolated PR3 positivity is rare (3%). Anti-histone antibodies are present in nearly 100%, with ANA positivity in 90–100% (91% homogenous pattern), while anti-dsDNA is detected in 26%.[2,6,14]

The main step of treatment is immediate discontinuation of the offending medication.[15] Manifestations typically resolve within one to four weeks, though persistence for up to eight months has been reported.[4] Severe cases particularly those with renal involvement, require immunosuppressive therapy in approximately 74% of cases, including high doses of glucocorticoids, rituximab, cyclophosphamide, or mycophenolate. Plasmapheresis or hemodialysis may be necessary in refractory cases.[2]

The only published cases of hydralazine-induced AAV with laryngeal involvement are by Levin[7] and Hawn,[16] neither of which reported hoarseness. Levin described a case with mucocutaneous ulcers, unilateral eyelid edema, dyspnea, and laryngeal edema requiring intubation, which resolved with steroids but was complicated by gastrointestinal bleeding.[7] Unlike our patient, ANA was positive (1:320, diffuse pattern), with MPO (60 U/mL), PR3 (33 U/mL) and anti-histone (4.8 U/mL) positivity while anti-dsDNA was negative. Skin and esophageal biopsies confirmed vasculitis. Hawn reported mucocutaneous blisters, bilateral chemosis and severe laryngeal edema.[16] The patient improved with intravenous steroids after discontinuing hydralazine but later died of gastrointestinal bleeding. The diagnosis was confirmed with a skin biopsy, with serologies positive for ANA (speckled pattern), ribosomal P antibody, cold agglutinin, rheumatoid factor, MPO, PR3, and anti-histone antibodies though titers were not reported. Unlike these cases, our patient survived with a full recovery, emphasizing the importance of early diagnosis and treatment.

Laryngeal manifestations are also more common in primary AAV than drug-induced AAV, mainly in childhood-onset disease. The reported incidence is 16–20% in GPA and 12% in EGPA. GPA typically presents with subglottic stenosis, and hoarseness with a life-threatening risk when airway narrowing reaches 80%.[17] EGPA may present with persistent dysphonia due to vocal cord paralysis from vagus nerve vasculitis or laryngeal polyps/masses, which may be recurrent.[18-20]

In primary AAV, upper airway involvement often accompanied with lower airway and renal disease, with the clinical phenotype influenced by the presence of MPO or PR3 antibodies.[21] Mixed serologic profiles, such as anti-histone, anti-dsDNA, ANA or dual-ANCA positivity are uncommon in primary AAV.[2] First-line therapy includes corticosteroids combined with rituximab or cyclophosphamide as steroid-sparing agent, according to availability, to prevent relapses. Recurrence is atypical for drug-induced AAV once the offending medication is eliminated.[21]

Another important differential diagnosis is DILE, which typically presents with systemic symptoms resembling primary systemic lupus erythematosus such as fever, arthralgia/arthritis, myalgia, rash and serositis.[22] However, these manifestations are usually milder and rarely progress to major life-threatening organ involvement. Serologically, hydralazine-induced lupus is characterized by near-universal positivity for ANA and anti-histone antibodies, while complement levels typically remain within the normal range. ANCA positivity is rare and, when present, is more suggestive of hydralazine-induced vasculitis with renal involvement. Management primarily involves discontinuation of the offending medication, with additional therapies such as NSAIDs, corticosteroids, hydroxychloroquine, or other disease-modifying antirheumatic drugs (DMARDs) as needed, similar to the treatment approach in primary lupus.[22]

The main limitation of our case report is the lack of histopathologic confirmation. As discussed previously, resource constraints and patient-specific factors precluded a tissue biopsy. Without it, the final diagnosis of hydralazine-induced AAV cannot be absolute. However, as we have shown, the patient's atypical constellation of symptoms, relevant medication exposure, mixed serologic findings with dual ANCA positivity, favorable response to withdrawal of the offending medication and treatment with DMARDs not typically used as first-line agents for primary AAV or DILE, as well as the lack of recurrence following cessation, collectively provide strong support for the highly suggestive diagnosis of hydralazine-induced AAV.

## CONCLUSION

Hydralazine-induced vasculitis typically presents with a purpuric rash, arthralgia, and pulmonary or kidney involvement, often resolving with medication discontinuation. Severe cases with glomerulonephritis or pulmonary hemorrhage, may require immunosuppression. Laryngeal involvement, particularly hoarseness is rare, but can be life threatening due to airway stenosis. Early recognition is crucial to prevent delayed treatment and complications. Dual-ANCA and anti-histone antibodies may warrant further investigation. This case of dysphonia with uncommon serological findings is a unique presentation of hydralazine-induced AAV, successfully recognized and treated.

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Our institution does not require ethical approval for reporting individual cases.


## Disclosures

None for all authors

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# Utility of Plasma Exchange in a Patient with Waldenström Macroglobulinemia and Recurrent Angioedema Secondary to C1 Esterase Inhibitor

YIGIT BAYKARA, MD; MOHAMED ABDELMONEM, PhD, MBA; MUHARREM YUNCE, MD

**KEYWORDS:** Angioedema; Waldenström Macroglobulinemia; Plasma Exchange

## INTRODUCTION

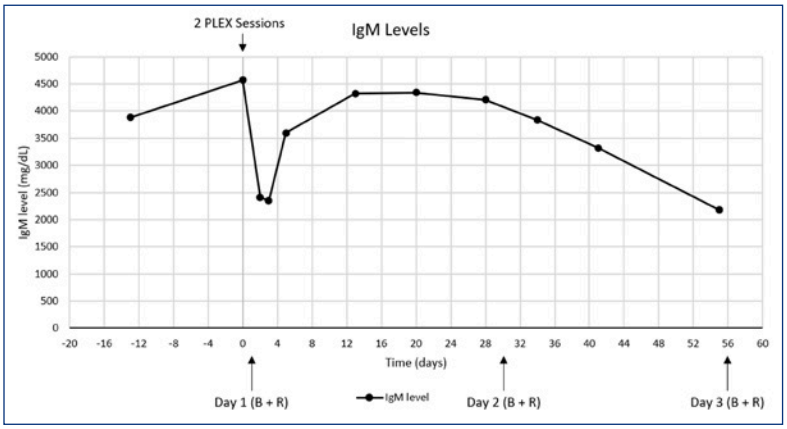
Acquired angioedema (AAE) is caused by either consumption or inactivation of C1 esterase inhibitor (C1-INH)[1] and is a rare, potentially life-threatening serious condition characterized by recurrent episodes of non-pitting edema of the skin or mucosa without urticaria.[2,3] Unlike the more prevalent hereditary angioedema (HAE), which typically presents in adolescence and has a positive family history, AAE usually occurs in older adults and is often a paraneoplastic phenomenon.[2] In AAE, a previously normal individual develops acquired C1-INH dysfunction leading to uncontrolled activation of the classic complement pathway and bradykinin-mediated angioedema.[2,4] This syndrome was first recognized in a patient with lymphoma and is most frequently associated with B-cell lymphoproliferative disorders or monoclonal gammopathies.[2] Indeed, up to 90% of AAE cases have an underlying clonal B-cell process such as non-Hodgkin lymphoma (e.g., marginal zone or lymphoplasmacytic lymphoma), Waldenström macroglobulinemia (WM), or monoclonal gammopathy of undetermined significance.[5,6]

Waldenström macroglobulinemia is an indolent lymphoplasmacytic lymphoma defined by bone marrow infiltration with clonal lymphoplasmacytoid cells and a circulating monoclonal IgM paraprotein.[7] Common manifestations of WM include anemia, lymphadenopathy, hepatosplenomegaly, and hyperviscosity from high IgM levels, while immunologic phenomena such as autoimmune neuropathy or cryoglobulinemia are also recognized.[8] Although exceedingly rare, WM may present initially with angioedema.[9] We report a case of a 67-year-old man who presented with isolated recurrent angioedema as the first manifestation of WM, caused by acquired C1-INH deficiency. This case highlights the importance of recognizing AAE in older patients with unexplained angioedema and illustrates the link between AAE and underlying lymphoproliferative disease, as well as unique management considerations such as plasma exchange before initiation of Rituximab therapy due to the possibility of a subsequent IgM flare.[10,11]

## CASE REPORT

A 67-year-old man presented to the emergency department (ED) with acute angioedema involving the tongue and difficulty speaking. The episode was unresponsive to epinephrine, dexamethasone, and diphenhydramine, necessitating nasotracheal intubation. Additional treatment included tranexamic acid (TXA) and fresh frozen plasma (FFP) with temporary improvement. He had experienced a similar episode of tongue swelling a few months earlier. Both episodes were isolated angioedema without associated rash or other systemic symptoms. His family history was notable for a father who had been diagnosed with WM and died five years after the diagnosis; however, there was no family history of angioedema. He reported not taking angiotensin-converting enzyme inhibitors. Physical examination revealed small left supraclavicular and right axillary lymphadenopathy. His complete blood count showed mild to moderate normocytic anemia, with hemoglobin levels ranging from 8.2 to 11.4 g/dL. Aspartate aminotransferase and alanine aminotransferase levels were elevated at 79 and 128 U/L, respectively. Complement levels were reduced, with C3 at 77 mg/dL, C4 at <8 mg/dL, and C1-INH at <8 mg/dL prior to FFP transfusion. C1q was measured at 4.4 mg/dL. Ultrasound showed hepatomegaly with multiple well-circumscribed echogenic masses, prompting magnetic resonance imaging (MRI). The MRI revealed two hyperintense liver lesions measuring 1.3 cm and 1.1 cm of unclear etiology, as well as splenomegaly (18 cm spleen). Bone marrow biopsy confirmed a diagnosis of lymphoplasmacytic lymphoma consistent with WM and AAE due to C1-INH deficiency. Further laboratory work-up showed an IgM level of 3883 mg/dL. Serum protein electrophoresis with immunofixation performed revealed an M-spike of 1.9 g/dL. IgA and IgG levels were within normal limits at 88 mg/dL and 834 mg/dL, respectively. Given his elevated IgM level of 4572 mg/dL, he underwent two consecutive prophylactic plasma exchange (PLEX) sessions with FFP as replacement fluid (to also replenish C1-INH) with good response. PLEX was performed using Spectra Optia Apheresis System (Software Version 3.7, TerumoBCT, Lakewood, CO) using peripheral veins. Patient's IgM level decreased from 4572 mg/dL to 2413 mg/dL. Both procedures were performed with acid citrate dextrose solution A (ACD-A) for anticoagulation and 1 gram Calcium Chloride

**Figure 1.** IgM levels through the course of treatment. Day 1 indicates the first day of chemotherapy. B + R: Bendamustine + Rituximab; PLEX: plasma exchange.




in 50 mL of Normal Saline via the return line throughout the procedure, titrated based upon citrate-related adverse events. The patient later was started on Bendamustine and Rituximab chemotherapy, after which IgM level rose to 4338 mg/dL but subsequently declined with ongoing therapy [**Figure 1**]. Although the serum viscosity during the initial presentation was not measured, it was within normal limits at 1.8 cP the day before the second cycle of chemotherapy.

## DISCUSSION

WM-associated AAE is an illustrative example of how treating the underlying malignancy can resolve the paraneoplastic symptoms. In our case, bone marrow biopsy confirmed lymphoplasmacytic lymphoma with an IgM monoclonal protein, establishing WM as the cause of the patient's acquired angioedema. Similar cases have been described in the literature, though they are rare. Willows et al[12] reported a 73-year-old man with acquired C1-INH deficiency who had both angioedema and nephrotic syndrome from IgM deposition due to an underlying lymphoplasmacytic lymphoma; notably, both the angioedema and the renal pathology resolved after treating the lymphoma with Bendamustine-Rituximab. Our patient's course was comparable. Before the hematologic diagnosis was made, he suffered multiple life-threathening episodes of facial and oropharyngeal swelling unresponsive to medical treatment ultimately requiring intubation. Once WM diagnosis was established and definitive therapy was initiated, angioedema attacks ceased. This aligns with reports that cytoreductive treatment of the B-cell clone can significantly ameliorate or cure AAE.[2] In the French cohort, for instance, Rituximab-based therapy (alone or with chemotherapy) prevented further angioedema in about 79% of treated patients,[6] underscoring that eradication or control of the B-cell disorder is essential for long-term remission of AAE.

From a pathophysiologic standpoint, it is worth noting that our patient's angioedema was the initial manifestation of WM, with no other typical WM features such as hyperviscosity or constitutional symptoms at presentation except from mild anemia. AAE can precede the diagnosis of an overt lymphoma by months or even years.[5,13] During this interval, patients may be misdiagnosed with idiopathic angioedema or allergies. In any patient over 40 with unexplained, recurrent angioedema and normal allergy testing, acquired C1-INH deficiency should be considered and complement studies (C4, C1q, C1-INH levels/function) obtained.[5,14] Our case reinforces this point. Early recognition of AAE led us to perform appropriate evaluations (including immunofixation and ultimately bone marrow biopsy), resulting in the diagnosis of WM at an asymptomatic stage. This has important implications, as timely treatment of the lymphoma not only addresses the angioedema but also may prevent progression of the hematologic disease.

The management of acquired angioedema has two major components: acute treatment of swelling attacks and long-term prophylaxis or curative therapy targeting the underlying cause.[2] During acute angioedema episodes, especially if they involve the airway or cause significant discomfort, therapies that restore or bypass the deficient C1-INH are indicated. First-line treatments for acute attacks include plasma-derived C1-INH concentrate (if available) and bradykinin-pathway-targeted therapies such as Icatibant (a bradykinin B2 receptor antagonist) or Ecallantide (a kallikrein inhibitor), which have been well established in HAE and reported to be effective in AAE as well.[6,15] In a cohort of AAE patients, Icatibant consistently relieved symptoms, and C1-INH concentrate was effective in >90% of treated attacks.[6] If these specific agents are not available, guidelines note that fresh frozen plasma (FFP) can be used to supply functional C1-INH and terminate an attack. Our patient, for example, received FFP during the episode of tongue swelling prior to the definitive diagnosis (providing temporary improvement). Caution is warranted with FFP as it contains complement components that in theory could fuel further bradykinin generation, but in practice FFP has been life-saving when C1-INH concentrate is inaccessible. Supportive care, including securing the airway in laryngeal attacks, is critical, keeping in mind that standard allergy medications (epinephrine, antihistamines, corticosteroids) are typically ineffective in bradykinin-mediated angioedema.

Long-term prophylaxis in AAE aims to reduce the frequency and severity of attacks while the underlying disease is being evaluated or treated. Attenuated androgens such as danazol can raise hepatic production of C1-INH and have been used in both hereditary and acquired angioedema to diminish attack frequency.[6,16] Antifibrinolytic agents like TXA are another option; TXA is thought to attenuate bradykinin formation (by inhibiting plasmin activation) and

has a modest prophylactic benefit in some patients.[6,17] In the French study, 76% of patients on long-term TXA had a reduction in attacks, though about 13% developed thromboses as side effects.[6] Our patient was initially started on tranexamic acid prophylaxis while diagnostic work-up was underway, which appeared to lessen the severity of his swellings. Various reports have shown that treating the associated lymphoproliferative disorder can lead to remission of AAE in the majority of cases.[2,6] In our case, we proceeded with combination chemoimmunotherapy for WM.

The patient's lymphoma was treated with Bendamustine plus Rituximab, a standard first-line regimen for WM. We paid special attention to the initiation of Rituximab due to the risk of a transient IgM flare that occurs in approximately 30–50% of patients with WM following the initiation of Rituximab therapy, potentially worsening hyperviscosity symptoms.[10,11] Although our patient had no initial hyperviscosity syndrome, his IgM level was significantly elevated, raising concern that a flare could trigger new symptoms or even paradoxically exacerbate the angioedema. To mitigate this risk, after multi-disciplinary discussions which included hematologist, immunologist, and apheresis practitioner, we implemented prophylactic PLEX before the first Rituximab dose. PLEX rapidly lowered his IgM burden and had the added benefit of removing any circulating anti-C1-INH autoantibodies or immune complexes, which likely provided temporary relief of his angioedema as well. In WM, it is generally recommended to consider PLEX for patients with very high IgM (for example, >4 g/dL) or evidence of hyperviscosity prior to starting Rituximab.[7,18] Consistent with published guidance, our patient underwent two sessions of PLEX with one plasma volume, after which Rituximab was started without incident. Even though an IgM flare occurred after the initiation of Rituximab, its level did not exceed pre-Rituximab PLEX levels. Notably, his subsequent IgM levels continued to decline with therapy. This approach – using pre-Rituximab PLEX – has been reported to prevent Rituximab-related flares and was successfully employed in the case reported by Fornero et al as well.[19]

Beyond preventing IgM flare, PLEX can serve as an interim therapeutic measure in severe AAE. By removing pathogenic IgM and immune complexes, PLEX can transiently raise C1-INH functional levels, providing temporary relief until longer-term therapies take full effect. However, PLEX is a procedure that requires specialized nurses and physicians and is not available in all centers. It is typically reserved for special situations such as ours (imminent Rituximab use or refractory, life-threatening angioedema).

In summary, the cornerstone of AAE management in the context of WM is treating the lymphoma. To this date, our patient received three cycles of Bendamustine-Rituximab, and he responded to treatment marked by a >50% reduction in IgM level and complete resolution of his angioedema episodes. This outcome mirrors prior reports where successful treatment of the B-cell malignancy led to disappearance of acquired angioedema symptoms.[12] It underscores that in secondary causes of angioedema, vigilance for an underlying disorder and its prompt therapy is key to curing the angioedema.

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# Splanchnic Vein Thrombosis as the Initial Manifestation of Lambda Light Chain Multiple Myeloma

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## ABSTRACT

We present the case of a 67-year-old man who developed superior mesenteric vein thrombosis (SMVT) as the initial manifestation of IgD lambda and lambda light chain multiple myeloma (LCMM). He initially presented with abdominal pain and was found to have SMVT without identifiable thrombophilic risk factors. Persistent macrocytosis, unexplained renal dysfunction, and mild anemia prompted further evaluation, revealing markedly elevated serum free lambda light chains, suppressed immunoglobulins, and a bone marrow biopsy confirming LCMM. This case highlights the importance of considering plasma cell dyscrasias in patients with unprovoked thrombosis at atypical sites, particularly when accompanied by subtle hematologic or renal abnormalities. Early recognition of LCMM is essential given its aggressive nature and potential for diagnostic delay due to absent or minimal findings on standard serum protein electrophoresis.


**KEYWORDS:** Splanchnic Vein Thrombosis; Multiple Myeloma

## CASE PRESENTATION

A 67-year-old non-smoker man with a history of hypertension, prediabetes, and a remote episode of spontaneous right popliteal vein thrombosis one year prior to presentation, which was treated with a three-month course of anticoagulation, presented with progressively worsening postprandial abdominal pain over three weeks, associated with nausea and vomiting. He denied any melena or hematochezia. On presentation, he was hemodynamically stable. Physical examination revealed diffuse abdominal tenderness without rebound or guarding. Laboratory testing revealed a white blood cell count of 14 $\times 10^3/\mu L$ (reference range [RR]: 4.0–10.8$\times 10^3/\mu L$), hemoglobin 13 g/dL (RR: 13.0–17.5 g/dL), mean corpuscular volume (MCV) 99 fL (RR: 81.0–99.0 fL), platelet count 409 $\times 10^3/\mu L$ (RR: 150–450 $\times$ $10^3/\mu L$), creatinine 1.4 mg/dL (RR: 0.7–1.2 mg/dL), and corrected calcium 10.5 mg/dL (RR: 8.5–10.2). Liver function tests, anion gap, albumin, globulin and albumin/globulin ratio (A/G ratio), and lactate were all within normal limits. Notably, MCV had consistently ranged between 97 and 99 fL over the past four years. Two months prior to presentation, his hemoglobin was 12.8 g/dL. A comprehensive metabolic panel (CMP) performed 10 months earlier was within normal limits, whereas a repeat CMP three months prior showed a mildly elevated creatinine of 1.26 mg/dL.

Contrast-enhanced computed tomography imaging of the abdomen and pelvis revealed long-segment small bowel wall thickening in the right lower quadrant, mesenteric edema, and occlusion of the superior mesenteric vein (SMV), findings concerning for ischemic enteritis. There was no evidence of bowel obstruction or pneumatosis. Surgical and vascular surgery teams were consulted. Hematology team was consulted due to the spontaneous and atypical site of thrombosis. Hypercoagulable testing, including anticardiolipin antibodies, beta-2 glycoprotein antibodies, Factor V Leiden, prothrombin G20210A mutation, JAK2 V617F mutation, and paroxysmal nocturnal hemoglobinuria (PNH) screen, was negative. Testing for lupus anticoagulant, protein C, and protein S testing were initially deferred due to ongoing anticoagulation with heparin and acute thrombotic event. The patient's condition improved with conservative management, thus thrombectomy and thrombolysis were not pursued. He was discharged on therapeutic enoxaparin. At the time of discharge, hemoglobin was 9.8 g/dL, MCV 99 fL, creatinine 1.4 mg/dL, and white cell and platelet counts were within normal limits. He was transitioned to therapeutic enoxaparin and subsequently discharged.

Three weeks after discharge, the patient re-presented with generalized weakness and acute kidney injury. Laboratory findings revealed WBC 5.4 $\times 10^3/\mu L$, hemoglobin slightly improved to 10.4 g/dL, MCV 103 fL, platelet count 274 $\times 10^3/\mu L$, creatinine 2.4 mg/dL, and calcium 10.4 mg/dL. Renal ultrasound and urinalysis were unremarkable. He was diagnosed with non-oliguric acute tubular necrosis. With improved gut function, he was switched to apixaban 5 mg twice daily on discharge. Creatinine at the time of discharge was 2.4 mg/dL.

Two weeks later at outpatient hematology follow-up, his labs showed hemoglobin 11.6 g/dL, MCV 98 fL, creatinine 2.3 mg/dL, mildly elevated calcium 10.5 mg/dL, and normal WBC, platelet count, vitamin B12, and folate levels. Given mild anemia, high-normal MCV, unexplained renal dysfunction, and absence of nutritional deficiencies or alcohol use, a plasma cell dyscrasia was suspected. Serum protein electrophoresis (SPEP) revealed two monoclonal bands:

one at 1.1 g/dL in the beta region (identified as free lambda light chains by immunofixation) and another at 0.3 g/dL in the gamma region (identified as IgD heavy chain). A serum free light chain assay showed kappa light chain of 1.33 mg/dL (RR: 0.33–1.94), lambda light chain of 2850 mg/dL (RR: 0.57–2.63), with a kappa/lambda free light chain ratio of 0.0005 (RR: 0.26–1.65). Beta-2 microglobulin was markedly elevated at 10,957 ng/mL (RR: 1000–2400). Lactate dehydrogenase (LDH) was within normal limits at 243 U/L (RR: 120–246). Immunoglobulin levels were suppressed with IgG 376 mg/dL (RR: 700–1600), IgA 67 mg/dL (RR: 70–400), and IgM 22 mg/dL (RR: 50–300). Bone marrow biopsy demonstrated a plasma cell neoplasm involving 50–60% of marrow cellularity and lambda light chain restriction, confirmed by in situ hybridization and flow cytometry. Congo red staining was negative for amyloid. Cytogenetic testing with fluorescence in situ hybridization (FISH) was normal.

## DISCUSSION

Venous thromboembolism (VTE) is a well-recognized complication in patients with multiple myeloma (MM), particularly in those undergoing treatment with immunomodulatory agents (IMiDs) such as lenalidomide, often in combination with high-dose corticosteroids or chemotherapeutic agents. Kristinsson et al. reported that patients with MM have a significantly increased risk of venous thrombosis, with hazard ratios of 7.5, 4.6, and 4.1 at 1, 5, and 10 years post-diagnosis, respectively.[1] The pathophysiology of hypercoagulability in MM has been demonstrated to be multifactorial with evidence of elevated von Willebrand factor (VWF) levels, activated protein C resistance, impaired fibrinolysis, and/or abnormal thrombin generation[2] all being reported. Free lambda light chains, especially in large quantities, can also cause direct endothelial injury and thereby activate coagulation pathways. This is compounded by the presence of procoagulant microparticles and inflammatory cytokines(especially with aggressive subtypes like light chain MM[LCMM] and IgD MM), which further enhance thrombotic risk.[3,4] Furthermore, anti-myeloma therapies, such as immunomodulatory drugs (IMiDs) and high-dose dexamethasone, are known to increase thrombotic potential by inducing endothelial damage and promoting prothrombotic conditions.[5,6] However, VTE as an initial presenting feature of previously undiagnosed MM, is rare with only a few cases reported in the literature.[7] To our knowledge, only one prior case has described MM initially presenting as mesenteric venous thrombosis, highlighting the rarity of our case.[8]

Superior mesenteric vein thrombosis (SMVT) has a broad differential including abdominal infections, inflammatory bowel disease, pancreatitis, trauma, surgical procedures, cirrhosis, portal hypertension, thrombophilic states, and malignancies. At the time of diagnosis of unprovoked SMVT, our patient had none of these risk factors, and he was subsequently diagnosed with LCMM. Multiple myeloma can cause renal amyloidosis, leading to nephrotic syndrome and a subsequent hypercoagulable state. However, our patient had an unremarkable urinalysis, normal serum albumin and lipid panel, and no evidence of pedal edema, essentially ruling out nephrotic syndrome as the cause of hypercoagulability. An important consideration in our case is whether SMVT led to ischemic enteritis or if the enteritis preceded and contributed to thrombosis. Deposition of monoclonal light chains in various tissues, including the gastrointestinal (GI) tract, has been documented and can result in structural changes such as bowel wall thickening.[9] Bonometti et al reported a case of kappa light chain/IgA multiple myeloma presenting with small bowel obstruction caused by circumferential thickening of the terminal ileum, underscoring the potential for light chain deposition to cause significant GI pathology.[10] In our patient, similar bowel wall thickening could have led to local inflammation and edema, contributing to altered venous blood flow and elevated mesenteric venous pressure – factors that may have predisposed to SMVT. Although the affected bowel segment was not biopsied, small bowel light chain deposition remains a plausible explanation in our case.

An additional noteworthy feature in this case was persistent mild macrocytosis in the absence of vitamin B12 or folate deficiency, alcohol use, or liver disease. While anemia in MM is typically normocytic, macrocytosis can be observed, especially in the presence of high levels of free lambda light chains and associated renal dysfunction. Free lambda light chains can interfere with erythropoiesis by direct toxicity to erythroid precursors or by altering intracellular folate metabolism, despite normal serum folate levels. This interference can lead to the production of fewer but larger red blood cells, resulting in macrocytosis.[11] Renal impairment, common in LCMM due to light chain cast nephropathy, can contribute to macrocytosis through reduced erythropoietin levels and altered red cell maturation.[12,13] LCMM and IgD MM often present with higher tumor burden, more aggressive disease, and poorer prognosis.[14,15] Marrow crowding may lead to ineffective erythropoiesis and macrocytosis. Furthermore, multiple myeloma can co-occur with or evolve into myelodysplastic syndrome(MDS). Macrocytosis in MM might reflect early clonal hematopoiesis. Maia et al investigated the presence of dysplastic hematopoiesis in newly diagnosed MM patients and found that 11.6% of cases displayed MDS-associated phenotypic alterations at diagnosis.[16] In our patient, highly elevated lambda free light chains, marrow crowding with neoplastic plasma cell comprising 50–60% of marrow cellularity, and renal dysfunction likely contributed to macrocytosis. There were no dysplastic hematopoietic precursor cells identified in our patient's bone marrow biopsy, making concomitant MDS less likely. It is important to note, however, that the absence of dysplasia does not exclude clonal hematopoiesis, which can occur without overt morphologic abnormalities.[17]

Interestingly, our patient's MCV had been at the upper limit of normal for at least four years prior to his initial presentation with SMV thrombosis, suggesting the possibility

of a smoldering plasma cell dyscrasia. Additionally, mild renal dysfunction was documented approximately three months before SMVT, raising further suspicion that multiple myeloma may have been present but undiagnosed at the time of initial presentation with SMVT. Recent evidence suggests that smoldering multiple myeloma (SMM), despite being an asymptomatic precursor state, may still carry a degree of hypercoagulability. In a study of 123 patients, including 31 with SMM, no thrombotic events were observed in the SMM subgroup however elevated levels of pro-inflammatory TGFβ and microvesicles (MVs), mediators of coagulation activation, were still found in patients prior to overt disease progression. This raises the possibility that even in SMM, subclinical prothrombotic mechanisms exist, highlighting a need for ongoing vigilance as the condition evolves.[18] His remote history of an unprovoked popliteal vein thrombosis one year prior also supports an underlying prothrombotic diathesis, likely related to an evolving plasma cell disorder. Ultimately, the diagnosis of LCMM with an associated IgD component was established. This case highlights the importance of recognizing subtle early signs of MM to facilitate timely diagnosis and treatment.

In conclusion, our case highlights the importance of considering plasma cell dyscrasias in the differential diagnosis of unprovoked thrombosis, particularly when it presents at atypical sites and in the absence of identifiable thrombophilic risk factors. LCMM should also be considered in the evaluation of unexplained macrocytic anemia, given its aggressive nature and potential for renal injury. A key feature of LCMM is the absence of intact monoclonal immunoglobulin production by malignant plasma cells, which can result in a negative SPEP and delay diagnosis.[19] Although our patient's SPEP revealed two monoclonal bands making this concern less relevant in our case, it remains a critical diagnostic consideration. Subtle clinical clues pointing toward LCMM should not be overlooked, as early recognition and a thorough diagnostic workup, including serum free light chain analysis and bone marrow biopsy, are vital for timely initiation of disease-modifying therapy.

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## Disclosures

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# A Rare Genital Concomitant Presentation of Extracavitary Primary Effusion Lymphoma and Squamous Cell Carcinoma

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## ABSTRACT

Primary Effusion Lymphoma (PEL) is a rare subtype of large B-cell lymphoma characterized by malignant effusions in body cavities, typically without solid masses. Commonly affected areas include pleural, pericardial, and peritoneal spaces. However, PEL can present as Extracavitary Primary Effusion Lymphoma (EC-PEL) with solid tumor masses in different organs. We encountered a unique case of EC-PEL in an HIV-infected patient presenting concomitant with a squamous cell carcinoma as a penile mass. This case highlights the diverse presentations of PEL and the importance of considering lymphomatous involvement in uncommon sites, particularly in immunocompromised individuals. To our knowledge, this is the first EC-PEL case presenting as a penile mass, in association with an invasive squamous cell carcinoma.

**KEYWORDS:** Primary Effusion Lymphoma; Extracavitary PEL, HIV; penile mass; immunocompromised

## INTRODUCTION

Human Herpesvirus 8 (HHV8), also known as Kaposi sarcoma-associated herpesvirus, is an oncogenic lymphotropic virus prevalent in sub-Saharan Africa and the Mediterranean. It is associated with various malignancies, including PEL, a rare and aggressive form of large B-cell non-Hodgkin lymphoma. PEL presents as malignant effusions without solid masses, often within pleural, pericardial, and peritoneal spaces. While predominantly diagnosed in HIV-infected individuals and universally associated with HHV8, co-infection with EBV occurs in approximately 80% of cases.[1] PEL also affects the elderly and transplant recipients. Beyond its classic presentation, PEL may manifest as solid tumor masses, known as extracavitary PEL (EC-PEL).[2] EC-PEL has been documented in various sites, including lymph nodes, gastrointestinal tract, lungs, skin, liver, and spleen, with lymph nodes being most frequently affected,[3,4] while CNS,[5] bone marrow, heart[4,6] or intravascular[7] presentations being rarely reported.

## CASE PRESENTATION

A 77-year-old man, with a long history of HIV (>20 years) on antiretroviral therapy (most recently on bictegravir-emtricitabine-tenofovir alafenam and rilpivirine), resected brain tuberculoma, squamous cell carcinoma of the esophagus treated with chemoradiation therapy, and well-to-moderately differentiated, keratinizing invasive squamous cell carcinoma of the oral cavity treated with surgery and radiation therapy, presented with a persistent ulcerating mass located on the head of his penis, initially noted seven years before. The patient's CBC was notable only for a mild thrombocytopenia (118 x $10^9$/L, reference range 168–382 x $10^9$/L). Flow cytometry studies detected a CD4:CD8 cell ratio of 0.228 (reference range 0.9–5) with a significantly decreased CD4 positive absolute lymphocyte count of 0.182 x $10^9$/L (reference range 0.5–1.9 x $10^9$/L).

A biopsy of the penile lesion identified an invasive keratinizing squamous cell carcinoma invading the corpus spongiosum and lymphovascular structures and the patient underwent a partial penectomy with resection of a 2.5 x 1.5 cm fungating mass with focal invasion in the corpora spongiosa.

Microscopic examination was notable for invasive keratinizing squamous cell carcinoma and also for adjacent dense aggregates of highly atypical large lymphoid cells [**Figure 1**], primarily with immunoblast-like morphology [**Figure 2**].

**Figure 1.** Hematoxylin and eosin stain. Ob. 4x. Extracavitary Primary Effusion Lymphoma and Squamous Cell Carcinoma.

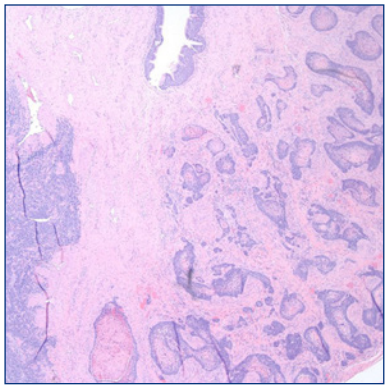


**Figure 2.** Hematoxylin and eosin stain. Ob. 50x, immersion oil. Extracavitary Primary Effusion Lymphoma cells with a predominant immunoblast-like morphology.

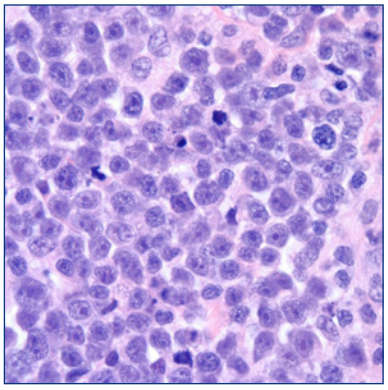


**Figure 3.** MUM1 immunostain. Ob. 50x, immersion oil. Lymphoma cells have uniform nuclear MUM1 positivity.

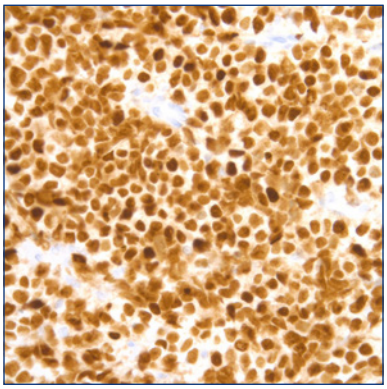


**Figure 4.** HHV8 immunostain. Ob. 50x, immersion oil. Lymphoma cells have uniformly nuclear HHV8 positivity.

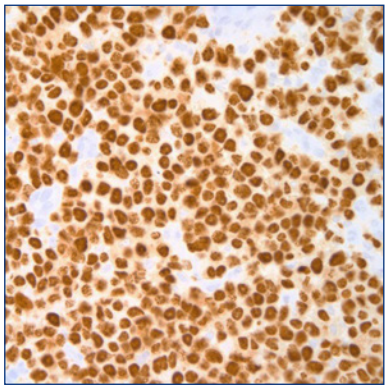


**Figure 5.** Ob. 50x, immersion oil. Lymphoma cells have uniformly nuclear EBER positivity.

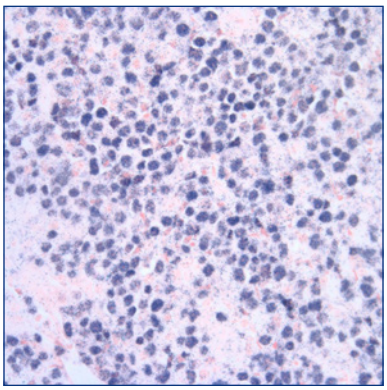
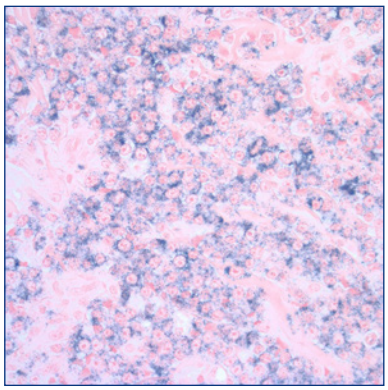


**Figure 6.** Kappa in-situ hybridization stain. Ob. 50x, immersion oil. Lymphoma cells have weak uniform kappa immunoglobulin cytoplasmic staining.



There were admixed plasmablast and centroblast-like cells, and an increased number of mitoses.

The neoplastic lymphoid cells were positive for MUM-1 [**Figure 3**], HHV-8 [**Figure 4**], c-myc, and CD30, with uniform, moderate-to-strong CD3 cytoplasmic staining. They had variable CD45, OCT2, CD7 and EMA expression and in a small subset (25–30%) were p53 positive. Their proliferation rate was high (~100% with MIB1 antibody to Ki-67 antigen). The neoplastic large lymphoid cells were negative for CD15, CD138, CD4, CD8, granzyme B, CD56, ALK1, GATA3, BCL2, BCL6, BCL1, CD10, CD21, CD20, PAX5, CD79a, BOB1, CD19, IgM, and TdT. EBER in-situ hybridization was positive, indicating EBV infection [**Figure 5**], and the neoplastic population was kappa restricted (weak staining) by in-situ hybridization stains [**Figure 6**]. PCR studies detected the presence of immunoglobulin heavy chain gene rearrangements and identified a minor clonal T-cell receptor beta gene rearrangement. FISH analysis was reported negative for MYC rearrangement. Molecular next generation sequencing analysis of a selected area of lymphoma identified two variants with variant allele frequency (VAF) close to 50%, likely arising from germline origin: MPL c.1653+1del likely pathogenic variant with a variant allele frequency (VAF) of 43.5% and UBA1 p.P25S variant of unknown significance (VUS) with 49.3% VAF. In addition, three low level somatic pathogenic variants were also detected with VAFs between 1–3%: TET2 p.Y1598Hfs*14, ATM p.Q2414* and DNMT3A p.R320*. A diagnosis of extracavitary primary effusion lymphoma was rendered.

Clinical evaluation revealed a well-healed penectomy stump and an additional presence of 2.5 cm ulcerated squamous cell cutaneous carcinoma on the scalp. A positron emission tomography combined with computerized tomography (PET-CT) demonstrated the cutaneous carcinoma, two sites of metabolic uptake (SUVmax of 7.4) in the site of penectomy, suggestive of residual tumor, but no other sites suspicious for lymphoma. After consideration of treatment options, the patient declined to consider further radiation therapy or cytotoxic chemotherapy, and elected to receive off-label therapy with the anti-CD30 antibody-drug conjugate brentuximab vedotin in combination with a PD-1 inhibitor nivolumab, as the combination has shown safety in other settings[8] for older individuals and was expected to have activity against residual PEL or penile squamous carcinoma. After three courses of this therapy the patient attained a complete metabolic response and discontinued further therapy. His cutaneous carcinoma has markedly decreased on therapy as well and allowed for subsequent resection. He remains free of the lymphoma at 16 months from diagnosis.

## DISCUSSION

HIV-infected individuals are at higher risk for hematological malignancies, particularly aggressive B-cell non-Hodgkin lymphomas.[9] PEL is linked to HHV-8 and is most commonly diagnosed in HIV-positive patients, and less commonly in elderly and transplant recipients. PEL primarily affects males.[10] Though it constitutes 2–4% of all AIDS-related NHLs, the lack of comprehensive epidemiologic data complicates precise quantification.[11]

PEL/EC-PEL lymphoma cells, originating from B-cells, may lack CD45, risking misdiagnosis. They also typically lack B-cell markers such as CD19, CD20, CD22, PAX5, OCT2, BOB1, and CD79a and often lack surface/cytoplasmic immunoglobulin light chain expression. They do not express germinal center markers (CD10, BCL6) being characterized of markers of terminal B-cell differentiation: HLA-DR, CD30, EMA, CD38, VS38c, CD138, and MUM1.[12]

EC-PELs may more frequently than PELs express B-cell–associated antigens and/or immunoglobulin light chains.[13]

Notable is also the expression of T-cell markers, especially CD3, which occurs in up to 33% of the cases,[4] with less frequent CD4, CD2 and CD5 expression. This immunophenotypic signature when corroborated with CD30 expression may incorrectly suggest an ALK negative anaplastic large cell lymphoma or other T-cell lymphomas.[10] The cause of T-cell marker expression remains unclear; however, EBV infection may play a role, as it has been associated with T-cell marker expression in B-cell lymphomas.[14]

The diagnosis of PEL and EC-PEL requires the demonstration of KSHV/HHV8, often performed using an antibody to KSHV/HHV8 LANA. MYC protein overexpression is usually identified in PEL cases,[15] probably due to the activity of HHV8-encoded latent protein.

Gene expression profiling indicate that PEL cell of origin seems to be of post-germinal center, plasmablastic derivation[16] while typical NHL-related rearrangements or mutations of BCL2, MYC, and TP53 are not identified. In their paper, Calvani et al using a 36-gene lymphopanel identified in 5/10 PELs, either a single or two mutations per sample across four different pathways: epigenetic modifiers (EP300, ARID1A), BCR-NF-κB (TNFAIP3), apoptosis (TP53), and T-cell immunity (CD58 and B2M).[10]

Genes involved in inflammation, cell adhesion and evasion such as Aquaporin-3, P-selectin glycoprotein ligand 1/SELPLG, and mucin1 were identified overexpressed in PEL, findings which may explain the presentation in body cavities. In addition, a frequent occurrence of complete or partial trisomy 12, trisomy 7, and abnormalities of bands 1q21–25 have been reported in PEL.[16]

In our case it remains unclear if the pathogenic MPL c.1653+1del and the variant of unknown significance UBA1 c.73C>T detected are playing a role in the development of this lymphoma. Of interest is the patient's mild but chronic thrombocytopenia that has been reported for more than 20 years, and may have been clinically attributed to chronic anti-retroviral therapy. Since MPL mutations have been reported in congenital amegakaryocytic thrombocytopenia,[17] and the low VAF somatic mutations identified in TET2, ATM and DNMT3A, raise the concern of a possible idiopathic cytopenia of undetermined significance (ICUS); a bone marrow examination remains under consideration as part of the ongoing clinical work-up.

PEL is an aggressive lymphoma, associated with poor prognosis, despite advances in HIV-related lymphoma treatment.[13] Chemotherapy and antiretroviral therapy (ART) have shown promise in achieving remission and prolonging survival.[18] EBV-positive PEL cases may experience more favorable outcomes.[19] Extracavitary forms may have a somewhat better prognosis than classic PEL, with lower relapse rates among patients in remission.[12,13]

There is no standardized treatment for PEL or EC-PEL. Management includes ART for HIV and cytotoxic chemotherapy, most commonly cyclophosphamide, doxorubicin, vincristine, and prednisolone, and for eligible patients using the infusional dose-adjusted regimen with etoposide (DA-EPOCH). Alternatives include dexamethasone, high-dose cytarabine, cisplatin, methotrexate, and brentuximab vedotin.

Due to high CD30 expression, Brentuximab vedotin, a CD30-targeted therapy, has been used in PEL. It has shown efficacy in vitro in PEL cell lines and in vivo in animal models.[20,21] Case reports have also documented prolonged remission with this regimen.[22] Our case was particularly challenging because of the patient's extensive prior oncologic history with chemotherapy and radiation exposure, advanced age and persistent AIDS, his personal refusal to consider any further cytotoxic chemotherapy, and concurrent presence of two squamous cell carcinomas of the penis and of the skin, in itself associated with guarded prognosis. The application of brentuximab vedotin and nivolumab has allowed for control of all malignancies with minimal toxicity and excellent oncologic outcome so far, demonstrating the utility of novel immunotherapy approaches even with patients who are compromised by immunosuppression and geriatric comorbidities.

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# Classification of Kaposi Sarcoma Subtype in a Patient from Cape Verde

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An immunocompetent 72-year-old male from Cape Verde presented with a four-year history of progressively spreading violaceous plaques and papules localized to the hands, feet, and lower extremities. His past medical history is significant for coronary artery disease (CAD), essential hypertension, type 2 diabetes mellitus, moderate non-proliferative diabetic retinopathy, dyslipidemia, and status post-coronary artery bypass grafting (CABG) ×4. His current medications include aspirin, atorvastatin, glipizide, sitagliptin, losartan, metformin, metoprolol, valacyclovir, and triamcinolone 0.1% ointment. The lesions were initially asymptomatic, with no systemic symptoms such as fever, weight loss, or lymphadenopathy. Over time, the affected areas became painful and swollen.

On examination, the left medial palm exhibited annular violaceous to purple, non-blanching plaques, while the left fourth digit displayed annular purple to dark brown plaques and papules. The bilateral dorsal feet had well-circumscribed violaceous plaques, with the left side more severely affected. The right plantar surface showed some violaceous plaques and patches. Additional findings included two isolated plaques on the left medial leg and right inner arm. No oral lesions were present. A biopsy of a left plantar foot lesion was diagnostic for Kaposi sarcoma (KS). HIV testing was negative. Initial CT showed no metastatic disease, and follow-up CT remained negative. Histologically, KS lesions demonstrate spindle-shaped endothelial cells forming irregular, slit-like vascular spaces filled with extravasated red blood cells.[1] Hemosiderin deposits, lymphocytic infiltrates, and hyaline globules are frequently observed. Early macular lesions exhibit mild vascular proliferation, whereas nodular lesions display dense spindle cell proliferation and extensive vascular growth. Immunohistochemical staining for HHV-8 latency-associated nuclear antigen-1 (LANA-1) and vascular markers (CD34, CD31 or ERG) are diagnostic for KS.

Given the absence of human immunodeficiency virus (HIV/AIDS) or medication-induced immunosuppression, the diagnosis was classified as classic Kaposi's sarcoma. Treatment options, including observation, surgical excision, intralesional chemotherapy, and radiation therapy, were discussed. The patient elected to proceed with radiation as the primary treatment. He was prescribed and completed five radiation treatments to the left foot and eight to the left fingers. He remains without systemic progression and follows medical oncology.

**Figure 1.** Kaposi sarcoma affecting the left lower extremity, primarily the dorsal aspect of the left foot, (October 2024).

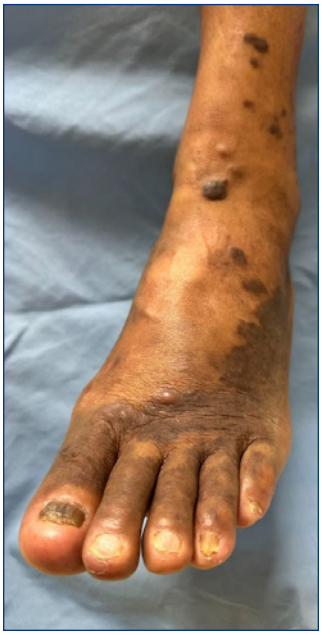
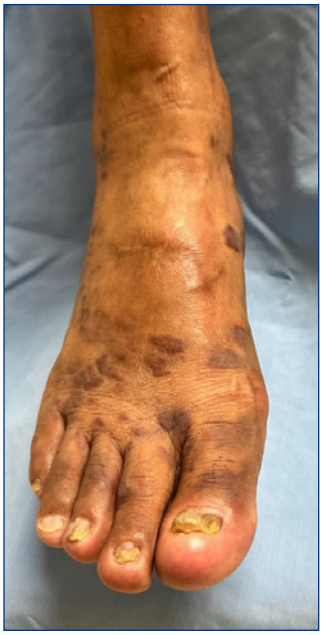


**Figure 2.** Purple to dark brown macules, patches, and plaques, showing Kaposi sarcoma, observed on the dorsal aspect of the right foot (October 2024).



KS is an angioproliferative neoplasm caused by infection human herpesvirus 8 (HHV-8).[1] KS is classified into four clinical subtypes: classic KS (CKS), African endemic KS, immunosuppression-related KS, and AIDS-related KS. Classic Kaposi Sarcoma (CKS) affects older men of Mediterranean, Eastern European, or Middle Eastern descent, typically during their sixth to seventh decades of life.[2] Although our patient does not have the expected demographic for the classic subtype, his physical exam findings and lack of immunosuppression support CKS. CKS presents as violaceous macules, patches, or nodules localized to the lower extremities, particularly the feet and ankles [**Figure 1**].[3] KS manifests as cutaneous lesions with a wide range of presentations, beginning as scattered pink to purple or dark brown macules and papules [**Figure 2**] and, over time, progressing into larger plaques and nodules, which may ulcerate, become multicentric, and cause significant discomfort [**Figure 3**].[3] While CKS progresses slowly, advanced cases may involve visceral organs. African Endemic KS is prevalent in sub-

**Figure 3.** Multicentric ulcerated nodules and violaceous patches on the medial longitudinal arch of the left foot (December 2023).

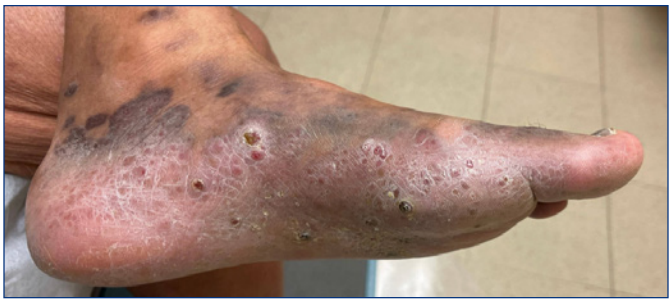
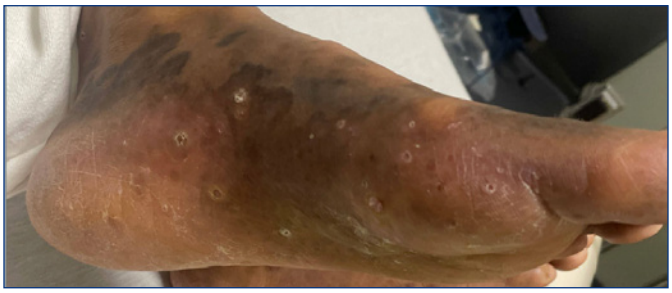


**Figure 4.** Kaposi sarcoma lesions at various stages of development on the left foot (February 2024).



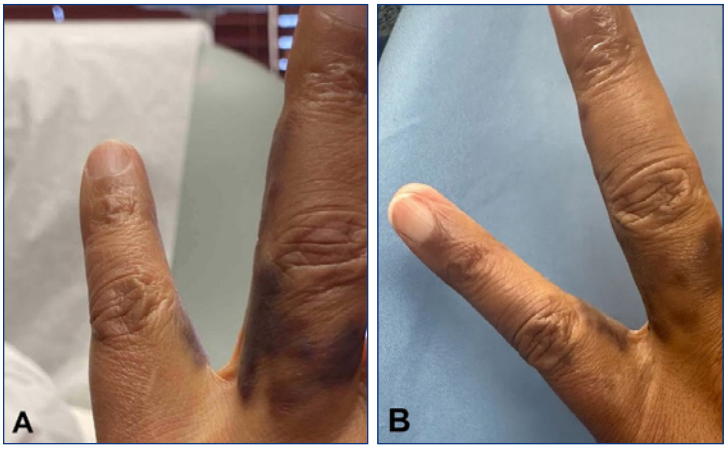
Saharan Africa, where KSHV infection rates are high.[4] It disproportionately affects younger individuals and includes a particularly aggressive variant called lymphadenopathic KS, primarily seen in children.[4] Since the patient was born in Cape Verde and goes back once every few years, the African Endemic subtype cannot be entirely ruled out.

Immunosuppression-related KS occurs in organ transplant recipients and individuals receiving long-term immunosuppressive therapy.[5] Lesions are often cutaneous but can spread to visceral organs. Adjusting or reducing immunosuppressive therapy can lead to disease regression. AIDS-related KS occurs in individuals with HIV infection.[6] Clinically, it presents as multifocal cutaneous lesions and frequently involves visceral sites. Before combined antiretroviral therapy (cART), AIDS-related KS was associated with significant morbidity and mortality.

KS lesions often progress in a chronic, multifocal pattern, with patches, macules, plaques, and nodules commonly appearing at different stages simultaneously [**Figure 4**]. Some local therapies include surgical excision, external beam radiation, and laser therapy.[4] Systemic therapies are reserved for widespread or symptomatic disease. Radiotherapy is particularly effective for localized lesions. A retrospective study analyzing 711 classic KS lesions and 771 HIV-related KS lesions demonstrated traditional X-ray radiotherapy as a safe and effective treatment modality for symptom relief and lesion control [**Figure 5A,B**].[5]

KS is a multifaceted disease with diverse clinical presentations and histopathological features. Subtype identification, early diagnosis, and tailored treatment strategies are essential for improving prognosis and enhancing quality of life.

**Figure 5A,B.** Comparison of the left hand before (**A**) and after (**B**) radiotherapy treatment for Kaposi sarcoma (April 2024).

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## Conflicts of interest

None disclosed.

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# Exploring the Role of FCHVs in Trauma Case Management in Nepal: A Qualitative Study

MANDEEP PATHAK, MS; SANJAYA BAHADUR CHAND, MPH; SARITA SHARMA, MPH; MICHEL J. MELLO, MD; JAGADISH JOSHI, MD; RAMU KHAREL, MD

## ABSTRACT

**BACKGROUND:** Traumatic injuries are a major cause of morbidity and mortality worldwide, with disproportionate burden in low-and-middle income countries. Nepal is no exception. Achham, a rural district in Nepal, suffers from a high prevalence of traumatic injuries primarily due to falls and road traffic incidents. Female Community Health Volunteers (FCHVs) might serve as essential frontline health providers to mitigate delay in care in rural regions. This study explores the feasibility of integrating FCHVs into the pre-hospital trauma care system in Achham, Nepal.

**METHODS:** A qualitative approach using phone-based key informant interviews with 20 randomly selected FCHVs and five purposively selected health coordinators from different municipalities across the Achham district was conducted. Data analysis involved thematic coding using NVivo software to identify key themes related to FCHVs' interest, availability, authority, potential barriers and opportunity in their participation in pre-hospital trauma care.

**RESULTS:** FCHVs demonstrated high availability (flexible schedules, willingness to respond to emergencies) and motivation. However, a significant knowledge gap exists (90% unfamiliar with first response in trauma) and existing first-response training was limited (25%). Health authorities from all represented municipalities showed support for FCHV training and mobilization efforts in pre-hospital trauma care.

**CONCLUSIONS:** FCHVs possess the potential to contribute to pre-hospital trauma care, but require thoughtful program development that includes training and supervision. This study highlights the initial feasibility, motivation from participants and leaders for FCHVs integration in rural trauma care, paving the way for improved trauma care access in rural Nepal.

**KEYWORDS:** Rural Nepal; Female Community Health Volunteers; Community Health Responders; Trauma care; Emergency care

## INTRODUCTION

In Nepal, the Female Community Health Volunteers (FCHVs) program, established in 1988 to promote family planning, has evolved into a broader role, encompassing maternal and child health, disaster response, and chronic disease management.[1-3] Despite their frontline presence, FCHVs' involvement in trauma care is uncommon, a critical gap in a country with a high burden of traumatic injuries.[4] The Achham district, characterized by remoteness, low human development, and limited access to healthcare, epitomizes this challenge.[5,6]

To enhance emergency response, including trauma care, a Provincial Health Emergency Operation Center (PHEOC) is under development in the region.[7,8] However, it is in its initial stages. To bridge this gap, a pilot research program was initiated by Kharel et al in 2023 to involve community health responders (CHRs) in pre-hospital trauma care in Achham.[9,10] Previously identified CHRs in the region included police, teachers, community health workers, and other social leaders.[11] This study aims to assess FCHVs' interest in joining the CHRs group to help in pre-hospital trauma care, and local leadership support for expanding their role in pre-hospital trauma care.

## METHODS

### Setting, Design and Participants Selection

A qualitative study was designed to understand the willingness and feasibility of FCHVs involvement in pre-hospital trauma care.

The study was conducted in all local levels (four municipalities and six rural municipalities) of Achham district, Nepal. A two-stage sampling approach was utilized. In the first stage, all available FCHVs (total 941) from the district of Achham were listed linearly. In the second phase, a systematic random-sampling technique was done, where all FCHV's were assigned a unique identifier, and a random number generator was used to identify interview participants from the large list. Twenty total random numbers between 0 and 941 were chosen. Four out of 20 randomly selected participants could not be reached via phone call. Therefore, we selected four new participants from the list of 941 FCHVs to substitute those who could not be contacted.

In addition, to identify the health coordinators from the

district, a purposive sampling technique was used. Five key health coordinators and decision-makers in the district of Achham were chosen by the study team. Any inactive FCHVs and health coordinators were excluded from this study.

A computer-assisted telephone interviewing (CATI) technique was used for data collection. Semi-structured key informant interviews (KIIs) were employed to gather primary data. Two distinct interviews were developed: one for FCHVs actively working in the community (n=20), and other for active health coordinators (n=5). A trained research coordinator (SC) conducted all the interviews, with verbal consents given prior to participating in the interview.

Following semi-structured telephone interviews using paper-based guides, the collected data underwent rigorous transcription, translation, and secure storage on OneDrive with restricted access for the study team only. All names were removed during the data storage, and surveys were aggregated either as FCHVs or health coordinators. A thematic analysis was then conducted, involving iterative reading, codebook development, coding with NVivo software, and identification of inter-code relationships to derive the final themes.

### Ethical approval

Ethical approval was obtained from the Nepal Health Research Council (NHRC). Verbal informed consent was obtained from all respondents prior to the interview. Participants were informed that they had the right to deny or withdraw from the study at any time and the result and contents of this study will be presented in publications.

## RESULTS

The diverse age range, with the average age of Female Community Health Volunteers (FCHVs) was 41 years. The age groups were evenly spread, with the largest percentage (35%) being between 50–59 years. The individuals had varied professional experience, averaging 14 years, with 40% having 20–29 years of experience. The respondents were almost equally split between rural (55%) and urban (45%) residents, indicating a slight rural majority [**Table 1**].

All (100%) FCHVs said that they were available as per need, which is stated as part of their current roles, and worked four to five mandatory days per month, which is mandated by government of Nepal. They were also available as per need if they received emergency meeting calls from the community leadership as well as patients. The FCHVs reported their involvement at communities in the following services: maternal and child health, including family planning, awareness, counseling, and education campaigns, and conducting outreach clinics.

**Table 2** presents the distribution of knowledge and interest in pre-hospital trauma- care service. Only 10% of FCHVs interviewed expressed an understanding of what "trauma" meant; however, all (100%) expressed a strong interest in receiving training and participating in pre-hospital trauma care. Sixty percent (60%) of FCHVs reported they still had knowledge and skills in some first aid (training they receive as part of their recruitment), while 10% reported they had no retained knowledge or skills in first-aid techniques.

A substantial number, 60%, reported lacking any formal training in at least one of the crucial areas in trauma care. The specific skills reported varied. Wound care was stated as a topic where most FCHVs had received training (70%), while only 5% reported being trained in fracture immobilization [**Table 3**].

**Table 1.** Socio-Demographic Characteristics

| Characteristic | Years/area | Number (n=20) | Percentage (%) |
|---|---|---|---|
| Age Distribution (Years) | 20–29 | 4 | 20 |
| | 30–39 | 5 | 20 |
| | 40–49 | 4 | 20 |
| | 50–59 | 7 | 20 |
| | Average Age | 41 | — |
| Year of Experience | 0–9 | 7 | 35 |
| | 10–19 | 5 | 25 |
| | 20–29 | 8 | 40 |
| | Average Year of Experience | 14 | — |
| Area of Residence | Rural | 11 | 55 |
| | Urban | 9 | 45 |

**Table 2.** Distribution of Respondent by Knowledge and Interest

| Aspect of Knowledge and Interest | Number (n=20) | Percentage (%) |
|---|---|---|
| Understanding of "Trauma" | 2 | 10 |
| Interest in Trauma Care Training | 20 | 100 |
| Retained Knowledge/ Skills in First Aid | 12 | 60 |
| Minimal Retained Knowledge/ Skills in First Aid | 6 | 30 |
| No Retained Knowledge/ Skills in First Aid | 2 | 10 |

Note: Individual FCHVs were allowed multiple responses

**Table 3.** Distribution of Respondent by Trauma-Care Training

| Trauma-care training topic | Number (n=20) | Percentage (%) |
|---|---|---|
| Wound Care | 15 | 70 |
| Position of Pregnant Women | 8 | 40 |
| Hemorrhage/Bleeding Control | 5 | 25 |
| Making Stretcher | 3 | 15 |
| None | 3 | 15 |
| Fracture Immobilization | 1 | 5 |

Note: Individual FCHVs were allowed multiple responses

**Table 4.** Distribution of Respondent by Their Perception (n=5)

| Health Coordinator's Perception | Agreement (%) |
|---|---|
| FCHVs' Current Lack of Utility in Trauma Care | 100 |
| Benefit of FCHVs' Participation in Trauma Training | 100 |
| Support for Future Community Efforts in Trauma Care | 100 |

Ninety percent (90%) of FCHVs felt they would be able to provide pre-hospital trauma care if equipped with adequate knowledge and skills. FCHVs also believed they could play a role in the transfer of patients to hospitals. FCHVs felt their participation in pre-hospital trauma care would improve their reputation in the community, and a few FCHVs believed it would build trust in the community. The primary barrier identified by FCHVs was a lack of dedicated training in pre-hospital trauma care. The majority of FCHVs reported no barriers to participation from their families.

**Table 4** shows that the distribution of health coordinators by their perception on FCHVs mobilization in pre-hospital trauma care. Health coordinators across all municipalities (100%) reported the lack of utility of FCHVs and their training for pre-hospital trauma care, and agreed that FCHVs' participation in pre-hospital training programs and care delivery would be beneficial for the community. The health coordinators offered their support in future endeavors in the local community for pre-hospital trauma care.

## DISCUSSION

This study demonstrates results for a phone-based key informant interview for FCHVs and health coordinators of the Achham district, and their perceptions for FCHVs participation in pre-hospital trauma care. Traumatic injuries cause a large healthcare burden in Achham (and across Nepal), and FCHVs could serve as a key group of community health responders for pre-hospital care. While a large gap in lack of formal trauma training was identified in this study, FCHVs' and health coordinators' strong willingness to participate in pre-hospital trauma care was significant. Furthermore, some FCHVs already participate in pre-hospital basic care without formal training. Their deep community engagement and local availability makes them well-positioned to provide crucial pre-hospital care.

Bayalpata Hospital, the only hospital in the far-West region providing in-hospital trauma care, provides free, high-quality trauma care at the hospital level, but a major gap in pre-hospital trauma care exists in the district. A pilot study by Kharel et al showed the knowledge sustainability and patient metrics improvement when various CHRs were used for pre-hospital trauma.[11] While FCHVs were not included as CHRs in the pilot study, this assessment indicates the local stakeholder buy-in for FCHV involvement in future efforts.[12] Bayalpata Hospital has committed to serving as a center for excellence for rural trauma care, and FCHVs will continue to be a key network of available providers in improving pre-hospital trauma care. In a future planned district-wide study by the research team, based on this study findings, FCHVs will be included as CHRs.

A few key limitations of this study include potential sampling bias. While all FCHVs were sampled using a random number generator, there is variability in the training of FCHVs based on their dates of recruitment into the program. The findings of this study might be just limited to Achham, and not generalizable to other FCHVs across Nepal. Only five health coordinators were identified, and these positions are temporary leadership roles. The views of studied coordinators might not be the same with changing local government and leadership. Additionally, FCHVs and coordinators response could have been subject to response bias leading to exaggerated answers. Recall bias could play a role in the answers as well.

## CONCLUSIONS

This study highlights the willingness and feasibility of integrating FCHVs into the pre-hospital trauma care program in Achham, Nepal. By addressing knowledge and skills gaps through comprehensive training and fostering collaboration, this initiative has the potential to significantly improve access to lifesaving pre-hospital trauma care in a geographically challenging region. The findings can inform the development and implementation of a pre-hospital trauma program through CHRs in Achham district.

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## Disclosures

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# Injury Patterns in Weightlifting: An Epidemiological Analysis of Emergency Visits (2014–2023)

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## ABSTRACT

**BACKGROUND:** Limited research exists on the impact of the pandemic on weightlifting injury trends. The objective of this study was to analyze weightlifting injury trends across age and gender, comparing pre-COVID, COVID, and post-COVID periods to provide long-term data that can inform national injury prevention strategies. We hypothesize that there was a temporary dip in weightlifting injuries during COVID and a resurgence in injury rates post-COVID that could contribute to an increase in specific injury types, particularly among young males, which may reflect inadequate reconditioning.

**METHODS:** Data was obtained from the Consumer Product Safety Commission's National Electronic Injury Surveillance System database for weightlifting injuries presented to United States (US) Emergency Departments from 2014 to 2023. Chi-square analyses, linear regressions, ANOVA, and Z-tests were used for data analysis.

**RESULTS:** From 2014 to 2023, there were an estimated 767,174 weightlifting-related injuries nationally. A 34.95% reduction in injury incidence occurred during the COVID period compared to pre-COVID, followed by a 47.19% increase post-COVID. Strains and sprains were the most common injuries, with incidence rates dropping 43.81% during COVID compared to pre-COVID levels and increasing 27.87% post-COVID.

**CONCLUSION:** There is a need for targeted injury prevention strategies, with consideration for psychosocial factors that impact younger populations.

**LEVEL OF EVIDENCE:** Level 3

**KEYWORDS:** Weightlifting; Injury; COVID; Trends; Emergency

## INTRODUCTION

Weightlifting, a form of resistance training involving free and fixed weights, has become increasingly popular as a means to enhance muscle strength, endurance, and hypertrophy.[1-3] In 2020, the CDC reported that 35.2% of men and 26.9% of women aged 18 or older engaged in muscle-strengthening activities at least twice weekly.[4]

Despite well-documented mental and physical benefits,[5-7] weightlifting carries inherent injury risks.[8-10] From 1990 to 2007, US emergency departments treated an estimated 970,801 weight training-related injuries nationwide.[11] These injuries ranged from acute events such as strains and lacerations to chronic overuse syndromes. Previous studies have identified the lower back and shoulder as common injury sites, with exercises like squats, deadlifts, and bench presses frequently implicated.[1,12]

While existing research has explored weightlifting injuries in specific populations or body regions,[13,14] a comprehensive analysis of recent trends across all age groups is lacking. Kerr et al examined weight-training-related injuries from 1990 to 2007.[11] During this period, Kerr et al found the most common weight-training injury diagnosis in US emergency departments was sprains/strains and patients were commonly younger (average age 27.6) and male (82.3%),[11] but the landscape of fitness and emergency care has evolved significantly since then. Moreover, the COVID-19 pandemic, beginning in January 2020, has impacted both weightlifting practices and healthcare utilization patterns.[15-17]

This study aims to provide the first epidemiological analysis of weightlifting-related injuries across all age groups treated in US emergency departments from 2014 to 2023. Injury rates before, during, and after the COVID-19 pandemic years are analyzed. Additionally, the study aims to update and expand upon previous findings regarding age and gender trends in weightlifting injuries. We hypothesize that weightlifting injuries temporarily declined during the COVID-19 pandemic, followed by a rebound afterward, with a greater rise in certain injury types—especially among young males—possibly due to insufficient physical reconditioning. By analyzing long-term trends and patterns of musculoskeletal injuries directly attributed to weightlifting, future safety protocols and clinicians in injury prevention and treatment strategies can be informed.

## METHODS

Data were obtained from the US Consumer Product Safety Commission's (CPSC) National Electronic Injury Surveillance System (NEISS) database. The CPSC-trained coders from a nationally representative, stratified probability sample of 100 US hospitals with at least six beds and a 24-hour emergency department (ED) service reviewed ED records

daily, inputting demographic, injury, and treatment information into the NEISS database. The CPSC applies statistical weights to the NEISS sample data to calculate national estimates of the number of injuries treated in all EDs across the United States.

Data from weight-training-related injuries (product code 3265) captured by NEISS from January 1, 2014, to December 31, 2023, were evaluated (N = 25,785). Injury case narratives were reviewed to ensure only injuries specifically related to weight training were included in the sample. Injuries not directly associated with weight training were excluded (N=6794) and patients without complete data (N=6) were also excluded resulting in (N=18985).

Variables of interest included age, gender, date of injury (by year), body region injured, injury diagnosis, disposition, and type of exercise (e.g., bench press, deadlift, bicep curl). The 26 CPSC body region codes were categorized into eight body regions consistent with previous NEISS research head (including eyes, ears, face, mouth, and neck), upper trunk (including shoulders), lower trunk (including pubic region), hand, foot, arm, leg, and other (e.g., internal injuries). The CPSC diagnosis codes were categorized into nine diagnoses: strain/sprain, fracture, contusions, abrasions, lacerations, nerve damage, dislocation, internal injury, crushing, hematoma, and other (concussion, avulsion, amputation, hemorrhage, dental injury, poisoning, foreign body, derma/conjunct, puncture, thermal burns).

Data analyses were conducted using Python *statsmodels* and *scipy* library while adjusting for sample weights and the stratified survey design, as recommended by the CPSC for NEISS data to produce national injury estimates. Chi-square analyses, linear regressions, ANOVA, and Z-tests were performed, with $p<.05$ considered statistically significant.

## RESULTS

### Injury Rates

From 2014 through 2023, there were an estimated total of 18,985 weightlifting-related injuries recorded in the NEISS database, representing a national estimate of 767,174 injuries. The annual number of injuries fluctuated between 1,297 and 2,141 from 2014 to 2019 [**Table 1**]. However, there was a notable decrease to 1,297 injuries in 2020 due to the COVID-19 pandemic, representing a 34.95% reduction. This was followed by a gradual recovery in subsequent years, reaching 2,126 injuries in 2023.

### Demographics

Among the injured, 79.21% were male (15,038 cases) and 20.79% were female (3,947 cases), with national estimates of 602,220 and 164,954 injuries respectively [**Table 1**]. Of patients with specified race, there were 36.74% White patients and 18.25% Black patients representing 6,975 injuries and 3,464 injuries [**Table 1**].

**Table 1.** Weight-Training-Related Injuries and Demographics

| Characteristic | Number (N=18985) | National Estimates |
|---|---|---|
| **Gender** | | |
| Male | 15,038 (79.21%) | 602220 |
| Female | 3947 (20.79%) | 164954 |
| <13 | 150 (0.79%) | 4478 |
| 13–18 | 3543 (18.66%) | 128339 |
| 19–34 | 8356 (44.01%) | 338517 |
| 3 –49 | 4107 (21.63%) | 172499 |
| 50–64 | 2032 (10.70%) | 86121 |
| 65+ | 797 (4.20%) | 37219 |
| **Race** | | |
| Not Specified | 7270 (38.29%) | 280609 |
| White | 6975 (36.74%) | 305608 |
| Black/African American | 3464 (18.25%) | 131501 |
| Other | 829 (4.37%) | 34192 |
| Asian | 364 (1.92%) | 11118 |
| American Indian/ Alaska Native | 46 (0.24%) | 2440 |
| Native Hawaiian/ Pacific Islander | 37 (0.19%) | 1706 |
| **Yearly Injuries** | | |
| 2014 | 2074 (10.92%) | 78784 |
| 2015 | 1982 (10.44%) | 81169 |
| 2016 | 2106 (11.09%) | 89929 |
| 2017 | 2141 (11.28%) | 88461 |
| 2018 | 1838 (9.68%) | 76627 |
| 2019 | 1820 (9.59%) | 74254 |
| 2020 | 1297 (6.83%) | 50287 |
| 2021 | 1743 (9.18%) | 66101 |
| 2022 | 1858 (9.79%) | 77419 |
| 2023 | 2126 (11.20%) | 84142 |

### Overall Injury Incidence

There was a significant reduction in the overall incidence of weightlifting-related injuries during the COVID period (2020) compared to the pre-COVID period (2014–2019). Specifically, there was a 34.95% reduction in the incidence rate of all injuries ($p<0.001$), dropping from an annual mean incidence of 1,993 injuries per year in pre-COVID years compared to 1,297 injuries in 2020 [**Figure 1**]. The post-COVID period (2021-2023) showed a recovery trend, with injury rates increasing 47.19% compared to the COVID period to a mean annual incidence of 1,909 injuries per year but remaining 4.24% below pre-COVID levels ($p<0.001$).

### Injury Types

Among specific injury types, strain and sprains were the most common at 7,199 cases [**Table 2**]. The mean incidence rates for strains and sprains were reduced significantly during

the COVID period, dropping 43.83% from an annual mean incidence of 826 to 464 ($p$<0.001) compared to pre-COVID levels. In the post-COVID period, these injuries showed partial recovery back to pre-COVID levels at an annual mean incidence of 593, but still 28.17% below pre COVID levels ($p$<0.001).

The mean annual incidence of contusions and abrasions, crushing, and fractures all dropped from the pre-COVID years during the COVID years ($p$<0.05). In the post-COVID period the incidence of each injury has increased at varying rates. Contusions and abrasions as well as dislocations have not returned to pre-COVID levels. However, fractures, internal injuries, lacerations, nerve damage, other injuries and unspecified injuries have surpassed ($p$<0.05) pre-COVID levels [**Table 2**].

The most common type of injury that was specified for males and females were strains/sprains. The rates of fractures and contusions for males were 5.9% and 5.0% compared to 6.9% and 7.2% for females.

**Figure 1. Weightlifting injuries by gender from 2014–2023**
The estimated annual number of weightlifting-related injuries treated in United States emergency departments from 2014 to 2023, stratified by gender (male and female) and total cases are visualized. The data show a significant reduction in injuries during the COVID-19 period (2020) compared to pre-COVID years (2014–2019), followed by a notable increase post-COVID (2021–2023). Linear regression models ($R^2$ values and p-values provided) indicate trends in injury rates, with males accounting for the majority of cases. Statistical significance ($p$<0.001) is noted for the differences between pre-COVID, COVID, and post-COVID periods.

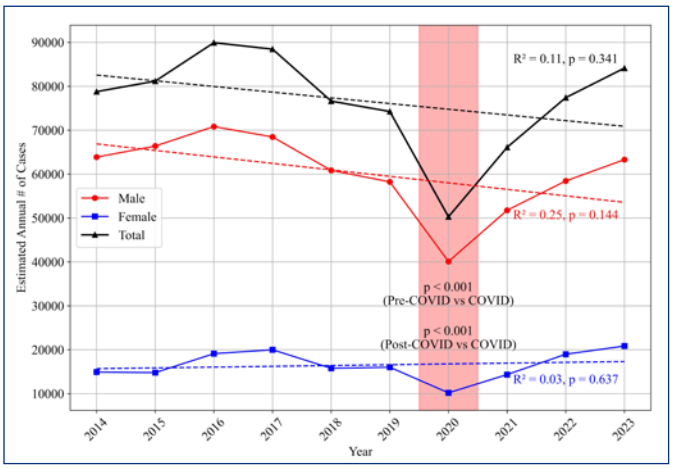


**Figure 2. Weightlifting injuries by age group from 2014–2023**
The estimated annual number of weightlifting-related injuries across different age groups treated in United States emergency departments from 2014 to 2023 is visualized. The data highlight a significant decline in injuries during the COVID-19 period (2020) compared to pre-COVID years (2014–2019), followed by a gradual recovery in the post-COVID period (2021–2023). The trends demonstrate varying injury rates among age groups, with young adults (19–34 years) consistently experiencing the highest number of injuries.

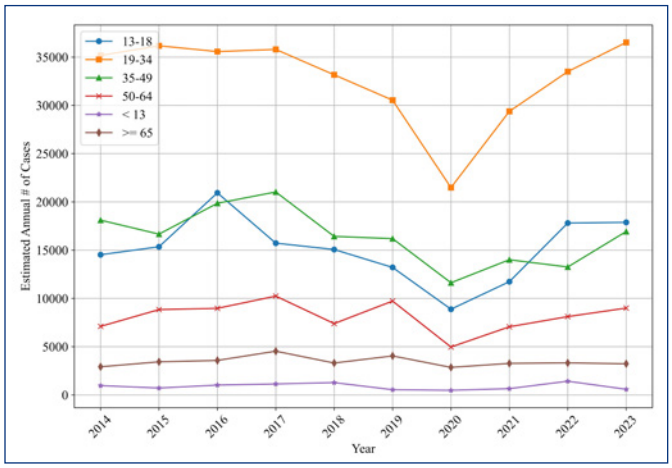


**Table 2.** Injuries Per Year by Diagnosis, Broken Down by Time Period

| | Pre-COVID (2014–2019) | COVID (2020) | Post-COVID (2021–2023) | Totals (%) | p-value Pre-COVID to COVID | p-value COVID to Post-COVID | p-value Pre-COVID to Post-COVID |
|---|---|---|---|---|---|---|---|
| Contusions/Abrasions | 111.83 | 53 | 101.67 | 1029 (5.42) | p = 0.026 | p = 0.078 | p = 0.460 |
| Crushing | 15.83 | 18 | 18.33 | 168 (0.88) | p = 0.040 | p = 0.223 | p = 0.299 |
| Dislocation | 39.00 | 34 | 34.33 | 371 (1.95) | p = 0.130 | p = 0.068 | p = 0.509 |
| Fracture | 109.83 | 92 | 137.67 | 1164 (6.13) | p = 0.023 | p = 0.929 | p < 0.001* |
| Hematoma | 8.33 | 10 | 10.67 | 92 (0.48) | p = 0.114 | p = 0.487 | p = 0.242 |
| Internal Injury | 28.00 | 22 | 37.67 | 303 (1.60) | p = 0.474 | p = 0.587 | p = 0.006 |
| Laceration | 64.17 | 46 | 73.00 | 650 (3.42) | p = 0.582 | p = 0.695 | p = 0.042 |
| Nerve Damage | 41.00 | 38 | 52.00 | 440 (2.32) | p = 0.050 | p = 0.753 | p = 0.006 |
| Strain/Sprain | 825.83 | 464 | 593.33 | 7199 (37.92) | p < 0.001* | p = 0.001* | p < 0.001* |
| Other | 21.17 | 21 | 29.00 | 235 (1.24) | p = 0.094 | p = 0.889 | p = 0.011 |
| Not Specified | 728.50 | 499 | 821.33 | 7334 (38.63) | p = 0.181 | p = 0.003 | p < 0.001* |
| Total | 1993.49 | 1297 | 1909.00 | 18985 | | | |

*Significant at p<0.05 with Bonferroni Correction

**Table 3.** Injuries by body region

| Location | Male (N=15038) | Female (N=3947) | p-value | Total Number (N=18985) | National Estimates |
|---|---|---|---|---|---|
| Upper Trunk | 5405 (35.94%) | 1287 (32.61%) | p* < 0.001 | 6692 (35.25%) | 274331 |
| Lower Trunk | 3872 (25.75%) | 867 (21.97%) | p* < 0.001 | 4739 (24.96%) | 190732 |
| Hand | 1607 (10.69%) | 406 (10.29%) | p = 0.4856 | 2013 (10.60%) | 78140 |
| Head | 1384 (9.20%) | 462 (11.71%) | p* < 0.001 | 1846 (9.73%) | 74351 |
| Arm | 1259 (8.37%) | 279 (7.07%) | p = 0.0083 | 1538 (8.10%) | 63293 |
| Foot | 667 (4.44%) | 341 (8.64%) | p* < 0.001 | 1008 (5.31%) | 39407 |
| Leg | 683 (4.54%) | 271 (6.87%) | p* < 0.001 | 954 (5.03%) | 39100 |
| Other | 161 (1.07%) | 34 (0.86%) | p = 0.2839 | 195 (1.03%) | 7818 |

*Significant at p<0.05 with Bonferroni Correction

Strains/sprains were also the most common type of injury across age groups. These injuries were followed by fractures (18%) and lacerations (16%) in the <13 group. Fractures (4.5–9.4%) and contusions (3.5–9.1%) were the most common following strains/sprains for the remaining age groups.

## Body Regions

Injuries by body region showed distinct patterns across the entire study period from 2014 to 2023. The upper trunk was the most affected area, accounting for 6,692 injuries, which represented approximately 35% of all reported cases [**Table 3**]. This was followed by lower trunk injuries, with 4,740 cases (25% of total), hand injuries with 2,015 cases (11%), and head injuries at 1,847 cases (10%) [**Table 3**].

Comparisons between males and females revealed that males were more likely ($p$<0.05) to sustain upper trunk and lower trunk injuries [**Table 3**]. However, females were more likely ($p$<0.05) to sustain head, foot, and leg injuries [**Table 3**].

There were significant variations in distribution of the body region of injury by age group. Notably, as age group increased there was an increase in upper trunk injuries [**Table 4**]. Lower trunk injuries peaked in the 19–34 age group [**Table 4**].

**Table 4.** Injuries by age group

| Location | <13 (%) | 13–18 (%) | 19–34 (%) | 35–49 (%) | 50–64 (%) | 65+ (%) | p–value |
|---|---|---|---|---|---|---|---|
| Upper Trunk | 28 (18.67) | 1006 (28.39) | 2904 (34.75) | 1552 (37.79) | 853 (41.98) | 349 (43.79) | p < 0.001* |
| Lower Trunk | 21 (14.00) | 684 (19.31) | 2344 (28.05) | 1102 (26.83) | 459 (22.59) | 129 (16.19) | p < 0.001* |
| Hand | 44 (29.33) | 567 (16.00) | 868 (10.39) | 330 (8.04) | 132 (6.50) | 72 (9.03) | p < 0.001* |
| Head | 25 (16.67) | 410 (11.57) | 784 (9.38) | 340 (8.28) | 196 (9.65) | 91 (11.42) | p < 0.001* |
| Arm | 10 (6.67) | 304 (8.58) | 583 (6.98) | 368 (8.96) | 193 (9.50) | 80 (10.04) | p < 0.001* |
| Foot | 16 (10.67) | 271 (7.65) | 455 (5.45) | 174 (4.24) | 70 (3.44) | 22 (2.76) | p < 0.001* |
| Leg | 6 (4.00) | 262 (7.39) | 322 (3.85) | 204 (4.97) | 110 (5.41) | 50 (6.27) | p < 0.001* |
| Other | 0 (0.00) | 39 (1.10) | 96 (1.15) | 37 (0.90) | 19 (0.94) | 4 (0.50) | p = 0.3121 |
| Total | 150 | 3543 | 8356 | 4107 | 2032 | 797 | |

*Significant at p<0.05 with Bonferroni Correction

## Comparisons by Age Group

Weightlifting injuries showed similar trends across all age groups when comparing pre-COVID, COVID, and post-COVID periods. Injuries were significantly decreased during the COVID year followed by a gradual increase [**Figure 2**]. All reported changes were statistically significant ($p$<0.001).

The 19-34 age group experienced the highest number of injuries throughout the study period [**Table 1**]. During the COVID year, this group saw a substantial reduction in injuries compared to the pre-COVID average. In the post-COVID period, injuries increased and in 2023 reached close to pre-COVID levels [**Figure 2**]. The 13–18 and 35–49 age group also experienced a decrease in injuries during the COVID year, followed by an increase post-COVID, though still below pre-COVID levels [**Figure 2**]. The under-13 age group showed the smallest relative changes and the smallest number of injures during the study period.

Older age groups (35–49, 50–64, and 65+) followed similar patterns, with substantial decreases during the COVID year and partial recoveries post-COVID [**Figure 2**]. However, their post-COVID injury rates remained below pre-COVID levels.

# DISCUSSION

This study evaluated weight-training-related injuries across all age groups of the general population treated at US emergency departments from 2014 to 2023. The epidemiological analysis of weightlifting injuries by age, gender, injury type, and exercise type build on previous work.[11,13] Understanding the change in weightlifting injury over the last decade provides useful information in designing targeted injury prevention efforts.

From 2014 to 2023 the rate of emergency department visits due to weightlifting injuries has overall remained constant. The limited increase stands in contrast to prior studies that have reported a larger increase in weightlifting injuries.[11,14,18] The overall plateau in weightlifting injuries likely stems from the COVID-19 pandemic. There was a significant decrease from the pre-COVID period (2014–2019) to COVID (2020) in weightlifting injuries. A decrease in weightlifting

and overall activity was common during the COVID-19 pandemic because of a lack of access to sports facilities,[19-21] which corresponds to the finding that most weightlifting injuries happened in the setting of sports. Notably, the decrease in COVID-19 exercise resulted in a long-term lowering of physical fitness from a decrease in activity.[22-24] While the rate of injury has increased over the last three years as individuals resume weightlifting, a slower increase in the rate of injury will likely continue. Additional interventions to reduce injury should be made as more people return to weightlifting. These findings support the hypothesis that injury rates overall temporarily declined during COVID and saw a resurgence in the post-COVID period as facilities reopened and people returned or started weightlifting without adequate conditioning. Moreover, we found that the specific injury types varied in the amount decreased during COVID and the amount increased during the post-COVID period.

The analysis in this study found a similar plateau of injury rates across age groups from 2014 to 2023 as previous findings for adolescents.[13] The COVID-19-associated dip was seen across most age groups. However, the proportion of injuries for those younger than 13 remained constant, likely because of an already low number of cases and due to random chance rather than consistent weightlifting. Young adults aged 19-34 composed the highest number (44%) of all weightlifting injuries in line with our hypothesis and previous findings.[18] Individuals aged between 13 to 18 and 35 to 49 also had a high proportion of injuries. Possible reasons include improper form due to lack of experience, overuse, and lifting heavier than what the athlete should be safely lifting. These populations may be susceptible to societal and psychosocial factors that could push the athlete towards overtraining, overlifting, and injury. Factors such as body dysmorphia, social media influence, performance pressure, and peer comparison can significantly contribute to maladaptive training behaviors.[25-28] Adolescents and young adults therefore represent an age group that should be targeted to reduce injuries as exercise-based injury prevention programs show success.[29-31] Those older than the age of 50 had a low proportion of injuries. The decline in injury with age likely reflects a decrease in activity, an increase in knowledge of safe lifting, and a decline in more injury-prone exercises.

Males had 79% of the number of injuries from 2014 to 2023 compared to females. The findings confirm our hypothesis and previous work that injuries from weightlifting continue to be male dominated.[11,13,14] This difference may be due to gender-based stigma for weightlifting, resulting in fewer women engaging in this form of exercise. In fact, females report more accounts of weight-related stigma which decreases motivation to exercise and levels of physical activity.[32,33] Weight training among women should be destigmatized, as it has proven that weight training helps prevent metabolic syndrome, reduces body fat, improves metabolic rate, and reduces the risk of osteoporosis.[6,34,35] Head, foot, and leg injuries were more common among women compared to men, suggesting the importance of education on proper technique and the use of weights.

## LIMITATIONS

This study has several limitations, most of which are related to its retrospective nature and use of the NEISS database. The NEISS database does not consistently provide information about the type of exercise that resulted in injury. This information was provided in the narrative section, which was free response and varied in level of detail. The NEISS database also has a code for "weightlifting," but this code didn't ensure the injury was associated with strength training. Additionally, the NEISS database didn't account for chronic sequelae of weightlifting, which accounts for many weightlifting injuries. The inclusion of chronic weightlifting injuries would provide a more comprehensive estimate of injury prevalence. The NEISS database didn't include patients who presented to the urgent care first, leading to an underestimation of injury prevalence. Furthermore, retrospective data collection limited our ability to analyze confounding risks and allowed for selection bias.

## CONCLUSION

This study reveals stable weightlifting injury rates from 2014 to 2023, with a significant pandemic-related dip and subsequent recovery. Key findings include the predominance of injuries among males and young adults, the prevalence of core body injuries, and the high injury rates associated with common exercises like squats and bench presses. To reduce injury risk, we recommend implementing proper warm-up routines, emphasizing correct form and technique, starting with lighter weights, using spotters, and ensuring safe equipment and environments. Education on these practices should be tailored to different age groups and gender especially to address the increased injury rate among adolescents and young adults. Future research should focus on prospective studies to better understand causal relationships and long-term outcomes of weightlifting injuries. Additionally, efforts to promote safe weightlifting practices among women and older adults could help balance participation and reduce injury risks across demographics.

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## Ethical Approval

Ethical approval is not applicable for this article

## Disclosures

None

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# An Innovative Approach to Interprofessional Education: Medical Student-Nurse Partnerships in the Clinical Setting

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## ABSTRACT

**INTRODUCTION:** Effective interdisciplinary collaboration (IPC) between physicians and other healthcare professionals is critical for enhancing patient outcomes. However, achieving successful collaboration remains challenging. This study aimed to develop an interprofessional elective that explores its impact on medical students' understanding of nursing roles and enhances collaboration between medical students and registered nurse (RN) facilitators.

**METHODS:** In 2021, a clinical elective was offered to third- and fourth-year medical students at The Warren Alpert Medical School of Brown University. This 80-hour elective, delivered over two weeks, paired students with nurses on acute care units at Rhode Island Hospital. The program focused on improving the understanding of RN roles, communication skills, and developing collaborative partnerships. Surveys were administered to students and nurses before and after the elective to assess knowledge, skills, and attitudes regarding IPC.

**RESULTS:** Statistically significant improvements were observed in both students' and nurses' perceptions of nursing roles and interdisciplinary communication. Students demonstrated increased comfort in communicating with nurses and improved understanding of nursing duties. Nurses reported greater appreciation, with physicians placing importance in understanding their workflow. The majority of nurses agreed that the two-week duration was sufficient for students to gain meaningful insights into nursing practice.

**DISCUSSION:** This study is among the first to examine both medical students' and nurses' experiences during an interprofessional clinical elective. Findings suggest that such programs provide valuable insights into nursing workflows, improve communication, and foster mutual respect between disciplines. Despite some limitations, including a small sample size and single-site focus, the positive impact on both students and nurses supports the expansion of similar interprofessional electives. Future research should explore the long-term impact of these programs on collaborative behaviors.


**KEYWORDS:** Interprofessional education; Interprofessional communication; Professionalism; Teamwork; Interdisciplinary teams

## INTRODUCTION

Healthcare's evolving complexity and nature demands improved teamwork and collaboration between physicians and other healthcare disciplines to enhance patient outcomes. Effective interdisciplinary collaboration (IPC) benefits both patients and healthcare professionals by reducing medical errors, improving communication, and fostering job satisfaction. However, achieving successful collaboration remains challenging, despite its well-established benefits.[1,2]

The relationship between physicians and nurses is central to successful IPC, requiring consistent practices that promote mutual understanding and coordination.[2] Evidence-based IPC programs have the potential to improve communication, reduce misunderstandings, and foster cohesive, high-performing teams. While much of the existing literature focuses on physicians' perspectives, viewpoints of other disciplines, particularly nursing, remain underexplored.

Recognizing the value of a multidisciplinary perspective in structuring interprofessional education (IPE), this study aimed to develop an interprofessional elective to explore its impact on the knowledge, skills, and attitudes of participating medical students and registered nurse (RN) facilitators.

## BACKGROUND

Many healthcare and educational institutions utilize IPE to foster cross-disciplinary relationships that promote relationship-building across disciplines and prepare medical students for collaborative practice. IPE is effective in advancing appreciation for diverse disciplines and supporting unified care teams, but variability in its structure, timing, length, and continuity, poses challenges to its implementation.[3]

Key themes in designing effective IPE include the setting, which significantly impacts outcomes. Conducting IPE in clinical environments, like hospitals, offers distinct advantages over classroom-based learning.[1,4,5] It exposes students to real-world interactions with healthcare professionals, mirroring medical rotations and clinical practice, and enhances interdisciplinary communication, a concept central to IPE, across various specialties and patient populations.[1-3,6-9]

IPE programs benefit from a diverse pool of healthcare professionals, such as RNs, physiotherapists, social workers, and dietitians, to provide authentic practice-based learning

experiences.[4,9,10] While there is no consensus on the ideal number of disciplines students should engage with, focusing on one or two professions allows for more in-depth, interactive experiences.[1,2,5,8] For instance, collaborating with registered nurses specifically enables medical students to engage in multiple interprofessional interactions, fostering a more respectful understanding of holistic patient care. This deeper appreciation enhances IPC by overcoming barriers, reducing incivility, and fostering a culture of respect, ultimately improving the way physicians interact with nurses and other healthcare professionals.

The duration of IPE programs also influences outcomes, with experiences ranging from a few hours to several weeks.[1,8,9] While program length does not alter the overall trend of improved understanding, communication, and comfort working with nurses, students in shorter programs (single day or less) felt that extending the experience would enhance benefits. For example, a Dutch study found that a four-week clinical IPE program was a "powerful learning experience" and recommended it for all medical students early in their education (p. 681).[11]

The Institute of Medicine (IOM) has called for mixed-methods research that combines both qualitative and quantitative research, involving both health profession educators and system leaders to assess IPE's effects.[12] Core competencies for interprofessional collaboration underscore the importance of these initiatives.[6,12] This study aimed to answer that call by developing an interprofessional elective to evaluate its impact medical students' understanding of RN roles, nursing expertise, communication in the nurse-provider relationship, and collaborative partnerships. It also explored RN facilitators' perspectives, focusing whether their involvement benefitted not only student learning, but also their own professional growth and collaboration skills.

## METHODS

In 2021, we offered a clinical elective at The Warren Alpert Medical School of Brown University, to promote interprofessional interaction between third- and fourth-year medical students and nurses on inpatient acute care medical/surgical units at Rhode Island Hospital. The elective's learning objectives were: (1) gaining a deeper understanding of RN roles and responsibilities, (2) recognizing and valuing nurses' expertise, knowledge, skills, and contributions to the interdisciplinary team, (3) developing critical communication skills within the nurse-provider relationship, and (4) establishing collaborative partnerships with nurse colleagues.

### Interprofessional Practice: Nursing Perspective Elective

The elective, "Interprofessional Practice: Nursing Perspective", was developed by an interdisciplinary team of physicians and nurses. This 80-hour elective was offered to medical students throughout the academic year, delivered over two consecutive weeks. Each student shadowed up to two nurses on the nurses' home unit across multiple shifts to ensure continuity of their experience. This structure allowed researchers to adequately prepare nurse facilitators by outlining the elective's objectives and integrating the students into nursing workflows. The two-week format balanced the benefits of extended immersive experiences, as suggested in the literature, with the availability of nurse facilitators, particularly given the high demand on nurses to train new staff during peak periods without overwhelming the clinical team's resources.

This partnership allowed medical students to observe nurse facilitators performing patient care tasks and medical record documentation. In addition to observation, students actively engaged in hands-on skills (e.g., medical equipment use, dressing changes) and patient care (e.g., education, activities of daily living) under the nurses' guidance, offering a more experiential learning approach compared to a traditional curriculum. Exposure to skills was contingent upon the tasks that arose during the nurses' shifts. When possible, additional time was arranged for students to gain hands-on experience with intravenous (IV) insertion by working with a member of the hospital's vascular access team.

All medical students and their assigned nurse facilitators were invited to participate in the study assessing the impact of this elective, which was approved and deemed exempt by the Lifespan Institutional Review Board (IRB). Participants completed pre- and post-elective surveys to assess knowledge, skills, and attitudes. Student surveys focused on nurse roles and responsibilities, while nurse surveys addressed interdisciplinary collaboration. Demographic information was not collected. Surveys were administered via REDCap,[13] with unique identification (ID) codes linking responses to ensure anonymity. At the conclusion of the elective, students submitted a written reflective piece on their observations, highlighting insights into nursing expertise and opportunities for improved communication between disciplines.

### Participants

All 22 third- and fourth-year medical students who enrolled in this elective between January 2021 to June 2022 participated in the study, completing both the pre- and post-elective surveys. Forty-two nurses also participated in the study; however, eight did not complete the post-elective survey and were excluded from analysis. Nurses reported a mean of 7.12 years of nursing experience ($SD$ = 7.91) and a mean of 4.52 years of experience precepting ($SD$ = 5.88).

### Measures

Pre- and post-elective surveys were developed before the start of the elective by the interdisciplinary team of physicians and nurses who designed the elective. The surveys for medical students and nurses differed, with questions informed by team discussions, lived experiences in IPC,

and a review of relevant literature. All participants completed the same discipline-based surveys, regardless of clinical location/specialty. Participants rated their agreement with statements regarding (1) knowledge of nurse roles and responsibilities, (2) self-assessment of communication skills between the roles, and (3) attitudes towards interprofessional collaboration between medical students and nurses, using a five-point Likert scale (1 = Strongly Disagree, 2 = Disagree, 3 = Neutral, 4 = Agree, and 5 = Strongly Agree; see **Tables 1** and **2** for details). To assess the elective's utility, nurses were asked an additional question in the post-elective survey: "Do you think a two-week (80-hour) elective is an appropriate amount of time to provide medical students insight into the nursing profession?"

**Table 1.** Comparisons of Pre- and Post- Knowledge, Skills, and Attitude Items Among Nurses

| Item | Pre | Post | Significance |
|---|---|---|---|
| **Knowledge** – To what degree do you agree medical students in acute care, inpatient hospital settings understand: | | | |
| The registered nurse's (RN) role in admitting a patient | 3.00 | 3.88 | .000[a] |
| How RNs administer medication | 2.91 | 4.56 | .000[a] |
| The RN's patient assessment responsibilities throughout the day | 2.82 | 4.44 | .000[a] |
| What RNs document throughout the day | 2.53 | 4.15 | .000[a] |
| Common challenges RNs face in day-to-day patient care | 2.12 | 4.26 | .000[a] |
| RN involvement in the psychosocial needs of a patient | 2.71 | 4.38 | .000[a] |
| The expertise (training/experience) RNs "bring to the table" | 2.85 | 4.35 | .000[a] |
| How to partner with RNs as members of the interdisciplinary care team | 3.06 | 4.45 | .000[a] |
| This two-week (80-hour) interprofessional education clinical elective experience will support medical students to increase their understanding of the above-listed items. Indicate the level to which you agree | 4.09 | 4.34 | .092 |
| **Skills** – I am comfortable communicating with medical students about: | | | |
| Major concerns (decompensating patient, medication error) | 4.33 | 4.48 | .304 |
| Minor concerns (need for assistance in tasks, routine/non-urgent changes in plans of care) | 4.38 | 4.53 | .257 |
| **Attitudes** – Please indicate the extent you agree or disagree with the following statements: | | | |
| It is important that physicians understand the roles and responsibilities of an RN | 4.55 | 4.97 | .021[b] |
| It is helpful for patient care if physicians understand the roles and responsibilities of an RN | 4.58 | 4.97 | .030 |

[a] $p < .006$ [b] $p < .025$

## Analysis

Paired samples t-tests were used to compare survey responses pre- and post-elective. Significance levels were adjusted for multiple comparisons. The results from the analyses of pre- and post-survey items of nurses and students are presented in **Table 1** and **Table 2**, respectively.

# RESULTS

## Nurse Surveys

Statistically significant differences were observed between pre- and post-survey results regarding nurses' perceptions of medical students' knowledge of nursing roles and responsibilities. Across almost all items, the average level of agreement increased significantly, particularly in areas related to nurse duties, such as medication administration, patient assessment, documentation, and overall awareness of nursing training and expertise [**Table 1**]. This suggests that the elective experience improved nurses' perceptions of students' familiarity with nursing workflows. However, there were no significant changes in nurses' ease with communicating care-based concerns to medical students as they already expressed high comfort levels [**Table 1**]. Post-elective, nurses also placed significantly more importance on

**Table 2.** Comparisons of Pre- and Post- Knowledge, Skills, and Attitude Items Among Medical Students

| Item | Pre | Post | Significance |
|---|---|---|---|
| **Knowledge** – Please select the response option you most agree with for each of the following statements. I am confident that I can describe: | | | |
| The initial intake of a patient performed by a nurse | 2.23 | 4.36 | .000[a] |
| How a nurse administers a medication. | 2.36 | 4.86 | .000[a] |
| How a nurse assesses a patient throughout the day. | 2.36 | 4.82 | .000[a] |
| What a nurse needs to document throughout the day. | 2.36 | 4.55 | .000[a] |
| A common challenge that nurses face. | 2.72 | 4.91 | .000[a] |
| A nurse's involvement in the psychosocial needs of a patient. | 2.95 | 4.82 | .000[a] |
| **Skills** – I am comfortable communicating with a nurse about: | | | |
| Major concerns (decompensating patients, medication error) | 3.36 | 4.68 | .000[b] |
| Minor concerns (need for assistance in tasks, routine/non-urgent changes in plans of care) | 3.72 | 4.50 | .000[b] |
| **Attitudes** | | | |
| It is important that physicians understand the roles and responsibilities of a RN | 5.00 | 5.00 | N/A |
| It is helpful for patient care if physicians understand the roles and responsibilities of a RN | 5.00 | 5.00 | N/A |

[a] $p<0.008$ [b] $p<0.025$

physicians understanding of nursing roles. After adjusting for multiple comparisons, a non-significant increase was found concerning perceptions of helpfulness in achieving this understanding (**Table 1**].

Regarding the elective's duration, 70.6% of nurses felt the two-week (80-hour) elective was sufficient to provide medical students with insight into nursing, while 29.4% felt it was too short; none indicated it was too long.

### Student Surveys

Statistically significant differences were found between pre- and post-survey results regarding students' self-perception of nursing knowledge. Across all areas, the average agreement increased, particularly in understanding nursing assessments, tasks, and daily challenges suggesting improved familiarity with nursing workflows. Students also demonstrated increased comfort in communicating with nurses about both minor and major care concerns. No differences were observed in attitude items, as all respondents strongly agreed on the importance and helpfulness of understanding nursing roles and responsibilities both pre- and post-survey [**Table 2**].

## DISCUSSION

This study is among the first to examine the experiences of both medical students and nurses during an interprofessional clinical elective, an area unexplored in existing literature. Results indicate that students gained valuable insights into nursing workflows and communication strategies, while nurses expressed satisfaction with the students' growth in these areas and its potential impact on future practice. Notably, many medical students reported low confidence in articulating the basic nursing functions before the elective, highlighting the importance of such programs in bridging the knowledge gap and fostering a deeper understanding of the nursing role. These findings suggest that both nurses and students benefited from the experience, promoting interprofessional collaboration and underscoring the value of parallel perspectives in shaping clinical rotations led by experienced nurse facilitators.

At the start of this study, it was uncertain whether nurses would view the experience as solely beneficial to the students or if it might contribute to additional stress or burnout. Surprisingly, nurses expressed satisfaction with the experience, often highlighting the value of "feeling seen" and appreciated for the expertise they contribute to patient care. This raises an interesting point about why some students chose this elective. Anecdotally, several students were initially drawn to the elective through encouragement from a nurse friend or family member. However, after completing the elective, many students expressed the belief that all medical students should participate, recognizing its significant value in enhancing their understanding of nursing roles and interprofessional collaboration.

Many medical students shadowing experiences with nurses are brief, often lasting one or two shifts, and typically involve first- or second-year students. What distinguishes this elective is its extended duration, designed for third- and fourth-year medical students. As students advance in their training, their perspectives on IPC evolve significantly. It is reasonable to assume that clinical experiences and observations of interprofessional communication at this later stage of their education play a crucial role in shaping their perspectives in meaningful ways.

## LIMITATIONS

Despite a high response rate, the transferability of this study is limited by its small sample size and single hospital site. The study benefitted from established physician and nurse leader partnerships and active involvement throughout planning, implementation, and evaluation. Institutions without these relationships may need to foster them before conducting similar studies or electives. These limitations may affect the generalizability of implementing such experiences at other academic and acute care institutions.

### Recommendation

It is recommended that medical schools, including The Warren Alpert Medical School of Brown University, continue offering immersive clinical interprofessional experiences for medical students. The authors also advocate for extending these experiences to physicians-in-training (residents) in Graduate Medical Education programs. Future studies should investigate whether these changed perspectives lead to long-term adoption of collaborative practice behaviors and explore qualitative aspects for deeper context of findings. Additionally, institutions should explore resources to support making interprofessional electives a required component of medical education.

## CONCLUSION

In conclusion, this study highlights the potential advantages of immersive, interprofessional clinical electives that pair medical students with experienced nurse facilitators. These experiences enhance understanding of nursing roles, improve communication between disciplines, and foster mutual respect and collaboration. Findings suggest that extending such electives could strengthen interprofessional relationships within healthcare teams. Despite some limitations, the positive impact on both student and nurse perspectives supports further investigation and expansion of similar programs.

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# Politics v. Applicants: Effects of the *Roe v. Wade* Overturn on Prospective MFM Fellowship Applicants

MEGAN M. LOBEL, MD; ADAM K. LEWKOWITZ, MD, MPHS; DAYNA A. BURRELL, MD


## ABSTRACT

**OBJECTIVE:** To assess how the overturn of *Roe v. Wade* affected decisions of Maternal-Fetal Medicine (MFM) fellowship applicants.

**METHODS:** This is a cross-sectional survey distributed to MFM fellowship applicants in the 2024 Match appointment cycle. The dual primary outcome was whether the overturn of *Roe v. Wade* affected the number and geographic distribution of MFM programs to which the applicants planned to apply and applicants' desire to receive dilation and evacuation (D&E) training during fellowship.

**RESULTS:** A total of 167 individuals applied to MFM fellowships in the 2024 Match appointment cycle. Thirty-seven applicants (22%) responded to our survey. Most identified as women (84%) and White (73%). While most participants planned to apply to the same number of programs (65%), 68% of participants planned to apply to fewer programs in abortion-restrictive states. Most participants (89%) were interested in receiving D&E training during fellowship.

**CONCLUSION:** These findings highlight the need for further assessment of how abortion restrictions impact MFM fellowship application, training, and practice.


**KEYWORDS**: Abortion; *Roe v. Wade*; Reproductive justice; Reproductive rights; MFM

## INTRODUCTION

Since the 2022 overturn of *Roe v. Wade* by the *Dobbs* decision, 21 US states either entirely ban or severely restrict abortion to earlier gestations (categorized hereafter as abortion-restrictive states). In order to continue providing reproductive healthcare in abortion-restrictive states, clinicians are forced to navigate these new laws while facing threats to their medical license, felony charges, or even prison sentences. This has led to an exodus of reproductive healthcare providers from abortion-restricted states and growing numbers and size of maternity-care deserts.[1]

These new restrictions changed not only clinical practice but medical education. Abortion bans created a dearth of abortion training opportunities for residencies and fellowships located within restricted states. As a result, residency applications to abortion-restrictive states declined 10.5% after the overturn of *Roe v. Wade* compared to the year prior.[2,3] Given roughly half of Graduate Medical Education graduates typically practice in the state where they trained,[4] the trends in obstetrics and gynecology (OB-GYN) residency preferences may affect the number of abortion providers in vulnerable regions for years to come.

Though the majority of abortions are performed during the first trimester by OB-GYNs, family medicine practitioners and advanced practice clinicians, Maternal Fetal Medicine (MFM) subspecialists have the unique ability to provide abortions for their patients with complex pregnancy complications that tend to occur beyond early gestational age restrictions (previable pre-labor rupture of membranes, fetal genetic and anatomic anomalies, complications of monochorionic twin pregnancies, critical maternal illness, etc.).[5] This requires advanced surgical skills in the form of dilation and evacuation (D&E) training that is typically obtained during OB-GYN residency or subsequent fellowships. While the initial impact of this legislative change on OB-GYN residency applications has been explored, the potential association between the overturn of *Roe v. Wade* and MFM fellowship application patterns remains unknown. We aimed to assess the extent to which the overturn of *Roe v. Wade* is associated with the application decisions of future MFM fellows.

## MATERIALS AND METHODS

We distributed a cross-sectional survey to prospective MFM fellowship candidates applying for the Match cycle conducted in 2023 for appointments beginning in 2024. Based on data reported by the National Resident Matching Program, we aimed to collect survey responses from the 167 individuals who applied to MFM fellowship in the 2024 Match appointment year cycle.[6] Basic participant demographic data was collected with each survey response. We sent the survey link to US OB-GYN residency program directors to distribute to those planning to apply into MFM for the 2024 appointment year (typically physicians completing postgraduate year 3 or postgraduate year 4 of residency training). Additionally, we circulated the survey electronically to all Society for Maternal Fetal Medicine members in March 2023. The dual primary outcome of this study was changes

**Table 1.** Participant demographic characteristics

| | n = 37 (%) |
|---|---|
| **Age** | |
| 26–30 years | 23 (62%) |
| 31–35 years | 14 (38%) |
| **Gender** | |
| Woman | 31 (84%) |
| Man | 6 (16%) |
| Transgender woman/man/nonbinary/other/ prefer not to respond | 0 (0%) |
| **Race** | |
| American Indian/Alaska Native | 0 (0%) |
| Asian | 5 (14%) |
| Black/African American | 3 (8%) |
| Native Hawaiian or Other Pacific Islander | 0 (0%) |
| White | 27 (73%) |
| Other | 2 (5%) |
| Hispanic/Latino ethnicity | 4 (11%) |
| **Year in training** | |
| Post-graduate year 3 | 30 (81%) |
| Post-graduate year 4 | 4 (11%) |
| Other | 3 (8%) |
| **Hometown location** | |
| Northwest | 3 (8%) |
| Southwest | 5 (14%) |
| Midwest | 9 (24%) |
| Northeast | 11 (30%) |
| Southeast | 5 (14%) |
| Outside the US | 4 (11%) |
| **Residency program location** | |
| Northwest | 1 (3%) |
| Southwest | 3 (8%) |
| Midwest | 15 (42%) |
| Northeast | 13 (36%) |
| Southeast | 4 (11%) |

to the number and geographic distribution of MFM programs to which the applicants planned to apply, as well as applicants' desires to receive D&E training during MFM fellowship. To achieve these outcomes, we developed a novel survey with questions that would characterize changes in the applicants' intentions with respect to the impact of abortion restrictions on their decision-making. The survey data was anonymous; thus, we obtained a waiver of consent from our institution's IRB (WHI 23-0013).

**Table 2.** Survey questions and responses

| | n = 37 (%) |
|---|---|
| **Has the overturn of Roe affected how you are planning to apply into MFM fellowship?** | |
| Yes | 21 (57%) |
| No | 12 (32%) |
| Unsure | 4 (11%) |
| **Overall, I plan to apply to:** | |
| Fewer programs | 6 (16%) |
| More programs | 7 (19%) |
| The same number of programs | 24 (65%) |
| **When considering applying to fellowships in abortion-restrictive states, I plan to apply to:** | |
| Fewer programs | 25 (68%) |
| More programs | 1 (3%) |
| The same number of programs | 11 (30%) |
| **When considering applying to fellowships in abortion-accessible states, I plan to apply to:** | |
| Fewer programs | 1 (3%) |
| More programs | 18 (49%) |
| The same number of programs | 18 (49%) |
| **What types of abortion education/training have you received in residency (select all that apply):** | |
| Medical management of abortion | 36 (97%) |
| Manual vacuum aspiration | 37 (100%) |
| Suction dilation & curettage | 36 (97%) |
| Dilation & evaluation | 33 (89%) |
| **Are you interested in receiving dilation & evacuation training during your fellowship?** | |
| Yes | 32 (87%) |
| No | 3 (8%) |
| Undecided | 2 (5%) |

## RESULTS

Of the 167 MFM Fellowship applicants, we received a representative sample of 37 survey responses (22%). Most participants identified as women (85%), 30 years or younger (62%), and White (73%) [**Table 1**]. Each region of the US was represented with respect to participants' hometown; however, most survey participants were undergoing training in the Midwest (9) or the Northeast (11).

The overturn of *Roe v. Wade* was associated with changes in MFM fellowship applicant decisions based on survey responses [**Table 2**]. Specifically, though the majority of participants planned to apply to the same number of programs (24), 25 participants planned to apply to fewer programs located in abortion-restrictive states, and 18 participants planned to apply to more programs in abortion-accessible states. Furthermore, most participants (33) expressed interest in receiving D&E training during MFM fellowship.

## DISCUSSION AND CONCLUSIONS

These survey results highlight potential impacts that abortion restrictions can impose on future MFM fellowship applicants. While many factors may contribute to applicants' decisions on how to apply, there appear to be personal and professional motivations tied to the accessibility of abortion care. MFM fellowship applicants may disproportionately avoid seeking training in abortion-restrictive states where D&E training is limited, thus leaving programs in restricted states with fewer candidates from which to select potential fellows. Our findings suggest that MFM fellowship programs may benefit from directly addressing and securing the ability to access D&E training during MFM fellowship in order to attract more candidates.

The low survey response serves as a limitation in drawing significant conclusions and introduces the risk of selection and sampling bias. With this method of survey distribution, program directors could choose whether to circulate the survey and applicants who chose to respond to the survey may have been more committed to opinions on abortion care based on their personal values or current training. Therefore, additional larger studies are needed to further assess the impact of the *Dobbs* decision on MFM fellowship application, training, and practice. As abortion care accessibility in the US declines, these findings point to potential long-term implications for the future of reproductive health practices and the availability of clinicians capable of providing advanced abortion procedures, including MFM subspecialists. As MFM fellows are future leaders within the field, further investigation should be conducted to assess the impact of abortion restrictions on MFM fellowship graduates as they seek employment after fellowship.

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# Gabapentin: Perspective on Its Use as a Postoperative Analgesic by Colorectal Providers

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## ABSTRACT

Gabapentin (Gb) is increasingly used in postoperative pain management largely to reduce opioid use but without a strong evidence base. There is no literature available to understand why and how surgeons use gabapentin. We surveyed 85 NESCRS (New England Society of Colon and Rectal Surgeons) members by email (August–October 2024). Of the 32 responses (38% response rate), 28 were included: 68% were colorectal surgeons, 18% were advanced practice providers, 39% were female, 46% were aged 31–50 years, and 68% were White. Commonly prescribed analgesics were opioids (96%), acetaminophen (93%), nonsteroidal anti-inflammatory drugs (68%), and Gb (57%). Providers believed Gb reduced opioid use (75%), provided analgesia (54%), and decreased ileus (39%), length of stay (21%), and delirium (4%). Experienced providers more often reported that Gb's benefits outweighed its risks (69%), reduced postoperative opioid use (46%), or that they were confident in managing Gb-related adverse effects (38%), compared with 63, 18, or 27%, respectively (p-value=1.00,0.21, or 0.67). Overall, colorectal providers acknowledge Gb's potential benefits and associated risks as a postoperative analgesic.

**KEYWORDS:** delirium; geriatric; ileus; KAP; gabapentinoid

## INTRODUCTION

Gabapentin, originally approved by the FDA for seizure disorder and neuropathic pain, has demonstrated benefits in chronic pain conditions, such as postherpetic neuralgia and diabetic neuropathy.[1] More recently, its off-label use for acute postoperative pain has gained traction, supported by randomized controlled trials (RCTs) in orthopedic, scrotal, and spinal surgeries.[2-5] Unfortunately, it is also being misused as a drug of abuse since the early 2000s.[6]

Yet, conflicting evidence persists: inflammatory bowel disease, orthopedic, thyroidectomy, and cardiac populations revealed no significant reductions in postoperative pain or opioid use.[7-10] Moreover, the potential for adverse events, including a higher incidence of delirium (3.4% vs 2.6% in non-users) in older adults (aged 65 and above), underscores the need to be thoughtful about patient selection and dosing protocols.[11]

Despite inconsistencies, gabapentin remains a key component of multimodal analgesia strategies, particularly within Enhanced Recovery After Surgery (ERAS) protocols.[12] ERAS guidelines for elective colorectal surgery recommend an opioid-sparing analgesic approach, using scheduled acetaminophen, non-steroidal anti-inflammatory drugs, and gabapentin to improve postoperative outcomes (e.g., shorter time to return of bowel function and length of stay (LOS)).[13] However, standardized dosing strategies and clear indications for perioperative gabapentin remain elusive.[14] As a result, many institutions rely on anecdotal approaches, potentially exposing patients to unnecessary risks while aiming for the benefits of multimodal analgesia.[15,16]

Despite gabapentin's frequent inclusion in ERAS protocols, there is a critical lack of data on the Knowledge, Attitudes, and Practices (KAP) of colorectal providers regarding its use.[17] This study addresses that gap by examining the decision-making of colorectal surgery teams regarding the purported analgesic and opioid-sparing advantages of gabapentin against potential safety concerns in everyday clinical practice. We aim to inform evidence-based guidelines and optimize postoperative pain management strategies.

## METHOD

### Study Participants

This cross-sectional study targeted colorectal surgeons and advanced practice providers (APPs), including nurse practitioners (NPs) and physician assistants (PAs) practicing in Maine, Vermont, New Hampshire, Massachusetts, Connecticut, and Rhode Island who were members of the New England Society of Colon and Rectal Surgeons (NESCRS). Ethical approval was obtained from the Institutional Review Board at Rhode Island Hospital (IRB No. 2057553-3). Participant confidentiality and data security were rigorously maintained by removing identifiers before analysis, and no incentives were offered for participation. Participants were engaged in clinical inpatient care for at least 50% of their time, and they were engaged in the care of inpatient surgical patients undergoing colorectal surgeries for at least 50% of their time.

### Study Setting, Design, and Procedure

From August to October 2024, a self-reported Knowledge, Attitude, and Practice (KAP) survey was administered anonymously to 85 eligible NESCRS members, including colorectal surgeons, nurse practitioners (NPs), and physician assistants (PAs). The survey was delivered through REDCap©, a secure electronic platform.[18]

### Survey Development

A multidisciplinary research team – comprising a geriatrician specializing in postoperative colorectal care (AR), a statistician with postdoctoral training in epidemiology (JFM), a master's student in public health (MZ), two colorectal surgeons (SS and MV), and an additional geriatrician experienced in surgical co-management services (LM) – developed the questionnaire, based on validated scales and guided by ERAS recommendations.[13,19] The survey items were designed to capture clinicians' understanding of gabapentin's mechanism of action, postoperative pain management potential, recommended dosing strategies, and known side effects.

### Pilot-Testing

Before distribution, the survey was pilot-tested with five physicians from the Division of Geriatrics and Palliative Care Medicine and one physician from the Division of General Surgery. Feedback regarding question relevance, duplication, and response-option clarity was collected via email. Revisions were then incorporated to enhance clarity and relevance.

### Survey Instrument

The final instrument consisted of 27 questions, primarily closed-ended with "Yes/No" or Likert-scale response options, requiring approximately 10–20 minutes to complete.[20] One open-ended question allowed respondents to provide comments, concerns, or suggestions about balancing the risks and benefits of gabapentin prescribing. Demographic information (age, gender, race, years of experience) and practice characteristics were also collected.

### Data Collection and Analysis

All survey responses were recorded anonymously. Each item was reviewed by the research team for technical accuracy and completeness before data analysis. Four participants were excluded because they did not dedicate at least 50% of their time to inpatient colorectal surgery care. Descriptive statistics were then used to evaluate participants' knowledge, attitudes, and practices regarding gabapentin in colorectal surgical care; analyses were performed using SAS software.[21] Chi-square and Fisher's exact tests were employed to assess respondents' approaches to several postoperative analgesics for colorectal surgery patients.

## RESULTS

### Demographic characteristics of participants

Of the 32 returned surveys (38% response rate), four were excluded for devoting less than 50% of their time to inpatient colorectal surgery care. The final analytical sample included 28 participants, predominantly colorectal surgeons (19/28, 68%) and advanced practice providers (5/28, 18%), while 4 (14%) preferred not to specify their professional role. Among the respondents, nine were male colorectal surgeons, five were female colorectal surgeons, and four were female APPs. One APP and three colorectal surgeons did not respond to the gender question. Most respondents were female (11/28, 39%), aged 31–50 years (13/28, 46%), and White/Caucasian (19/28, 68%), with a smaller proportion identifying as Hispanic or Latino (2/28, 7%). Nearly half (13/28, 46%) reported having 10 or more years of clinical experience as colorectal surgeons or APPs. [**Table 1**]

**Table 1.** Baseline characteristics of the surveyed colorectal surgeons, or advanced practice providers (including nurse practitioners and physician assistants) members of the New England Society of Colon and Rectal Surgeons, New England region, August to October 2024.

| Participants' characteristics | n, (%) |
|---|---|
| **Age** | |
| 31–50 | 13 (47%) |
| 51–70 | 11 (39%) |
| Prefer not to answer | 4 (14%) |
| **Gender** | |
| Male | 9 (32%) |
| Female | 11 (39%) |
| Prefer not to answer | 8 (29%) |
| **Race/ethnicity** | |
| White or Caucasian | 19 (68%) |
| Hispanic | 2 (7%) |
| Other race | 2 (7%) |
| Prefer not to answer | 5 (18%) |
| **Practitioner type** | |
| CS | 19 (68%) |
| APP(a) | 5 (18%) |
| Prefer not to answer | 4 (14%) |
| **Number of years of experience as a CS or APP** | |
| At least 1 year but less than 3 years | 3 (11%) |
| At least 3 years but less than 5 years | 4 (14%) |
| At least 5 years but less than 10 years | 4 (14%) |
| 10 years or more | 13 (47%) |
| Prefer not to answer | 4 (14%) |

Notes: a) APP includes NPs and PAs members of the New England Society of Colon and Rectal Surgeons.

Abbreviations: APP – advanced practice providers; CS – colorectal surgeons; NP – nurse practitioners; PA – physician assistants.

### Influence of Provider Experience

Participants with fewer years in practice indicated greater familiarity and a more favorable attitude toward gabapentin's effectiveness (55% vs. 46%; p-value=0.6820). Those with more than 10 years of experience were more likely to believe the benefits of gabapentin outweigh the risks (69% vs. 63%; p-value=1.000), to express confidence in managing potential adverse effects (38% vs. 27%; p-value=0.6792), and to assert that gabapentin reduces overall postoperative opioid use (46% vs. 18%; p-value=0.2108). Although these differences were not statistically significant, they suggest a trend in how clinical experience may shape perceptions of gabapentin's role in perioperative pain management. [**Figures 1,2**]

**Figure 1.** Overall attitude toward the effectiveness of gabapentin in managing pain as a postoperative analgesic, and the potential benefits of gabapentin outweigh the risk, among CS, or APP members of the New England Society of Colon and Rectal Surgeons, New England region, August to October 2024.

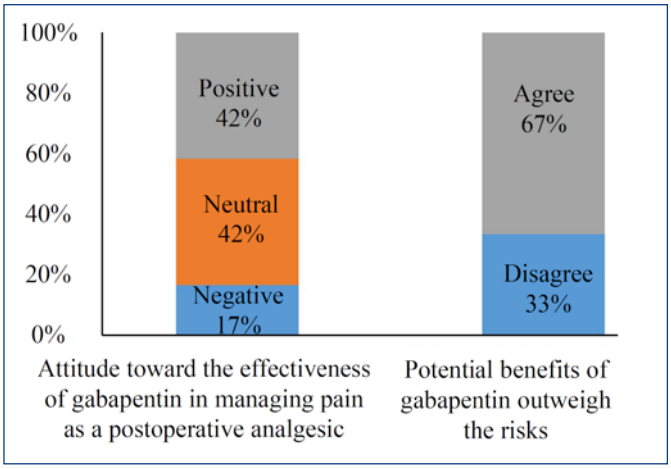
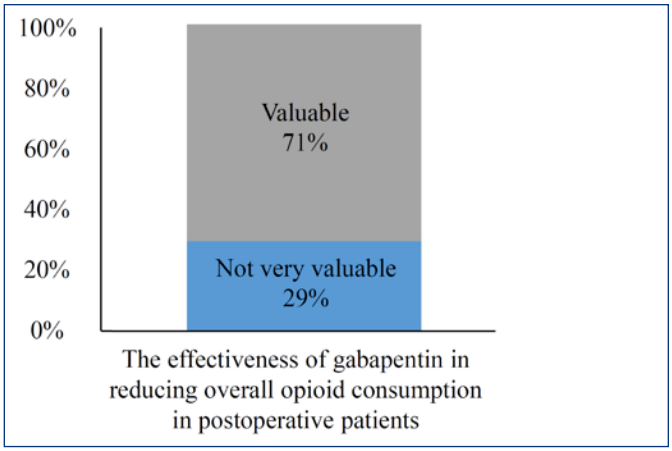



**Figure 2.** How valuable gabapentin is for reducing the overall opioid consumption of postoperative patients among CS, or APP members of the New England Society of Colon and Rectal Surgeons, New England region, August to October 2024.




### Commonly Prescribed Analgesics

When queried about their usual postoperative pain management for colorectal surgery patients, the vast majority reported prescribing opioids (27/28, 96%) and acetaminophen (26/28, 93%), followed by NSAIDs (19/28, 68%), gabapentin (16/28, 57%), and topical anesthetics (11/28, 39%).

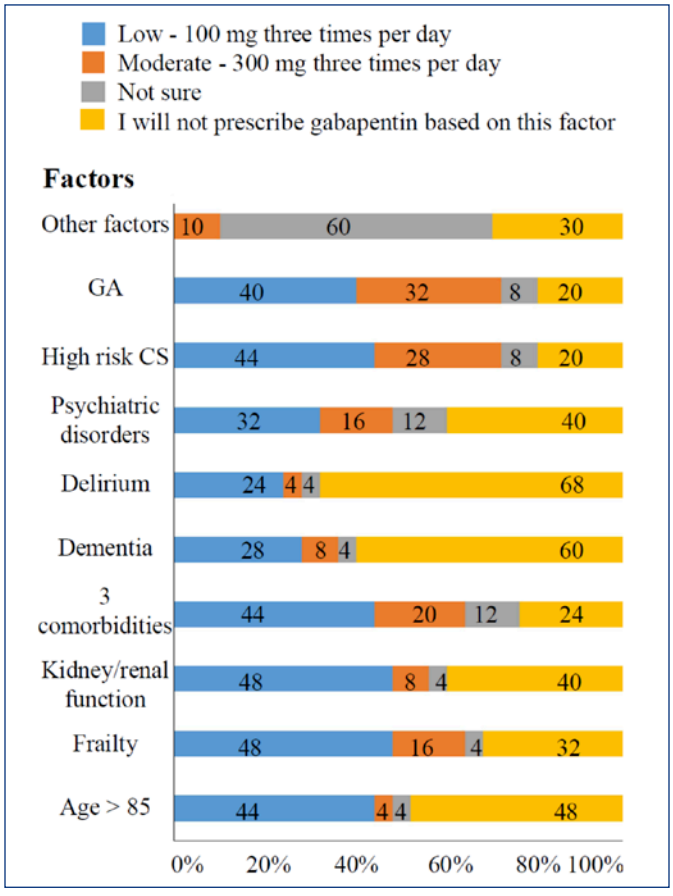
### Factors Modifying Analgesic Regimens

Participants identified the top three patient-related factors prompting them to modify their usual use of: 1) Opioids: delirium (23/28, 82%), age over 85 (22/28, 79%), and dementia (21/28, 75%); 2) NSAIDs: renal insufficiency (18/28, 64%), age over 85 (11/28, 39%), and frailty (5/28, 18%); 3) Gabapentin: age over 85 (13/28, 46%), delirium or dementia (each 11/28, 39%), and frailty (7/28, 25%). [**Figure 4**]

### Pain Assessment Scales

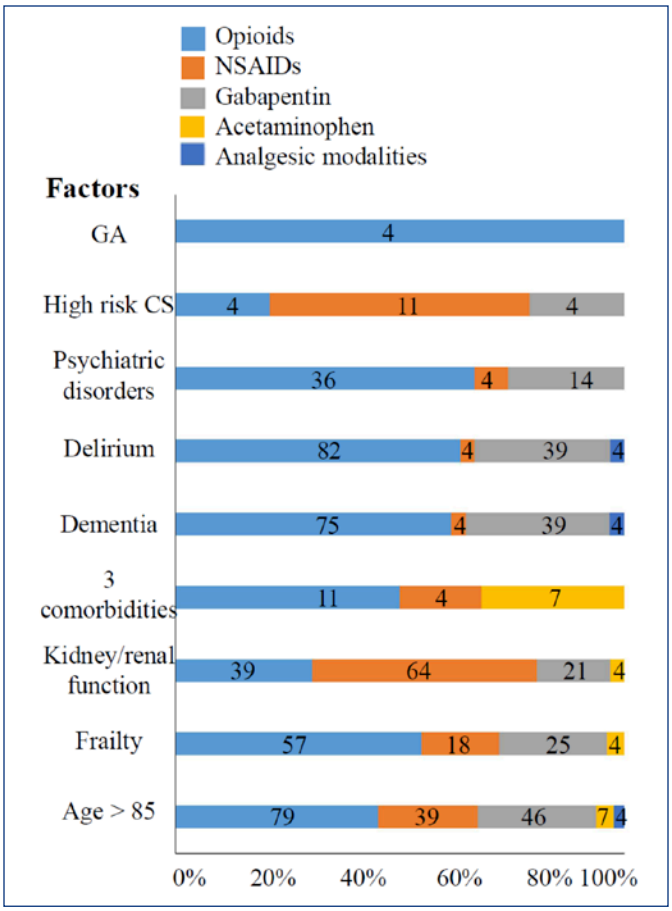
The most commonly used pain assessment tool was the Numerical Rating Scale (NRS) (17/28, 61%), followed by the Visual Analog Scale (VAS) (6/28, 21%), Faces Pain Scale (FPS)

**Figure 3.** Typical dosage of gabapentin prescribed based on different factors among CS, or APP members of the New England Society of Colon and Rectal Surgeons, New England region, August to October 2024.




Abbreviations: APP – advanced practice providers; CS – colorectal surgeons; GA – General anesthesia; NP – nurse practitioners; PA – physician assistants.

**Figure 4.** Factors that would cause the practitioners to modify the analgesic modalities regimen among CS, or APP members of the New England Society of Colon and Rectal Surgeons, New England region, August to October 2024.




(5/28, 18%), and Verbal Rating Scale (VRS) (3/28, 11%). Two respondents (7%) did not utilize any of these standardized measures.

### Gabapentin-Prescribing Patterns and Dosage Influences

Nearly all respondents (27/28, 96%) reported prescribing gabapentin as a postoperative analgesic for colorectal surgery; 11 (40%) did so frequently. When determining dosage, 25 respondents considered the following common factors: a) no dose: delirium (17/25, 68%), dementia (15/25, 60%), and age over 85 (12/25, 48%); b) low dose (100mg): frailty and renal impairment (each 12/25, 48%), followed by age over 85, dementia, or high-risk colorectal surgery (each 11/25, 44%); c) moderate dose (300 mg): general anesthesia (8/25, 32%), high-risk colorectal surgery (7/25, 28%), and three or more comorbidities (5/25, 20%). [**Figure 3**]

### Potential Side Effects and Management

The side effects of gabapentin most frequently reported by participants included sedation (21/28, 75%), delirium (18/28, 64%), dizziness (12/28, 43%), nausea or vomiting (4/28, 14%), and leg swelling (2/28, 7%). Among 25 respondents who indicated how they managed such adverse effects, 64% rarely encountered them, whereas 36% sometimes did. 80% of those who observed side effects stopped administering gabapentin entirely, 16% reduced dosage, and 4% consulted a hospitalist or geriatrician. Post-discharge, 76% discontinued gabapentin, while 12% continued it as initially prescribed.

### Perceived Benefits

When asked about gabapentin's main perceived advantages as a postoperative analgesic, 21 respondents (three-quarters of the sample) highlighted the potential for reducing opioid use, followed by improved pain control (15/28, 54%), reduced ileus (11/28, 39%), decreased length of stay (6/28, 21%), and minimized delirium (1/28, 4%).

### Overall Perspective Regarding Gabapentin Use

Three respondents answered the open-ended question regarding balancing the risks and benefits of gabapentin prescribing. Across these comments, participants highlight a preference for minimizing opioid use in postoperative pain management, often aiming to discharge patients on non-opioid medications (e.g., acetaminophen). One participant specifically noted that gabapentin is seldom required due to effective alternatives such as Transversus Abdominis Plane blocks and intravenous acetaminophen. They particularly mentioned using gabapentin for opioid-tolerant patients, assuming they would have a low tolerance to pain. Another emphasized that these practices – favoring reduced narcotics and selective use of gabapentin – stem from guidance received during fellowship training.

## DISCUSSION

Gabapentin has gained prominence as part of multimodal postoperative pain management strategies, largely due to a belief that it has the potential to reduce perioperative opioid consumption.[3,4,22,23] While RCTs in orthopedic, thoracic, breast, and thoracotomy surgeries have demonstrated an opioid-sparing effect, its direct analgesic benefit remains less consistent.[5] A meta-analysis by Arumugam et al that included procedures such as abdominal hysterectomy, breast cancer surgery, cholecystectomy, and thyroidectomy similarly concluded that gabapentin significantly reduces opioid requirements, although data on its impact on pain scores were more variable.[23]

Despite this growing body of evidence, there is a notable paucity of studies focusing on older adults, a population especially vulnerable to gabapentin's known central nervous system side effects.[11] As gabapentin is also on the Beers List of potentially inappropriate medications for older adults, its safety profile in elderly patients warrants particular

caution.[11,24] This knowledge gap is of concern for surgeons seeking to balance effective pain control with the need to minimize delirium and other adverse events.

Our survey findings provide insights into how colorectal providers navigate these considerations. Although the overwhelming majority (96%) reported using gabapentin, only 40% did so frequently, indicating that concerns regarding sedation, delirium, and dizziness – consistent with prior findings – likely moderate its use.[9-11] Prescribing patterns regarding opioid and gabapentin use were influenced by patient age, dementia, delirium, and frailty, while the use of NSAIDs was primarily driven by renal function. Providers were also mindful of the dose of gabapentin that was being prescribed. Participants highlighted age >85 years, dementia, and delirium as key factors deterring them from prescribing gabapentin, aligning with the broader caution urged in the geriatric population.[11] They also reported tailoring gabapentin doses between 100mg and 300mg based on comorbidities such as frailty and renal dysfunction, echoing an individualized approach recommended in ERAS protocols.[13]

Regarding providers' attitudes toward gabapentin, our data suggest that both newer and seasoned clinicians see its potential value in minimizing opioid use, working as an analgesic, as well as reducing ileus, hospital length of stay, and delirium – a finding that mirrors current clinical guidelines.[2] A majority of the providers discontinued gabapentin post-discharge, which aligns with the goal of its use post-operatively. Less-experienced clinicians were more apt to endorse gabapentin's analgesic utility, whereas those with a decade or more of experience were more inclined to believe its overall benefits outweigh its risks and felt confident managing complications. Although these differences were not statistically significant, they underscore how clinical experience and familiarity may influence risk-benefit assessments of perioperative gabapentin.

Lastly, our study investigated providers' practices regarding gabapentin use. Along with opioids, Acetaminophen, and NSAIDs, we found surgical teams using gabapentin for pain management. They reported multiple factors affecting their choice of pain medication, including age and comorbidities (e.g., dementia, delirium, renal function). They were more comfortable prescribing low doses (100mg), being mindful of frailty, renal function, age, dementia, or high-risk colorectal surgery. The providers were comfortable with a moderate dose (300mg), considering the use of general anesthesia, high-risk colorectal surgery, and patients with ≥3 comorbidities, which likely represents sicker patients with a need for more careful and multimodal pain management.[25,26]

To reduce the use of opioid analgesics in acute pain, multimodal analgesia with the use of non-opioid medication is often implemented to optimize pain management while mitigating adverse side effects.[27] Transversus abdominis plane (TAP) blocks, which one of our respondents noted, offer superior localized pain control while reducing the need for systemic opioids.[28,29] Compared to gabapentin, which is often used as an adjunct for neuropathic pain relief and multimodal analgesia, TAP blocks provide more targeted pain relief.[30] As the respondent mentioned, TAP blocks, along with intravenous acetaminophen, have become more commonly employed as part of enhanced recovery protocols.[31] These methods may contribute to better pain control and shorter hospital stays compared to reliance on general anesthesia and systemic analgesics alone.[32] However, while TAP blocks effectively manage somatic pain, gabapentin remains relevant in addressing neuropathic pain components, highlighting the importance of individualized pain management strategies.[33,34] Concurrent use of acetaminophen, lidocaine patches, and regimens, including NSAIDs and gabapentin, might also reduce the need for opioid medication, but the side effect profile still requires attention.[35] Of note, most providers discontinued gabapentin at discharge, reflecting its key role in immediate postoperative pain management while avoiding long-term medication.[36,30,37] This practice aligns with the principle of multimodal analgesia under ERAS guidelines, which encourage the use of non-opioid analgesics to expedite recovery while limiting opioid dependence.[13,38] Nevertheless, the lingering concerns about delirium risk, particularly in older adults, highlight the need for more robust randomized control trials – focusing on both efficacy and safety – to guide perioperative gabapentin use in this vulnerable group.[11]

## LIMITATIONS

Several limitations should be acknowledged. First, our survey is geographically confined to a single region, limiting generalizability to other settings.[39] Second, the modest response rate (38%) raises the possibility of response bias, wherein those with strong opinions regarding gabapentin might have been more motivated to participate.[40] Third, we focused on colorectal surgery providers; thus, these findings may not reflect practices in other surgical specialties with differing patient populations.[41] Finally, this cross-sectional design precludes causal inferences, and further prospective or randomized studies are needed to clarify optimal dosing and patient selection for gabapentin in postoperative pain management.[42]

## CONCLUSION

In summary, most colorectal surgeons and advanced practice providers in our study recognized gabapentin's potential to reduce opioid use and offered favorable views on its role in postoperative analgesia. Yet the perceived risk of adverse effects – particularly in older, frail, or cognitively impaired patients – limits its routine application. Given the growing emphasis on multimodal analgesia in Enhanced Recovery After Surgery protocols, further high-quality research is necessary to establish evidence-based guidelines for safe, effective gabapentin use, especially in vulnerable populations.[43,44]

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# Renal AA Amyloidosis

JIE TANG, MD, MPH


## ABSTRACT

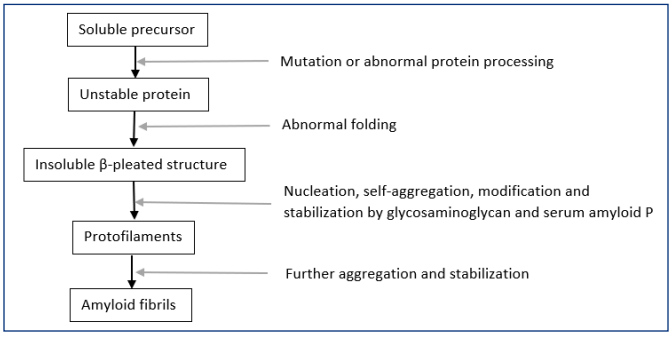
Amyloidosis is a rare systemic condition caused by extracellular deposition of misfolded fibrillary protein aggregates leading to progressive organ dysfunction. The kidney is a common site of amyloid deposition, with variable clinical presentations. Here, we will review pathophysiology, clinical manifestation, diagnosis and management of renal AA amyloidosis. Although significant progress has been made in understanding the disease pathophysiology and improving diagnostic yield, the treatment options remain limited, and the overall prognosis depends on the control of underlying inflammation.


**KEYWORDS:** Amyloidosis, serum amyloid A, chronic inflammation

## INTRODUCTION

Amyloidosis is a rare but serious systemic disorder caused by deposits of pathogenic aggregates of misfolded proteins called amyloid in organs and tissues. Due to the conformational changes, soluble peptides in their normal configurations turn into a common insoluble fibrillar appearance with a structure rich in anti-parallel β-pleated sheet. The pathological process starts with a nucleation after a critical concentration of amyloid protein is reached, followed by aggregation and rapid expansion in the extracellular matrix, ultimately generates protofilaments that interact to form fibrils [**Figure 1**].[1] Both glycosaminoglycan and serum amyloid P can stabilize the structural changes in amyloid precursors to promote fibrillogenesis and prevent proteolysis/degradation.[2,3] Once formed, all amyloid proteins share a characteristic tinctorial property, showing an apple-green birefringence when observed under polarized light after Congo red staining or a yellow–green fluorescence after thioflavin S staining.

**Figure 1.** Amyloid fibril formation

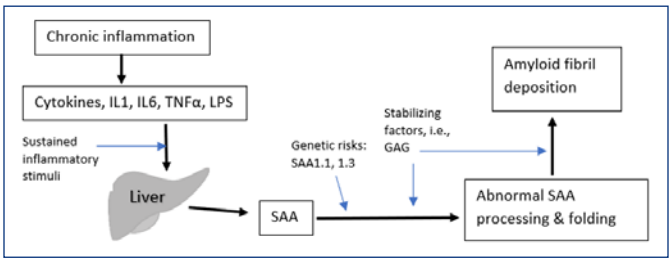



The origins of amyloid protein are quite diverse, with some resulting from genetic mutations and others due to deranged or dysregulated protein processing. Currently, at least 36 different amyloid proteins have been identified,[4] resulting in localized or systemic amyloidosis. They can be divided into the following types: AL (amyloid light-chain) amyloidosis, AH (amyloid heavy-chain), AA (amyloid A protein) amyloidosis, the familial or hereditary amyloidoses (i.e., TTR, apolipoprotein, fibrinogen A, lysozyme, cystatin, etc.), senile systemic amyloidosis, and dialysis-related β2-microglobulin amyloidosis. AL or AH amyloidosis is associated with plasma cell dyscrasia with increased light chain or heavy chain production. AA amyloidosis is associated with chronic inflammation from systemic autoimmune disease, infections and neoplasm. In familial amyloidoses, altered protein becomes amyloidogenic due to genetic mutations. TTR amyloidosis includes familial mutant transthyretin (ATTRm) amyloidosis, and senile systemic amyloidosis (SSA) involving wide-type TTR protein with amyloid deposit predominantly in the heart. Amyloidosis can also be categorized as being primary, secondary, hemodialysis-related, hereditary, senile, or localized.

## RENAL AA AMYLOIDOSIS

The culprit of AA amyloidosis is a proteolytic fragment of serum amyloid A (SAA) protein, an acute-phase reactant made by liver whose expression dramatically increases in response to proinflammatory cytokines. Of the original 104 amino-acid SAA protein with a predominant α-helical structure, only the N-terminal fragments containing 66–76 amino-acid are commonly found in amyloid fibrils.[5] Therefore, both proteolytic action and a structural change adopting a cross-pleated sheet configuration are required for the development of AA amyloidosis. The fact that only a minority of patients with chronic inflammation and elevated blood SAA levels developed AA amyloidosis suggests a possible genetic predisposition.[5] Indeed, in patients with familial Mediterranean fever, SAA1 polymorphism (specifically a/a

**Figure 2.** Formation of AA amyloid




genotype) has a significant and independent association with renal amyloidosis.[6] Similar association between SAA1 gene polymorphism and AA amyloidosis was identified in a Japanese cohort with rheumatoid arthritis.[7] Sustained release of inflammatory cytokines stimulates liver to synthesize and release SAA protein, which turns into pathologic amyloid fibrils after abnormal protein processing and mis-folding. Glycosaminoglycans (GAG) can stabilize the mis-folded amyloid precursors and amyloid fibrils and inhibit their degradation. **Figure 2** shows the process of AA amyloid formation.

The kidney is the most common organ affected by AA amyloidosis due to its filtering property. Renal manifestations, typically as nephrotic range proteinuria and reduced renal function, occur in 80–90% of cases with amyloidosis and portend a poor prognosis. According to a Mayo clinic registry of biopsy proven AA amyloidosis, 100% had SAA amyloid deposit in the kidney. Among them, over 90% had proteinuria and/or renal insufficiency.[8] In another large case series, nephrotic syndrome was present in 39% of patients on presentation, whereas sub-nephrotic proteinuria with and without renal dysfunction was found in 42% and 20% of patients, respectively.[9] **Table 1** lists the patient characteristics and renal manifestations of AA amyloidosis from three large cohorts.

## ETIOLOGIES

AA amyloidosis is considered to be reactive amyloidosis to chronic inflammation. As a result, inflammatory conditions including rheumatic/autoimmune diseases, autoinflammatory syndromes (i.e., Familial Mediterranean fever) and infections are commonly implicated. Malignancy has been linked to AA amyloidosis in less than 10% of cases.[10-12] Recently, obesity has been increasingly recognized as a potential cause of AA amyloidosis due to the presence of persistent low grade inflammation.[13-15] Overall, 15% of cases are considered "idiopathic" without an identifiable cause. In such cases, a hereditary form related to SAA gene mutation may be present and genetic testing should be pursued.[16]

## PATHOLOGICAL DIAGNOSIS

Amyloid can be present anywhere inside the kidney, but the glomerular deposits are most prominent. Under light microscopy, these amyloid deposits appear as amorphous material. Inside glomeruli, capillary loop deposits can be segmental or global, and the mesangial deposits if extensive can lead to nodular formation resembling Kimmelstiel-Wilson lesions of diabetic nephropathy. In rare occasions, the amyloid deposits can lead to glomerular basement membrane dissolution and crescent formation. Crescents in amyloidosis is rare, and is usually associated with AA

**Table 1.** Renal manifestations and survival of AA amyloidosis

| | | Gertz, et al[8] | Ahbap, et al[9] | Bergesio, et al[28] |
|---|---|---|---|---|
| **#, participants** | | 64 | 121 | 86 |
| **Age, years** | | 51/64(median, men/women) | 43 (mean) | 62 (mean) |
| **Gender (men), %** | | 59 | 69 | 42 |
| **Underlying diseases** | | Rheumatologic disorders (66%), chronic infections (17%), inflammatory bowel disease (9%), others (8%) | FMF (37.1%), TB (24.7%), chronic rheumatologic diseases (8.2%), COPD (6.6%), others or unknown (23.1%) | Not reported |
| **Renal presentations** | | Median serum creatinine =2mg/dl, median urine protein =4.2 grams/day | Mean serum creatinine = 2.3 mg/dl, mean urine protein =6.7 grams/day | Mean serum creatinine = 2.0 mg/dl, mean urine protein =5.0 grams/day |
| **Follow-up** | **Renal outcomes** | Median follow up of the 17 survivors =42 months. 35% developed ESRD. | Mean follow up= 38.2 ± 37.2 months. 56.2% developed ESRD. Mean renal survival was 64.7 months. Renal survival rates at 1, 2 and 5 years were 81.7%, 67.3% and 46.1%, respectively | Median time of follow-up = 30 months. 47% developed ESRD |
| | **Mortality** | 74% died, primarily as a result of renal failure. Median survival =24.5 months | 41% died, primarily from complications of renal failure. Mean overall survival was 88.7 ± 7.8 months. Survival rates at 1, 2 and 5 years were 80.7%, 68.2% and 51.3%, respectively | 40% died from complications of amyloidosis. Median survival =79 months. Cumulative survival at 2 and 5 years were 74% and 51% respectively |

Abbreviations: TB: Tuberculosis; COPD: Chronic obstructive pulmonary disease; ESRD: End-stage renal disease.

amyloidosis.[17] Amyloid deposits can also involve extraglomerular vessels (i.e., arterioles) and tubulointerstitium, and sometimes be isolated to renal medulla eluding diagnosis if biopsy sample is superficial.[18] These deposits can be readily identified by their ability to bind Congo red or thioflavin-T, and confirmed by serum amyloid A stain via immunohistochemistry. It should be noted that AA amyloid deposits can sometimes trap immunoglobulin light chain leading to false positive immunofluorescent staining.[19] Under electron microscopy, classic amyloid fibrils should be seen, and immune complex–type deposits are typically absent.

## CONGOPHILIC STAINING AND AMYLOID TYPING

Congo red dye, despite its strong affinity for β-sheet structures, can bind to non-amyloid proteins in tissue sections,[20] leading to a false-positive diagnosis. Furthermore, false-negative Congo red stains have also been documented,[21] further limiting its diagnostic utility. To overcome this limitation, Shehabeldin et al used Texas Red–filtered fluorescence microscopy to enhance the amyloid-specific congophilia, and reported an increased diagnostic yield and improved diagnostic specificity.[22] Once the tissue amyloid deposition is established, the amyloidogenic proteins can be further identified by mass spectrometry after laser-microdissection.[23]

## MANAGEMENT AND OUTCOMES

The goal is to treat underlying inflammatory disease and suppress SAA production. Studies using agents targeting inflammatory cytokines including interleukin 6 and tumor necrosis factor-α have shown promising results.[24,25] Eprodisate, a novel therapeutic blocking the interactions between glycosaminoglycan and amyloidogenic proteins have also been developed, to reduce polymerization and promote breakdown of pathogenic amyloid fibrils. A phase II multicenter trial in patients with renal AA amyloidosis, showed that eprodisate significantly slowed down the rate of kidney function decline.[26]

In patients progressing to end-stage renal disease (ESRD), either hemodialysis or peritoneal dialysis can be offered, with potential complications including hypotension and peritonitis depending on the extent of extra-renal involvement of AA amyloidosis. Ultimately, kidney transplantation might be an effective therapeutic option although clinical experiences have been limited so far. A small study of living donor kidney transplant indicated that patient and graft survivals were similar in AA amyloidosis and matched non-amyloidotic controls.[27]

AA amyloidosis involving kidneys has been associated with high morbidity and mortality. Despite treatment, progression to ESRD is fairly common, with an extremely low rate of renal recovery.[9] In an Italian cohort of AA amyloidosis, the mean rate of glomerular filtration rate decline was 2.3 ml/min per month with a median renal survival of only 25 months after diagnosis. Overall, 47% progressed to ESRD in that cohort.[28] AA amyloidosis is also associated with reduced renal allograft survival and a high risk of disease recurrence after kidney transplantation.[29] Furthermore, serum creatinine concentration at presentation is also highly predictive of mortality in patients with AA amyloidosis.[9] Indeed, renal complications were found to be the main cause of death, with median survival ranging from 24 to 53 months after the diagnosis is established.[8,30] Once on dialysis, survival rates at one year ranged from 30% to 72% based on the observations from various cohorts.[9,31-33]

The overall prognosis is largely hinged upon the control of underlying inflammatory process. In a seminal study of 80 patients with AA amyloidosis who were followed prospectively for 12–117 months. Among those with controlled inflammation and normalized serum SAA concentrations, 60% had regressed tissue amyloid deposit, and 93% had stabilized or improved amyloidotic organ function. However, the amyloid disease burden increased, and organ function deteriorated in most of those whose SAA levels remained significantly elevated. Estimated patient survival at 10 years was 90% in patients with normalized SAA concentration, but only 40% in those with elevated SAA level (p=0.0009).[34]

Lastly, AA amyloidosis can recur after kidney transplantation. The risk of recurrence is closely associated with the presence of uncontrolled chronic inflammation or persistent infections. Therefore, it is essential for transplant nephrologists to thoroughly evaluate and rule out any ongoing inflammatory or infectious processes before proceeding with transplantation. Patients are generally advised to remain disease-free for a period of at least six months, although the optimal duration has not been definitively established.

## CONCLUSION

Renal AA amyloidosis is a serious condition with variable clinical manifestations. Its diagnosis requires a high degree of clinical suspicion and timely recognition. Newer therapeutic agents have been studied to suppress systemic inflammation, generating hopes of targeted therapy with better tolerability and efficacy. Given the rarity of this disease and its potential to affect multiple organ systems, a specialized multidisciplinary care model has been adopted; however, data on the long-term outcomes of this approach are still needed.

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## Disclosures

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# The Intersection of Alcohol Use and Suicide Mortality Among Males, age 25–64, in Rhode Island

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## INTRODUCTION

Excessive alcohol use is an established risk factor for death by suicide.[1] The Rhode Island Violent Death Reporting System (RIVDRS) collects data on all suicide deaths occurring in the state. Data collected include demographic and injury information, toxicology results, and circumstances associated with the cause of death. During 2018–2022, an average of 109 suicide deaths were observed among Rhode Island residents each year.[2] Approximately, three-quarters of these deaths were observed among males, with more than half of all suicide deaths (56%) occurring among males, age 25–64.

Data from the Rhode Island Behavioral Risk Factor Surveillance System (RI BRFSS) highlight the burden of alcohol use among Rhode Islanders. From 2018–2022, 59% of Rhode Island adults reported using any alcohol in the past 30 days, a higher prevalence than the US median of 53%.[3] Across the life course, male Rhode Islanders reported drinking any alcohol and binge drinking more frequently than female Rhode Islanders. Any alcohol use was most common among male Rhode Islanders, age 25–44, and binge drinking was most common among male Rhode Islanders, age 18–34.[3]

One in four Rhode Island males, age 25–64, who died by suicide between 2018 and 2022, had a known alcohol dependence or alcohol problem at the time of death.[2] Given the burden of suicide deaths and increased alcohol use in this population, this article aims to further explore alcohol use and other characteristics among males, age 25–64 who died by suicide between 2018 and 2022.

## METHODS

Suicide deaths among Rhode Island residents that occurred between 2018 and 2022 were analyzed from RIVDRS. Toxicology variables were used to identify decedents who were tested for alcohol and the reported blood alcohol content (BAC) around the time of death. BAC levels were used to categorize a death as being alcohol-involved (BAC of ≥0.01 g/dl) or associated with legal intoxication (BAC of ≥0.08 g/dl). Deaths where alcohol testing was not performed were excluded from the analysis.

For comparative analysis, a binary measure was constructed to classify suicide decedents into two distinct categories: (1) deaths among males, age 25–64 with positive alcohol test results, and (2) all other suicide deaths not meeting these criteria. Demographic, injury mechanism, and circumstance variables from RIVDRS were recoded and compared across these groups. Demographic characteristics compared included race/ethnicity (Hispanic, non-Hispanic White, non-Hispanic Black, Other, non-Hispanic), education level (less than high school, high school graduate, some college or associate's degree, bachelor's degree or higher), and marital status (married, single/never married or widowed, divorced or separated). Injury mechanisms (hanging, strangulation or suffocation, firearm, poisoning, other) and circumstances associated with the cause of death (alcohol problem, other substance abuse problem, mental health problem, physical health problem) were also evaluated. Proportions were calculated across groups and compared for statistical significance using chi-square tests (α=0.05). Data coding and all analyses were completed using SAS (version 9.4).

## RESULTS

Of the 547 suicide deaths identified in RIVDRS during the study period, 527 had alcohol testing results available and were included in these analyses. A total of 171 (32.4%) alcohol-involved suicide deaths were identified, and 110 (64.3%) of these deaths were among males, age 25–64 [**Table 1**]. Compared to all other suicide deaths, a higher proportion of deaths meeting the criteria for alcohol-involved (36.7% versus 26.9%) and legal intoxication (25.7% versus 18.1%) were observed among males, age 25–64 [**Table 1**, p<0.05]. Both the

**Table 1.** Number and Percentage of Alcohol-Tested Populations in Rhode Island by Toxicology BAC Levels, Males, age 25-64, 2018–2022

| Toxicology BAC Levels | Males, 25–64 Alcohol Tested (N=300) | | Rhode Island Population Excluding Males, 25–64 Alcohol Tested (N=227) | | p-value[1] |
|---|---|---|---|---|---|
| | N | % | N | % | |
| Alcohol-Involved (BAC) ≥ 0.01g/dl | 110 | 36.7 | 61 | 26.9 | 0.0174 |
| Not alcohol-involved | 190 | 63.7 | 166 | 73.1 | |
| Legally Intoxicated (BAC) ≥ 0.08g/dl | 77 | 25.7 | 41 | 18.1 | 0.0381 |

[1] Chi-square test

**Table 2.** Number and Percentage of Males, age 25–64 by Injury Mechanism of Suicide and Alcohol-Involvement status, 2018–2022

| Toxicology BAC Levels | Males, 25–64 Alcohol-Involved (N=110) | | Males, 25–64 Not Alcohol-Involved (N=190) | | p-value[1] |
|---|---|---|---|---|---|
| | N | % | N | % | |
| Hanging, strangulation, suffocation | 53 | 48.2 | 80 | 42.1 | 0.3073 |
| Firearms | 36 | 32.7 | 54 | 28.4 | 0.4328 |
| Poisoning* | 14 | 12.7 | 22 | 11.6 | 0.7680 |

[1]Chi-square test
*Number and percentage can be reported but should be interpreted with caution due to RSE 20–30%

median and average BAC levels of 0.15 g/dl for males, age 25-64, who were tested for alcohol at the time of death indicate levels of intoxication well above Rhode Island's legal intoxication threshold of 0.08 g/dl, suggesting the presence of high alcohol consumption at the time of suicide death. The median and average BAC levels based on injury mechanism of suicide are about the same as the total median and average well above Rhode Island's legal intoxication threshold of 0.08 g/dl.

Demographic characteristics and known circumstances at the time of death were compared among males, age 25–64, with a BAC of ≥0.01g/dl to males, age 25–64, who were not alcohol-involved at the time of death (data not shown). The only significant difference observed was the percent with a known alcohol problem (43.7% versus 16.0%, p<.0001). When comparing injury mechanisms across groups, proportions of deaths by hanging, firearm, and poisoning did not vary significantly [**Table 2**]. Among males, age 25–64, where the deaths were found to be alcohol-involved, the median BAC was observed to be the same (0.15 g/dl) across all injury mechanisms.

## DISCUSSION/RECOMMENDATIONS

The findings of this analysis support alcohol use as a risk factor for suicide death among Rhode Island males, age 25–64. Approximately one-third of all suicide deaths involved alcohol, and the majority of alcohol-involved suicide deaths were among males, age 25–64. Most suicide deaths with a BAC at or above legal intoxication were also among males, age 25–64. Alcohol is a well-established risk factor associated with suicide deaths and has been identified by the World Health Organization and other public health bodies as a key concept in suicide prevention.[1,4,5] Despite the substantial amount of research conducted on alcohol and suicide, there remains a gap in including alcohol in suicide prevention policy and practice.[4] Given the significant relationships observed in our study and nationally between alcohol and suicide, it is important to screen for suicidality among people who use alcohol excessively and evaluate alcohol use among individuals who may be at risk of suicide.[1] Using the Screening, Brief Intervention, and Referral to Treatment (SBIRT) model for patients with a recent suicide-related visit and an evidence-based suicide screener such as the Columbia Suicide Severity Rating Scale (CSSRS) following alcohol-related visits can help identify individuals at risk for attempting suicide while under the influence of alcohol and ultimately help prevent these deaths. It is important to note, however, that administering the CSSRS or other suicide screener during clinical sobriety is the best practice due to potentially unreliable responses while using alcohol.[6] In addition, the expansion of these screenings from primary care and emergency departments to additional healthcare settings such as Certified Community Behavioral Health Centers (CCBHCs) and urgent care centers would provide more opportunities to identify individuals at risk and refer them to appropriate services.

Ensuring this population of individuals at risk for suicide, who are also excessively using alcohol, get referred to substance use, and mental health services is vital to ensure a holistic approach to treatment. Clinicians and/or peers who are providing therapeutic services should follow evidence-based guidelines for implementing safety plans to prevent future suicide attempts. Discussions around removal or secure storage of alcohol in the home during the safety planning process may decrease the potential for an alcohol-involved suicide death.[7]

This study has several strengths. First, it included all suicides in the state of Rhode Island, allowing for comprehensive analysis on suicides among males, age 25–64. Additionally, though alcohol and suicide have been studied extensively, much of the literature surrounding alcohol-involved suicide among adult males is dated, making this study a timely contribution. This study and other recent research demonstrate that addressing alcohol consumption among at-risk populations for suicide is important for reducing alcohol-involved suicide deaths.[1]

There are also a few notable limitations to this analysis. BAC levels entered in RIVDRS were used to classify deaths as being alcohol-involved or legally intoxicated. Testing is typically performed after death, and the level of body decomposition at the time of testing could influence the alcohol results. The RIVDRS coding manual provides guidance on how toxicology results should be entered and notes that alcohol detected because of decomposition rather than ingestion does not generally measure more than 0.040%.[8] Thus, while misclassification is possible, any impacts to the analysis were likely minor. Additionally, though five years of data were combined for analyses, small sample sizes were still observed, limiting the analysis and statistical power. Although a statistically significant difference was not observed by injury mechanism in this sample, this could be

related to the sample size or differences in the Rhode Island population.

Additional research in the area of excessive alcohol use and suicide is needed. While the data examined demonstrate the burden of alcohol use among adult male suicide decedents in Rhode Island, a larger sample size may show a stronger association identifying those most at risk for suicide. Current lethal means safety trainings do not include alcohol as a potential lethal mean for suicide. While prescription and over the counter medications are viewed as lethal means, piloting the inclusion of alcohol in these trainings could lead to decline in alcohol-involved suicide deaths, alcohol-related suicide deaths, and polysubstance suicide deaths.[9,10]

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# Rhode Island Monthly Vital Statistics Report
# Provisional Occurrence Data from the Division of Vital Records

| VITAL EVENTS | REPORTING PERIOD | | |
|---|---|---|---|
| | FEBRUARY 2025 | 12 MONTHS ENDING WITH FEBRUARY 2025 | |
| | Number | Number | Rates |
| Live Births | 824 | 10,924 | 10.3* |
| Deaths | 937 | 10,713 | 10.1* |
| Infant Deaths | 6 | 43 | 4.1# |
| Neonatal Deaths | 5 | 32 | 2.9# |
| Marriages | 354 | 6,903 | 6.5* |
| Divorces | 241 | 2,533 | 2.4* |

* Rates per 1,000 estimated population
# Rates per 1,000 live births

| Underlying Cause of Death Category | REPORTING PERIOD | | | |
|---|---|---|---|---|
| | AUGUST 2024 | 12 MONTHS ENDING WITH AUGUST 2024 | | |
| | Number (a) | Number (a) | Rates (b) | YPLL (c) |
| Diseases of the Heart | 202 | 2,444 | 222.7 | 3,202.5 |
| Malignant Neoplasms | 180 | 2,228 | 203.0 | 4,471.5 |
| Cerebrovascular Disease | 43 | 447 | 40.7 | 512.0 |
| Injuries (Accident/Suicide/Homicide) | 67 | 950 | 86.6 | 10,710.5 |
| COPD | 41 | 467 | 42.6 | 390.0 |

(a) Cause of death statistics were derived from the underlying cause of death reported by physicians on death certificates.
(b) Rates per 100,000 estimated population of 1,097,379 for 2020 (www.census.gov)
(c) Years of Potential Life Lost (YPLL).

NOTE: Totals represent vital events, which occurred in Rhode Island for the reporting periods listed above.
Monthly provisional totals should be analyzed with caution because the numbers may be small and subject to seasonal variation.

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## We are read everywhere

In the past twelve months, more than **61,000** unique viewers worldwide have read *Rhode Island Medical Journal* articles or researched topics from its archives, rimedj.org.

**TOLEDO, SPAIN**

**Michael Migliori, MD**, Ophthalmologist-in-Chief at RI Hospital, and RIMS Public Laws Committee Chair, stands with the statue of Miguel de Cervantes whose book, *El Ingenioso Hidalgo don Quijote de la Mancha,* has also been read everywhere.

The city of Toledo, (right) high above the Tajo River, was founded in the 2nd century BCE by the Romans and inhabited ever since.

View of Toledo, painted by Doménikos Theotokópoulos "El Greco" (c.1596–1600). El Greco was born in Crete in 1514, but moved to Toledo in 1577 and painted there the remainder of his life. [WIKIMEDIA COMMONS]

Wherever you may be, or wherever your travels may take you, check the Journal on your mobile device, and send us a photo: **mkorr@rimed.org**.

# In the Shadow of the Statue of Liberty: Medical Inspections During the Heyday of US Immigration

MARY KORR
RIMJ MANAGING EDITOR

On Oct. 28, 1886, the Statue of Liberty was officially unveiled in a dedication ceremony on Bedloe's Island (now Liberty Island) in New York Harbor. The event celebrated the statue's creators and the people of France and the United States. French and American dignitaries, including President Grover Cleveland, were present. Over a million people lined the streets of New York to celebrate with the city's first ticker-tape parade.

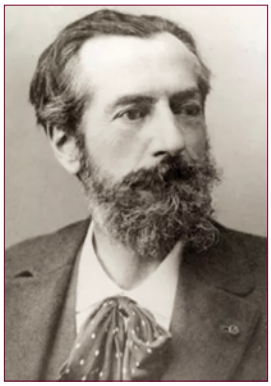

**Image 1.** A portrait of Frédéric-Auguste Bartholdi. [NATIONAL PARK SERVICE, STATUE OF LIBERTY NM. HTTPS://WWW.NPS.GOV/STLI/LEARN/HISTORYCULTURE/FREDERIC-AUGUSTE-BARTHOLDI.HTM]

The statue's sculptor, Frédéric-Auguste Bartholdi [**Image 1**], was ensconced in the crown, waiting for the signal to unveil the face of what was described as the "Goddess of Liberty." [**Image 2**] Bartholdi was no stranger to America's shores. In 1876 he married Jeanne-Emilie Baheux in Newport at the home of his friend and fellow artist, John LaFarge.

Six years after the statue's installation, the heyday of immigration began, with steamships arriving at Ellis Island in 1892. The island was owned by the United States government, and turned over to the US Immigration Service. A vintage photograph [**Image 3**] shows the entry station for immigrants arriving from Europe.

**Image 2.** Statue of Liberty, New York Harbor, circa 1905. [LIBRARY OF CONGRESS, DETROIT PHOTOGRAPHIC CO HTTPS://WWW.LOC.GOV/ITEM/2008679689]

The National Park Service website[1] states that an immigration law passed in 1891, which created a Bureau of Immigration and a Superintendent of Immigration within the Treasury Department, mandated health inspections be given by surgeons of the Marine Hospital Service to all entering this country [**Images 4,5**].

According to The Statue of Liberty-Ellis Island Foundation website,[2] first- and second-class passengers were not required to undergo the inspection process at Ellis Island. "Instead, these passengers received a cursory inspection aboard the ship; the theory being that if a person could afford to purchase a first- or second-class ticket they were affluent and less likely to become a public charge in America due to medical or legal reasons. However, regardless of class, sick passengers or those with legal problems were sent to Ellis Island for further inspection."

The immigration centers were training grounds for newly minted physicians, who


**Image 3.** Immigrant Station, Ellis Island, NY, between 1904 and 1911. [LIBRARY OF CONGRESS. HTTPS://WWW.LOC.GOV/ITEM/2025672260]

**Image 4.** Physicians examining a group of Jewish immigrants at Ellis Island, circa 1907. Eye chart written in Hebrew hangs on wall. [UNDERWOOD & UNDERWOOD, LIBRARY OF CONGRESS. HTTPS://WWW.LOC.GOV/ITEM/2012646350]

**Image 5.** This photo shows an interview of a young immigrant and his interpreter, in the foreground, at Ellis Island. In the background are a physician and an immigration officer. [NATIONAL LIBRARY OF MEDICINE. HTTP://RESOURCE.NLM.NIH.GOV/101447227]

worked under the senior physicians to examine for smallpox, the plague, typhus, cholera, yellow fever, and trachoma – the latter the top reason immigrants were denied entrance – as well as separate those with leprosy. However, it was the immigration officers and not the physicians who made the determination to admit or not, send for further interviews, and isolate when deemed necessary.

**Image 6.** A man in pajamas and a robe is sitting and reading a newspaper behind a caged door in quarantine detention at Ellis Island, circa 1930. [NATIONAL LIBRARY OF MEDICINE. HTTP://RESOURCE.NLM.NIH.GOV/101447216]

Those not immediately admitted were initially sent to fenced-in enclosures or detention centers by the immigration officers [**Images 6,7**]. By the end of the first year, over 400,000 immigrants had been processed through the new station.[1]

In 1902, a hospital was constructed on Ellis Island, and in 1906, a contagious disease ward was built, where sick passengers were sent for further treatment. Some were eventually admitted; others returned to their country of origin.

Ellis Island, which ceased operations as an immigration center in 1954, and is now a national park, was the largest inspection center in the country, followed by Angel Island in San Francisco. Because of overcrowding at Ellis Island in the early 1900s, steamships began arriving in Providence and New Bedford on the Fabre line, from Marseilles, with stops in Portugal and Italy [**Image 8**].

**Image 7.** Immigrants in a detention pen on the roof of the main building at the Ellis Island Immigration Station. [NATIONAL LIBRARY OF MEDICINE. HTTP://RESOURCE.NLM.NIH.GOV/101547032]


**Image 8.** Panorama of the opening of the new state dock in Providence, and arrival of the first ocean steamship on December 17, 1913.
[WM. MILLS & SON, PHOTOGRAPHER. HTTPS://WWW.LOC.GOV/ITEM/2007662753]

## THE NEW COLOSSUS

NOT LIKE THE BRAZEN GIANT OF GREEK FAME,
WITH CONQUERING LIMBS ASTRIDE FROM LAND TO LAND;
HERE AT OUR SEA-WASHED, SUNSET GATES SHALL STAND
A MIGHTY WOMAN WITH A TORCH, WHOSE FLAME
IS THE IMPRISONED LIGHTNING, AND HER NAME
MOTHER OF EXILES. FROM HER BEACON-HAND
GLOWS WORLD-WIDE WELCOME; HER MILD EYES COMMAND
THE AIR-BRIDGED HARBOR THAT TWIN CITIES FRAME.
"KEEP, ANCIENT LANDS, YOUR STORIED POMP!" CRIES SHE
WITH SILENT LIPS. "GIVE ME YOUR TIRED, YOUR POOR,
YOUR HUDDLED MASSES YEARNING TO BREATHE FREE,
THE WRETCHED REFUSE OF YOUR TEEMING SHORE.
SEND THESE, THE HOMELESS, TEMPEST-TOST TO ME,
I LIFT MY LAMP BESIDE THE GOLDEN DOOR!"

This month, 139 years after the unveiling of the Statue of Liberty, and given the current immigration turmoil in this country, the poem by Emma Lazarus, left, engraved on a plaque on the Statue's pedestal, still captures the hopes and dreams of those who sought – and those seeking – the American dream. ❖

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## RI delegation announces $7.94M grant for new mental health facility for children at Bradley Hospital

EAST PROVIDENCE — In an effort to help Bradley Hospital provide cutting-edge research and state-of-the-art facilities to support children dealing with mental health disorders, Rhode Island's Congressional Delegation announced a new $7,940,991 federal grant for Bradley Hospital to advance the construction of a pediatric psychiatric research laboratory, to be co-located on Bradley's hospital campus in East Providence.

U.S. Senators **JACK REED** and **SHELDON WHITEHOUSE** and U.S. Representatives **SETH MAGAZINER** and **GABE AMO** said the new federal funding, which is administered by the National Institutes of Health (NIH), will help build a state-of-the-art facility to enhance pediatric psychiatric research and centralize services in one convenient, modern facility.

"Bradley's new facility will provide Rhode Islanders with high-quality mental health care and help conduct innovative research initiatives that will enhance treatment and prevention efforts. This federal grant is a major boost to help advance the project and better serve the community, especially our youngest patients in need of mental health services," said Senator Reed, a member of the Appropriations Committee.

"Without a dedicated space on campus, Bradley Hospital's research laboratories are scattered across multiple locations, limiting collaboration and distancing scientists from the very patients who stand to benefit most from their work. A unified facility would not only provide the appropriate space for advanced research and equipment but also bring researchers closer to their patients – accelerating discoveries, improving outcomes, and fostering vital collaboration across core labs. This proposed center would significantly enhance Bradley Hospital's capacity to address the urgent and evolving challenges in youth and adolescent psychiatry and behavioral health," said Bradley Hospital President **HENRY SACHS III, MD**. ❖

## Northeast Public Health Collaborative forms

Several Northeastern states and America's largest city have been collaborating since early 2025 and on September 19th formally announced the Northeast Public Health Collaborative, a voluntary regional coalition of public health agencies and leaders, brought together to share expertise, improve coordination, enhance capacity, strengthen regional readiness, and promote and protect evidence-based public health.

The Collaborative's shared purpose is to work together in new ways – optimizing the use of shared resources, innovating and reimagining core services – to ensure trust in public health, respond to public health threats, advance community health and strengthen confidence in vaccines and science-based medicine. The group's shared goal is to protect the health, safety and well-being of all residents by providing information based on science, data, and evidence, while working to ensure equitable access to vaccines, medications and services.

The regional partnership, which was informally established several months ago, held its first in-person meeting in Rhode Island in August. The Collaborative has already formed interjurisdictional working groups to identify opportunities for collaboration and shared planning across multiple public health disciplines including public health emergency preparedness and response, vaccine recommendations and purchasing, data collection and analysis, infectious disease, epidemiology and laboratory capacity and services.

Members of the Collaborative worked together on science-based guidance for health care personnel (HCP) advising on precautions health care workers should take to protect themselves and patients during respiratory virus season. Other examples of collaborative efforts include sharing information on public health emergency preparedness related to three FIFA (International Federation of Association Football) World Cup host cities within the collaborative, exploring workforce pipeline activities given the understaffing in public health and coordinating state lab related activities and services.

Rhode Island Department of Health Director **JERRY LARKIN, MD**, said, "Collaboration is the core of public health. We look forward to continuing to work with the Northeast Public Health Collaborative to improve information sharing, coordinate on public health initiatives, and develop policy that is grounded in science and data. This partnership will advance our work to prevent disease and promote the health and safety of the people in every community in Rhode Island."

Connecticut Department of Public Health Commissioner **MANISHA JUTHANI, MD**, said, "In public health, we are always stronger together. Pathogens know no borders. Particularly in the northeast, people cross borders daily for work and school. In a time of significant change in public health, we have benefited from the enhanced collaborations between our jurisdictions. We are confident that we will preserve and protect core public health principles and services as we navigate current changes together."

Maine CDC Director, **PUTHIERY VA, MD**, said, "The people of Maine are known for their resilience, neighborly support, and a collaborative approach to solving community challenges. This spirit is evident in the Northeast Public Health Collaborative, which serves as an incubator for solutions in public health. By working together, we can build more adaptable, sustainable, and resilient public health framework for the region."

Massachusetts Commissioner of Public Health **ROBBIE GOLDSTEIN, MD, PhD**, said, "When our states speak in concert, our voice carries farther, and our

impact deepens. Those who work in public health are entrusted with a profound responsibility – a promise – to protect the health and safety of those in our states, to advance equity, and to ground every decision in data and evidence. Strong public health must stand high above ideology. Our region understands this, and we are moving forward, resolute, united, and guided by science."

New Jersey Acting Health Commissioner **JEFF BROWN** said, "The interconnectedness of our populations and shared health challenges across the Northeast make this Collaborative a natural synergy and extension of our longstanding partnerships with peer health agencies to support the health of the people of New Jersey. Public health requires regular sharing of information, ideas, and best practices across jurisdictions and state lines. Whether it's responding to a pandemic or an outbreak or preparing for a large-scale event such as the upcoming FIFA World Cup, with three host cities in the Northeast, working together helps keep our residents safe and healthy. We look forward to continuing to do so with our colleagues in the Collaborative."

New York State Health Commissioner **JAMES MCDONALD, MD, MPH**, said, "Everyone benefits when we work together. I am excited about this collaborative; we all share the same goal of achieving health and well-being for our people. New York is proud to be part of the Northeast Public Health Collaborative. By working together, we are creating a more adaptable, sustainable and resilient public health system for our state and the region."

Pennsylvania Department of Health Secretary **DEBRA BOGEN, MD**, said, "Protecting public health has always been a collaborative effort. Continuing to work with public health experts in other states allows the exchange of best practices, pursuit of efficiencies, and opportunities for collaboration to better meet the needs of Pennsylvanians."

New York City Acting Health Commissioner **MICHELLE MORSE, MD**, said, "As the oldest and largest local health department in the nation, the New York City Health Department is proud to be a member of the Northeast Public Health Collaborative. We must always protect our public health infrastructure, reject misinformation, and maintain trust in science. The collaborative is working together to rebuild public trust, and provide factual information, so people can make informed decisions about their health, and continue our critical work to address health inequities."

While the Northeast Public Health Collaborative members share common public health goals and objectives, they recognize that each state and city is independent with their own diverse populations and unique sets of laws, regulations and histories. Members may choose to participate in or adapt those specific initiatives consistent with their particular needs, values, objectives, and statutory or regulatory requirements. ❖

## RIDOH issues 2025–2026 COVID-19 vaccine recommendations

PROVIDENCE — The Rhode Island Department of Health (RIDOH) recommends the 2025–2026 COVID-19 vaccine for most Rhode Islanders six months of age and older to protect against serious illness from COVID-19 over the coming weeks and months.

"COVID-19 vaccine can help prevent serious illness and hospitalization, and it is an important tool to support our healthcare system as a whole in Rhode Island," said Director of Health **JERRY LARKIN, MD**. "Rhode Island has some of the best vaccination rates in the country because we make vaccine access a priority, and because we base our recommendations on science and data."

Children six months to two years of age and adults 19 years of age and older (including pregnant women) should be vaccinated. For healthy children between two years and 18 years of age, parents should talk to a healthcare professional about whether COVID-19 vaccine should be administered.

Vaccination is particularly important for people 65 years of age and older and anyone who is at higher risk for severe illness from COVID-19. Health conditions that put someone at higher risk for severe COVID-19 include obesity, diabetes, heart disease, asthma or chronic lung disease, and being immunocompromised. Additionally, pregnancy puts someone at higher risk for severe illness from COVID-19. The COVID-19 vaccine is safe during pregnancy. Vaccination can protect women and their infants after birth.

These COVID-19 vaccine recommendations come after Governor **DAN MCKEE**, RIDOH, and the Office of the Health Insurance Commissioner (OHIC) announced steps to ensure access to COVID-19 vaccine. RIDOH and OHIC issued a Bulletin to third-party payers to ensure coverage of COVID-19 vaccine for Rhode Islanders six months of age and older. Additionally, RIDOH issued a standing order to also allow pharmacists to administer COVID-19 vaccine to all patients who are three years of age and older. (While pharmacies can still set their own vaccination criteria and may require a patient to self-attest to having a condition that puts you at risk for severe COVID-19, a majority of Rhode Islanders fall into at least one of these categories of conditions and can be vaccinated in a pharmacy.)

Rhode Island's recommendations for the 2025–2026 COVID-19 vaccine are in alignment with the recommendations from several major medical organizations, such as the American Academy of Pediatrics, American Academy of Family Physicians, and the American College of Obstetricians and Gynecologists. These recommendations are also in alignment with the guidance issued by the Northeast Public Health Collaborative, a regional coalition of public health agencies. ❖

## Governor McKee, Department of Health, Health Insurance Commissioner announce actions to protect access to COVID-19 vaccine

PROVIDENCE — Governor Dan McKee announced immediate measures on Sept. 12th to ensure continued access to the COVID-19 vaccine for all Rhode Islanders older than six months of age who want to receive one.

"We are taking action in Rhode Island to ensure that the public health turmoil at the national level does not affect the ability of Rhode Islanders to access vaccines that keep us healthy and safe," said Governor **DAN MCKEE**. "It's crucial that people who want to get the COVID-19 vaccine have the ability to do so in Rhode Island."

At Governor McKee's direction, the Rhode Island Department of Health (RIDOH) and the Office of the Health Insurance Commissioner (OHIC) issued a Bulletin to insurers to ensure coverage of COVID-19 vaccine according to the vaccination recommendations by major medical organizations, such as the American Academy of Pediatrics, American Academy of Family Physicians, and the American College of Obstetricians and Gynecologists. Collectively, these organizations recommend that the COVID-19 vaccine be available for everyone six months of age and older. At the Governor's direction, prior to the issuance of this bulletin, both RIDOH and OHIC met with insurance providers on this issue, and providers indicated they would provide continued coverage in alignment with this order.

At the Governor's direction, RIDOH has also issued a standing order to allow pharmacists to administer the 2025–2026 COVID-19 vaccine to all patients who are three years of age and older, independent of the FDA indications. The COVID-19 vaccine is currently available in many retail pharmacies in Rhode Island. Pharmacies may still set their own vaccination criteria and may require clients to self-attest to either being at least 65 years of age or having a condition that puts them at higher risk for COVID-19. It is important to note that the list of conditions is broad and that the majority of Rhode Islanders may fall into at least one of these condition categories and can be vaccinated in a pharmacy.

"There is a place in Rhode Island for everyone in the state older than six months of age to get their COVID-19 vaccine," said Director of Health **JERRY LARKIN, MD**. "Rhode Island has some of the best overall vaccination rates in the country because we make vaccine access a priority, and because RIDOH bases its recommendations on science and data. We will continue to make the COVID-19 vaccine available, and we will continue to be the source of science and fact-based information about vaccines in Rhode Island."

"Access to the COVID-19 vaccine promotes public health and mitigates outbreaks of disease that raise insurance costs and strain our hospitals and health care providers," said Health Insurance Commissioner **CORY KING**. "Vaccine coverage without patient cost-sharing eliminates financial barriers for consumers and preserves necessary access."

Most Rhode Islanders will get their COVID-19 vaccine through their primary care provider, at a health center, or at a pharmacy. The COVID-19 vaccine will be available in the offices of primary care providers in the coming weeks. A physician can administer the 2025–2026 COVID-19 vaccine to anyone older than six months of age. The offices of pediatricians and family physicians are the best option for accessing the COVID-19 vaccine for children, especially those between six months and five years of age.

"The Rhode Island Health Center Association strongly supports the Governor and RIDOH's decision to ensure full access to COVID-19 vaccines. As Rhode Island's community health centers serve over 220,000 Rhode Islanders, including patients who are uninsured, this action reflects a commitment to keeping all Rhode Islanders healthy," said **ELENA NICOLELLA**, President and CEO of the Rhode Island Health Center Association.

"The Rhode Island Medical Society strongly supports the state's leadership in ensuring broad access to the updated COVID-19 vaccine. By aligning with science-based recommendations and working collaboratively with insurers, pharmacies, and providers, the state is helping to protect the health of our patients and our communities. We are grateful for this partnership and remain committed to working alongside the Department of Health to make vaccination accessible to all Rhode Islanders," said **KARA STAVROS, MD**, President of the Rhode Island Medical Society.

"The Rhode Island Chapter of the American Academy of Pediatrics thanks Gov. McKee and the Rhode Island Department of Health for ensuring access and availability of COVID-19 vaccines for children and adults. We are proud that the important steps announced today will contribute to the health and well-being of the children and others in our wonderful state," said **SCOTT A. RIVKEES, MD**, President of the Rhode Island Chapter of the American Academy of Pediatrics.

"I am proud to stand alongside our Department of Health and the Governor in expressing strong confidence in the safety and effectiveness of COVID-19 vaccines," said **MICHAEL P. KOSTER, MD**, Vice President of the Rhode Island Chapter of the American Academy of Pediatrics.

"Arches Medical would like to formally express our full support for the state's work to expand vaccine and COVID access. As an organization committed to the well-being of the public, we believe these initiatives are crucial for ensuring health equity and protecting our communities," said **KENNY CORREIA, PharmD, BCACP, CDOE**, Director of Pharmacy Services at Arches Medical. ❖

## Rhode Island Life Science Hub fueling the future of innovation with investments in innovative life science companies

PROVIDENCE — The Rhode Island Life Science Hub (RILSH), the state-supported organization dedicated to growing Rhode Island's life sciences ecosystem, announced the strategic investment of $4 million dollars in nondilutive funding to companies furthering its mission of building the RI Life Science community. With these most recent awards, RILSH has now deployed a total of $16 million dollars since its launch, fueling the growth of Rhode Island-based companies, attracting new businesses and investments, and accelerating the translation of scientific breakthroughs into real-world solutions.

"These latest investments highlight the breadth of innovation happening in Rhode Island and underscore our commitment to positioning the state as a competitive hub for life sciences," said **DR. MARK A. TURCO**, President and CEO of the R.I. Life Science Hub. "We are proud to provide nondilutive funding to this new cohort of companies, which – together with past recipients – are fueling innovation across our core clusters of neuroscience, health and aging, RNA, and immunology. By supporting advances in therapeutics, diagnostics, and medical technologies, we are helping companies grow and thrive in Rhode Island."

These companies reflect Rhode Island's growing strengths across its priority areas of research:

**Trace Sensing Technologies**, a University of Rhode Island spinout relocating from Connecticut, is pioneering advanced sensors to detect breath biomarkers for early, non-invasive disease diagnosis. This funding will support the development of Trace's platform technology, TRACE-E, aimed at identifying patients with chronic kidney disease in its earliest stages.

**Expanse Medical**, a California-based MedTech innovation leader, will expand its operations to the East Coast with a new base in Rhode Island. Expanse pioneers breakthrough solutions to clinical bottlenecks through first-principles engineering, deep clinical insight, and full-cycle product development, backed by leading industry partners. Expanse also plans to use the strategic RI headquarters to propel the development of its portfolio company's proprietary and unique medical device solution to the treatment of patients with erectile dysfunction.

**Lenoss Medical** is advancing minimally invasive, first of its kind, biological spinal fracture treatments that harness the body's natural bone-healing properties, offering a new approach to orthopedic care. Lenoss is a commercial stage technology and will use funding to scale its U.S.-based operations.

**TEEM Therapeutics** is a Brown University spinout that is working in the regenerative medicine field and developing precision drugs for heart disease by integrating tissue-engineered human heart models with advanced sensors and software to identify novel therapeutic targets. Funding will be used to establish RI headquarters for the company.

**Line Diagnostics** is a Brown University spinout creating ultrasensitive blood and Pap smear tests for early and reliable detection of ovarian, uterine, and other cancers, addressing critical gaps in women's health diagnostics. Funding will be used to establish RI headquarters for the soon to be established company. ❖

VA Providence Director Lawrence Connell speaks about the importance of THRIVE during the Center Expert and Shareholder Forum (CESF). [PROVIDENCE VA]

## VA Providence leadership participates in the Center Expert and Shareholder Forum

PROVIDENCE — VA Providence leadership participated in the Center Expert and Shareholder Forum (CESF) on September 10th, which brought together researchers and stakeholders to discuss ongoing projects and their real-world impact on long-term services and supports.

Director **LAWRENCE CONNELL** opened his remarks by thanking participants and offering special recognition to **JAMES RUDOLPH, MD**, director of the THRIVE COIN, for his leadership in advancing Veteran care. Connell emphasized that research is at the heart of VA Providence's mission, driving evidence-based care and ensuring better outcomes for Veterans.

The event highlighted THRIVE COIN's research initiatives, including projects that show how integrating social workers into primary care reduces ER visits, how social risk data can predict readmissions, and the urgent need to better understand dementia among Veterans experiencing housing instability. Additional studies at VA Providence are focused on innovative models such as hospital-at-home programs, enhancing end-of-life and post-acute care, and developing person-centered approaches in long-term care. Current projects also address mental health – including suicide prevention, substance use disorders, and depression in community living centers – as well as the impact of COVID-19, food insecurity, and housing stability on vulnerable Veteran populations.

Discussions also highlighted VA Providence's partnerships with Geriatric & Extended Care, the Office of Homeless Programs, the Office of Health Equity, the Office of Mental Health, Pharmacy Benefits Management, and the Office of Rural Health, reflecting the center's theme of Research That Brings Long-Term Service and Support to Veterans.

Connell concluded by looking ahead to the State of the THRIVE COIN update and thanked attendees for their expertise, dedication, and commitment to advancing Veteran-centered care. ❖


VA Providence staff and Veterans march down Chalkstone Avenue to support Veteran Suicide Prevention. [COURTESY OF THE PROVIDENCE VA]

## Providence VA hosts suicide prevention walk and fair

PROVIDENCE — As part of Suicide Prevention Awareness Week in September, the VA Providence Suicide Prevention Team hosted a Suicide Prevention Walk and Resource Fair.

Veterans, employees, and community partners walked together to honor those impacted by suicide and to raise awareness about available resources. At the resource fair, attendees connected with VA mental health staff, community providers, and peer support specialists to learn about crisis response, coping strategies, and ongoing care options. The event emphasized the message that suicide prevention is everyone's responsibility, and that no Veteran should ever feel alone. ❖

## Care New England participates in statewide suicide prevention training, reaches nearly 90 clinicians

PROVIDENCE — In a major step forward for suicide prevention in Rhode Island, Care New England (CNE) collaborated with the Rhode Island Department of Health (RIDOH) to lead the successful training of 89 clinicians across the state in Counseling on Access to Lethal Means (CALM). CALM is an evidence-based training aimed at reducing deaths by suicide. It focuses on creating a safer environment in the home when an individual is at high risk for suicide.

The training focused on clinicians in emergency and behavioral health settings, where opportunities for early intervention are critical – especially among men aged 25–64, the group most affected by suicide in Rhode Island.

CALM equips healthcare professionals to intervene both during a crisis and preventively, helping patients and families create safer environments. A new evaluation from RIDOH underscores the impact of CNE's efforts:

- 83% of participating CNE clinicians now screen for suicide risk, with 67% doing so at every patient visit.
- 61% report daily conversations about suicide risk with patients.

Clinicians reported a significant increase in confidence in collaborating with patients and families around safety and secure storage of medications – conversations shown to reduce suicide risk.

Training was funded by a grant from the Centers for Disease Control to RIDOH, as well as philanthropic donations to Butler Hospital. ❖

## ACOG affirms safety and benefits of acetaminophen during pregnancy

The following is a statement from **STEVEN J. FLEISCHMAN, MD, MBA, FACOG**, president of the American College of Obstetricians and Gynecologists (ACOG):

"Suggestions that acetaminophen use in pregnancy causes autism are not only highly concerning to clinicians but also irresponsible when considering the harmful and confusing message they send to pregnant patients, including those who may need to rely on this beneficial medicine during pregnancy.

"The announcement by HHS is not backed by the full body of scientific evidence and dangerously simplifies the many and complex causes of neurologic challenges in children. It is highly unsettling that our federal health agencies are willing to make an announcement that will affect the health and well-being of millions of people without the backing of reliable data.

"In more than two decades of research on the use of acetaminophen in pregnancy, not a single reputable study has successfully concluded that the use of acetaminophen in any trimester of pregnancy causes neurodevelopmental disorders in children. In fact, the two highest-quality studies on this subject – one of which was published in JAMA last year – found no significant associations between use of acetaminophen during pregnancy and children's risk of autism, ADHD, or intellectual disability.

"The studies that are frequently pointed to as evidence of a causal relationship, including the latest systematic review released in August, include the same methodological limitations – for example, lack of a control for confounding factors or use of unreliable self-reported data – that are prevalent in the majority of studies on this topic.

"Acetaminophen is one of the few options available to pregnant patients to treat pain and fever, which can be harmful to pregnant people when left untreated. Maternal fever, headaches as an early sign of preeclampsia, and pain are all managed with the therapeutic use of acetaminophen, making acetaminophen essential to the people who need it. The conditions people use acetaminophen to treat during pregnancy are far more dangerous than any theoretical risks and can create severe morbidity and mortality for the pregnant person and the fetus.

"When considering the use of medication in pregnancy, it's important to consider all potential risks along with any benefits. The data from numerous studies have shown that acetaminophen plays an important – and safe – role in the well-being of pregnant women."

To learn more, see ACOG's frequently asked questions on acetaminophen in pregnancy. ❖

## Treating opioid addiction in jails improves treatment engagement, reduces overdose deaths and reincarceration

BETHESDA, MD — A study supported by the National Institutes of Health (NIH) finds that individuals who received medication for opioid use disorder (MOUD) while incarcerated were significantly more likely to continue treatment six months after release than those who did not receive MOUD. The study also found that receiving MOUD in jail was associated with a 52% lower risk of fatal opioid overdose, a 24% lower risk of non-fatal opioid overdose, a 56% lower risk of death from any cause, and a 12% lower risk of reincarceration after release. These outcomes underscore the importance of providing MOUD treatment during incarceration.

Published in The New England Journal of Medicine,1 the study analyzed data from 6,400 people with probable opioid use disorder who were incarcerated in seven Massachusetts county jails between September 2019 and December 2020. Of these, 42% received MOUD while in jail, while 58% did not. Researchers monitored treatment engagement, opioid overdose, reincarceration, and mortality for all participants for up to six months after release.

"These findings demonstrate the importance of providing medications to treat opioid use disorder in correctional settings," said **NORA D. VOLKOW, MD**, director of NIDA. "Offering effective opioid treatment to people in jail is a critical step toward addressing the opioid crisis, promoting recovery, saving lives and reducing reincarceration. It's a win-win for public health."

The opioid epidemic remains a devastating public health challenge in the United States, contributing to more than 80,000 deaths in 2024 alone. People with opioid use disorder are overrepresented in jails compared to the general population. Despite their effectiveness, MOUD is available in only about 13% of U.S. jails and is often restricted to specific groups, such as pregnant women. This limited access contributes to forced withdrawal, increasing the risk of relapse and overdose post-release.

Massachusetts has been especially impacted by the overdose epidemic, with fatal opioid-related overdoses quadrupling over the past two decades. In response, a 2018 state law mandated a four-year pilot program to provide all U.S. Food and Drug Administration-approved MOUD – buprenorphine, methadone, and naltrexone – in five county jails, with two additional jails voluntarily joining the program. The law requires that individuals already receiving treatment for opioid use disorder continue it during detention, begin treatment before release when appropriate, and be connected to community care after release.

To evaluate the impact of the pilot program, the Massachusetts Department of Public Health partnered with the Massachusetts Justice Community Opioid Innovation Network (MassJCOIN) and participating jails to conduct a comprehensive study tracking post-release outcomes. Researchers collected data directly from incarcerated individuals and extracted information from jail administrative and clinical records. These data were integrated with the Massachusetts Public Health Data Warehouse, which links over 35 state databases to track treatment for substance use disorders, incarceration, mortality, and other public health indicators. This linkage enabled a robust analysis of the program's impact on key post-release outcomes.

Treatment in jail was strongly associated with better outcomes after release. Within the first 30 days, 60.2% of those who received MOUD in jail, initiated treatment in the community, compared to only 17.6% of individuals who weren't treated. Half of the group treated in jail stayed on medication for at least 75% of the first 90 days after release, while only 12.3% of the untreated group did the same. Six months after release, 57.5% of those who received treatment in jail continued receiving MOUD, compared to just 22.8% of those who did not. Most people treated in jail received buprenorphine (67.9%) followed by methadone (25.7%) and naltrexone (6.5%).

"The Massachusetts initiative represents a model for how jails can play a vital role in addressing the opioid epidemic in the community," said **PETER D. FRIEDMANN, MD, MPH**, lead author and addiction medicine physician at the University of Massachusetts Chan Medical School. Senior author **ELIZABETH A. EVANS, PhD**, a public health professor from University of Massachusetts-Amherst added, "establishing these types of programs in local jails is a powerful and effective strategy for engaging and retaining people in treatment and reducing overdose deaths after release."

Future research should explore the generalizability of these findings to other correctional systems, as well as how outcomes differ across population subgroups and by the type of medication received. Research to examine which strategies for implementing MOUD in jails are most effective in supporting recovery after release are also needed.

This research was supported by the Justice Community Opioid Innovation Network (JCOIN), a nationwide research program that tests strategies to expand effective treatment, recovery, and related services for individuals with opioid use disorder involved in the criminal justice system. JCOIN is funded by the NIH's National Institute on Drug Abuse as part of the NIH Helping to End Addiction Long-term® (NIH HEAL Initiative®). ❖

### Reference

PD Friedmann, et al. Medications for Opioid Use Disorder in County Jails: Outcomes After Release. *New England Journal of Medicine*. 2025. DOI: 10.1056/NEJMsa2415987

## NIH launches $50M Autism Data Science Initiative (ADSI)

BETHESDA, MD — The National Institutes of Health has launched the Autism Data Science Initiative (ADSI), a landmark research effort that will harness large-scale data resources to explore contributors to the causes and rising prevalence of autism spectrum disorder. More than $50 million in awards will support 13 pioneering projects that draw on genomic, epigenomic, metabolomic, proteomic, clinical, behavioral and autism services data. These projects will integrate, aggregate and analyze existing data resources, generate targeted new data and validate findings through independent replication hubs.

"Our Autism Data Science Initiative will unite powerful datasets in ways never before possible," said NIH Director **JAY BHATTACHARYA, MD, PhD**. "By bringing together genetics, biology, and environmental exposures, we are opening the door to breakthroughs that will deepen our understanding of autism and improve lives."

A key feature of ADSI is the use of exposomics – the comprehensive study of environmental, medical, and lifestyle factors in combination with genetics and biology. Projects will investigate a wide range of influences, including environmental contaminants such as pesticides and air pollutants, maternal nutrition and diet, perinatal complications, psychosocial stress, and immune responses during pregnancy and early development.

Examples of funded efforts include examining how prenatal exposures interact with genetic risk in large autism cohorts, how causal inference methods can clarify contributors to rising prevalence, and how adult outcomes such as community participation and mental health can be improved through service innovations. Independent replication and validation centers will test models across diverse populations, ensuring that findings are transparent, reproducible, and useful for real-world application.

Each ADSI research team will work in partnership with the autism community to help shape the direction of the research and ensure that the perspectives of autistic individuals, caregivers, and service providers inform the initiative.

According to Centers for Disease Control and Prevention data, autism prevalence in the United States has risen from fewer than 1 in 2,000 children in the 1970s to approximately 1 in 31 today. Autism is a highly variable condition characterized by challenges in social communication and interaction, alongside restricted or repetitive patterns of behavior and interests.

While these trends underscore the urgency of this research, the underlying causes remain complex and multifaceted. Research supported by NIH and others has shown a strong genetic component to autism risk. However, nongenetic factors – such as environmental exposures and maternal health conditions – are less well understood.

ADSI will apply advanced analytic methods, including machine learning, exposome-wide analyses, and organoid models, to study how gene–environment interactions contribute to autism, how these and other factors influence prevalence over time, and how current treatments and services may be improved.

ADSI is a collaborative effort managed by NIH's Division of Program Coordination, Planning, and Strategic Initiatives within the Office of the Director, along with the National Institute of Environmental Health Sciences, the Eunice Kennedy Shriver National Institute of Child Health and Human Development, the National Institute of Neurological Disorders and Stroke, the National Institute of Mental Health and the National Institute on Deafness and Other Communication Disorders.

A list of awardee institutions and project descriptions is available on the ADSI funded research page. ❖

## Repeated head impacts cause early neuron loss and inflammation in young athletes

*NIH-funded study reveals brain changes long before chronic traumatic encephalopathy (CTE) develops*

BETHESDA, MD — Research supported by the National Institutes of Health (NIH) shows that repeated head impacts from contact sports can cause early and lasting changes in the brains of young- to middle-aged athletes. The findings show that these changes may occur years before chronic traumatic encephalopathy (CTE) develops its hallmark disease features, which can now only be detected by examining brain tissue after death.

"This study underscores that many changes in the brain can occur after repetitive head impacts," said **WALTER KOROSHETZ, MD**, director of NIH's National Institute of Neurological Disorders and Stroke (NINDS). "These early brain changes might help diagnose and treat CTE earlier than is currently possible now."

Scientists at the Boston University CTE Center, the U.S. Department of Veterans Affairs Boston Healthcare System and collaborating institutions analyzed postmortem brain tissue from athletes under age 51. Most of them had played American football. The team examined brain tissue from these athletes, using cutting-edge tools that track gene

activity and images in individual cells. Many of these tools were pioneered by the NIH's Brain Research Through Advancing Innovative Neurotechnologies® Initiative, or The BRAIN Initiative®. The researchers identified many additional changes in brains beyond the usual molecular signature known to scientists: buildup of a protein called tau in nerve cells next to small blood vessels deep in the brain's folds.

For example, the researchers found a striking 56% loss of a specific type of neurons in that particular brain area, which takes hard hits during impacts and also where the tau protein accumulates. This loss was evident even in athletes who had no tau buildup. It also tracked with the number of years of exposure to repetitive head impacts. The findings thus suggest that neuronal damage can occur much earlier than is visible by the currently known CTE disease marker tau. The team also observed that the brain's immune cells, called microglia, became increasingly activated in proportion to the number of years the athletes had played contact sports.

The study also revealed important molecular changes in the brain's blood vessels. These changes included gene patterns that could signal immune activity, a possible reaction to lower oxygen levels in nearby brain tissue, and thickening and growth of small blood vessels. Together with these findings, the researchers identified a newly described communication pathway between microglia and blood vessel cells. The authors suggest that this crosstalk may help explain how early cellular problems set the stage for disease progression long before CTE becomes visible.

The study is one of the first to focus on younger athletes, shifting attention from advanced CTE in older people to the earliest cellular signatures of damage.

"What's striking is the dramatic cellular changes, including significant, location-specific neuron loss in young athletes who had no detectable CTE," said **RICHARD HODES, MD**, director of NIH's National Institute on Aging (NIA). "Understanding these early events may help us protect young athletes today as well as reduce risks for dementia in the future."

By revealing the earliest cellular warning signs, this work lays the foundation for new ways to detect brain effects of repetitive head injuries and potentially lead to interventions that could prevent devastating CTE neurodegeneration.

This research was supported by NINDS and NIA through grants F31NS132407, U19AG068753, RF1AG057902, R01AG062348, R01AG090553, U54NS115266, and P30AG072978. ❖

## AMA advocacy win: new federal policies will help physician practices share patient data

CHICAGO — Thanks to years of American Medical Association (AMA) advocacy, physician practices will soon benefit from long-overdue federal reforms that make sharing patient data faster, easier, and more complete without extra logins, endless clicking, or expensive add-ons.

New federal interoperability agreements require all participating electronic health records (EHRs) to connect directly to national data-sharing networks approved by the Centers for Medicare & Medicaid Services. These systems must now deliver real-time, full patient information, including clinical notes, images, and medication lists that physicians actually use in care, rather than the basic data fields that are now available.

"We're finally moving past the days of chasing down records and critical patient details. Large institutions and small practices alike struggle with the lack of interoperability in patient records," said AMA President **BOBBY MUKKAMALA, MD**. "Physicians will be able to quickly see what tests have been conducted and what treatments recommended. We can decrease the cost of care by not repeating tests."

The new policies call for:

- **Real-time data exchange**
  EHRs must support seamless access to full medical records, including unstructured data such as PDFs and images.
- **Automatic encounter notifications**
  Practices will get alerts within 24 hours when their patients go to the emergency department, are hospitalized, or see another provider, giving them a chance to follow up quickly.
- **Fewer login barriers for patients**
  Patients will be able to present digital IDs or QR codes at check-in, allowing outside records to flow directly into the EHRs without creating new portal accounts.
- **Smart visit summaries**
  Patients will receive structured summaries of their visits, ready to take home, without creating extra log-ins.

In day-to-day practice, these changes could prevent duplicate lab orders when a patient recently had testing done elsewhere, catch medication changes made during a specialist visit, or intervene early after an ER discharge. Practices will be notified within 24 hours when their patients visit the emergency department or see another clinician, paving the way for coordinated care. ❖

## Rhode Island Hospital launches first U.S. clinical trial combining focused ultrasound and immunotherapy

PROVIDENCE — Rhode Island Hospital has launched the nation's first clinical trial investigating the use of non-invasive focused ultrasound in combination with immunotherapy to treat brain metastases – marking a major milestone in the advancement of neuro-oncology care.

This groundbreaking study will evaluate the safety and efficacy of focused ultrasound technology as a potential alternative to conventional treatments such as surgery and radiation therapy, which can carry significant risks and side effects. By contrast, this clinical trial aims to determine whether focused ultrasound – a technique that uses sound waves to target tissue deep within the brain – can safely and more effectively treat metastatic tumors when paired with immunotherapy.

"Our laboratory research suggests this approach can significantly improve outcomes for patients with brain metastases," said **CLARK C. CHEN, MD, PhD,** professor of neurosurgery and director of the Brain Tumor Program at Brown University Health. "We're excited to lead this first-of-its-kind U.S. study and to offer patients a non-invasive option that could redefine how we treat brain tumors."

The trial leverages a powerful combination: focused ultrasound to temporarily open the blood-brain barrier (BBB), and immunotherapy, a treatment that has already revolutionized outcomes for patients with advanced cancers, particularly lung cancer. The BBB, while protecting the brain from harmful substances, also blocks many anti-cancer therapies. By briefly disrupting this barrier, focused ultrasound allows immunotherapy drugs to reach brain tumors more directly and in greater concentrations.

This trial is being conducted in collaboration with leading U.S. medical institutions and sponsored by Insightec, a global leader in focused ultrasound technology. The research is supported by funding from the Rainwater Charitable Foundation, which also provided the clinical infrastructure enabling this innovative work.

For more information: Study Details | Blood-brain Barrier (BBB) Opening Using Exablate Focused Ultrasound With Standard of Care Treatment of NSCLC Brain Mets | ClinicalTrials.gov ❖

# Appointments

## ACEP names L. Anthony Cirillo, MD, of RI, as new president

SALT LAKE CITY, UT — The American College of Emergency Physicians (ACEP) announced on September 3, 2025 that **L. ANTHONY CIRILLO, MD, FACEP**, a Rhode Island resident, has been appointed president for the 2025–2026 term.

As president of ACEP, Dr. Cirillo will prioritize efforts to ensure that emergency physicians are afforded the "3 Rs" that emergency physicians deserve, want and need: Respect for the life-saving care we provide, the Resources to provide that care, and fair Reimbursement for the critical role we play in the healthcare system in this country.

"Emergency physicians now face a defining moment," said Dr. Cirillo. "While ACEP rises to address the most pressing challenges in emergency medicine today, we have critical opportunities to stand together to shape the systems and develop the leaders of tomorrow. I am grateful and humbled for the opportunity to lead ACEP and usher in the changes necessary to empower every individual emergency physician."

Dr. Cirillo will direct ACEP efforts to further the development of a comprehensive leadership development pathway for ACEP members to become the healthcare leaders of the future. With a renewed commitment to ensuring that emergency medicine is recognized as the most valuable specialty in healthcare, Dr. Cirillo will mobilize members through the work of ACEP committees to create "outside the box" solutions that question and address the many flawed constructs of healthcare delivery in this country.

"Demand for physician-led emergency care is soaring all over the world. Emergency physicians know they can rely on ACEP to help establish best practices and serve as a professional home, regardless of their practice setting," said Dr. Cirillo. "As we grow our best-in-class accreditation programs, we will continue to set and raise standards for the specialty at home and abroad."

Dr. Cirillo has been a practicing emergency physician for over 30 years and currently practices as a regional traveler as well as the director of government affairs for US Acute Care Solutions. He is past chair of the ACEP Board of Directors and is a past chair of ACEP's federal government affairs, state legislative and regulatory, and membership committees. He was the 2018 Recipient of ACEP's Colin C. Rorrie, Jr, PhD Award for Excellence in Health Policy. He is a past president of the RI Chapter of ACEP and was elected to the ACEP National Board of Directors in October 2018.

Dr. Cirillo earned his medical degree at the University of Vermont College of Medicine and completed an emergency medicine residency at UMASS Medical Center in Worcester, MA, where he served as chief resident. Following residency, he served as clinical faculty at the Albany Medical Center emergency medicine residency program for three years. In Rhode Island, he served as the Chief of Emergency Medicine at the former Memorial Hospital of Rhode Island and worked as a consultant to the Rhode Island Department of Health, where he oversaw the creation of the Center for Emergency Preparedness & Response. ❖

## South County Health names Gerald Colvin, DO, Cancer Center medical director

*Expands team of permanent medical oncology providers*

WAKEFIELD – South County Health recently announced the continued growth of its Cancer Center, highlighted by the return of **GERALD COLVIN, DO**, as medical director of the center.

Over the coming months, Dr. Colvin will be joined by three additional permanent medical oncology providers, including **CHRISTOPHER SEIDLER, MD**, who served as interim medical director this past year, and **DONALD JOYCE, MD**, medical director of radiation therapy.

### Additions to the Cancer Center

**GRIFFIN REYNOLDS, MD** (Starting in November)

**PATRICIA KARWAN, DNP** (Starting in December)

**HEATHER GLENN, FNP** (Starting in January)

"These appointments reflect South County Health's unwavering dedication and promise to provide comprehensive cancer care to our community," said **AARON ROBINSON**, president and CEO. "With Dr. Colvin returning to lead our program, and the additions of Dr. Reynolds, Patricia Karwan, and Heather Glenn, we are now better equipped than ever to deliver advanced, permanent, community-based cancer care – a truly transformative moment for both our health system and the community we serve."

### Expanding Access in East Greenwich

As part of this growth, South County Health will also open a new outpatient cancer clinic at the East Greenwich Medical and Wellness Center later this fall. This expansion will make it even easier for patients and families in central Rhode Island to receive expert cancer care, closer to where they live and work. ❖

# Appointments

## Kent appoints Jeffrey Sanders, MHA, interim president

WARWICK — Care New England's Kent Hospital has announced the appointment of **JEFFREY SANDERS, MHA**, as interim president. Sanders steps into the role following the recent departure of Kent President and COO, Paari Gopalakrishnan, MD, MBA, and will provide executive leadership as the search continues for Kent Hospital's next permanent president and chief operating officer.

Sanders brings more than 20 years of distinguished leadership in healthcare administration, with a track record of delivering operational excellence, enhancing patient care, and driving strategic innovation within complex, integrated health systems and academic medical centers.

"Jeff's extensive experience, coupled with his deep commitment to patient-centered care, makes him an ideal leader during this transition," said **MICHAEL WAGNER, MD**, president and CEO of Care New England. "We are confident he will be a valuable partner to the Kent team as we continue our search for a permanent leader."

Most recently, Sanders served as President of the Southern Region at Maine Health, a $3.5 billion integrated health system. In this role, he provided executive oversight for Maine Medical Center, a 700-bed academic medical center and the state's only children's hospital, and Southern Maine Health Care, which includes a 135-bed rehabilitation hospital. During his tenure, the medical center achieved both an "A" safety rating from Leapfrog and a 5-star rating from Medicare. He also led the successful completion of a $179 million capital campaign and was instrumental in advancing facility modernization plans valued at over $500 million.

Sanders holds a Master of Healthcare Administration from the University of North Carolina at Chapel Hill and a Bachelor of Arts in Political Science from Saint Anselm College. He is a member of the American College of Healthcare Executives and has served on numerous boards, including the Maine Hospital Association, United Way of Greater Portland, and Portland Regional Chamber of Commerce. ❖

## Jennifer M. La Luz, MBA, CPHQ, named Vice President of Operations for Kent Hospital

WARWICK — **JENNIFER M. LA LUZ, MBA, CPHQ**, has been promoted to Vice President of Operations for Kent Hospital. In her new position, she will now oversee outpatient rehab services, facilities, security, and hospital operations. She will continue to oversee the Diagnostic Imaging Department, rehabilitation services, environmental services, and transport

Over the past 12 months, she has been serving as the Kent Hospital Operational Readiness executive for the Epic transition project, in addition to her other duties, which include expanding access to our testing and procedural services.

Since joining Kent Hospital in 2019, Jennifer has established herself as a trusted subject matter expert and change agent – consistently exceeding expectations and setting new standards for success. Most recently serving as Executive Director of Operations, she previously led as Senior Director of Quality and Access. In that role, she was recognized for her steady leadership and key accomplishments, including securing The Joint Commission's Advanced Total Joint Center of Excellence Accreditation and the Level 2-Silver Geriatric Emergency Department Accreditation, among other significant recognitions.

She earned an MBA from the University of New Mexico – Anderson School of Management. She is also a Certified Professional in Healthcare Quality (CPHQ). ❖

# Recognition

## Neighborhood Health Plan one of NCQA's highest-rated Medicaid health plans

SMITHFIELD — Neighborhood Health Plan of Rhode Island (Neighborhood) has again been recognized as one of the nation's highest-rated Medicaid health plans, earning a 4.5 out of 5 in the National Committee for Quality Assurance's (NCQA) 2025 Medicaid Health Plan Ratings. This recognition marks the 22nd consecutive year – since NCQA began rating Medicaid plans – that Neighborhood has ranked in the top 10% nationally. In addition, Neighborhood is also the only Medicaid health plan in Rhode Island to achieve a 4.5 out of 5 rating.

Neighborhood has also earned NCQA's Health Equity Accreditation for its Medicaid and Exchange products – affirming its commitment to reducing health disparities and improving care for all Rhode Islanders.

"Neighborhood's 22-year streak as a nationally recognized and top-rated NCQA Medicaid Health Plan is a powerful testament to the quality of care we provide and the dedication of our team," said Neighborhood President and CEO **PETER MARINO**. "Moreover, being the only Medicaid health plan in Rhode Island to receive 4.5 out of 5 speaks volumes about our mission-driven approach and the strength of our outstanding provider partnerships, including our terrific federally qualified health centers who care for about half of our members."

NCQA's Medicaid Health Plan Ratings evaluate health plans based on the care patients receive, their satisfaction with that care, and the plans' efforts to drive continuous improvement. In NCQA's 2025 ratings, Neighborhood is one of 14 Medicaid health plans nationwide, and the only one in Rhode Island, to receive an overall rating of 4.5 (nationally, no Medicaid health plan received a 5 out of 5 rating). Notably, Neighborhood scored 4.5 out of 5 for Prevention and Equity, improving in 11 of 18 measures.

NCQA's Health Equity Accreditation recognizes organizations that lead the market in providing culturally and linguistically sensitive services and work to reduce health care disparities. This was Neighborhood's first time applying for this level of accreditation, which recognizes Neighborhood's efforts to identify and address health disparities, promote culturally and linguistically appropriate services, and engage communities in meaningful ways.

"Each of our members deserves access to high-quality care that truly meets their needs," said Neighborhood Chief Medical Officer **KRISTIN RUSSELL, MD**. "Achieving NCQA's Health Equity Accreditation affirms our commitment to addressing disparities and enhancing the safety, effectiveness, and responsiveness of care and reflects the commitment and collaboration that fuel our mission and drive better health outcomes." ❖

## Kent Hospital attains verification from American College of Surgeons Geriatric Surgery program

WARWICK — Kent Hospital announced that they have received verification under the American College of Surgeons Geriatric Surgery Verification (GSV) program. Fewer than 1% of hospitals receive this prestigious designation. Kent is the 25th hospital in the nation, and the first community hospital in New England, to earn it.

The GSV program improves surgical care and outcomes for older adults by promoting comprehensive patient- and family-centered care, encouraging interdisciplinary collaboration and communication, and facilitating evidence-based practices. The program focuses on the overall health and treatment goals of older adults, emphasizing the importance of thorough evaluations before surgery, improved treatment plans, and highlighting the significance of discharge and postoperative care plans to ensure continuous care throughout the surgical journey.

"The population of Americans aged 65 and older has grown by 34% over the past decade, and by 2030, one in five Americans will be over the age of 65," said **PAARI GOPALAKRISHNAN, MD**, president and chief operating officer of Kent Hospital. "In response to this demographic shift, Kent Hospital has made a strategic investment in older adult care. We have placed great emphasis on our Acute Care for Elders (ACE) Unit, the Silver-Level 2 Geriatric Emergency Department Accreditation (GEDA), and now the GSV designation, all part of our commitment to excellence in senior care. Caring for our community is our mission at Kent Hospital, and as our community ages, we are fully prepared to meet their evolving healthcare needs."

"Earning the Geriatric Surgery Verification certification from the American College of Surgeons is a proud milestone for our surgical team and is a reflection of our unwavering commitment to providing the highest standard of care to older adults," said **MELISSA MURPHY, MD**, Executive Chief of Surgery, Care New England, Director, Geriatric Surgery Program. "This achievement, along with the ACE Unit and GEDA, reinforces our vision to lead in age-friendly surgical care."

As a verified geriatric surgery facility, Kent Hospital has met the standards as defined in the Optimal Resources for Geriatric Surgery manual, which helps ensure the most effective use of surgical care for a vulnerable aging population. These standards are evidence-based and define resources and processes that hospitals must have in place to perform operations effectively, efficiently, and safely for older adults. The standards are also patient-centered, so hospitals can always prioritize what matters most to individual patients regarding their needs and treatment goals. The GSV program has been shown to reduce incidents of delirium and shorten the average length of stay in the hospital after an operation.

As an ACS-verified hospital, Kent Hospital is also an ACS Surgical Quality Partner. Being a Surgical Quality Partner signifies a hospital's dedication to consistently improving procedures and approaches, while maintaining a critical eye on process at every step. ❖

# Places

## Brown Surgical Associates' surgeons first in New England to perform implantation of iliac branch device

PROVIDENCE — Brown Surgical Associates announced that **JEFFERY SLAIBY, MD**, and **PETER SODEN, MD**, recently became the first surgeons in New England to implant the newly FDA-approved Zenith® Iliac Branch Device (ZBIS). The procedure took place on July 29, 2025, at Rhode Island Hospital, marking a major step forward in treating patients with aortoiliac and iliac aneurysms.

The device, which gained FDA approval in May of this year, is built on Cook Medical's proven Zenith platform and is designed to offer a safer, minimally invasive option for patients with these life-threatening conditions. The ZBIS graft not only repairs aneurysms but also preserves blood flow to the internal iliac artery.

"This device expands treatment options for patients who previously might not have been candidates for minimally invasive repair," said Dr. Slaiby. "It's exciting to bring this technology to Rhode Island and be the first in New England to perform this life-changing surgery."

Dr. Soden added: "The ability to treat aneurysms while preserving blood flow is a significant advancement. We're proud to offer our patients the latest in innovative vascular care right here at Rhode Island Hospital."

Clinical trial data show strong long-term outcomes, including durable aneurysm repair and 97% of patients free from buttock claudication at five years. Cook Medical has called the launch of ZBIS an important addition to its aortic device portfolio, expanding treatment options and improving patient results. ❖

## Kent Hospital's Evening of Hope Event raises over $269,000 to benefit its ED

WARWICK — Kent Hospital recently held its annual event, Evening of Hope, at the Dunes Club in Narragansett, where more than 300 attendees enjoyed an impactful evening with delightful delicacies, friends, and fun, while supporting vital enhancements to Kent Hospital's Emergency Department, including equipment upgrades and infrastructure improvements, ensuring that every patient who walks through its doors receives the exceptional care they deserve. The event raised over $269,000 and counting.

**Edward Thomas, MD**, Kent Hospital Foundation Board member, and family attend the Evening of Hope event. From left to right: **Max Charness**, **Lauren Charness**, **Alexandra Thomas**, **Michelle Thomas**, **Dr. Thomas**, and **Brian Thomas**. [COURTESY OF KENT HOSPITAL]

Kent Hospital's Emergency Department is the second largest in Rhode Island, treating nearly 70,000 patients each year. The department earned the Silver-Level 2 Geriatric Emergency Department Accreditation (GEDA) from the American College of Emergency Physicians, making Kent the only hospital in Rhode Island to receive this distinction and one of fewer than 100 hospitals nationwide to achieve this level of recognition for excellence in geriatric emergency care.

Kent's Emergency Department is also ranked in the top 10 percent nationally for clinical excellence and patient satisfaction. With an innovative provider and triage model, the hospital has significantly reduced wait times and improved overall patient flow. These advancements have led to exceptional patient experience ratings, reinforcing Kent's commitment to delivering high-quality, compassionate emergency care to every patient who comes through its doors.

In addition, the evening celebrated **EDWARD J. COONEY, Jr.** as the 2025 Jonathan K. Farnum Outstanding Philanthropist Honoree and **JINEN THAKKAR, MD**, as the 2025 Kent Hospital President's Award for Community Care Honoree.

"Kent Hospital is much more than a workplace for our doctors, nurses, and team members; it is a place where they dedicate their lives to caring for others, demonstrating this commitment every single day. It is where our family, friends, and neighbors receive compassionate care that promotes their health and well-being. At Kent, we see the best of humanity reflected in ourselves and each other. I am deeply grateful to everyone who attended this year's event and to the staff and volunteers whose efforts made it such a success. Each year, I am inspired by the incredible support our community gives to Kent Hospital and the life-saving work performed by the devoted caregivers at Kent," said **JEFFREY CABRAL**, chief philanthropy officer, Care New England.

# Obituaries

**JERRY M. KHERADI, MD, FACG**, 84, of North Providence, passed away peacefully at his home Sept. 9, 2025. Born in Yazd, Iran, he pursued his medical degree at Grant Medical College in Mumbai, India, completed his medical internship and residency in New York, and pursued a fellowship in gastroenterology at Rhode Island Hospital. A Fellow of the American College of Gastroenterology, Dr. Kheradi cared for the Rhode Island community for more than 30 years in private practice, serving patients in both gastroenterology and internal medicine.

He served on the Credentials Committee at Our Lady of Fatima Hospital and was president of the Rhode Island Gastroenterology Society. Upon retiring, he donated his office suite to Tri-County, a charitable organization that transformed the space into a state-of-the-art dental clinic serving underprivileged children and families. He continued his lifelong commitment to service as chairperson for Funds and Finance for the Federation of Zoroastrian Associations of North America (FEZANA) for more than a decade. He spoke eight languages, he was a gifted, intelligent, and hardworking physician who dedicated his life to helping others.

He is survived by his wife, Celeste; his beloved daughter, Delara Lungen, and her husband, Matthew; and his treasured grandchildren, James and Ava, who brought endless light and pride into his life. He also leaves behind his dear sisters, Farangis Izedian and Manijeh Nadjmi, and her husband, Dr. Bruce Nadjmi; along with sisters-in-law Homai Kheradi and Teresa Kheradi; and a large extended family of devoted nieces, nephews, and lifelong friends who will carry his memory forward with love.

Donations can be made in his memory to St. Anthony Church, 4 Gibbs Street, North Providence, RI 02904 or FEZANA. ❖

**STEVEN WEISBLATT, MD**, born September 4, 1952 in Philadelphia, died peacefully on September 16, 2024 after battling cancer. After receiving his medical degree at the University of Wisconsin, he eventually settled in Rhode Island with his family in 1989.

He spent 25+ years dedicated to his practice at St. Joseph's Hospital before moving with his wife and best friend, Judith Gaynor Weisblatt (1950–2019), to Fayetteville, AR, to work at the VA. He returned to his hometown of Philadelphia after the passing of his beloved wife.

He loved reading, history, film, music and pretending to be indifferent to the beloved family dog, Pondy. He was dedicated to his loved ones, always had a helpful bit of advice or story and held a curiosity about life that never dimmed.

He leaves behind his son, Samuel Weisblatt, his daughter-in-law, Laura and his four grandchildren, Yishai, Judah, Yair and Noa, as well as his daughter, Elizabeth Weisblatt and her partner Medra Cruikshank along with his younger siblings, Ricky and Roseann Weisblatt.

In his memory, a donation can be made to the Throat Cancer Foundation or The Survivor Mitzvah Project. ❖