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# RHODE ISLAND MEDICAL JOURNAL



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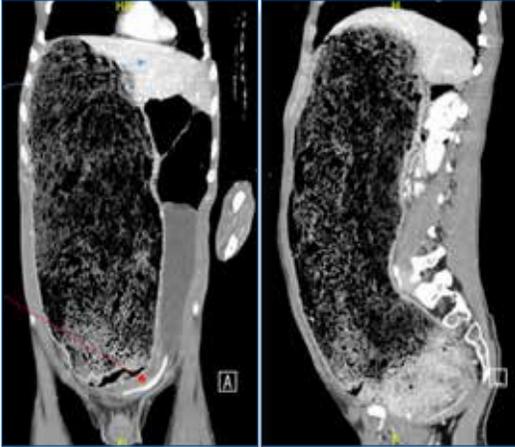
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## Fecaloma – A Common Problem, Uncommon Dimensions

RICHA NAHAR, MD; DENISE FERNANDES, MD; MICHAEL SANTOS, MD

### ABSTRACT

Chronic constipation and fecal impaction are common in older individuals but can also be found in younger patients with cognitive and psychiatric illnesses. The diagnosis of fecal impaction and, the assessment of severity are best performed clinically. Here, we present a case of a 30-year-old autistic individual where limited history was obtainable and further imaging helped to urgently diagnose a 47 x 15.6 x 12 cm stool ball, causing significant mass effect of surrounding intra-abdominal structures. Fecal disimpaction and aggressive bowel regimen prevented the pathological effects of severe fecal retention.

**KEYWORDS:** fecal impaction, fecaloma, comorbidities in patients with intellectual disabilities

### INTRODUCTION

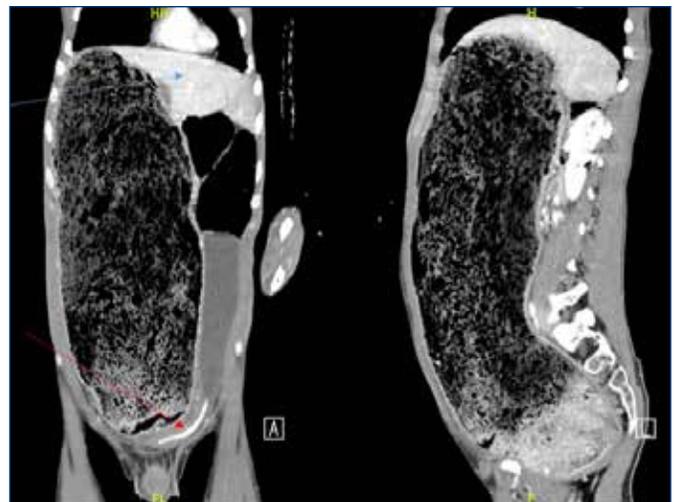
Fecal impaction is defined as an accumulation of hard stool in the recto-sigmoid colon that cannot be evacuated spontaneously. It is preventable with early diagnosis and treatment; however, if left untreated, a fecaloma can form, which can cause pressure on the intestinal wall, the lumen, and the adjacent abdominal viscera. The increase in intraluminal pressure can cause bowel wall ischemia leading to stercoraceous colitis, ischemic colitis, bowel wall necrosis, intestinal perforation, fecal peritonitis, and death. In extreme cases, a giant fecaloma may cause a mass effect on the adjacent structures outside of the gastrointestinal tract. Management of stool impaction can be straightforward if diagnosed in a timely fashion, with the first line of treatment being a manual disimpaction, followed by an aggressive bowel regimen. This case illustrates a large fecaloma with a mass effect on the surrounding abdominal organs and vasculature.

### CASE REPORT

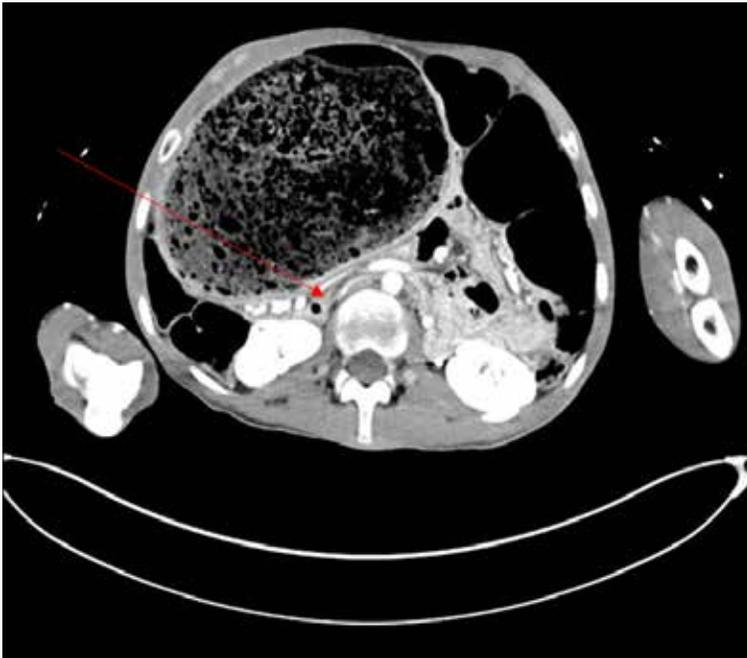
A 30-year-old man with autism, chronic constipation, and fecal incontinence presented to the emergency department with emesis and diffuse abdominal pain for 2 days. Due to cognitive impairment and minimally verbal state, he was unable to characterize the pain, provide a review of systems or cooperate with the physical examination. His mother reported that his abdomen had become increasingly

distended, associated with multiple episodes of feculent vomitus, and decreasing urine output. He took bisacodyl and polyethylene glycol daily. He had no personal or family history of Hirschsprung's disease. He did not take any opioid medications, and he did not have any recent travel or infectious symptoms. On examination, he had resting tachycardia of 111 beats per minute with a blood pressure of 98/68 mmHg. Abdominal exam showed significant abdominal distension with right-sided tenderness without guarding or rigidity. The digital rectal exam showed hard, impacted stool. There was bilateral lower extremity blanchable erythema without edema. The fecal occult blood test was negative, and laboratory workup was unremarkable. Computed tomography (CT) scan of the abdomen and pelvis with contrast revealed a 47 x 15.6 x 12 cm stool ball extending from the rectosigmoid colon to the right hemidiaphragm with peri-rectal edema, concerning for stercoral colitis (stercoral colitis is an inflammatory colitis related to increased intraluminal pressure from impacted fecal material). There was mass effect on the abdominal and pelvic viscera, including the displacement of the urinary bladder in the left lower abdominal quadrant and displacement of liver cranially (**Figure 1**).

**Figure 1.** Computed tomography of abdomen and pelvis with contrast showing dilated sigmoid colon with hyperdense mass with air foci, demonstrating a 47x15.6x12cm fecaloma. The urinary bladder is displaced to the left lower quadrant (red arrow) and the liver which is displaced cranially (blue arrow).



**Figure 2.** Computed tomography of abdomen and pelvis with contrast showing dilated sigmoid colon with hyperdense mass with air foci, demonstrating a 47x15.6x12cm fecaloma, with compression of the IVC (red arrow).



There was a complete collapse of the inferior vena cava with CT evidence of decreased return of the blood flow from the right lower extremity (Figure 2).

He underwent fecal disimpaction and the bladder was decompressed with a straight catheter, with 900 cc of urine output. Given his history of chronic constipation, he was started on an aggressive bowel evacuation protocol with oral polyethylene glycol, milk of magnesia, mineral oil, magnesium citrate, rectal bisacodyl, and tap water enemas. Bowel and bladder function returned, and his abdominal discomfort resolved. He was discharged one week later with an aggressive bowel regimen of mineral oil enemas, polyethylene glycol, and rectal suppositories.

## DISCUSSION

Chronic constipation is prevalent in 14% of the population in North America and is the most prevalent comorbidity in adults with autism spectrum disorders and intellectual disabilities.<sup>1,2</sup> A history of chronic constipation has been found in half of the patients with stool impaction and more than a quarter of cases had an underlying neuropsychiatric disease.<sup>3</sup> The hospitalization rate for constipation for people with an intellectual disability is 8 times higher than for those without an intellectual disability.<sup>4</sup> Risk factors for constipation in this group include inadequate dietary fiber and water intake, colonic hypomotility, rectal sensitivity impairment, and limited physical mobility.<sup>2,5</sup> Chronic constipation is a well-known side effect of antipsychotic medications,

which are often prescribed to patients with intellectual disabilities.<sup>5</sup>

Fecal impactions usually present with vague symptoms of abdominal pain, distension, nausea, and vomiting and can mimic a broad range of intra-abdominal pathologies such as large or small bowel obstruction, colonic stricture, carcinoma of the colon, infectious gastroenteritis, colitis, diverticulitis, among others.<sup>2</sup> Patients with intellectual disability may not be able to communicate the history of constipation or describe the pertinent symptoms for the diagnosis that would trigger the timely management.<sup>2,5</sup> In these patients, pain may usually present as distress, irritability, aggression, confusion, or sleep disturbance. Diagnostic delay is more likely in scenarios where “paradoxical diarrhea” is reported, or when loose stool seeps around the impacted stool. This is even more likely in patients with an intellectual disability, where the consequence of limited expression of symptoms becomes severe fecal impaction.<sup>2,3</sup>

Fecal impaction can lead to serious intraabdominal complications. With limited distension of the anal passage and marked elasticity of the rectum, a mass of feces can become too massive to evacuate.

The hard stool ball can cause direct pressure on the intestinal wall of the rectosigmoid colon which has a smaller diameter and weak vasculature, causing ischemia, inflammation, and wall necrosis leading to stercoral colitis, ulceration, intestinal perforation, fistula formation, and peritonitis.<sup>3</sup> Rectal distension can cause compression of adjacent abdominal structures which can lead to post-obstructive acute renal failure, obstructive uropathy, urinary retention, nerve compression, and radiculopathies.<sup>3</sup> Extrinsic compression of major intra-abdominal vessels can impede venous return and decrease cardiac output.<sup>6</sup> In extreme cases, excess intra-abdominal pressure can lead to abdominal compartment syndrome, which can progress to shock and hemodynamic instability.<sup>3</sup>

Diagnosis of fecal impaction requires a high clinical suspicion based on a complete history, abdominal exam, and palpation of hard stool on digital rectal exam. In non-collaborating patients where history is not reliable and physical exam cannot be performed, abdominal imaging with acute abdominal series or CT abdomen and pelvis with contrast can prompt early diagnosis and management of colonic fecal loading with a manual disimpaction followed by stimulation of colonic evacuation with suppositories and enema. Once an obstruction is relieved, a proximal stool washout can be initiated with oral laxatives.<sup>2</sup> Surgical evaluation is necessary in presence of an acute abdomen. Fecaloma-induced perforations have a high mortality rate of 33%.<sup>3</sup> A fatal prognosis is common in patients with prior hospitalizations with stool impaction especially among patients with

neuropsychiatric illnesses, the elderly, and in those with chronic renal failure.<sup>3</sup> Our patient improved with manual disimpaction followed by an aggressive bowel regimen with enemas and laxatives. Preventing future episodes of constipation with adequate fiber and water intake with a daily bowel regimen is of paramount importance.<sup>2,3</sup>

## CONCLUSION

Fecal impaction can cause significant complications, especially in the elderly and in patients with neuropsychiatric illness. In serious cases, it can result in fecalomas, which can cause inflammation, perforation, and mass effect on vital organs. Rapid diagnosis and removal of the fecaloma may prevent life-threatening emergencies.

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# Valproate-induced Periorbital Edema

SARAH HATAHET, MD; KHALED KHALAF, MD; SALAHELDIN ELHAMAMSY, MD

## ABSTRACT

**INTRODUCTION:** Valproate is an antiepileptic medication that can be used to manage behavioral symptoms associated with Alzheimer's dementia. We present a rare case of valproate-induced periorbital edema.

**CASE:** A 76-year-old man came to the emergency room with agitation and aggression. He was medically cleared and referred to a psychiatric facility where he was treated with haloperidol. When he developed drug-induced parkinsonism, the haloperidol was stopped, and the patient was started on valproate 250 mg twice daily. The day after valproate administration, the patient developed periorbital edema. After ruling out other causes of periorbital edema, adverse drug reaction was suspected. Valproate was discontinued, and the edema rapidly resolved within five days.

**CONCLUSION:** Periorbital edema is a rare side effect of valproate. It can occur in patients who are being treated with valproate for behavioral changes in Alzheimer's disease. The edema resolves with discontinuation of the medication.

**KEYWORDS:** valproate, periorbital edema, dementia, adverse drug reaction

## INTRODUCTION

Drug-related peripheral edema is not uncommon; however, valproate-related edema is a rare adverse side effect that has been reported after long-term administration of the medication.<sup>1</sup> Gastrointestinal side effects, hepatitis, pancreatitis, and thrombocytopenia have all been reported with valproate.<sup>2</sup> We present here a rare case of periorbital edema as a side effect of valproate.

## CASE REPORT

A 76-year-old man with a history of dementia with behavioral disturbance, who lived at home with his wife, presented to the emergency department due to agitation and aggressive behavior toward his wife. He was medically cleared and transferred to an inpatient psychiatric unit for further management.

In the facility, the patient was aggressive toward staff and other patients. He did not have physical limitations and did not need an assistive device to ambulate. He maintained eye contact, could make his needs known, and was able to engage in a conversation. However, he had delusions and hallucinations, was confused, and was unable to answer questions appropriately.

After several altercations with other patients in the facility, he was deemed a risk to himself and others and started on haloperidol. The haloperidol was stopped when he developed gait changes, rigidity, and cogwheeling. He was transitioned to quetiapine and developed somnolence and decline in his functional status. He was taken off quetiapine, but he developed agitation once again.

He was next started on valproate for symptom management, but the following morning, the patient was noted to have new onset eyelid swelling and bilateral lower extremity edema to the level of the knee. The initial differential diagnosis included facial cellulitis, renal disease, liver disease, heart failure, and medication side effects.

Workup was negative CBC, BNP, BMP, and liver function testing and TSH showed no abnormalities. He was taken off the valproate after a literature search showed edema as a rare side effect of the medication.<sup>3,4</sup> The pedal and periorbital edema rapidly resolved in five days. The patient was diagnosed with valproate-induced facial edema.

## DISCUSSION

Valproate can be used in the treatment of agitation with dementia, as well as for generalized or partial seizures, prophylaxis of migraine headache, and bipolar disorder. Gastrointestinal side effects have been seen with valproate along with hepatitis, pancreatitis, and thrombocytopenia.<sup>8</sup> New peripheral edema should prompt a thorough evaluation for underlying conditions such as congestive heart failure, liver cirrhosis, nephrotic syndrome, hypoalbuminemia, and lymphatic or venous obstruction.<sup>3</sup> There have been case reports of valproate causing peripheral edema without other side effects.<sup>4</sup> A few cases reported valproate-induced bilateral lower extremity edema which resolved quickly after the valproate was stopped.<sup>3,4,7</sup>

The mechanism by which valproate causes peripheral edema is not known. Valproate can exhibit its pharmacologic

effects by increasing neuronal concentrations of GABA level in the brain. This can happen by either inhibiting its metabolism or increasing its synthesis.<sup>4,6</sup> Some studies have reported lower extremity edema when using medications that affect the GABA system, such as benzodiazepines. Tiagabine, an anti-epileptic drug thought to generate peripheral edema, is associated with the  $\gamma$ -aminobutyric acid (GABA) system, which is utilized by valproate as well.<sup>3</sup>

GABA receptors have been identified in peripheral tissues with reported effects on modulating peripheral vascular resistance.<sup>4</sup> This might be related to the development of edema as an adverse medication effect.

Some studies report edema in the context of liver injury related to valproate use; however, our patient had no abnormalities in his renal or liver functions and did not develop liver injury.<sup>7</sup> The course of events including development of bilateral lower extremity edema and eyelid edema one day after taking valproate, and resolution of the edema five days after stopping the medication, suggest adverse drug reaction as the cause of our patient's peripheral edema and periorbital edema.

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## Disclosures

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# A Case of Tumor Lysis Syndrome Complicated by Disseminated Intravascular Coagulation – Case Reports of the LifePACT Critical Care Transport Team

LAUREN MORITO, MS, NRP, FP-C; KELLY MEEHAN-COUSSEE, MD; FRANCIS SULLIVAN, MD; KENNETH A. WILLIAMS, MD, FACEP, FAEMS

## ABSTRACT

Hematologic/Oncologic emergencies are rarely seen in the critical care transport environment but must be recognized and treated without delay. We report such a patient transported from a referring hospital to a tertiary care center by the LifePACT team, a 52-year-old male with a history of acute myeloid leukemia (AML). The patient presented to the referring hospital with known laboratory test abnormalities, suffered cardiac arrest, was resuscitated, accepted for transfer to a tertiary care center, and LifePACT was requested to perform the transport.

**KEYWORDS:** hyperkalemia, tumor lysis syndrome, ambulance, emergency medical services, critical care transport

## BACKGROUND

The LifePACT Critical Care Transport team is operated by Rhode Island Hospital and Hasbro Children's Hospital in Providence, Rhode Island. It includes emergency medical technicians, critical care paramedics, nurses, and physicians (emergency medicine attendings, fellows and residents, pediatric and emergency medicine residents for pediatric patients) who treat and transfer acutely ill and injured pediatric and adult patients throughout southern New England. LifePACT differs from standard advanced life support ambulances in that a higher level of training, experience, skill, pharmacologic and procedural interventions are available. Second- and third-line seizure medications, antibiotics, insulin, vasopressors, paralytics and other rapid sequence induction medications are standard. Transvenous pacing, balloon pump or Impella support, hemodynamic monitoring, and hospital ICU equivalent oxygenation/ventilation support can be continued during transport.

Most LifePACT transports are for acute medical, cardiac, neurologic, and traumatic emergencies; oncologic transports are rare. While most LifePACT patients have brief bedside times prior to transport, the patient described in this report required extensive stabilization efforts from the LifePACT team at the referring hospital prior to transport.

## CASE PRESENTATION

LifePACT was dispatched to transfer a 52-year-old male with a history of acute myeloid leukemia (AML) from a referring hospital to a tertiary care facility for further care and possible plasmapheresis. He had been seen earlier in the day by his primary care physician with complaints of fatigue and dyspnea. He was last treated with hydroxyurea one week prior to presentation. Laboratory work revealed a WBC of 245 k/cu mm, hemoglobin of 6.7g/dl and platelets of 28 k/cu mm. He was referred to a local hospital emergency department where he was noted to be ill appearing, with shortness of breath and abdominal pain. Laboratory testing was notable for a Na of 131 meq/l, Cl of 94 mEq/l, BUN of 81 mg/dl, creatinine of 2.7 mg/dl, Bili of 1.7 mg/dl, glucose of 40 mg/dl, pH less than 7, bicarbonate of 3.4 mEq/dl, and base excess of -27. A chest X-ray revealed pneumonia, for which he was given a gram of cefepime. CT scan of the abdomen was notable for splenic infarcts and ischemic bowel. The patient deteriorated and developed hypoxic respiratory distress requiring intubation. He was referred to an area tertiary care center and an advanced life support (ALS) (a lower level of care than critical care transport) ambulance was requested. However, just before that team's departure, the patient's QRS began to widen, he became bradycardic and lost pulses. CPR was started by the ambulance crew, who returned him to the referring hospital for resuscitation. Return of spontaneous circulation (ROSC) occurred after CPR, atropine, and epinephrine administration. A post-ROSC blood gas revealed a pH of 6.93, CO<sub>2</sub> of 16 mmHg and O<sub>2</sub> of 68 mmHg. The patient was completely unresponsive even in the absence of paralytics or sedation. A sodium bicarbonate infusion was started, and LifePACT was requested for transfer. Shortly after LifePACT arrival, the patient again became bradycardic and hypotensive. The team initiated a norepinephrine infusion along with a fluid bolus, and administered calcium chloride given concern for hyperkalemia. The bradycardia worsened, but responded to push-dose epinephrine and atropine. The LifePACT transport physician placed a femoral triple lumen catheter under ultrasound guidance. Point-of-care testing using LifePACT's iStat (Abbott Laboratories, Princeton, NJ) revealed pH 6.6, PCO<sub>2</sub> 71.9 mmHg, PO<sub>2</sub> 25 mmHg, Base Excess -30, HCO<sub>3</sub><sup>-</sup> 7.4, Na 130 meq/l, K 7.8 meq/l, Ca 1.32 mg/dl and glucose 56 mg/dl. The mixed acidosis was

felt to be secondary to the patient's recent cardiac arrest. His hyperkalemia was treated with intravenous dextrose and insulin, with infusions of insulin and epinephrine prepared. Blood glucose improved on re-testing. During transport preparation, copious oropharyngeal, nasal, and IV-site bleeding developed. Further hospital laboratory results revealed elevated uric acid and phosphorus levels, and an INR of 9. Given these results, the CT findings, and the bleeding diathesis, disseminated intravascular coagulopathy (DIC) related to tumor lysis syndrome and/or AML was suspected by the LifePACT team. DIC is associated with both AML and tumor lysis syndrome.<sup>1,2</sup>

During transport, the patient displayed QRS widening, prompting additional calcium, dextrose, and insulin administration. He remained critically ill but otherwise unchanged during transport. Upon arrival at the tertiary center, he had emergency hematology/oncology consultation, but given his rapid deterioration, prognosis was felt to be very poor. His family decided to implement comfort measure goals of care, and he died shortly afterwards.

## DISCUSSION

Tumor lysis syndrome is a group of metabolic disturbances caused by treatment of rapidly proliferating and drug-sensitive malignancies.<sup>3</sup> It is characterized by hyperkalemia, hyperphosphatemia, hypocalcemia, and hyperuricemia. This combination occurs when a large number of tumor cells are lysed, discharging their contents into the circulation. This development can lead to cardiac arrhythmias, acute kidney injury, neurological deterioration including seizures, and uric acid nephropathy.<sup>3</sup> It is the most common disease-related emergency that physicians encounter while caring for individuals with hematologic cancers.<sup>3</sup>

### Risk Factors

Cancers with a high proliferation rate, large tumor burden, a lactic dehydrogenase level more than twice normal, pre-existing renal disease and/or volume depletion are all risk factors for TLS development. Cancers most frequently associated with TLS include non-Hodgkin's lymphomas, ALL, AML and CLL. This patient was considered at high risk for this condition given his AML with a white count of over 250,000.<sup>1</sup>

### Diagnostics

The Cairo Bishop Definition of Tumor Lysis Syndrome combines laboratory and clinical features including:<sup>3</sup>

- Serum uric acid level  $\geq 8$  mg/dL, or 25% increase from baseline
- Serum potassium level  $\geq 6$  mEq/L, or 25% increase from baseline

- Serum phosphate level  $\geq 6.5$  mg/dL in children and  $\geq 4.5$  mg/dL in adults, or 25% increase from baseline
- Serum calcium level  $\leq 7$  mg/dL, or 25% decrease from baseline

It further defines clinical Tumor Lysis Syndrome as two of the laboratory abnormalities plus any of the one of the following:

- Increase in serum creatinine level  $\geq 1.5$  times the upper limit of normal
- Cardiac arrhythmia/sudden death
- Seizures

These potentially lethal ramifications can be managed effectively with prompt treatment.

## TREATMENT OF SUSPECTED TUMOR LYSIS SYNDROME

Electrolyte abnormalities should be treated aggressively to avoid EKG changes and arrhythmias. Hyperkalemia is treated with insulin, dextrose and calcium, sodium bicarbonate and albuterol. Dialysis may be required. Hyperphosphatemia can also be managed with dialysis. It should be corrected before calcium administration unless arrhythmia or tetany is present. Renal dysfunction should be treated with fluid and electrolyte management, appropriate drug dose adjustment, and, if necessary, dialysis.<sup>3</sup> Rasburicase, usually considered a preventive measure, can be given if severe acute kidney injury develops. Rasburicase is a recombinant urate oxidase enzyme used to reduce existing plasma uric acid by converting it to allantoin, which is more soluble in urine.

## SUMMARY

We present a case of complicated tumor lysis syndrome requiring critical care transport. LifePACT provided significant stabilizing care prior to departing the referring hospital, including placement of a central venous line, bedside laboratory testing, treatment of hyperkalemia, and ventilator management. Time spent stabilizing patients at the referring hospital must be balanced against the benefit of advanced treatment available at the receiving hospital.

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## Disclosures

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# Delayed Diagnosis of Paget-Schroetter Syndrome in a Patient with COVID-19

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## ABSTRACT

Paget-Schroetter Syndrome (PSS), a subtype of thoracic outlet syndrome, is a rare condition defined as thrombosis of the axillosubclavian vein secondary to anatomical abnormalities or repetitive injury to vessel endothelium from exertion. In the setting of the COVID-19 pandemic, venous thrombosis in COVID-positive patients may be attributed to the well-described hypercoagulability associated with the viral syndrome, increasing the rate of misdiagnosis of PSS and delaying definitive treatment. We report a case of PSS in a 19-year-old male who presented to multiple health care providers with an upper extremity thrombus and was found to be SARS-CoV-2 positive on hospitalization. In his case, his COVID status likely contributed to a delay in diagnosis of Paget-Schroetter syndrome, with the patient missing the window for the standard treatment protocol.

**KEYWORDS:** Paget Schroetter Syndrome, COVID-19, hypercoagulability, deep vein thrombosis

## INTRODUCTION

Paget-Schroetter syndrome (PSS), alternatively referred to as effort thrombosis, is a subcategory of the venous thoracic outlet syndromes, defined as primary thrombosis of the axillo-subclavian vein.<sup>1,2</sup> The thoracic outlet syndrome subcategories also include neurogenic and arterial syndromes, with neurogenic making up over 95% of thoracic outlet syndromes. Only 3-5% of thoracic outlet syndromes are venous in etiology.<sup>3</sup> PSS was first described in 1875 by Sir James Paget<sup>4</sup> as spontaneous thrombosis of the axillo-subclavian vein, with later postulation from von Schroetter that venous damage resulted from activity involving muscular strain.<sup>5</sup> Despite being a well-established condition, it is commonly overlooked as a diagnosis, likely due to its relatively low incidence of one to two per 100,000 cases per year.<sup>1</sup>

A number of case reports have been published detailing various presentations of PSS and the inciting activities. However, very few have been published detailing the diagnosis of PSS in the context of the COVID-19 pandemic, with no reports, to our knowledge, of cases with initial misdiagnosis of PSS as a thrombotic sequelae of COVID-19.<sup>6,7</sup>

We describe a case of a 19-year-old male with PSS who tested positive for SARS-CoV-2 on hospital admission for upper extremity thrombus, after presenting to multiple outside providers for associated symptoms. Clinical diagnosis of PSS was delayed, ultimately placing this patient outside of the window for standard treatment. This case underscores the importance of raising clinicians' awareness of PSS, how its clinical features are distinct from thrombotic events secondary to COVID-19, and when to promptly initiate its unique treatment protocol.

## CASE PRESENTATION

An athletic 19-year-old right-handed male with no significant medical history was admitted with edema, erythema, and pain with abduction of the right upper extremity (RUE). His symptoms began roughly one month prior, following vigorous physical activity, which included cliff jumping and playing basketball. The patient also reported exacerbation of symptoms, with intermittent pain of the entire right extremity, when weightlifting. He denied use of any prescription medications or recent surgeries and reported occasional alcohol and marijuana use. Family history was notable for a lower extremity deep vein thrombosis (DVT) in his father, without clear report of provocation.

He first presented to an urgent care facility, where shoulder x-ray showed no acute abnormalities. He was discharged with instructions to start nonsteroidal anti-inflammatory drugs. Roughly 20 days following his urgent care visit, he presented to an outside emergency department (ED) with dyspnea and worsening RUE pain. CT angiogram (CTA) showed subsegmental pulmonary emboli (PE) in the left lingula and lower lobe of the left lung and duplex ultrasound (US) showed an occlusive thrombus in the right basilic vein. Details of thrombus involvement of more proximal vasculature were not documented. The patient's PEs were treated with heparin and he was discharged on rivaroxaban 15mg, twice daily with hematology follow-up to further assess the etiology of his thrombi. The patient refused COVID-19 testing throughout that hospitalization for unknown reasons and did not exhibit typical symptoms of COVID-19 during his stay.

Ten days following discharge, he presented to outpatient hematology with residual edema and reduced range of

motion due to pain in the RUE, despite reported compliance with rivaroxaban therapy. He was then advised to present to our ED. His vitals were within normal limits, with a temperature of 36.6°C, heart rate of 69 beats per min, blood pressure of 118/58 mmHg, a respiratory rate of 17 breaths per min, and SpO<sub>2</sub> of 99%. Physical exam was notable for additional findings of cervical lymphadenopathy and tenderness to palpation of the right axilla and lateral to the cubital fossa. Visible prominence of superficial veins on the affected side, known as Urschel's sign, was not observed. Distal pulses were palpable bilaterally, neurological exam was normal, and a general review of systems was grossly negative.

Duplex US of RUE demonstrated thrombi in the right subclavian, axillary, and basilic veins, concerning for extension or reoccurrence of thrombosis. A repeat CTA was also performed, with no evidence of PE. In the context of palpable cervical lymph nodes and concerns for hypercoagulability associated with malignancy, a CTA of the neck was ordered, which did not demonstrate pathologic lymphadenopathy. Initial laboratory workup was notable for an INR of 1.9, a negative hypercoagulability panel (activated protein C resistance, protein S and protein C activity, lupus anticoagulant, antithrombin III, factor VIII assay, activated partial thromboplastin time mix 1:1, prothrombin time mix 1:1) and detection of SARS-CoV-2 on PCR. Complete blood count and basic metabolic panel were unremarkable.

The patient was admitted on a heparin drip and bridged to warfarin on hospital day two. Both hypercoagulability due to COVID-19 and PSS were considered as potential diagnoses based on his clinical history. Vascular surgery consultants recommended further imaging with MRI/MRA, which was scheduled as an outpatient. The patient was discharged on hospital day five on warfarin.

Outpatient MRI/MRA with and without venous contrast revealed a right subclavian DVT arising near the vein's origin, as it passes ventral to the anterior scalene muscle without any notable anatomical abnormalities on these images. The patient was continued on warfarin, but duplex imaging 3 months later revealed no change in the right subclavian thrombus. Failure of thrombus resolution suggested PSS over COVID-19-associated hypercoagulability, with repetitive physical activity being the most likely trigger.

The patient fell far outside of the standard 14-day window for catheter-directed thrombolysis by the time of final diagnosis. Five months following discharge, the patient underwent first rib resection for decompression of the thoracic outlet. The one-month post-operative RUE duplex US showed complete resolution of the thrombi with wall thickening in the axillary vein. Despite thrombi resolution, the patient continued to report episodes of discoloration and edema of the right arm after upper body exercise but was able to return to full activity.

## DISCUSSION

PSS accounts for only 10–20% of all cases of upper extremity deep vein thrombosis, and approximately 1% to 4% of all cases of venous thrombosis in general, making it relatively rare.<sup>1,8</sup> The other 80% of cases of upper extremity thrombosis are secondary to a predisposing factor, such as in-dwelling devices or hypercoagulable states.<sup>8</sup> Our patient reflects the demographics of those usually affected, as it is most common in young male athletes, with the mean age at presentation of roughly 30 years and a male-female ratio of 2:1. It is also more commonly seen in the right arm, likely reflecting the greater proportion of right-handed individuals in the general population.<sup>1</sup>

Activities that involve repetitive movement of the upper extremity, with extremes of abduction or external rotation, such as throwing sports or overhead lifting, are seen as the inciting factor in 60–80% of cases.<sup>1,9–12</sup> At such extremes of motion, the subclavian vein may be compressed between the clavicle and first rib, even in cases without anatomical abnormalities of the thoracic outlet.<sup>1,2</sup> This chronic compression is thought to incite microtrauma, which progresses to fibrosis of the area and reduced mobility of the vein, predisposing it to further damage with movement, and thrombosis formation.<sup>13</sup>

Symptoms at presentation may vary from intermittent upper extremity edema and pain, aggravated by physical activity, to severe, persistent feelings of heaviness and swelling with erythema or blue discoloration. Patients may also have axillary fullness and tenderness to palpation of the affected arm. Many patients with chronic obstruction also have Urschel's sign, or visibly enlarged collateral veins of the shoulder and chest, on exam.<sup>1,14</sup> In patients with a presentation suspicious for PSS, duplex US is the test of choice, with a sensitivity and specificity of roughly 80%–100%.<sup>15</sup> Once the diagnosis is made, treatment should be initiated as soon as possible.

Although anticoagulation therapy is advised for at least three months, standard treatment also involves catheter-directed thrombolysis (CDT) within the first two weeks of symptoms, followed by correction of the anatomic problem trigger via thoracic outlet surgical decompression.<sup>16,17</sup> This protocol minimizes the long-term morbidity of the condition and the possibility of treatment failure.<sup>18,19</sup> After the standard two-week window, the success rate of thrombolysis drops significantly. Three reports indicate no success in thrombolysis in patients with symptoms for greater than 10 days, while other studies report a success rate of 29% after 2–12 weeks.<sup>1,20</sup> While it is generally supported that surgical treatment follows thrombolytic therapy, the exact timing of surgery is less agreed upon.

Complications associated with limiting treatment to just anticoagulation includes recurrent thrombosis and pulmonary emboli, which is seen in 15% of cases who do not undergo CDT.<sup>1</sup> Approximately 70% of patients will also go

on to develop additional long-term complications with anticoagulation alone, including persistent symptoms or permanent disability, limiting participation in manual labor.<sup>21</sup> Despite eventual surgical treatment with first rib resection, the patient had residual symptoms, including swelling and pain with extremes of motion, that may have been avoided if CDT was administered within the standard treatment window. While there is limited data on the usual timing of diagnosis, a retrospective review of 34 patients with PSS showed that 26 patients underwent CDT treatment after a mean of 5.5 days of symptoms versus eight patients who were managed over one month after symptom onset, indicating that significant delay in treatment is likely common.<sup>22</sup>

In the setting of the COVID-19 pandemic, the diagnosis of upper extremity venous thrombosis is likely further complicated by the well-described thrombotic sequelae of the novel virus. Although conclusive data on the relative venous thrombosis risk remains limited among patients who do not become critically ill with COVID-19, there has been a general increase in thrombotic events seen in hospitalized patients.<sup>23–25</sup> Greater clinician awareness around all causes of venous thrombosis is needed in this climate, along with more conclusive data on coagulation abnormalities seen in non-critically ill patients with COVID-19. Moreover, clinicians should consider PSS whenever a young patient presents with an upper extremity DVT and be advised to take a thorough history to assess for inciting activities. Familiarity with this syndrome has the potential to greatly impact the promptness of diagnosis and patient outcomes.

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## Functional Gait Disorder, Before and After Treatment

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This 87-year-old man was first evaluated for possible Parkinson's disease (PD) in 2018. His exam was consistent with PD except for his gait, which was normal. Two years later he was seen again for an acute decline in gait. He had a stooped posture, absent arm-swing, small stride and was thought to have idiopathic PD. His response to L-Dopa was equivocal. Over the next two years, his parkinsonian signs varied from non-existent to moderately severe, unrelated to his L-Dopa dose, so it was stopped.

**Video 1** was made at an urgent visit due to a severe worsening of gait. Walking had been normal 2 weeks before, according to his physical therapist. At this visit he was told that his problem was non-physiologic. He returned to his physical therapist, who was also told his diagnosis. She treated him for his gait disorder, *not* using any special techniques despite the non-physiological etiology. His long-term psychiatrist and psychologist, who treated him for chronic anxiety, could not identify a psychiatric etiology for his gait disorder. **Video 2** shows his return to baseline.

The diagnosis of a functional, or non-physiologic disorder, is based on a non-physiological history, such as an acute onset, or unexplained resolution of symptoms, as well as non-physiological findings on exam. Old age and "belle indifference" are no longer considered reliable factors in the diagnosis, and the identification of a psychological etiology to diagnose conversion disorders was abandoned in the Diagnostic and Statistical Manual (DSM) V.<sup>1</sup> The dramatic unexplained changes in his disability and exam made the diagnosis straightforward. Two to 5% of new patients seen in movement disorders clinics are diagnosed with functional disorders.



**Video 1.** The walking is initially wide-based, but there was no imbalance when he walked sideways. The ability to overcome his gait dysfunction with an unusual maneuver which should have worsened the imbalance, the lack of difference between walking with and without the crutches, and the last few steps into the office where the gait was normal, all point to a non-physiological problem.  
<https://vimeo.com/632094617>



**Video 2.** Normal gait is seen in this video.  
<https://vimeo.com/632087652>

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### Disclosure

Patient provided written, informed consent for videos to be published.

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## Cryptic Presentation of Disseminated Cryptococcosis

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### ABSTRACT

Cryptococcosis is a global invasive mycosis, commonly encountered in patients with HIV/AIDS with low CD4 counts, diabetics, organ and stem-cell transplant recipients, malignancies, and other patients with immunosuppression. The presentation depends on which organ is usually involved although multi-organ involvement may be present. Here, we describe a young female with an enlarging flank mass, found to have disseminated cryptococcosis in the setting of immunosuppression.

**KEYWORDS:** Cryptococcus, cryptococcus neoformans, immunocompromise, disseminated cryptococcosis, abscess

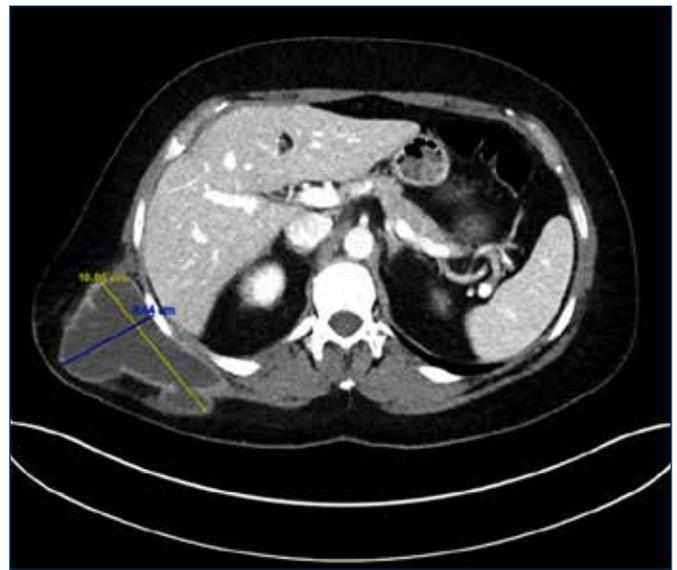
### CASE PRESENTATION

A 47-year-old female with history of relapsing-remitting multiple sclerosis, on fingolimod, presented with enlarging right flank mass that has been present for one year. The mass reportedly fluctuated in size without intervention or drainage, and it would typically worsen and improve over the course of a few weeks. Physical exam was remarkable for a large, non-fluctuant right flank mass with mild tenderness and erythema without drainage or any other skin lesions. CT scan showed complex, right posterior lateral chest wall intramuscular fluid collection measuring 10 x 6.4 x 9 cm with extension into the right eighth intercostal space with cortical irregularity of the adjacent 10th rib (**Figure 1**). Aerobic, anaerobic, and fungal cultures grew cryptococcus neoformans (**Figure 2**). Serum cryptococcus antigen was positive at a titer of 1:256.

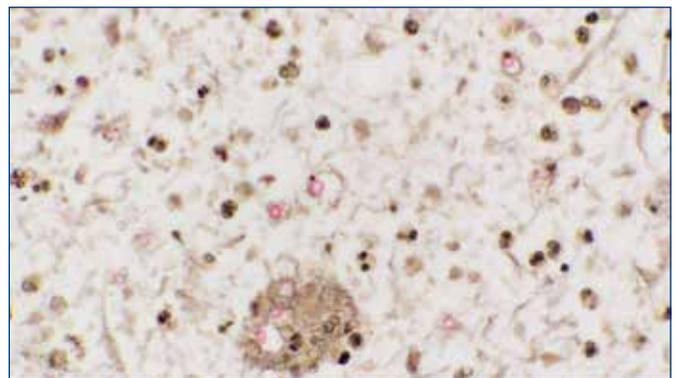
MRI of the brain demonstrated innumerable supra and infratentorial enhancing lesions with several lesions demonstrating vasogenic edema. There was relative sparing of the basal ganglia, which is typically noted in cryptococcal disease. A lumbar puncture (LP) showed a mildly elevated opening pressure of 31cm H<sub>2</sub>O, although this was with the patient sitting up, and cryptococcal antigen titer of 1:64 in CSF. A repeat LP revealed an opening pressure of 14.5 cm H<sub>2</sub>O.

Infectious disease consultants recommended an induction regimen of amphotericin and flucytosine for a 6-week course; however, the patient did not receive flucytosine due to insurance issues. She was started on fluconazole 800 mg

**Figure 1.** CT scan of abdomen pelvis with IV contrast showing fluid collection measuring 10 x 6.4 x 9 cm with extension into the right eighth intercostal space.



**Figure 2.** The photomicrograph of mucin-stained sections of the fluid at magnification x600. Cryptococcus neoformans demonstrated as mucin positive spores.



daily in addition to the amphotericin and was asked to stop taking fingolimod at the time of discharge from the hospital. Repeat LP performed after 6 weeks showed no yeast or fungal elements in the CSF. The patient stated she was feeling better and was continued on fluconazole as part of consolidation regimen for 8 more weeks.

## DISCUSSION

Cryptococcosis is caused by an encapsulated opportunistic fungus and is usually due to *Cryptococcus neoformans* or *Cryptococcus gattii*. *Cryptococcus neoformans* can affect any organ or tissue, but is mostly acquired through inhalation to the lungs and can then disseminate to other sites including the central nervous system (CNS), bone and skin. The clinical presentation of cryptococcosis varies between immunocompromised and immunocompetent patients. Meningoencephalitis is common in immunocompromised individuals whereas in immunocompetent individuals, patients generally present with pulmonary or CNS space-occupying lesion.<sup>1</sup>

Infectious Diseases Society of America guidelines recommend amphotericin B in conjunction with flucytosine as primary induction therapy for disseminated cryptococcosis, followed by fluconazole for consolidation therapy. Increased intracranial pressure and presence of cryptococcomas require special strategies for management. CSF pressure should be measured at baseline. If the CSF pressure is  $\geq 25$  cm H<sub>2</sub>O and there are symptoms of increased intracranial pressure during induction therapy, relief of opening pressure by 50% through CSF drainage is recommended. Repeat LP after induction regimen is necessary to ensure response to therapy and clearance.<sup>2</sup>

Disseminated cryptococcosis is associated with significant morbidity and mortality. Delay in diagnosis leading to delay in appropriate anti-fungal treatment is related to increased mortality in non-HIV patients compared to HIV patients.<sup>3-5</sup> This case demonstrates that diagnosing cryptococcosis can sometimes be challenging, especially in patients with atypical presentations. Clinicians must maintain a high index of suspicion in immunosuppressed patients for timely diagnosis of disseminated cryptococcosis to facilitate prompt anti-fungal treatment.

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# Autopsy Education and Rate: Effect of the COVID-19 Pandemic

WEIBIAO CAO, MD

## ABSTRACT

Autopsy training is required for board certification by the American Board of Pathology and may be affected by autopsy rate. It is unclear whether the COVID-19 pandemic has affected autopsy education and rate. Prior to the pandemic, our autopsy gross organ review lectures at the Brown University pathology residency program were in-person and used a detective style to discover the pathological lesions followed by an integrated discussion of anatomic and clinical pathology. During the COVID-19 pandemic, these lectures became remote and there was a noticeable impact on the involvement and responsiveness of the audience compared to in-person teaching. Certain qualities of face-to-face teaching can be difficult to be reproduced through virtual teaching, including the detective style to look for pathological lesions and the ability to palpate lesions from gross specimens. Our results showed that the autopsy case number increased during the COVID-19 pandemic, but the overall autopsy rate did not significantly change.

**KEYWORDS:** autopsy education, autopsy rates during COVID pandemic, medical autopsies, pathology education

## INTRODUCTION

Autopsy has two general categories: medico-legal (forensic) and medical (hospital) autopsies. Forensic autopsies are performed in medical examiner offices in the USA, whereas hospital autopsies are performed to answer specific questions that family members or physicians may have, including cause of death, disease extent, treatment effectiveness, or hospital quality assurance.<sup>1</sup> Autopsy training is a requirement for pathology residents and plays an important role in their education. The autopsy aids in the education of residents by providing teaching materials for clinical and pathological correlations and provides an opportunity for pathology residents to enhance their knowledge of normal and abnormal anatomy and histology.

Autopsy training consists of a combination of autopsy rotations and lectures. In autopsy rotations, pathology residents review clinical history, perform external examination of the body, eviscerate (usually with assistance of a diener) and dissect organs, identify any gross abnormalities, review

microscopic slides, and draft a final autopsy report. At our Brown University pathology residency program, lectures are both didactic and case-based with autopsy gross organ review. The latter involved in-person teaching prior to the COVID-19 pandemic, but was changed to remote teaching during the pandemic. Remote teaching was used by many universities due to requirements of social distancing and “lockdown” during the COVID-19 pandemic.<sup>2-4</sup>

Recent reduction in the number of autopsies may affect autopsy education. In the United States, hospital autopsy rates have been steadily dropping over the past 50 years, decreasing from 40%–60% prior to 1970 to now less than 10%.<sup>5</sup> Decreasing number of hospital autopsies has made the completion of 50 autopsies difficult in many pathology residency training programs. In response to lower number of autopsies, the American Board of Pathology reduced the minimum autopsy number required for board certification in anatomic pathology from 50 to 30 autopsies beginning in August 2020.<sup>6</sup> However, the importance of adequate training in autopsy was demonstrated in the COVID-19 pandemic as early understanding of the pathogenesis of COVID-19 was obtained through autopsies, leading to improved treatments for COVID-19 patients. It is unclear whether concerns of potential risks of exposure to SARS-CoV-2 through aerosols generated during dissection of lungs, infusion of formalin into lungs, and during opening skulls with an oscillating saw affect the overall autopsy rate.

In this study, we discuss the format of the autopsy gross organ review lectures at the Brown University pathology residency program before and during the pandemic and hypothesized that education of residents suffered and that autopsy rates were impacted by the COVID-19 pandemic.

## FORMAT OF BROWN UNIVERSITY PATHOLOGY RESIDENCY PROGRAM

### 1a. Comparison of a new format with an old one

The Brown University Pathology Residency Program at Rhode Island Hospital used a format consisting of organ reviews of two autopsy cases and PowerPoint presentations before 2017 (old format). After 2018, we removed PowerPoint presentations and increased autopsy cases from two to four within the one-hour lecture (new format). Residents’ responses were obtained from those experiencing both formats.

### 1b. Detective style of discovery of abnormal pathological findings

Before reviewing organs, the resident performing the autopsy provided a brief clinical summary to his/her peers. Some critical histories related to autopsy findings were not provided, such as the history of cancer. Residents were required to find pathological abnormalities by themselves. For some interesting cases, a few microscopic pictures for gross-microscopic correlation were provided after organ reviews.

### 1c. Integration of anatomic and clinical pathology

The pathology attending reviewed the clinical history and pathological findings beforehand. Teaching points of clinical pathology were prepared. For example, when a patient had HIV, residents were taught how to look for infections of specific organisms based on the patient's lymphocyte count. In patients with acute pancreatitis, residents were taught the methods of amylase and lipase measurements, different types of amylase, the sensitivity and specificity of these assays, the time course of abnormal changes and the factors affecting measurements. In patients with sepsis, residents were taught the features of a bacterium, including how to culture the bacterium, which culture medium to use and what morphology was on the culture plate and on gram staining.

### 1d. Autopsy lectures after March 2020 (COVID-19 pandemic period)

Due to social distancing rules during the COVID-19 pandemic, autopsy lectures were changed to online lectures through Zoom. Residents presented images of autopsy cases. Each case was discussed as described above.

## METHODS

### Residents' Evaluations

Between July 2019 and February 2020 (before the COVID-19 pandemic in Rhode Island), evaluations were received from six in-person autopsy organ review lectures. During the COVID-19 pandemic (March 2020–March 2021), evaluations were obtained from four Zoom online lectures.

An anonymous evaluation form was provided to the residents. Six categories were scored, including 1) discovery and discussion of abnormal pathological findings; 2) discussion of cause of death; 3) understandability; 4) involvement and responsiveness of audience; 5) integration of anatomic and clinical pathology; and 6) overall educational activity. Each category was scored from 1 (lowest) to 5 (highest). Statistical analysis between score 5 and score 1–4 was performed by using Chi square test.

### Effect of the COVID-19 pandemic on autopsy rate

Autopsy rate was calculated during a period from March 2019 to February 2020 (before COVID-19 pandemic in Rhode

Island) and that from March 2020 to February 2021 (COVID-19 pandemic period). Death and autopsy numbers were also analyzed. Statistical analysis for comparison of autopsy rates was performed by using Chi square test. The study was approved by the Institutional Review Board (IRB) at Rhode Island Hospital and performed according to our institution IRB guidelines.

## RESULTS

### 1. Teaching format of Brown University Pathology Residency Program and the effect of the COVID-19 pandemic

#### 1a. Comparison of the new format with the old one

Feedback was received from six residents who had experiences with both formats. All six residents felt that the format without PowerPoint presentations was better and they learned more from having at least four cases per lecture instead of two cases. In addition, the integrated discussion about each case was better than PowerPoint presentations. With PowerPoint presentations, residents tended to just read off the slides and move onto next case. The format without PowerPoint presentations was more engaging and interactive.

#### 1b. Discovering abnormal pathological findings

The Brown University pathology residency program had 12 residents in the academic year of 2019–2020. Out of 6 lectures between July 2019 and February 2020 (before the COVID-19 pandemic), 34 evaluation forms were received. The discovery of abnormal pathological findings received a score of 5 from all 34 evaluations (100%) (Table 1). The course required the residents to first identify the lesions in the gross specimens. However, sometimes small pathological lesions were missed because residents covered the lesions with their hands while holding the specimen. The approach to first identify the unknown lesions significantly increased their interests. In addition, residents felt that they retained the lessons better when they had to examine the organs for pathology by themselves. Seniors and chief residents were more involved in teaching by sharing their findings.

During the COVID-19 pandemic (March 2020–March 2021), abnormal pathological findings were discovered on the images instead of gross organs. Residents missed feeling the textures of the lesions by hands. Sometimes, residents forgot to take a picture of an interesting lesion. The discovery of abnormal pathological findings received a score of 5 in 18 out of 20 evaluations (90%). The difference was not statistically significant when compared with before COVID-19 (90% vs 100%,  $P>0.05$ , Table 1).

#### 1c. Integration of anatomic and clinical pathology

Integration of anatomic and clinical pathology also received a score of 5 from all 34 evaluations (100%) before the COVID-19 pandemic. Clinical pathology questions were

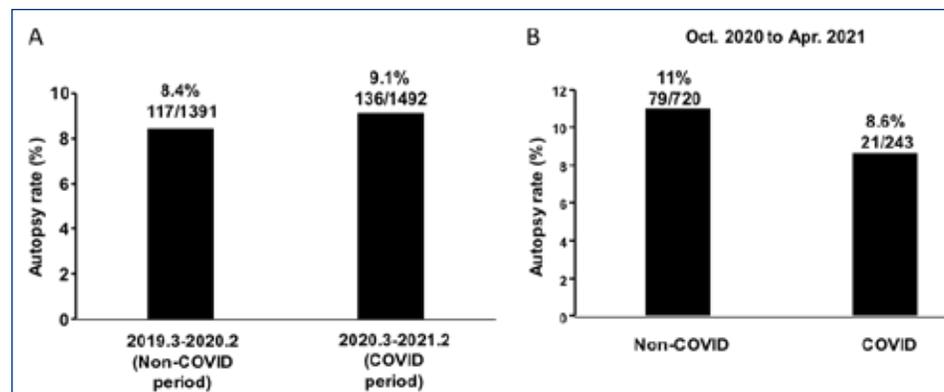
**Table 1.** Evaluation scores of autopsy organ review lectures

Category	Group	Number	Score				P value (score 5 vs score 1–4)
			1–2	3	4	5	
Abnormal findings discovered and discussed	Non-COVID	34	0	0	0	34 (100%)	P>0.05
	COVID	20	0	1 (5%)	1 (5%)	18 (90%)	
Cause of death discussed	Non-COVID	34	0	0	0	34 (100%)	P<0.05
	COVID	20	0	1 (5%)	2 (10%)	17 (85%)	
Understandability	Non-COVID	34	0	0	0	34 (100%)	P>0.05
	COVID	20	0	0	2 (10%)	18 (90%)	
Involvement & responsiveness of audience	Non-COVID	34	0	0	0	34 (100%)	P<0.05
	COVID	20	0	1 (5%)	2 (10%)	17 (85%)	
Review anatomic and clinical pathology knowledge	Non-COVID	34	0	0	0	34 (100%)	P>0.05
	COVID	20	0	0	2 (10%)	18 (90%)	
Overall educational activity	Non-COVID	33	0	0	1 (3%)	32 (97%)	P>0.05
	COVID	20	0	1 (5%)	2 (10%)	17 (85%)	

**Figure 1.** Autopsy rates before and during the COVID-19 pandemic.

**A.** Autopsy rate over a year before the COVID-19 pandemic was 8.4%, whereas it was 9.1% (136/1492) during the COVID-19 pandemic. The difference was not statistically significant ( $P>0.05$ ).

**B.** During the COVID-19 pandemic between October 2020 and April 2021, the autopsy rate for non-COVID patients was 11%, whereas it was 8.6% in patients with COVID-19. The autopsy rate was slightly lower in COVID-19 patients, but the difference was not statistically significant.



first asked and then explained, which made the lecture more interactive. During the COVID-19 pandemic, the integration of anatomic and clinical pathology received a score of 5 in 18 out of 20 evaluations (90%), a difference which was not statistically significant when compared with before COVID-19 (90% vs 100%,  $P>0.05$ , **Table 1**).

Similarly, the understandability of lectures received a score of 5 in 100% evaluations before COVID-19 and 90% during COVID-19. The overall education activity received a score of 5 in 97% evaluations before COVID-19 and 85% during COVID-19. Both differences had no statistical significance (**Table 1**).

However, both the involvement and responsiveness of the

audience and the discussion of the cause of death received a score of 5 in 85% evaluations during the COVID-19 pandemic, which were significantly lower than those before COVID-19 (85% vs 100%,  $P<0.05$ , **Table 1**).

## 2. Effect of the COVID-19 pandemic on autopsy rate

Autopsy rate may affect autopsy education. Therefore, autopsy rate was calculated before and during the COVID-19 pandemic. Autopsy rate over a year before the COVID-19 pandemic (between March 2019 and February 2020) was 8.4% (117/1391), whereas it was 9.1% (136/1492) during the COVID-19 pandemic (March 2020–February 2021) (**Figure 1A**). The difference was not statistically significant. During the COVID-19 pandemic between October 2020 and April 2021, the autopsy rate for non-COVID patients was 11%, whereas it was 8.6% in patients with COVID-19 (**Figure 1B**). The autopsy rate was slightly lower in COVID-19 patients, but the difference was not statistically significant. The death number and the percentage of death of patients with COVID-19 among all deaths reached a peak in December 2020 (**Figure 2**), whereas the death number in non-COVID patients was relatively stable. The autopsy number also reached the peak in December 2020 and January 2021 (**Figure 3A**). From October 2020

to February 2021, the total autopsy number increased by 38-200%, when compared with one year ago (October 2019 to February 2020, **Figure 3B**). The autopsy rate also increased from 7.9% before COVID-19 (from October 2019 to February 2020) to 10.7% during the same months of the COVID-19 pandemic, but the increase did not have the statistical significance.

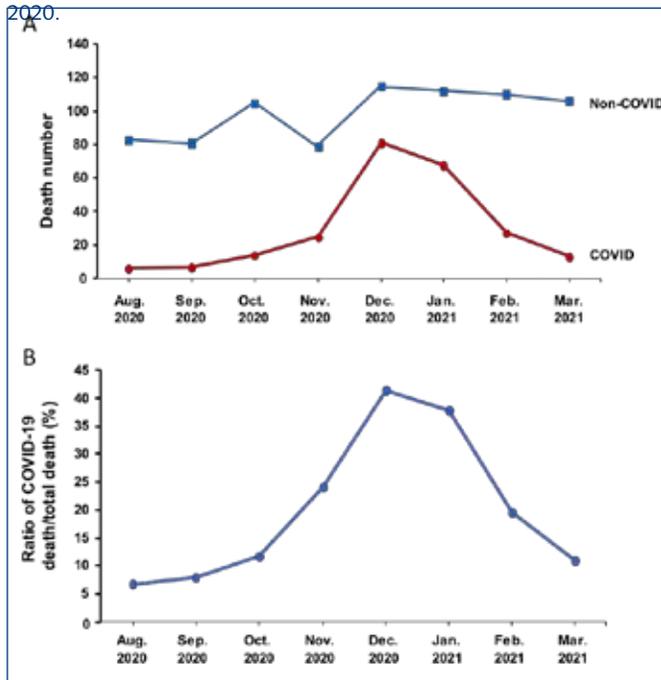
## DISCUSSION

### 1. Effect of the COVID-19 pandemic on autopsy education

Autopsy gross organ review is a crucial education opportunity to expose residents, particularly those who are rotating

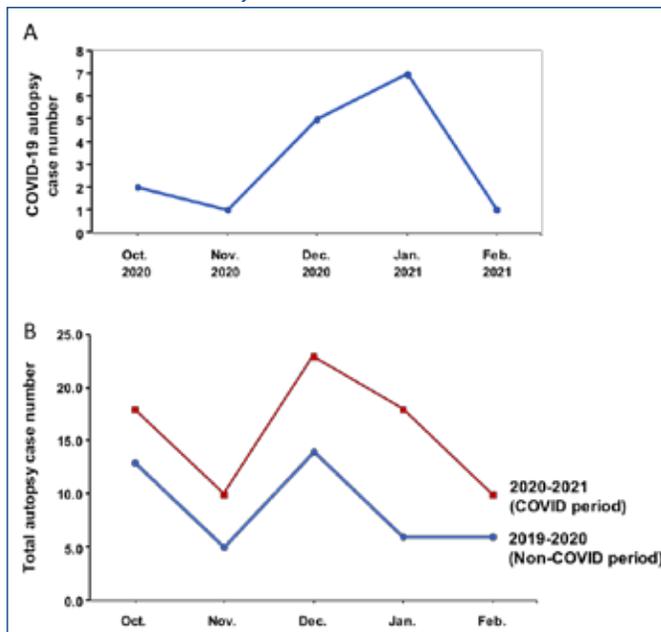
**Figure 2. Death numbers during the COVID-19 pandemic in Rhode Island hospital.**

**A.** The death number in patients with COVID-19 reached a peak in December 2020, whereas the death number in non-COVID patients was relatively stable. **B.** The ratio of death number of patients with COVID-19 over the total death number reached a peak in December 2020.



**Figure 3. Autopsy numbers.**

**A.** The autopsy number reached a peak in December 2020 and January 2021. **B.** From October 2020 to February 2021, the total autopsy number increased by 38–200%, when compared with one year ago (October 2019 to February 2020).



not through the autopsy service, to more autopsy training. This course used to be in-person prior to the COVID-19 pandemic. Since the first COVID-19 case was reported in Rhode Island in March 2020,<sup>7</sup> the course became remote through Zoom. Over the course of the COVID-19 pandemic, similar changes were made by many colleges and universities worldwide as well as in medical field, including pathology.<sup>2-4</sup>

Our study found that the involvement and responsiveness of the audience was affected by the transition from in-person to remote teaching. This may be due to multiple factors. One concern was poor internet connectivity as reported in literature,<sup>3</sup> although this has not been an issue at our institution. The second factor could be audio problems, including echoes and background noises from different environments. It has been reported that remote teaching and learning may encounter interruption due to unintended activation of “sleep mode” on the computer, poor sound quality and limited viewing due to small screen size.<sup>8</sup> The third concern is the level of distractions during remote teaching as educators cannot as easily pick up the residents’ responses or know whether they are listening when the video feature is turned off. It has been shown that the remote learning quality may be worse than in-person learning, particularly for those who are not willing to learn independently.<sup>9</sup> Hayden, Navedo and Gordon found that the issue in communication between educators and students through the virtual platform can become a barrier in fully understanding the complexity of a case.<sup>10</sup> This might explain why in this study there were a lower percentage of evaluations receiving a score of 5 on the discussion of the cause of death via remote learning.

In addition, certain activities of in-person education cannot be reproduced through remote teaching. This includes learning through hands-on exploration of gross organ specimens to look for pathological lesions by both palpation and visual inspection, like a detective. Similar impact was observed in the teaching of anatomy, where the pandemic affected the areas of laboratory sessions and cadaveric dissections.<sup>11</sup>

In short, education in autopsy was impacted by the COVID-19 pandemic. Certain activities of in-person teaching cannot be reproduced during the remote teaching.

## 2. Effect of the COVID-19 pandemic on autopsy rate

Hospital autopsy rates have been declining in the United States<sup>5</sup> in the past decades partially because of advances in imaging technology which give physicians more confidence in their diagnoses. Recent policy changes may further decrease hospital autopsies as the Centers for Medicare and Medicaid Services (CMS) eliminated the requirement of an autopsy program for hospitals to qualify for Medicare reimbursement on September 30, 2019.<sup>12</sup> However, the importance of autopsy was shown during the pandemic as autopsies play a key role in understanding the pathophysiology of COVID-19. Early autopsies demonstrated microvascular

thrombosis and marked inflammatory changes in patients with COVID-19,<sup>13</sup> which led to the inclusion of antithrombotic therapy in some national treatment guidelines for patients of COVID-19.<sup>14</sup> That might in part explain why autopsy rates and case numbers were slightly higher during the COVID-19 pandemic than prior to it, although the change was not statistically significant. The death number of COVID-19 and the percentage of death of patients with COVID-19 among all deaths as well as the total number of autopsies per month peaked in December 2020 and January 2021 at Rhode Island Hospital, coinciding with the second peak of COVID-19 cases and deaths in our state.<sup>15</sup> To my knowledge, this is the first report of a comparison of the autopsy rates between before and during the COVID-19 pandemic.

Interestingly, autopsy rates in COVID-19 patients were slightly lower than that in non-COVID patients. This discrepancy may be due to the fact that causes of death are known in most patients with COVID-19 who died from respiratory failure. This slightly lower autopsy rate in patients with COVID-19 did not appear to affect the overall autopsy education in our program because the total number of autopsies increased during the COVID-19 pandemic and because there was a high prevalence of autopsy cases of COVID-19 patients in our hospital. In non-major academic institutes, the autopsy rate of COVID-19 patients may be much lower, affecting autopsy education in these centers. In fact, many local community hospitals around our hospital stopped performing autopsies and occasionally transferred autopsies to our hospital.

In conclusion, the autopsy rates were not affected by the COVID-19 pandemic, but the overall number of autopsy cases increased and the pandemic demonstrated the importance of autopsy as a key factor in understanding the pathophysiology of disease. If policies that require each hospital to perform a certain percentage of autopsies are not reinstated, autopsy rates may continue to trend downwards and the education of our future trainees may be further impacted.

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# The Weekend Warrior: Common Foot and Ankle Injuries in Recreational Athletes

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## ABSTRACT

Weekend warriors are recreational athletes who compress their physical activity into 1–2 weekly exercise sessions. The characteristic combination of general deconditioning and excessive activity can predispose these individuals to a multitude of foot and ankle injuries. The purpose of this review is to highlight the etiology and management of common foot and ankle injuries in recreational athletes.

**KEYWORDS:** weekend warriors, recreational athletes, foot and ankle injuries

## INTRODUCTION

The “Weekend Warrior” refers to an athlete who makes the ambitious effort to condense the weekly aerobic exercise recommendations of the Centers for Disease Control and Prevention into 1 to 2 short sessions per week. This practice is a common phenomenon in the sporting world.<sup>1</sup> Busy sedentary lifestyles combined with motivation to remain active have contributed to a rise in weekend warriors, and while in many ways not ideal, this style of physical activity has shown mortality benefits over the inactive alternative.<sup>2</sup> Still, the occasional heavy demand placed on the musculoskeletal system of an individual who typically lacks substantial conditioning puts them at risk for injury.<sup>3</sup> The foot and ankle undergo significant stress in nearly all recreational physical activities and are at risk of both acute and overuse injuries

following physical activity.<sup>3,4</sup> The purpose of this review is to highlight some of the common foot and ankle injuries in recreational athletes (Table 1).

## ANKLE

### Ankle sprain

The quintessential injury of the weekend warrior, ankle sprains are the traumatic stretching or tearing of ankle ligaments and are one of the most common athletic injuries, with an incidence of 7.2 per 10,000 exposures in adults. The ankle is the most commonly injured body part in 24 different sports, with ankle sprain representing the predominant ankle injury in 33 major sports.<sup>5</sup> Ankle sprains are classified either as high ankle sprains (syndesmosis injury) or low ankle sprains, the latter of which is conventionally implied when describing an otherwise unspecified “ankle sprain.”

**Low ankle sprains** constitute a vast majority of ankle sprains, representing approximately 90% of all ankle ligament injuries.<sup>6</sup> Anatomically, the ankle joint is supported laterally by three ligaments: the anterior talo-fibular ligament (ATFL), the calcaneo-fibular ligament (CFL) and the posterior talo-fibular ligament (PTFL). The deltoid ligament supports the ankle joint medially, and is stronger and less frequently injured than its lateral counterparts. The ATFL in particular serves to prevent extreme plantarflexion and anterior talar translation, pulling taut during plantarflexion. Injury to the ligaments of the ankle occurs most typically with a “roll” of the ankle, that is the inversion of a plantarflexed foot, which places increased stress on the already tight ATFL and can result in injury ranging from microscopic to total tearing. The CFL is the second most commonly injured ankle ligament, occurring either in conjunction with an ATFL injury or specifically due to dorsiflexion and inversion of the foot.<sup>7</sup> The pain of a lateral ankle sprain is generally not subtle, but is highly variable; only an estimated 50% of lateral ankle sprains prompt individuals to seek medical care in the acute or subacute setting.<sup>8</sup>

Presentation of ankle sprains can vary greatly based on severity. In the acute setting, pain and swelling can limit exam findings, and a delayed physical exam performed 4–5 days after injury has been demonstrated to have the high sensitivity (96%) and specificity (84%).<sup>9</sup> ATFL laxity can be assessed by the anterior drawer test of the ankle, while the

**Table 1.** Common Injuries in the Recreational Athletes

Featured in review	Beyond scope of review
<b>Ankle</b>	
Ankle sprain (common/low)	Ankle fracture
Syndesmotic injury (high ankle sprain)	Gastrocnemius (calf) strain
Achilles tendon rupture	Retrocalcaneal bursitis
Achilles tendinopathy (tendinitis)	Ankle arthritis
<b>Foot</b>	
Jones fracture	Other stress fractures
Metatarsal stress fracture	Lisfranc injury
Plantar fasciitis	Turf toe

talor tilt test is useful for identifying CFL instability. The anterolateral drawer test, which allows for internal rotation of the ankle while testing, has seen growing interest due to evidence suggesting superiority over the conventional anterior drawer test, particularly in patients lacking medial-sided injury. Grading of a lateral ankle sprain is performed clinically, with the injury determined to be grade I (minimal bruising/swelling, normal weight bearing), II (moderate bruising/swelling), or III (severe bruising/swelling, substantial pain with weight bearing). Grade I sprains result from stretches or a slight tear in the ankle ligament, with the ankle still stable on examination. Grade II injuries suggest an incomplete tear in the ankle ligaments, producing mild ankle instability, while a grade III sprain occurs with complete tear of ankle ligaments with the ankle markedly unstable.<sup>7</sup> Treatment of ankle sprains is predominantly conservative, with the RICE-principle (rest, ice, compression, elevation) a mainstay of initial management, though the efficacy of RICE is not well established in the literature. Given the volume of these injuries and the potential for chronic sequelae, there exists a plethora of literature examining different treatment modalities and therapeutic options: no benefits have been seen with the use of manual mobilization, electrotherapy, laser therapy, or ultrasound therapy.<sup>7,10</sup> Research suggests that immobilization for a short period via a cast or boot can be advantageous in the management of grade III injuries, but immobilization was less beneficial than functional movement in lower grade strains. Evidence strongly supports a rehabilitation program that implements progressive weight bearing following an acute ankle sprain, with a focus on early active range of motion movement, neuromuscular exercises, and proprioceptive training.<sup>11,12</sup> The ultimate goal of therapy following acute injury is prevention of chronic ankle instability, which describes any persistent symptoms and injury recurrence that may occur.<sup>11</sup> High quality, supervised exercise programs and ankle bracing, particularly during sports, have been repeatedly shown in large reviews to be effective in reducing the risk of chronic instability. While acute ankle sprains can be well managed in the primary care setting, specialist referral and potential operative management is generally reserved for chronic, recurrent, refractory symptoms. Acute repair of single instance high grade tears is rarely performed, even in elite athletes.<sup>12</sup>

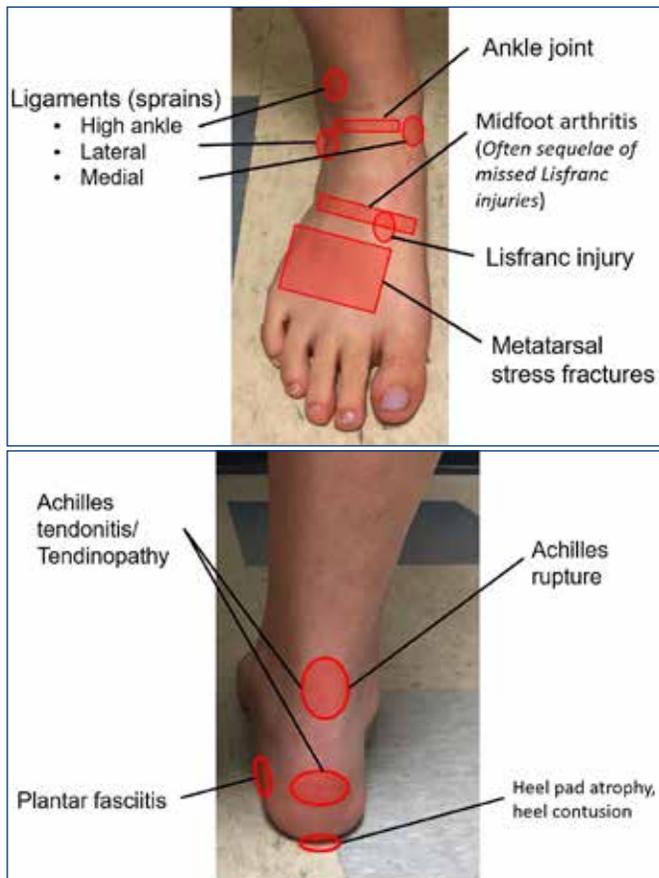
**High ankle sprains**, or syndesmotic injuries, account for up to 20% of ankle sprains, and can occur independently or in association with ankle fractures.<sup>13</sup> The distal tibiofibular syndesmosis is responsible for maintaining the connection between the distal tibia and fibula, allowing for fibular rotation and translation during movement, and is comprised of multiple ligaments including the anterior-inferior tibiofibular ligament (AITFL) and posterior-inferior tibiofibular ligament (PITFL), amongst others.<sup>7</sup> In the event of a forceful external rotation of the foot with the ankle in dorsiflexion, the distal fibula can separate from the tibia and tear

the ligaments connecting them, starting with the AITFL. Patients may present with more severe pain than a typical lateral ankle sprain that can be localized more proximally to the syndesmosis or anterolateral ankle. A positive squeeze test, in which squeezing the tibia and fibula together at the mid-calf level elicits syndesmosis pain distally, is a highly specific finding (85% specificity).<sup>14</sup> Suspected syndesmotic injuries often warrant advanced imaging for potential associated fractures (CT) or associated ligamentous injury or osteochondral lesions (MRI), and high ankle sprains can be similarly graded based on the degree of ligamentous injury. Syndesmotic injuries can be managed in the primary care setting, with severe injury or associated fractures warranting specialist consult. Following an acute syndesmotic injury, conservative management is recommended for stable injuries and is overall similar to low ankle sprains after a period of immobilization, frequently including 3 weeks of non-weight bearing, a below-the-knee cast or brace, RICE, and physical therapy with an emphasis on proprioceptive exercises. Patients managed conservatively demonstrate excellent rates of return to activity, albeit with a longer recovery period than after low ankle sprains. Grade III injuries predominantly warrant surgical fixation to correct instability. Syndesmotic screws and suture-button devices have each have demonstrated comparable efficacy, with the latter shown to be associated with faster return to work and lower rates of hardware removal.<sup>15</sup> Partial weight bearing and physical therapy progression is allowed 6 weeks after surgery, and even elite athletes demonstrate a high rate of return to play.<sup>7</sup>

### Achilles Tendon Rupture

Rupture of the Achilles tendon, which connects both the gastrocnemius and soleus muscles to the calcaneus of the foot, is one of the most common sporting injuries with a rate of injury up to 12 per 100,000 individuals reported in the literature, predominantly in males in the fourth to fifth decade of life.<sup>16</sup> Physical activity involving explosive eccentric contractions of the lower extremity with a push off of a weight-bearing foot with an extended knee implicated in over half of rupture injuries.<sup>17</sup> Patients often report a popping sensation or a feeling of a blow to the calf. On physical exam, a palpable defect may be noted 2 to 6 centimeters from the calcaneal insertion site (**Figures 1 A,B**). Additionally, a positive Thompson test, in which squeezing of the calf musculature of a prone patient fails to generate passive plantar flexion, suggests a total rupture of the tendon.<sup>3</sup> Achilles tendon rupture warrants a specialist referral, though management of an acute rupture is controversial and can vary by physician and patient. A 2017 meta-analysis by Deng et al. found a significantly lower re-rupture rate in surgically managed patients, but no difference in return to sport, range of motion, or subsequent physical activity.<sup>18</sup> Conservative management, which frequently involves immobilization with gradual decreased heel lifting and progressive physical

**Figure 1.** Common sites of respective pain during examination of the (A) anterior and (B) posterior ankle



therapy, has lower rates of complications, particularly infections and venous thromboembolism.<sup>19</sup> With each treatment modality possessing its own respective risk profiles, operative versus non-operative management is often based on physician and patient preference.

## FOOT Fractures

**Jones fractures** are common injuries amongst high-level athletes, with increased attention being paid towards diagnosis and management of the condition across all active individuals. A majority of fractures to the 5th metatarsal bone of the foot occur in the tuberosity of the metatarsal base, or zone 1. Jones fractures occur at the metaphyseal-diaphyseal junction of the 5th metatarsal where the 4th and 5th metatarsal bones articulate. This vascular watershed area, zone 2, is predisposed to disruption of local blood flow following a fracture, as well as being an area of mechanical stress, contributing to high rates of nonunion (20%–30% nonunion rate) after injury.<sup>20</sup> Zone 1 fractures, in contrast, have almost a 99% union rate and very rarely require operative intervention. Patients often report an acute episode of

**Figure 2.** Oblique foot radiograph demonstrating 5th metatarsal fracture involving Zone 2 (Jones Fracture, red arrow).



lateral foot pain that persists, most notable when attempting to pivot or cut on the affected foot, that can be localized to the fifth metatarsal. Standard radiographic imaging is crucial for diagnosis, and often provides sufficient information for classification (**Figure 2**). Management of Jones fractures continues to evolve: in recreational athletes, non-operative treatment using a short leg cast or boot for 6–8 weeks may be sufficient, though refracture rates may be as high as 30% and 70%.<sup>21</sup> Operative treatment with intramedullary screw fixation reduces rates of nonunion and can improve return to activity time, and is therefore considered for higher demand athletes.

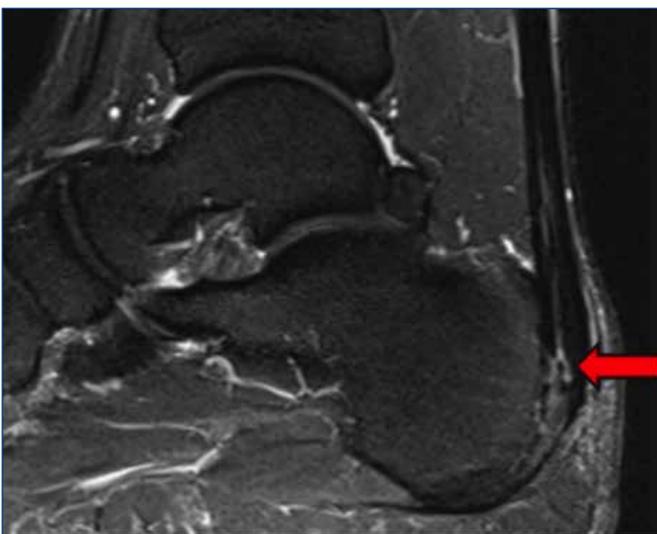
**Metatarsal stress** fractures encompass 10% of all stress fractures in active patients, and have been associated with footwear type, playing turf, and repetitive physical activity.<sup>3,22,23</sup> Colloquially known as “march fractures”, they were first recognized as the source of foot pain in soldiers on lengthy marches. Metatarsal stress fractures occur in recreational and elite athletes alike, frequently following an increase in activity intensity.<sup>22</sup> Stress injuries, while fractures, are overuse injuries that occur when microtrauma accumulation at the bone exceeds the rate of bone remodeling, with the second, third, and fifth metatarsal shafts the most common sites of stress fractures in the foot. Presentation often involved gradual, persistent foot pain that can intensify with activity. As early phase stress fractures can be difficult to visualize on X-ray unless they progress to displacement, MRI is the gold standard for early diagnosis with bone scan an alternative option, although clinical suspicion

and absence of other radiographic findings can be sufficient for diagnosis. Radiographs several weeks after symptoms have started often reveal callus formation, which is also diagnostic. Stress fractures are generally managed conservatively via activity modification with the possible addition of a walking boot, with healing expected in 6–8 weeks.<sup>24</sup>

## OVERUSE

While certainly less severe than a rupture, both insertional and noninsertional **tendinopathy of the Achilles tendon** can be a common cause of disability given the tendon's crucial role in most activities. The rate of Achilles tendinopathy has risen 10-fold over the past three decades with a suspected connection to a rise of recreational sporting activities.<sup>25</sup> The pathology of tendinopathy is complex and our understanding has evolved significantly; Longo et al. defines tendinopathy as “a failed healing response” in which collagen fibers are disrupted and are replaced haphazardly or by non-collagenous fibrous tissue.<sup>26</sup> Excessive loading of tendons during intense physical activity is considered the predominant stimulus for tendinopathy, but there exists a complex, multifactorial relationship with variables including age, vascular supply, metalloprotease presence, gait, ankle stability, training patterns, and exercise environment.<sup>26</sup> Tendinopathy pain was previously conflated with inflammation (“tendonitis”), but histological examination demonstrates minimal evidence of inflammation. Physical exam is the gold standard for diagnosis with pain along the Achilles tendon observed (particularly in dorsiflexion), sometimes with palpable thickening or nodules, but evidence of tendinopathy can also be visualized on MRI (**Figure 3**). Common Achilles tendinopathy can be managed in the

**Figure 3.** Sagittal magnetic resonance imaging (MRI) of Achilles insertional tendinopathy, displaying increased interstitial fluid/signal in the distal Achilles with bone edema at the insertion (red arrow).



primary care setting though it can prove particularly recalcitrant, with many treatment modalities more conventional than well validated in the literature. NSAIDs and cryotherapy can provide symptomatic relief, with limited evidence of long-term effectiveness. Eccentric calf muscle training has shown the most promising results in treating chronic tendinopathy as part of physical therapy, while steroid injections are avoided due to risks of rupture.<sup>27</sup> Regardless of treatment, up to 45% of patients will remain symptomatic after 6 months of conservative therapy, at which time surgical treatment can be considered. Operative treatments include debridement of the tendon with or without calcaneal bony prominence resection, suture anchor repair of the tendon, or tendon transfer (typically the flexor hallucis longus).<sup>27</sup> Surgical management is successful in producing good to excellent results in 85% of cases, but patients must be counseled on the possibility of reoccurrence or unsatisfactory surgical outcomes.<sup>26,27</sup>

**Plantar fasciitis** represents an estimated 11–15% of foot-related complaints in adults and is a common cause of frustration and activity limitations.<sup>28</sup> The plantar fascia, the layer of connective tissue across the sole of the foot, originates at the plantar surface of the calcaneus and plays an important role in arch support. In plantar fasciitis, the accumulation of microtears following chronic overuse creates a cycle of inflammation predominantly at the aponeurosis of the fascial origin, resulting in insidious, persistent pain that worsens with activity initiation or upon standing in the morning.<sup>29</sup> Weekend warrior athletes are at particular risk, as sudden repetitive stress to an unconditioned fascia is the quintessential situation for precipitating plantar fasciitis.<sup>3</sup> Though the condition can prove frustratingly persistent, long-term prognosis is very favorable with over 80% of patients experiencing resolution in less than 12 months, and specialist referral often only warranted for chronic or debilitating symptoms.<sup>30</sup> Diagnosis of plantar fasciitis can often be made by the pattern of pain reported in the patient's history with a physical exam helping to exclude other causes of heel pain. Imaging can be helpful to exclude other causes of heel pain such as calcaneal stress fracture, subtalar arthritis, or Achilles insertional tendinopathy. First-line treatment modalities are often undertaken simultaneously, and as such there exists conflicting or absent evidence in the literature regarding their individual efficacy. Stretching, NSAID use, and supportive shoe inserts have all demonstrated some degree of symptomatic improvement, with fascial stretching favored over Achilles stretching.<sup>31,32</sup> Night splints to assist in gentle stretching of the plantar fascia have anecdotal support and can serve as an additional treatment modality, though evidence in support of their efficacy is lacking. Plantar injections, especially repetitive, are primarily avoided due to the risk of fat pad atrophy, and surgical plantar release is reserved for severely refractory cases and is rarely necessary.

## CONCLUSION

Weekend warriors are recreational athletes who compress their physical activity into 1–2 weekly intervals, combining general deconditioning with a rapid increase in excessive activity to create a classic environment for numerous foot and ankle injuries. Recognizing these common injuries in this subset of patients can help with efficient and accurate diagnosis and management.

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# Impact of Direct Transport vs. Transfer on Out-of-Hospital Traumatic Cardiac Arrest

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## ABSTRACT

**BACKGROUND:** Injured patients benefit from direct transport to a trauma center; however, it is unknown whether patients with traumatic out-of-hospital cardiac arrest (OHCA) benefit from initial resuscitation at the nearest emergency department (ED) if a trauma center is farther away. We hypothesized that patients with traumatic OHCA transported directly to a trauma center have less in-hospital mortality after initial resuscitation compared to those transferred from non-trauma centers.

**METHODS:** We examined patients presenting with traumatic OHCA within our institutional trauma registry and the National Trauma Data Bank (NTDB) and excluded patients with ED mortality. Our primary outcome was all-cause mortality during index hospitalization; multiple logistic regression controlled for age, sex, injury severity score, mechanism of injury, signs of life, emergency surgery, and level I trauma center designation.

**RESULTS:** We identified 271 and 1,138 adult patients with traumatic OHCA in our registry and the NTDB; 28% and 16% were transferred from another facility, respectively. Following initial resuscitation, patients transferred to a trauma center had higher in-hospital mortality than those transported directly in both our local and national cohorts (aOR: 2.27, 95%CI: 1.03-4.98, and aOR: 2.66, 95%CI: 1.35 – 5.26, respectively).

**DISCUSSION:** Patients with traumatic OHCA transported directly to a trauma center may have increased survival to discharge compared to those transferred from another facility, even accounting for initial resuscitation. Further investigation should examine the impact of both physiologic and logistic factors including distance to trauma center, traffic, and weather patterns that may impact prehospital decision-making and destination selection.

**KEYWORDS:** prehospital care, emergency medical services, cardiac arrest, trauma

## BACKGROUND

Injured patients benefit from direct transport to a tertiary trauma center.<sup>1,2</sup> Patients with traumatic out-of-hospital cardiac arrest (OHCA) have significant risk of mortality, and effective resuscitation is hindered by delay in arrival to a trauma center where advanced resuscitation or operative intervention may be provided.<sup>3-5</sup> In some trauma systems, patients with traumatic OHCA are transported by emergency medical services (EMS) to the nearest emergency department (ED) – regardless of trauma center designation. In theory, this facilitates the early provision of lifesaving interventions such as blood transfusion or needle thoracotomy that may or may not be available prehospitally, depending on level of care and available resources. In these cases, Advanced Trauma Life Support guidelines recommend the prompt transfer of survivors to a trauma center after stabilization. However, the decision to transport patients with traumatic OHCA to the nearest non-trauma center may paradoxically delay the provision of advanced trauma care if the aforementioned interventions are not readily available on presentation to the community ED.

Our Level I Trauma Center is the only ACS- and State-designated trauma center in our state. Patients from suburban and rural areas in our large catchment area frequently receive their initial care and resuscitation efforts at another facility prior to transfer to our institution. Therefore, we receive injured patients who have survived both their initial traumatic OHCA in the field as well as their initial resuscitation and transfer from an external facility. These types of inter-facility transfers are commonplace in our nation. Therefore, it is important to better characterize their outcomes in order to improve care on a systems level. We hypothesized that despite successful resuscitation at a non-trauma center (NTC), patients with traumatic OHCA transported directly to a trauma center (TC) have higher rates of survival to discharge.

## METHODS

We aimed to evaluate our center's experience with traumatic OHCA, and to frame these results within the context of the analogous national outcomes. Thus, we studied two databases separately – our institution's trauma registry and the National Trauma Data Bank (NTDB). The National Sample

Program (NSP) datasets of the NTDB from 2012 and 2013 were purchased from the American College of Surgeons since these were the only available datasets that included prehospital cardiac arrest as a variable at the time of analysis. Traumatic OHCA was defined to occur in the setting of known or presumed trauma. For our local data, we obtained Institutional Review Board (IRB) approval to perform a retrospective cohort study of adult patients presenting to our ED following traumatic OHCA between January 2012 and February 2017. Of note, there were significant changes within our statewide EMS protocols for out-of-hospital cardiac arrest after that time point such as a mandatory 30-minute on-scene resuscitation for arrests with non-traumatic etiology. Though trauma patients were exempted from this requirement, our prehospital protocols within the studied time period were better matched to the national standards that patients were exposed to within the NTDB dataset. Additionally, we excluded patients who were directly transported to a TC and died in the ED from our final analytic sample. This was done to account for the absence of patients who did not survive their initial resuscitation at an NTC prior to transfer, as well as to generate two physiologically comparable groups of patients with salvageable traumatic OHCA.

We defined our primary outcome as all-cause mortality during index hospitalization. Trauma center designation levels were categorized as ACS level I or level II, state-designated level I or II, or other. Distances between injury site and referring facility or between injury site and our institution were approximated based on zip codes of injury using Google Maps. Distance between referring hospitals and our institution were calculated using Google Maps based on known addresses of referring hospitals. Signs of life were defined to include the presence of a pupillary response, spontaneous ventilation, carotid pulse, measurable or palpable blood pressure, extremity movement, or cardiac electrical activity according to the 2001 definition from the American College of Surgeons Committee on Trauma.<sup>6</sup> Demographic data, physiologic data upon arrival, injury mechanism and severity, procedures performed, and outcome data were collected.

Parametric categorical data were analyzed with bivariate analysis. We applied Pearson's Chi square test, with Fisher exact test for sparse values, to test independence. Parametric continuous data were compared using Student t-test. Nonparametric data were analyzed using the Wilcoxon rank sum test. Statistical significance was set at  $\alpha=0.05$ . We performed simple and multiple

logistic regression analyses on the weighted population estimates to obtain crude and adjusted odds ratios of mortality. We completed all analyses using Stata/SE statistical software, version 14.0 for Windows 10, copyright 1985–2015 Statacorp LP, College Station, TX, USA.

## RESULTS

### Local Data

We identified 271 adult patients who were treated at our institution between January 2012 and February 2017 with traumatic OHCA. Of those, 194 patients were male (71.6%) and 76 (28.0%) were transferred to our ED after resuscitation at an NTC (Table 1). The median [IQR] distance from the prehospital scene of injury to our ED for the directly transported cohort was 6.6 [3.9, 13.3] miles. For transferred patients, the median distance between prehospital scene of injury and the transferring hospital was 4.1 [2.3, 8.5] miles compared to a hypothetical distance of 21.3 [13.3, 33.2] miles if direct transport to our TC had been initiated. Our all-cause mortality rate was 82.3% for all comers, and the majority of deaths occurred in the ED. There was a higher rate of both ED (76.9 vs. 18.4%,  $p<0.001$ ) and overall mortality (87% vs. 71%,  $p=0.002$ ) within our direct transport vs. transferred cohorts.

**Table 1. Local Data – Patient Characteristics**

Characteristics of analytic sample and comparison groups within our local data: direct transport to a trauma center vs. transferred from another facility.

	Total (N=271)	Direct (n=195)	Transfer (n=76)	P value
Gender – Male, n (%)	194 (71.6)	149 (76.4)	45 (59.2)	0.005
Age, mean (SD)	47.7 (22.8)	45.6 (22.3)	53.3 (23.2)	0.01
EMS Time (minutes), median [IQR]	33 [27, 52]	30 [25, 40]	75 [61, 91]	<0.001
Outside Hospital (minutes)	N/A	N/A	77 (50–167)	
Mechanism, n (%)				0.007
Blunt	364 (62.5)	230 (57.5)	134 (75.3)	
Penetration	97 (21.4)	71 (25.3)	21 (11.5)	
Other	77 (16.1)	50 (17.%)	27 (13.2)	
ISS, median [IQR]	14 [5, 25]	13.5 [5, 25]	17, [10, 25.5]	0.03
ED GCS, median [IQR]	3 [3, 4]	3 [3, 3]	3 [3, 3]	NS
Mortality, n (%)				0.04
ED Mortality	164 (60.5)	150 (76.9)	14 (18.4)	< 0.001
Overall Mortality	224 (82.7)	170 (87.2)	54 (71.1)	0.002
*Among ED Survivors	60 (56.1)	20 (44.4)	40 (64.5)	< 0.001
Emergency surgery, n(%)	17 (6.3)	8 (4.1)	9 (11.8)	0.03
*Among ED Survivors	17 (15.9)	8 (17.8)	9 (14.5)	NS
Hospital LOS (days), median [IQR]	3 [2, 7]	5 [2, 8]	3 [2, 6]	0.02

SD: Standard Deviation, IQR: Interquartile Range, EMS: Emergency Medical Services, ISS: Injury Severity Score, ED: Emergency Department, GCS: Glasgow coma scale, LOS: length of stay.

Our final analytic sample included 107 (39.5%) patients who survived their ED resuscitation and were admitted to the hospital. Among these ED survivors, there was higher in-hospital mortality among transferred vs. directly transported patients (64.5% vs. 44.4%,  $p=0.03$ , aOR: 2.27, CI: 1.03-4.98). Seventeen patients underwent emergency surgery, of which 11 (64.7%) subsequently experienced in-hospital mortality. There was a higher rate of emergency surgery within the transferred cohort overall; however, this difference was not significant when adjusting for ED survivors.

### National Sample Program Data

Between 2012 and 2013, the NSP recorded 1,138 adult patients that presented to either an ACS- or State-designated level I or II trauma center with traumatic OHCA. Of these, 956 patients were directly transported to a TC and 182 (16%) were transferred from another facility. Of the total sample, 75.8% were males, 31.3% sustained penetrating trauma, and the median ISS was 25. The mean age was 43.5 years, and patients within the direct transport cohort were younger than those in the transferred cohort (42 vs. 52 years,  $p<0.001$ ). On arrival to the TC, 585 (52.4%) patients had documented signs of life (SOL). Including all comers, transferred patients had SOL on arrival in 90.3% compared to 45.3% in the direct group. The overall mortality rate was 83.7% and 68% of deaths occurred in the ED. Including all patients, the direct transport cohort experienced higher mortality both overall (85.3 vs. 72.4%,  $p=0.003$ ) and within the ED (73.1 vs. 27.3%,  $p<0.001$ ).

To generate our final analytic sample, we excluded 580 patients that expired in the ED following direct transport to a TC as well as those without available data for the primary outcome ( $n=10$ ). Thus, our final analysis included 538 patients, of whom 356 (66.2%) were directly transported and 182 (33.8%) were transferred from another facility to the final TC (Table 2). There was no difference in gender, race, ISS, GCS on arrival, length of stay, or level of trauma center. Patients who were directly transported to TC were younger (45 vs. 51.9 years,  $p<0.001$ ) and underwent emergency surgery more frequently (27.9 vs. 11.5%,  $p=0.001$ ). There was a higher rate of penetrating trauma within the direct vs. transferred cohorts (25.3 vs. 11.5%,  $p=0.007$ ). Transferred patients took longer to arrive at a TC (101 vs. 41 minutes,  $p<0.001$ ), with prehospital time only including time from referral hospital to TC – not including scene times prior to transfer. Mortality was lower in the direct transport group compared to the transferred group (60.3 vs. 72.8%,  $p=0.04$ ). Penetrating injuries resulted in higher mortality than blunt injuries (73.5 vs. 61.2%), but there was no difference in mortality

**Table 2. National Trauma Data Bank – Patient Characteristics**

Characteristics of analytic sample and comparison groups within the National Trauma Data Bank (NTDB): direct transport to a trauma center vs. transferred from another facility. Results are presented as number of patients in our sample and percentages from weighted population estimates.

	Total (N=538)	Direct (n=356)	Transfer (n=182)	P value
Gender – Male, n (%)	379 (70.5)	253 (71.1)	126 (69.2)	NS
Age, mean (SD)	47.9 (18.9)	45.9 (17.7)	51.9 (20.6)	<0.001
Trauma Center				NS
ACS Level I	346 (58.4)	237 (58.1)	109 (59.3)	
ACS Level II	61 (10.7)	34 (10.1)	27 (12.2)	
State Level I	126 (29.7)	81 (30.4)	45 (28)	
State Level II	5 (1.2)	4 (1.4)	1 (5)	
EMS Time (minutes), median [IQR]	56 [35, 112]	41 [31, 66]	101 [69, 1440]	<0.001
Mechanism, n (%)				0.007
Blunt	364 (62.5)	230 (57.5)	134 (75.3)	
Penetration	97 (21.4)	71 (25.3)	21 (11.5)	
Other	77 (16.1)	50 (17.2)	27 (13.2)	
ISS, median [IQR]	22 [9, 30]	21 [10, 29]	22 [9, 33]	NS
SOL on ED Arrival, n (%)	464 (82.9)	306 (79.6)	158 (91.5)	0.001
ED GCS, median [IQR]	3 [3, 6]	3 [3, 6]	3 [3, 6]	NS
Overall Mortality, n (%)	356 (63.8)	232 (60.3)	124 (72.8)	0.04
Emergency surgery, n (%)	126 (23.3)	105 (27.9)	21 (11.5)	0.001
Hospital LOS (days), median [IQR]	3 [1, 7]	3 [1, 7]	2 [1, 7]	NS

SD: Standard Deviation, IQR: Interquartile Range, ACS: American College of Surgeons, EMS: Emergency Medical Services, ISS: Injury Severity Score, SOL: Signs of life, ED: Emergency Department, GCS: Glasgow coma scale, LOS: length of stay

between the transfer or direct groups within this subgroup of penetrating injury. However, among the subgroups with traumatic OHCA after blunt trauma, there was higher in-hospital mortality in the transferred vs. direct cohort (72.5 vs. 55.7%,  $p=0.02$ ). Adjusting for age, gender, injury severity score, mechanism of injury, presence of SOL on ED arrival, requirement for emergency surgery, and Level I TC designation, patients with traumatic OHCA who were transferred from another facility to a trauma center had higher odds of mortality (aOR: 2.66, 95% confidence interval: 1.35–5.26).

### DISCUSSION

In this study, we used local and national databases to examine the outcomes of patients with traumatic out-of-hospital cardiac arrest who were directly transported to a trauma center compared to those who were initially transported to the closest emergency department for initial resuscitation prior to being transferred to a trauma center. We observed a significantly higher rate of both ED and overall mortality in

patients who were directly transported to a trauma center. Despite this initial indication of a survival advantage, we found that patients who were eventually transferred from a non-trauma center to a Level I trauma center subsequently experienced significantly higher rates of all-cause in-hospital mortality compared to those who were directly transported when adjusted for those who experienced ED mortality at the trauma center.

The prehospital management of traumatic OHCA is entirely different from cardiac arrest secondary to medical etiologies including acute coronary syndrome or arrhythmia, which are more commonly encountered by prehospital providers. In the case of non-traumatic OHCA, prehospital providers may remain on scene for up to thirty minutes to optimize resuscitation by maximizing chest compression fraction and limiting the interruptions to cardiopulmonary resuscitation.<sup>7</sup> This is a reasonable approach when the majority of evidence-based interventions fall within the scope of both basic and advanced life support prehospital personnel. However, the principles of traumatic OHCA management are fundamentally different and are focused on the rapid control of hemorrhage, the relief of obstructive shock (i.e., tension pneumothorax or cardiac tamponade), and the establishment of a definitive airway. While some interventions such as needle thoracostomy are commonly within the paramedic scope of practice, they may be less frequently performed by individual providers outside of trauma centers and are associated with variable success rates.<sup>8,9</sup> While life-saving procedures including emergency thoracotomy have been successfully deployed prehospitally by physician-led teams,<sup>10</sup> they remain exceedingly rare for most clinicians. As such, ideal conditions include performance by a specialized trauma team in a well-equipped trauma center. Whether they occur within a non-trauma center or during a prolonged direct transport, delays to receiving appropriate trauma care result in increased mortality and may render further interventions as futile.<sup>3,11</sup>

Unfortunately, trauma is not restricted to a one-mile radius around the trauma center. While we identified a subsequent in-hospital survival advantage for traumatic OHCA survivors who were directly transported to a trauma center, there are only so many miles of transport that a trauma patient can tolerate without relief of an obstructed airway or tension pneumothorax. Thus for many patients, the question of “How far from a trauma center is too far to consider direct transport?” remains unanswered. Certainly, some prehospital providers in rural systems or austere environments may have no choice but to transport to the nearest facility, regardless of trauma center designation. In these cases, our study highlights the important fact that despite an initial survival advantage, patients brought to the nearest non-trauma center after traumatic OHCA are still at risk of higher long-term mortality when compared to those who were directly transported to a trauma center.

In considering the rationale for this finding, we believe that it is important to recognize that physicians at trauma and non-trauma centers may have differing definitions of futility for patients with traumatic cardiac arrest. While a surgeon at a Level I trauma center may not offer invasive procedures such as resuscitative thoracotomy to a patient with a blunt mechanism or prolonged arrest time in accordance with the Eastern Association for the Surgery of Trauma's practice management guidelines, the same patient might undergo thoracotomy in the community setting despite perceived futility in the trauma center. Should that patient survive their eventual transfer to the trauma center, the long-term utility of further interventions on survival or functional status remains unknown since they would have been pronounced dead on arrival if directly transported. In our local data, we showed similar rates of subsequent surgical intervention among ED survivors who were directly transported or subsequently transferred to our institution. Despite similar rates of intervention among these survivors, patients who were directly transported to a Level I trauma center had lower subsequent rates of in-hospital mortality.

One-third of injured patients are transported to a non-trauma center initially,<sup>12</sup> and it is likely that individual EMS provider judgment, distance to a trauma center, and patient demographic factors play a role in selection of optimal transport destination.<sup>13-16</sup> Several studies have established the benefit of direct transport to a trauma center rather than undertriage to a non-trauma center,<sup>17-19</sup> and for this reason, the establishment of well-coordinated trauma systems results has resulted in decreased risk of mortality.<sup>20</sup> Our work adds to the body of evidence that patients who are eventually transferred to a trauma center compared to those who are directly transported may experience higher rates of mortality in the longer term.

## LIMITATIONS

In our comparison of outcomes between patients transferred to and directly transported to a trauma center, we are unable to account for those who were pronounced dead or non-survivable in the field or at outside hospitals. To reduce bias and increase the direct comparability of our cohorts, we excluded patients who were pronounced dead in the emergency department from our final analysis and thus created an artificial sample of patients in whom the immediate-term outcome of ED survival was already known. This severely limits the generalizability of our results which should thus be used for hypothesis generation rather than direct implementation within prehospital protocols. Additionally, because the NTDB only contains data from contributing trauma centers until the date of discharge, we were unable to assess important post-discharge outcomes including mortality and functional status. As with all retrospective research, there are limitations due to missing values.

In our analysis of NTDB data, we were unable to control for geographic differences across the U.S. because two thirds of values for the region variable were missing in our sample. Also, the reported prehospital time in the NTDB does not include time spent at the referring non-trauma or Level II trauma center. However, if total prehospital time prior to arrival at a non-trauma center was reported, this would have increased the difference that we found in our results.

## CONCLUSION

In our analysis of both local and national data, patients with traumatic out-of-hospital cardiac arrest who were transferred to a trauma center after successful resuscitation at a non-trauma center have higher odds of in-hospital mortality compared to those who were directly transported to a trauma center. Educational efforts in a regional trauma system should emphasize the importance of minimizing delays to the provision of evidence-based trauma care both during initial care at non-trauma centers and throughout inter-facility transfer. While our findings should be considered exploratory in nature, they highlight the important fact that the optimal cut point in transportation time for prehospital destination selection after traumatic cardiac arrest remains unknown.

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# Inequities Laid Bare: The Mental Health of Young Adults in Rhode Island During the COVID-19 Pandemic

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*(Editor's Note: Part 1 of a Series)*

## ABSTRACT

This study documents disparities in the mental health burden of young adults in Rhode Island during the COVID-19 pandemic as it pertains to essential worker status, sexual orientation, gender identity, and childhood trauma. A cross-sectional web-based survey of young adults aged 18 to 25 years conducted between May and October of 2020 assessed anxiety symptoms, depressive symptoms, and thoughts of suicide. In fully adjusted regression models, (n =528 young adults) being an essential worker, a sexual minority, having lower relative SES, and having more adverse childhood experiences were significantly associated with negative mental health outcomes. In models adjusted for individual ACEs, exposure to mental illness in the household, physical violence between adults in the household, emotional abuse, and sexual abuse were independently associated with all three outcomes. Young adults most vulnerable and stigmatized in the community are also those who are most severely affected in terms of mental health.

**KEYWORDS:** COVID-19, mental health, Rhode Island, young adults

## INTRODUCTION

The disruption to daily life, economic struggles, and generalized fear from the coronavirus disease (COVID-19) pandemic have taken a toll on the US population.<sup>1</sup> Dramatic increases in depression and anxiety diagnoses have been reported in the general U.S. adult population,<sup>2,3</sup> especially among young adults.<sup>4</sup> Young adults ages 18 to 25 years old bear the greatest burden of mental health outcomes.<sup>5</sup> The transition to adulthood is a vulnerable developmental period in which long-term risk behaviors and mental health trajectories are established.<sup>6</sup> In 2019, young adults suffered disproportionately from depression and anxiety, 21% and 19.5% respectively, compared to the general adult population (18.5% and 15% respectively).<sup>7</sup> The same holds for suicidal thoughts, with adult prevalence at 4.8%, but 11.8% among young adults.<sup>8</sup> Females generally have higher risk for depression and anxiety symptoms than males,<sup>7</sup> and sexual and gender minorities have higher risk for poor mental health symptoms

and suicidal ideation.<sup>9</sup> Associations between adverse childhood experiences (ACEs) and several adult mental health outcomes are well documented in the literature.<sup>10,11</sup> Individual traumatic experiences, such as childhood physical, sexual, or verbal abuse,<sup>11</sup> or the death a family member,<sup>12</sup> have been linked to increased risk for posttraumatic stress, depression, and anxiety. Community trauma from disasters, accidents, violence, and war have also been linked to post-traumatic stress, depression, and anxiety.<sup>10</sup> The COVID-19 pandemic, with its shared experience of uncertainty, isolation, and hardship, is another type of community trauma.

In March 2020, policies were put in place across the U.S. to restrict all non-essential travel and person-to-person contact, while also limiting the size of social gatherings. This early period of the pandemic was marked by a shift to learning and working remotely, wearing masks in public, limiting business capacity and operations, and a shortage in common household products.<sup>13</sup> Essential workers were at particular risk to stressors during COVID-19 and are those who conduct operations and services that are essential for critical infrastructure operations.<sup>14</sup> Almost overnight, many essential workers in low-wage, high-risk occupations had to cope with coronavirus-related stress, due to uncertainty surrounding the disease. In addition, essential workers faced an increased risk of virus exposure, worry about infecting their family members, dealing with a low supply of personal protective equipment (PPE), concerns over unsafe work environments, and longer work hours.<sup>15</sup>

Young adults, racial/ethnic minorities, and essential workers have suffered a disproportionate burden of the mental health consequences of the pandemic.<sup>2,16</sup> Given that COVID-19-related stressors may not be evenly distributed across the U.S. population, this study examines inequities in the mental health burden in young adults living in Rhode Island during the COVID-19 pandemic. We expand on previous work that examined US college students' perceived stress and anxiety by gender, sexual orientation, race/ethnicity, and income during the COVID-19 pandemic.<sup>17</sup> The present study assessed anxiety symptoms, depressive symptoms, and thoughts of suicide in a diverse sample of young adults ages 18 to 25 during the COVID-19 pandemic and compared participants by essential worker status, gender identity, sexual orientation, and childhood trauma.

## METHODS

### Sample

The Rhode Island Young Adult Survey (RIYAS) is a non-probability sample of young adults aged 18-25 years residing for at least part of the year in Rhode Island. Web-based surveys were administered in both English and Spanish. Recruitment included paid Instagram ads targeted 18-25-year-old users georeferenced in Rhode Island. Supplemental recruitment included posts to Rhode Island community Facebook pages and email recruitment to three Rhode Island institutions of higher education. Data collection occurred between May and October 2020. Surveys took an average of 15 minutes to complete, and respondents received a \$10 electronic Amazon gift card. A total of 546 eligible young adults completed the survey. Eighteen respondents (3.3%) were excluded from the present analyses due to invalid race/ethnicity information, leaving an analytic sample of N=528. This study was approved by the Johnson & Wales University Institutional Review Board.

### Measures

**Primary outcomes:** Depressive symptoms were measured by the Center for Epidemiologic Studies Short Depression Scale (CES-D-10), a screening tool used to identify past week depressive symptoms.<sup>18</sup> Both the validity and reliability of the scale has been previously established.<sup>19</sup> The scale includes 10 items with responses on a 4-point Likert scale. Total continuous depressive symptom scores could range from 0 to 30 with higher scores suggesting greater severity of symptoms. A cut-off of 10 or higher was indicative of depressive disorder.<sup>20</sup> Anxiety symptoms were measured by the Generalized Anxiety Disorder-7 (GAD-7), a screening tool used to identify past two week anxiety symptoms.<sup>21</sup> Validity and reliability has been demonstrated in adolescents and the general adult population.<sup>21,22</sup> The scale includes 7 items with response options on a 4-point Likert scale that ranges from “not at all” to “nearly every day.” Responses were scored from 0 to 3 for all items with total continuous anxiety symptoms scores ranging from 0 to 21. Higher scores suggest greater severity of symptoms. A cut-off of 10 or higher was used to identify those with likely anxiety disorder.<sup>23</sup> Suicidal ideation was measured as a binary variable based on a “yes” or “no” response to the question, “During the past 12 months, did you ever seriously consider attempting suicide?”

**Primary Exposures:** Essential worker status was determined by a yes or no response to the question, “At any point since the COVID-19 national emergency, have you been considered an “essential worker?” ACEs were measured by the Behavioral Risk Factor Surveillance System module, which was adapted from the original CDC-Kaiser ACE Study.<sup>10</sup> This module consists of 11 items related to experiences of abuse (emotional, physical, or sexual) and household challenges (e.g, divorce, mental illness, substance

abuse) occurring before the age of 18 years. The 11 items were scored consistent with scoring instructions ranging from 0 to 8, and the 8 individual ACEs were examined.

**Sociodemographic characteristics:** Relative socioeconomic status (SES) was measured using the MacArthur Scale of Subjective Social Status (MacArthur SSS), which assesses a person’s perceived rank relative to others in their community, where 1 indicates being the “worst off” and 10 indicates being the “best off.”<sup>24</sup> Sexual orientation was dichotomized as heterosexual or a sexual minority. Race/ethnicity was dichotomized as being white, non-Hispanic or not. Gender was categorized as female, male, or gender minority. Other important sociodemographic covariates included age, student status and employment.

### Statistical Analysis

Descriptive and bivariate statistics, namely chi-square, t-tests, and crude logistic models, assessed relationships between the independent variables and each of the three primary outcomes. All variables were retained in the adjusted logistic regression models. Associations between covariates and each outcome were examined in two sequential steps. First, an ACE score ranging between 0 and 8 was regressed on each outcome. Second, the *unique* association between each ACE and study outcomes was examined. Statistical significance was assumed at a threshold of  $p < 0.05$ . All statistical analyses were conducted using Stata, version 15.<sup>25</sup>

## RESULTS

Of the included 528 young adults, 70.8% (N=374) were female, the majority were white, non-Hispanic (68.4%) and heterosexual (73.9%). The mean age was 20.5 years old and mean ACE score was 2.19. Most respondents were employed (59.5%) and enrolled in school (70.5%). More than one-third of the young adults (36.2%) identified as being an essential worker during the COVID-19 pandemic. Essential workers were more likely to be employed ( $p < 0.001$ ), more likely to be enrolled in school ( $p = 0.023$ ), more likely to have anxiety symptoms ( $p = 0.005$ ), and report considering suicide in the past year ( $p = 0.014$ ). (See **Table 1**.)

**Depressive Symptoms:** Crude logistic regressions for depressive symptoms suggest that being a gender minority, a sexual minority, having lower relative SES, and a higher adverse childhood experiences score were all significantly associated with increased odds of depressive symptoms. In the fully adjusted model, these associations remained significant, except the association between being a gender minority and depressive symptoms ( $p = 0.861$ ). The crude association between being an essential worker and depressive symptoms was marginally significant in the unadjusted model ( $p = 0.064$ ) but was no longer significant in the fully adjusted model ( $p = 0.130$ ). (See **Table 2**.)

**Anxiety Symptoms:** Crude logistic regressions for anxiety

**Table 1.** Sociodemographic Characteristics of the 2020 Rhode Island Young Adult Survey and Essential Workers

Variable	RIYAS n = 528 (%)	Essential Workers n = 191 (%)	P-value
Essential Worker	191 (36.2)		
Age (mean, SD)	20.5 (2.24)	20.7 (2.15)	0.362
Gender			0.588
Female	374 (70.8)	133 (69.6)	
Male	132 (25.0)	51 (26.7)	
Gender Minority	22 (4.2)	7 (3.7)	
White, non-Hispanic	361 (68.4)	131 (68.6)	0.936
Sexual Orientation			0.653
Heterosexual	390 (73.9)	145 (75.9)	
Sexual Minority	138 (26.1)	46 (24.1)	
Employed	314 (59.5)	153 (80.1)	<b>&lt;0.001</b>
Enrolled in School	372 (70.5)	146 (76.4)	<b>0.023</b>
Relative SES (mean, SD)	6.30 (1.69)	6.21 (1.68)	0.328
Depressive Symptoms	233 (44.1)	93 (48.7)	0.112
Anxiety Symptoms	165 (31.3)	74 (38.7)	<b>0.005</b>
Considered Suicide	64 (12.1)	32 (16.8)	<b>0.014</b>
ACEs Score (mean, SD)	2.19 (2.06)	2.39 (2.15)	0.085

P-values were determined by t-tests for continuous variables and chi-square tests for categorical variables

**Table 2.** Crude logistic regressions on depressive symptoms, anxiety symptoms, and having considered suicide in the 2020 Rhode Island Young Adult Survey

Variables	Depressive Symptoms		Anxiety Symptoms		Considered Suicide	
	OR	95% CI	OR	95% CI	OR	95% CI
Essential Worker	1.34	0.93, 1.91	<b>1.71</b>	<b>1.17, 2.49</b>	<b>1.92</b>	<b>1.13, 3.25</b>
Age	0.97	0.90, 1.05	0.97	0.90, 1.06	0.96	0.86, 1.08
Male	0.72	0.48, 1.09	0.64	0.41, 1.01	1.04	0.56, 1.95
Gender Minority	<b>3.27</b>	<b>1.25, 8.54</b>	<b>3.02</b>	<b>1.26, 7.26</b>	<b>4.64</b>	<b>1.84, 11.73</b>
Non-white or Hispanic	0.94	0.65, 1.36	0.54	0.36, 0.83	1.06	0.61, 1.86
Sexual Minority	<b>4.42</b>	<b>2.90, 6.73</b>	<b>3.34</b>	<b>2.22, 5.01</b>	<b>5.32</b>	<b>3.08, 9.18</b>
Employed	0.86	0.61, 1.23	1.20	0.82, 1.75	1.07	0.63, 1.83
Enrolled in School	1.07	0.73, 1.56	1.08	0.72, 1.62	1.30	0.71, 2.36
Relative SES	<b>0.68</b>	<b>0.60, 0.76</b>	<b>0.75</b>	<b>0.66, 0.84</b>	<b>0.64</b>	<b>0.54, 0.75</b>
ACEs score	<b>1.39</b>	<b>1.27, 1.54</b>	<b>1.32</b>	<b>1.21, 1.45</b>	<b>1.38</b>	<b>1.23, 1.56</b>

Reference group: Essential worker = no; Gender=female; Race/Ethnicity= Non-Hispanic White; Sexual orientation = Heterosexual; Employed = no; Enrolled in school = no.

**Table 3.** Adjusted logistic regressions on depressive symptoms, anxiety symptoms, and having considered suicide in the 2020 Rhode Island Young Adult Survey

Variables	Depressive Symptoms		Anxiety Symptoms		Considered Suicide	
	AOR	95% CI	AOR	95% CI	AOR	95% CI
Essential Worker	1.39	0.91, 2.13	<b>1.75</b>	<b>1.12, 2.72</b>	<b>2.11</b>	<b>1.12, 3.97</b>
Age	0.96	0.86, 1.06	0.95	0.86, 1.06	0.95	0.81, 1.11
Male	0.86	0.55, 1.36	0.70	0.43, 1.15	1.37	0.68, 2.75
Gender Minority	1.11	0.35, 3.51	1.18	0.42, 3.33	1.61	0.52, 4.95
Non-white or Hispanic	0.72	0.47, 1.11	<b>0.40</b>	<b>0.25, 0.65</b>	0.90	0.47, 1.71
Sexual Minority	<b>2.89</b>	<b>1.80, 4.64</b>	<b>2.19</b>	<b>1.36, 3.50</b>	<b>3.52</b>	<b>1.88, 6.58</b>
Employed	0.82	0.54, 1.26	1.07	0.68, 1.68	0.93	0.48, 1.77
Enrolled in School	1.03	0.62, 1.69	0.98	0.59, 1.66	1.43	0.68, 3.02
Relative SES	<b>0.74</b>	<b>0.65, 0.84</b>	<b>0.78</b>	<b>0.68, 0.89</b>	<b>0.72</b>	<b>0.60, 0.88</b>
ACEs score	<b>1.27</b>	<b>1.14, 1.40</b>	<b>1.21</b>	<b>1.09, 1.34</b>	<b>1.22</b>	<b>1.06, 1.40</b>

Reference group: Essential worker = no; Gender=female; Race/Ethnicity= Non-Hispanic White; Sexual orientation = Heterosexual; Employed = no; Enrolled in school = no.

**Table 4.** Adjusted logistic regressions on depressive symptoms, anxiety symptoms, and having considered suicide controlling for individual Adverse Childhood Experiences in the 2020 Rhode Island Young Adult Survey

Variables	Depressive Symptoms		Anxiety Symptoms		Considered suicide	
	AOR	95% CI	AOR	95% CI	AOR	95% CI
Significant ACEs						
<b>Abuse of child</b>						
Emotional abuse	<b>3.09</b>	<b>2.08, 4.58</b>	<b>3.03</b>	<b>1.99, 4.64</b>	<b>2.27</b>	<b>1.20, 4.28</b>
Sexual abuse	<b>1.98</b>	<b>1.11, 3.52</b>	<b>2.58</b>	<b>1.46, 4.56</b>	<b>2.25</b>	<b>1.11, 4.55</b>
<b>Household Dysfunction</b>						
Domestic violence	<b>2.34</b>	<b>1.39, 3.94</b>	<b>1.67</b>	<b>1.01, 2.80</b>	<b>2.12</b>	<b>1.11, 4.05</b>
Household member with mental illness	<b>2.67</b>	<b>1.79, 3.99</b>	<b>2.44</b>	<b>1.61, 3.70</b>	<b>1.90</b>	<b>1.03, 3.50</b>

Models controlled for essential worker (reference = no), age, gender (reference = female), race/ethnicity (reference = non-Hispanic white), sexual orientation (reference = heterosexual), employed (reference = no), enrolled in school (reference = no), relative SES, and individual ACEs: Abuse (physical, emotional, sexual); Household dysfunction (domestic violence, mental illness of household member, substance abuse of household member, divorce or separation by parent, incarceration of household member).

symptoms show being an essential worker, a gender minority, a sexual minority, having lower relative SES, and a higher ACE score were all significantly associated with increased odds of anxiety symptoms. In the fully adjusted model, these associations remained significant, except the association between being a gender minority and anxiety symptoms ( $p=0.758$ ). Being non-white or Hispanic became significantly associated with decreased odds of anxiety symptoms in the multiple logistic regression analysis ( $p<0.001$ ).

**Considered Suicide:** Crude logistic regressions for having considered suicide reveal being an essential worker, a gender minority, a sexual minority, having lower relative SES, and a higher ACE score were all associated with increased odds of having considered suicide. In the fully adjusted model, these associations remained significant, except the association between being a gender minority and having considered suicide ( $p=0.406$ ). (See **Table 3**.)

**Individual ACES and mental health outcomes:** In adjusted models for individual ACEs, exposure to mental illness in the household, physical violence between adults in the household, emotional abuse of the child and sexual abuse of the child were independently associated with all three mental health outcomes, controlling for all other covariates. The most frequently reported ACEs were emotional abuse of the child (49.4%), mental illness of a household member (40.5%), divorce or separation by parent (31.4%), and substance abuse by a household member (31.3%), followed by physical abuse of the child (20.6%), domestic violence (18.6%), sexual abuse of the child (14.8%), and incarceration of a household member (12.1%). (See **Table 4**.)

## DISCUSSION

Findings from the RIYAS study provide insights into the mental health of young adults in Rhode Island during the early months of the pandemic. Prior national<sup>3,27</sup> and area-specific studies<sup>30-31</sup> have suggested that the prevalence of depression, anxiety and suicide ideation among young adults has increased during COVID-19. Our study, which was conducted early on in the pandemic, found a slightly lower prevalence of depressive or anxiety symptoms, and thoughts of suicide among young adults than results from a contemporaneous national survey administered by the CDC.<sup>28</sup> For example, in the RIYAS there were lower reports of depressive or anxiety symptoms (48% versus 63% respectively), and suicidal ideation (12.1% versus 19.9%).<sup>28</sup> In contrast, a study of young adults found a lower prevalence of depression (25.2%) and anxiety symptoms (29.8%) in April/May 2020<sup>30</sup> than those reported here.

While others have examined mental health in U.S. young adults during COVID-19, this study's unique contribution is its focus on inequities among young adults related to sexual orientation and gender identity, essential worker status, and childhood trauma. Our findings build on two area-specific

studies that examined the impact of the COVID-19 pandemic on the mental health of adolescents and young adults (aged 12–22) living in Long Island, New York,<sup>31</sup> and in a community sample of young adults (aged 22–29) living in Seattle, Washington.<sup>30</sup> Neither study, however, controlled for measures of disparities (sexual orientation, gender identity, and measures of childhood trauma). Furthermore, we expanded on previous work that examined inequalities in college students' perceived stress and generalized anxiety during the pandemic that found that sexual minority, transgender, and gender diverse participants reported worse mental health than their cisgender, heterosexual peers.<sup>17</sup> Similarly, our results show that being a sexual minority was associated with increases in all poor mental health outcomes during the pandemic. The same was true for gender minorities in the crude models, but the full models were unable to detect the association likely due to issues of limited power. Prior literature has clearly established that sexual and gender minorities are at an increased risk of poor mental health outcomes,<sup>32</sup> likely because sexual minorities face unique and hostile stressors (e.g., experiences of prejudice, discrimination, and perceived stigma) related to their identity resulting in internalized negative attitudes and, in turn, mental health symptoms.

Relative SES was associated with all mental health outcomes, showing that young adults of higher relative SES were more protected from experiencing depression, anxiety symptoms and suicidal ideation. This is consistent with numerous studies that find indicators of low SES are directly associated with increased mental health problems in children and adults,<sup>33</sup> which likely exists due to various mechanisms via differences in education, occupation, household income per capita and other financial resources, social hierarchy, and underlying race/ethnicity differences.<sup>34</sup> While those with lower SES generally have higher risk of poor mental health, this risk is likely compounded by the additional economic instability posed by the pandemic, disruption to education, and increased social isolation.

Being an essential worker was significantly associated with increased symptoms of generalized anxiety and considering suicide, but was only marginally significant for depression, likely due to small sample size. Essential workers were required to continue to physically go to work, increasing their risk of virus exposure, infecting their families, dealing with a low supply of PPE and concerns over unsafe working conditions, all while their non-essential counterparts were able to work or learn from home.<sup>15</sup> The population of young adults continuing to work as essential workers despite the increased risk were likely less financially secure and dependent upon keeping those jobs.

Our study provides novel data about the impact of ACEs on young adults' mental health during the pandemic. Young adults with more adverse childhood trauma had increased risk of poor mental health across all outcomes, even after

controlling for other measures of inequalities. ACEs are known to be strongly associated with poor mental health in young adulthood, and a dose-response relationship with poor mental health has been documented.<sup>10</sup> Toxic stress from traumatic childhood experiences can alter brain development and impact long-term maladaptive coping and stress response.<sup>35</sup> The effects of stress on mental health are also cumulative, whereby chronic activation of the stress response can lead to dysfunction across various physiological systems.<sup>36</sup> This suggests that, while adults with a history of ACEs are already at increased risk for poor mental health, this same population may have an even harder time coping with the stresses and disruption of the COVID-19 pandemic. Exposure to early life trauma may continue to affect the mental health of young adults, even after the global COVID-19 pandemic wanes, given that the pandemic has magnified social and economic inequities and led to a further increase in the burden of ACEs.<sup>37</sup>

While this study is a novel contribution to the literature, there are several limitations. This was a cross-sectional study and causality cannot be determined. Recruitment was done via a convenience sample, and therefore the sample may not be representative of RI young adults. All data collection was via self-reports and recall and social desirability biases may be a concern. There were no diagnostic evaluations for anxiety or depressive disorders; however, clinically validated screening instruments were used to assess symptoms and robust sensitivity analyses confirmed the present findings. Finally, there is likely limited power to detect other significant associations due to the small sample size.

## CONCLUSIONS

Among young adults, those who are already most vulnerable and stigmatized in the community are also those who are most severely affected in terms of mental health. Well-understood mental health disparities have only been further exacerbated by the pandemic, and these disadvantaged populations need more support than ever.

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## Characteristics of COVID-19 Workplace Clusters in Rhode Island

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### ABSTRACT

The COVID-19 pandemic has impacted certain workplace settings disproportionately, putting some industries at a higher risk for workplace transmission than others. This study examines workplace clusters in Rhode Island between March 2020 and May 2021. There were 14,580 cases associated with 2784 clusters during this period, with the largest number of workplace clusters occurring in manufacturing, food services, and retail. A better understanding of most impacted industries can inform sector-specific COVID-19 guidance and policy changes.

**KEYWORDS:** COVID-19, workplace, cluster, industry

### INTRODUCTION

Coronavirus Disease 2019 (COVID-19) has had devastating impacts on the economy, causing increased unemployment rates across most industries and age groups.<sup>1</sup> While research has focused on worker exposure risk to COVID-19 in health-care and congregate settings, few studies have examined risk among other workplace settings outside of these.<sup>2-4</sup> Many factors play a role in the impact of risk of COVID-19 workplace transmission, including ability to physical distance, mask-wearing, ventilation, area of workplace, carpooling to work, and workplace structure.<sup>5,6</sup> Efforts to mitigate workplace transmission have included masking guidelines, distancing measures, remote work, workforce testing and quarantine guidelines.<sup>7</sup> Regular active screening for COVID-19 symptoms among employees has shown to be critical in prevention efforts as well.<sup>8</sup>

Following mitigation efforts in some workplace settings can be challenging. Manufacturing settings, for example, cannot work remotely and may not be able to operate at a six-foot distance.<sup>6</sup> Workplaces such as these may be at an increased risk for COVID-19 transmission and workplace clusters.<sup>9</sup> A comprehensive understanding of the distribution of workplace COVID-19 outbreaks by industry sector can help direct future public health action.

The Rhode Island Department of Health (RIDOH) investigates all COVID-19 cases to collect demographics, work history, medical history, and symptom information. RIDOH monitors clusters of cases within a workplace to confirm transmission, and then provides workplace-specific public

health guidance. RIDOH's COVID-19 Epidemiologic Operations unit (Epi-Ops) analyzed industry trends among RI workplace cases from March 2020 through May 2021 to determine which workplace settings are experiencing higher COVID-19 transmission.

### METHODS

All laboratory-confirmed PCR cases of COVID-19 are reported to RIDOH along with self-reported rapid antigen tests. Factors analyzed included demographic information, such as gender, age, primary language spoken, race/ethnicity, and whether the case lived in a High-Density Community (HDC), defined as an area of higher population density than average, determined by zip code of the case's residence. Case investigation data was used to determine if workplace cases worked while infectious or symptomatic. A case is classified as working infectious if the person was physically in the workplace two days prior to symptom onset date or, for asymptomatic cases, specimen collection date. A cluster is defined as two or more laboratory-confirmed cases of COVID-19 among individuals associated with a setting within a 14-day period.

A workplace-associated case is defined as a person who was present in the workplace during the 14 days prior to COVID-19 diagnosis. In this analysis, health care, education, and congregate living settings are excluded. Each case is classified by industry using the North American Industry Classification System (NAICS).<sup>10</sup> Frequencies were calculated using Microsoft Excel (Microsoft Office 365, Version 2008).

### RESULTS

There were 30,696 workplace-associated cases from March 1, 2020–May 31, 2021. Of these, 14,953 (48.7%) were associated with a workplace cluster. Cases attributed to a workplace cluster were more often male (57.4%), aged 26 to 35 (26.0%) (Table 1). Most cluster-associated cases were symptomatic (86.1%). English was the primary language spoken at home (84.5%), followed by Spanish (9.6%). Additionally, most cases were White (62.0%) and Non-Hispanic (77.0%). There was no difference in case counts based on HDC status.

There were 2,784 clusters identified during this period. Clusters were seen across all industries, with manufacturing

**Table 1.** Employer Cluster-Associated COVID-19 Case Demographics, March 2020–May 2021.

Demographics	Count (n=14580)	Percent
<b>Gender</b>		
Male	8371	57.4%
Female	6187	42.4%
Other/Declined	22	0.2%
<b>Age Group</b>		
16–25	2778	19.1%
26–35	3784	26.0%
36–45	2850	19.5%
46–55	2897	19.9%
56–64	2035	14.0%
65+	236	1.6%
<b>Symptom Status</b>		
Asymptomatic	1873	12.8%
Symptomatic	12554	86.1%
Unknown	153	1.0%
<b>High Density Community</b>		
Yes	7312	50.2%
No	6998	48.0%
Unknown	270	1.9%
<b>Primary Language in Home</b>		
English	12314	84.5%
Haitian Creole	8	0.1%
Portuguese	63	0.4%
Spanish	1390	9.5%
No Info	765	5.2%
Other	40	0.3%
<b>Race/Ethnicity</b>		
Hispanic or Latino (any race)	3350	23.0%
Non-Hispanic	11230	77.0%
American Indian or Alaska Native	52	0.4%
Asian	396	2.7%
Black or African American	983	6.7%
White	9046	62.0%
Multiple Races	131	0.9%
Declined Race	306	2.1%
Unknown	316	2.2%

(27.4%), food services and drinking places (18.5%), and retail (10.9%) having the highest percentage (Table 2). Among all industries, the average number of cases in a cluster was 3.7(±1.3). Industries with the highest average number of cases in a cluster were financial activities (6.3 cases) and government (6.3 cases). Industries with a higher percent of employees working while infectious were accommodation

**Table 2.** Workplace Cluster Characteristics by Industry, March 2020–May 2021.

Industry	Total Employee Cases	Average Number of Cases in Cluster	Total Clusters n (%)	Working Infectious n (%)	Working Symptomatic n (%)
Accommodation	180	2.4	26 (0.9%)	24 (52.2%)	20 (43.5%)
Arts, Entertainment, and Recreation	786	3.4	83 (2.8%)	116 (64.1%)	60 (33.1%)
Construction	1226	3.5	176 (6.0%)	264 (74.2%)	156 (43.8%)
Delivery	705	5.5	43 (1.5%)	197 (51.4%)	186 (45.3%)
Financial Activities	2203	6.3	175 (6.0%)	470 (34.9%)	296 (22.0%)
Food Services and Drinking Places	4040	4.7	540 (18.5%)	1012 (62.8%)	547 (33.9%)
Government	2001	6.3	144 (4.9%)	738 (63.7%)	431 (37.2%)
Landscaping	264	3.0	37 (1.3%)	50 (73.5%)	31 (45.6%)
Manufacturing	6661	5.2	801 (27.%)	2624 (75.3%)	1707 (44.%)
Personal and Laundry Services	573	2.9	50 (1.7%)	95 (72.0%)	54 (40.9%)
Professional, Scientific, and Technical Services	2494	2.9	167 (5.7%)	320 (65.8%)	192 (39.5%)
Religious Services	139	2.4	14 (0.5%)	20 (69.0%)	11 (37.9%)
Rentals and Real Estate	378	3.3	32 (1.1%)	56 (58.3%)	39 (40.6%)
Repair and Maintenance	1016	2.7	115 (3.9%)	216 (76.6%)	123 (44.7%)
Retail	5836	3.3	318 (10.9%)	1339 (70.3%)	806 (42.3%)
Staffing	139	3.3	10 (0.3%)	35 (66.0%)	25 (43.1%)
Transportation	749	5.0	23 (0.8%)	178 (74.8%)	101 (42.4%)
Utilities	461	2.4	17 (0.6%)	102 (65.0%)	60 (38.2%)
Veterinary	86	2.6	13 (0.4%)	22 (73.3%)	12 (40.0%)
<b>Total/Average</b>	<b>29937</b>	<b>3.7</b>	<b>3.7 (5.0%)</b>	<b>7878 (65.4%)</b>	<b>4857 (39.9%)</b>

(81.0%), repair and maintenance (76.6%), and manufacturing (75.3%). Similar associations were seen among cluster-associated cases working while symptomatic, with accommodation (71.4%), landscaping (45.6%), and manufacturing (44.4%) having the highest proportion of cases. Among clusters in all industries, an average of 67.0% cases worked while infectious and 41.4% worked while symptomatic.

## DISCUSSION

Certain industry settings have a higher risk for COVID-19 transmission than others.<sup>11</sup> Similar to previous studies, industries where workers are in proximity, like manufacturing, or more closely interact with the public, such as retail and food service, experienced more clusters of cases among employees.<sup>11,12</sup> The high number of workplace clusters in the manufacturing industry illustrates the challenges in implementing mitigation strategies in this setting. In meat and poultry plants, existing workflows utilizing assembly lines demand proximity. Balancing the need for refrigeration to reduce spoilage while simultaneously maintaining optimal ventilation can also be difficult.<sup>13</sup> A study by the Utah Department of Health found a disproportionate burden of COVID-19 within the manufacturing industry, particularly among meat processing facilities, like this analysis.<sup>9</sup> Conversely, the high number of clusters seen in government and financial activities are typically office-based settings. As jobs in these fields are viewed as lower risk than other work settings, it is probable that mitigation strategies such as mask wearing and physical distancing may be used less strictly than in perceived higher-risk occupations, such as public-facing jobs.

Of cases working while symptomatic, manufacturing and repair and maintenance had some of the largest percentages, consistent with previous research that essential workers are more likely to work with symptoms than non-essential workers.<sup>14,15</sup> However, there is no literature looking at working symptomatic among non-essential industries. This analysis showed delivery (45.3%) and staffing (43.1%) also had high proportions of employees working symptomatic. Information on motivators for working while symptomatic is not systematically collected during case interviews. However, factors may include financial, lack of paid sick leave, unawareness of mild or subtle COVID-19 symptoms, and fear of overburdening co-workers. In the delivery industry, employees are likely to work alone, isolated from others for most of the day, leading them to think they may not be able to transmit COVID-19 during the brief interactions that they have with others. Many staffing employees work for large manufacturers or retailers, where they are temporary employees and may not be familiar with the organization's screening or symptom-monitoring requirements.<sup>15</sup>

Numerous factors contribute to the risk of COVID-19 workplace transmission that are influenced by workplace setting. Understanding the distribution of workplace clusters across industries can help target where intervention may be needed in a COVID-19 surge or other infectious diseases. In addressing immediate goals to reduce workplace COVID-19 transmission, broader systemic challenges have been uncovered that impact worker health and safety. Disparities in policies regarding paid sick leave, unemployment benefits, and childcare payment support may be leaving some workers more vulnerable to COVID-19 infection.<sup>14</sup> RIDOH

engagement with employers has highlighted the prevalence of disparities in RI workplaces. Further research is needed on how these disparities contribute to workplace transmission and how policy changes might effectively address this.

## LIMITATIONS

Executive orders directing closure of certain “non-essential” services throughout the pandemic impacted industry sectors differently. Attendance at work was likely different based on industry. In addition, these findings may not be generalizable to states where the pandemic response differed from RI. Another limitation is self-reported symptom onset data. Cases may have mis-reported their symptom onset due to either recall bias or fear of symptom status while at work being disclosed to their employer. Finally, workplace transmission cannot be confirmed in all clusters. Household and community transmission may have contributed to workplace clusters in the analysis.

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

VITAL EVENTS	REPORTING PERIOD		
	JUNE 2021	12 MONTHS ENDING WITH JUNE 2021	
	Number	Number	Rates
Live Births	1030	10,947	10.3*
Deaths	815	11,691	11.0*
Infant Deaths	3	54	4.9#
Neonatal Deaths	2	38	3.5#
Marriages	712	5,531	5.2*
Divorces	234	2,318	2.2*

\* Rates per 1,000 estimated population

# Rates per 1,000 live births

Underlying Cause of Death Category	REPORTING PERIOD			
	DECEMBER 2020	12 MONTHS ENDING WITH DECEMBER 2020		
	Number (a)	Number (a)	Rates (b)	YPLL (c)
Diseases of the Heart	207	2,371	223.8	3,325.0
Malignant Neoplasms	183	2,136	201.6	4,380.0
Cerebrovascular Disease	44	440	41.5	675.0
Injuries (Accident/Suicide/Homicide)	78	962	90.8	14,044.5
COPD	29	460	43.4	425.5

(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 1,059,361 for 2019 (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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# One Small Step for Rhode Island Medicaid, One Giant Leap Towards Hepatitis C Elimination

LYNN E. TAYLOR, MD, FACP, FAASLD, FIDSA

On Aug. 1, 2021, Rhode Island (RI) Medicaid removed prior authorizations (PAs) for two direct-acting antiviral (DAA) regimens for hepatitis C virus (HCV), glecaprevir/pibrentasvir and sofosbuvir/velpatasvir/voxilaprevir, following seven other states. Removing PAs will increase access to HCV cure for thousands of RI Medicaid beneficiaries. Treatment is indicated for all HCV-infected adults (except those with short life expectancy that DAAs cannot remediate and in pregnancy) because cure improves quality of life; slows liver disease progression; reduces risk for cirrhosis, liver failure, hepatocellular carcinoma, extra-hepatic complications, transplantation and all-cause mortality; and thwarts transmission.<sup>1-3</sup> Treatment scale-up can decrease prevalence and incidence, and makes possible elimination of the United States' (U.S.) biggest infectious disease killer (aside from SARS-CoV-2), saving \$3.3–3.8 billion in future health care costs.<sup>4-10</sup>

This step represents the culmination of eight years of advocacy to ensure equitable access to these life-saving medications that can safely cure 99% of HCV infections in eight to 12 weeks. During these years, for many untreated Rhode Islanders, hepatic fibrosis progressed. Some died unnecessarily of HCV. Transmission skyrocketed, creating greater medical and economic burdens.<sup>11</sup>

## Treatment chronology

Rescinding the PA must be understood in its historic context. In 2001, the FDA approved the first pegylated interferon (PEG) for HCV. Attaching a polyethylene glycol compound to interferon-alpha prolonged its half-life. Thrice-weekly standard interferon could be injected weekly for the year. In 2002, after seeing many patients go untreated at RI's syringe services program and HIV clinics (as was common in those days), I started the Miriam Hospital Immunology Center's Coinfection Program for patients with coexisting HIV and viral hepatitis, supported by Drs. Timothy Flanigan, Edward Feller and Pierre Gholam.<sup>12</sup> The goal was to treat HCV in people living with HIV/AIDS (PLWHA), including those with substance use and/or psychiatric disorders, based on lessons learned from Dr. Flanigan's modified directly observed therapy approach (DOT) to deliver antiretrovirals (ARVs), and our experience with HCV care of incarcerated persons.<sup>13-14</sup>

Interferon was ineffective and toxic, potentially causing fatigue, flu-like and neurocognitive symptoms, depression, suicidality, homicidality, other reversible and sometimes

long-term consequences. Side effects of this immunomodulator could be more common and severe for PLWHA. The addition of ribavirin, a teratogenic oral nucleoside analogue, improved response rates. Ribavirin causes hemolytic anemia exacerbated by interferon's bone marrow suppressant effects, and can precipitate myocardial infarction, respiratory distress and other harms. Yet HCV was emerging as a leading cause of morbidity and mortality as better ARVs improved HIV control. Dr. Charles Carpenter's Monday morning Immunology Center meetings, traditionally beginning by honoring those who died of AIDS in the prior week, increasingly commemorated patients who died of HCV.

So began a program of weekly PEG administration coinciding with Monday's HIV/HCV support group. All week I micro-managed patients experiencing unintended effects, modifying doses and prescribing adjunctive therapies. Cindy MacLeod, RN, helped forge weekly multi-disciplinary meetings with Family Service of RI for home-based mental health care and case management during the year of PEG/ribavirin (PR). Stacey Chapman, RN, then stepped in. For the next decade we combatted PR hazards day and night. Miriam hematologists provided erythropoietin for PR-induced anemia, granulocyte colony-stimulating factor for neutropenia, and interleukin-11 platelet growth factor. Dr. Gene Jacobs provided psychiatric expertise. Robert Janigian, MD, evaluated high-risk patients' retinas, examining patients with ophthalmologic symptoms same-day lest interferon induce vision loss.

In 2005, I began prescribing buprenorphine to stabilize opioid use disorder as bridge to PR.<sup>15</sup> I became managing physician of RI's only HIV/AIDS assisted living establishment, to facilitate residence for PR patients living alone, unstably housed, or at high risk. When needing help, I contacted experts around the world treating PLWHA and patients with psychiatric illness and addiction.<sup>16</sup> In 2009, European physicians providing guidance started the International Network on Hepatitis in Substance Users (INHSU). I travelled to Zurich for the first of many INHSU meetings, bringing best practices back to RI.

## Development of DAAs

Despite optimizing safety and adherence, genotype 1 (the most prevalent strain) cure rates for PLWHA remained under 20%. Progress stagnated while courageous individuals braved months and sometimes two years of PR, given

virologic relapse after year one. Then a better understanding of HCV's life cycle resulted in the development of DAAs, which stop HCV's ability to replicate. FDA-approved in 2011, protease inhibitors (PIs) telaprevir and boceprevir were first, used with PR, else resistance mutations developed. Dosed three times daily, they improved cure rates but were only active against genotype 1, caused more severe anemia than with PR alone, and could trigger desquamating skin rashes. The second-generation once-daily PI simeprevir, approved in 2013 for use with PR, could also cause severe rash.

Physicians began recommending PR deferral for patients at low risk to progress to significant fibrosis, in favor of waiting for two DAAs, each blocking a different viral replication step. Baby boomers' high HCV prevalence plus noxious, ineffective pharmacotherapies contributed to the peaking burden of advanced liver disease. The backlog of interferon-experienced treatment failures, interferon-intolerant, and those with PR contraindications, grew.

### Turning point in DAAs/Medicaid hurdles

On Dec. 6, 2013 the FDA approved sofosbuvir, an NS5B polymerase inhibitor – a new DAA class. This pan-genotypic game-changer made HCV curable without interferon. While at that time sofosbuvir had to be combined with simeprevir (for genotype 1), or ribavirin (for any genotype), sofosbuvir-based treatment could be life saving for PR treatment-failures, decompensated cirrhotics and others with PR contraindications, plus treatment-naïve patients. Finally, we had tools to avert the suffering and premature deaths, remove HCV's painful stigma and stop interferon's harm. We had cared for patients through years of ARV progress, which transformed HIV from a death sentence to a chronic, manageable illness. Here was the opportunity to transform HCV into our first curable virus, a pivotal moment in medical history!

What a shock to learn that sofosbuvir would not be added to RI's Medicaid formulary. Drs. Thomas Sepe, Alan Epstein and I met with Medicaid officials repeatedly to discuss a PA, share evidence, review treatment as prevention...while winter became spring...then summer. Patients pleaded to know when it would be their turn; we had no answers. What could we say to our cirrhotic patients running out of time – one with a painful, 20-centimeter spleen, another with interferon-induced hypertriglyceridemia and diabetes by week two, not cured after two PR courses; a non-PR candidate with thalassemia trait, arteriovenous malformations and coronary artery disease; another with a painful cryoglobulin-induced rash, coagulopathy, epistaxis and new-onset ascites?

In August 2014, eight months after FDA-approval, RI Medicaid issued its PA. Months of discussions were ignored. RI Medicaid would restrict sofosbuvir to those with advanced fibrosis, meaning that patients had to wait until serious hepatic disease developed, possibly a pre-cancerous liver, before treatment. RI Medicaid also instituted sobriety,

prescriber, and HIV-related restrictions despite simplified therapy with efficacy irrespective of disease stage, substance use or HIV status.<sup>17</sup>

The PA dealt a blow to individual and public health. This was the heyday of Dr. Carpenter's Immunology Center. We strove for comprehensive care for PWLHA throughout the adult lifespan, nurturing close patient-doctor relationships, with incremental care over time. We remembered those struggling through interferon, beating their HIV and sometimes substance misuse after years of toil, only to die of HCV; those dying too young following transplant failure as their new livers became reinfected; and Vietnam veterans dying of HCV after so many battles. Many feared PR would compromise their work performance. Many travelled from other states for PR so that no one near home would know of their HCV.

Medicaid recipients started undergoing costly and at times needless work-ups, sometimes with universal screening for rare liver diseases and elastography and/or liver ultrasound – even for young people with normal results of serum biomarker fibrosis scores calculated from routine blood tests. Those without advanced disease were told they were not 'sick enough,' for DAAs. Many emerged without DAAs if they had used any alcohol or drugs within six months. Many sought second opinions. Often the same evaluation was repeated. Medicaid required no elastography PA. Duplicative evaluations increased the ultimate cost per cure.

We raced to treat those with advanced scarring while new diagnoses surged. There were improvements in Medicaid restrictions – for example, nurse practitioners (NPs) were allowed to prescribe DAAs – but many endured. We published on Medicaid's response to this historic breakthrough, which exacerbated health care disparities.<sup>17</sup> Restrictions violated federal Medicaid law, which requires states to cover medications consistent with their FDA labels. After four years of forums, radio shows and negotiations to no avail, stakeholders informed RI's Executive Office of Health and Human Services (EOHHS) that they were prepared to litigate against EOHHS.<sup>18</sup> On July 1, 2018, the remaining DAA restrictions were lifted under threat of lawsuit.<sup>18</sup>

The arduous PA remained a barrier. This pre-approval process to determine if a patient met payer-specific DAA criteria differed across four RI Medicaid plans (and seven other payers), each with unique requirements, taking 45–120 minutes per patient.<sup>19</sup> We completed and faxed a payer-specific PA document, plus laboratory results, to each plan. PAs required repeat blood tests – HCV RNA and genotype within 90 days even for patients with documented viremia for years and recent genotyping, prescribed pan-genotypic regimens – and myriad administrative elements (phone calls, peer-to-peer discourse, denials, appeals). Each plan dictated a preferred pharmacy, some mail order only, and a preferred formulary. Many practices lacked staff for this. The process delayed treatment initiation, prevented

test-to-treat strategies, and contributed to loss to follow-up.

And oh, the administrative waste. How much time did we spend on this bureaucratic task rather than with patients? The U.S. spends more on health care than any other nation, with the cost of waste accounting for 25%–30% of total health care spending.<sup>20,21</sup> The administrative complexity category is associated with the greatest contribution to waste, even more than the inflation of medication pricing.<sup>20</sup>

There was collateral damage. PAs contributed to misperceptions about HCV. Some clinicians interpreted fibrosis documentation to mean that they could not treat without radiologic evaluation of liver stiffness (not the case). Others inferred that they could not treat people who use drugs, while evidence demonstrates comparable cure rates with and without substance use with appropriate supports, and that reduction in the viremic pool is imperative. Appreciation of the opportunity for quantum progress was lost.

Even without PAs for two preferred regimens, challenges persist. Both contain PIs (glecaprevir and voxilaprevir). For beneficiaries with PI contraindications, Medicaid does not include alternatives, compelling PAs. PIs and thus both regimens are unsafe in decompensated cirrhosis. Rarely, PIs may induce drug-induced liver injury in patients with Class A cirrhosis or alcohol misuse.<sup>22</sup> Drug-drug interactions are common. For example, glecaprevir and voxilaprevir may not be used with certain ARVs (e.g., ritonavir-containing regimens), nor with dabigatran, while PI-sparing sofosbuvir/velpatasvir may be co-administered. Atorvastatin, lovastatin and simvastatin, contraindicated with glecaprevir, and rosuvastatin and pitavastatin, contraindicated with voxilaprevir, may be prescribed at low doses with sofosbuvir/velpatasvir. Importantly, sofosbuvir/velpatasvir/voxilaprevir, salvage therapy for DAA failures (combining three DAAs blocking three distinct replication steps), should not be used for reinfections, which should be treated as naïve. RI Medicaid wants patient-level virologic response data submitted if requested (I decline). We are not obligated to provide treatment outcomes to prescribe medications for other diseases; this is particular to HCV and unwarranted.

Neighborhood Health, UnitedHealthcare Community and Tufts Health Public, the three plans offering coverage to RI Medicaid recipients, deem DAAs “specialty medications” provided through one pharmacy only. Their pharmacists must talk to patients via phone before dispensing DAAs. The scripted conversation, not tailored to the individual, stresses adverse events, rare with correctly prescribed DAAs. Only one month’s DAAs are provided at a time; refill delays can decrease cure rates. UnitedHealthcare’s pharmacy in Indiana, Optum, ships DAAs to a home address once a patient and Optum’s pharmacist schedule delivery via phone; expect long telephone wait times. Tufts’ pharmacy, CVS Caremark Specialty Pharmacy in Illinois, follows the same mail-only practice, hindering treatment for patients with unstable housing or telephone access.

### RI lags in elimination projections

In part due to this history, RI’s HCV prevalence exceeds national averages.<sup>23</sup> RI joins seven states projected to eliminate HCV latest, beyond 2050.<sup>8</sup> It will be said that Medicaid programs, caring for a disproportionate share of HCV, struggle to treat their enrollees. While rationing and an onerous PA pathway curbed DAA prescriptions, RI Medicaid’s largest provider recorded \$1,366,000,000 revenue in 2017, 35.1% growth percentage, and \$354,625,064 revenue growth, as RI’s second fastest growing private company.<sup>24</sup> It is well established that universal, immediate DAA treatment in Medicaid populations is cost effective and decreases downstream costs, due to avoidance of liver-related complications (not including prevention benefits which decrease risks to the community). As untreated persons reach age 65, costs are shifted to Medicare. Here, medication discounts do not exist, but universal treatment does nationally, increasing DAA expenses for the population not treated earlier.<sup>10</sup>

Sofosbuvir’s production cost is approximately \$1.50 per pill.<sup>25</sup> Initially, manufacturers set U.S. prices unduly high. However, list prices bear little resemblance to what Medicaid pays. DAA makers provide substantial discounts to Medicaid and pharmacy benefits managers. While DAA wholesale acquisition costs have dropped dramatically since sofosbuvir approval, lack of transparency about current pricing and discounts continues. I estimate RI’s current Medicaid price for eight weeks of glecaprevir/pibrentasvir at \$10,000. Hopefully with this writing, we get the facts. Let us consider lessons learned in the care of people experiencing poverty and other marginalized populations, work together for solutions prioritizing the needs of individuals and public health, and do better with the next therapeutic revolution.

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## Epilogue

Decades of scientific work culminated in the 2020 Nobel Prize in Medicine being awarded to **Harvey Alter**, **Michael Houghton** and **Charles Rice** for their 1989 discovery of HCV. Several years ago, I had the privilege of meeting Dr. Alter at an HCV meeting. After his keynote address, Dr. Alter read an original poem. I summoned the courage to thank him and ask for a copy. I was elated to receive the following email on Aug. 2, 2021:

“Lynn: It has only been about two years since you asked for this poem (maybe three). I usually like to wait five years before responding, but consider this a priority. Seriously, your note to me got lost and somehow just reappeared. Very sorry for the delay. Hope things are as well as they can be in these crazy times, Harvey.”

Dr. Alter, Distinguished NIH Scientist Emeritus, gave permission to publish his poem here.

### I Can't See the Forest for the Hb Ags?

*I think that I shall never see  
This virus called non-A, non-B  
A virus I cannot deliver  
And yet I know it's in the liver  
A virus that we often blame,  
But which exists alone by name  
No antigen or DNA  
No little test to mark its way.  
A virus which in our confusion  
Has forced us into mass collusion  
To make exist just by exclusion  
But is it real or an illusion?  
Oh great Liver in the sky  
Show us where and tell us why  
Send us thoughts that will inspire us  
Let us see this elusive virus  
If we don't publish soon, they're going to fire us*

*Let us find this little beastie  
Give us a sign - a star from the Easty  
Well today we're together  
And our quest we'll begin  
For this agent that plagues us like original sin  
And perhaps someday, we all will agree  
That indeed there exists a non-A, non-B*

Harvey J. Alter, MD, MACP  
Distinguished NIH Scientist Emeritus  
Department of Transfusion Medicine  
Bethesda, MD 20892

**Acknowledgments**

I thank Linda Hurley, CEO of CODAC, for the opportunity to provide medical care to CODAC's population of patients contending with infectious complications of opioid use disorder. I am grateful to my HCV nurse collaborators over the past 20 years, Cindy MacLeod, RN; Stacey Chapman, RN; Linda Little, RN; and Sophie-Sprecht Walsh, LPN. Jackie Habchi, PharmD, leads the way in keeping up with the rapidly evolving PA and other payer requirements. I thank the many individuals who have given me the privilege of participating in their HCV-related medical care.

**Author**

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**Disclaimer**

The views expressed herein are those of the author.

**Financial disclosures**

Royalties, UpToDate

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# Emotional Impact of COVID-19 Pandemic on Adults with Cystic Fibrosis

SARAH RHOADS, MD; KATHRYN COONEY, LICSW; DEBASREE BANERJEE, MD, MS

**KEYWORDS:** Cystic Fibrosis, COVID-19, Social Work

Cystic Fibrosis (CF) is the most common lethal, genetic disease in the United States. While considered to be a rare disease, there are 70,000 people living with CF worldwide and 30,000 in the United States alone.<sup>1</sup> People with CF (PwCF) suffer from multiorgan dysfunction, and the most common cause of mortality is respiratory failure. CF has been associated with worsening respiratory function and death during prior respiratory virus pandemics.<sup>2</sup> While current observational data suggests that PwCF are not developing as severe COVID-19-related illness as originally expected, those with severely compromised lung function and those who have undergone lung transplantation have worse outcomes including hospitalization and death.<sup>3</sup> Public health education to reduce the risk of transmission of Sars-CoV-2 align with long-standing infection control practices amongst PwCF, established by the Cystic Fibrosis Foundation (CFF) to reduce transmission of multidrug-resistant bacteria among PwCF.<sup>1</sup> As such, PwCF were already well versed in wearing masks, safe-distancing and avoiding group gatherings prior to the pandemic. We set out to capture this unique patient-centered perspective on the effects of the pandemic on psychosocial and physical aspects of daily life, as part of a larger study.

We hypothesized that PwCF would be significantly impacted by the COVID-19 pandemic and experience increased anxiety and stress due to perceived vulnerability but that there would be limited changes in behavior with respect to infection-control measures. We designed a telephone-based survey of PwCF at a single academic center (n = 62 adults) from May to July 2020 at Rhode Island Hospital/Hasbro Children's Hospital. The survey consisted of an assessment of social desirability bias, a validated scale for quality of life in individuals with Cystic Fibrosis (CFQR), and a voluntary open-ended question about how COVID-19 has affected them. A total of 16 individuals discussed the impact of COVID-19 on their lives (Table 1). Survey responses were modeled as binomial distributions and compared between the group of patients who mentioned COVID-19 concerns during the interview and those that did not, with p-values <0.05 reported as significant. Interestingly, there was an

**Table 1.** Patient Characteristics

	PwCF with COVID-19 response (n = 16)
Age (mean, range in years)	30.3 (18–49)
Sex, Female N (%)	13 (45)
BMI (mean)	22.9
FEV1 (% average, range)	63 (23–100)
Modulator therapy (% taking)	89.7%
Non-CF Lung Disease	4 (2 asthma, 1 MAC, 1 ABPA)
Pseudomonas aeruginosa sputum culture (%)	18 (62%)
Lung-transplant recipient (%)	2 (6.9%)
CF Exacerbation Prior Year (%)	5 outpatient (17%), 16 inpatient (55%)
Anxiety Diagnosis (%)	16 (55%)

increased agreement with the statement “you felt well” in the preceding 2 weeks amongst those who chose to discuss COVID-19 concerns compared to those who did not (mean response 2.29 vs 1.57 on 4-point scale, higher score indicates agreement, p-value 0.008), while there was no significant difference in response to the statement “you felt worried” (mean response 2.5 vs 1.93, p-value 0.121). Our survey did not capture the reasons for not discussing COVID-19 related issues.

Around the world, the COVID-19 pandemic has contributed to significant increases in anxiety, depression, and feelings of isolation. Of our total adult clinic population, 96% (n=60) patients were seen by a clinical social worker either in person or remotely with an average of 2.6 visits per year since November 2019 when Sars-CoV-2 emerged. Among patients seen in 2020, 87.7% were screened with the PHQ9 and GAD7 of which 10% presented with symptoms of depression and 33.3% presented with symptoms of anxiety compared with 8.9% and 25% respectively in 2019.

Our interviews demonstrated significant lifestyle changes and feelings of isolation amongst PwCF, but additionally highlighted the anxiety PwCF perceived their family members and housemates to have experienced. Fears of accidental transmission, and the concern about serious subsequent illness, significantly impacted the behaviors of PwCF and their loved ones (Table 2).

**Table 2.** Participants' Quotes Regarding Experience with Coronavirus-19

Topic	Illustrative Quotes
Concern for infection risk	<ul style="list-style-type: none"> <li>• 24 yo M: "As a CF patient, it's difficult already, never mind a respiratory illness. COVID has made me take my daily routine more seriously and increase my precautions."</li> <li>• 37 yo M: "It is definitely a worry, for sure in terms of CF. Last week I had a tickle and it felt like a cold without cold symptoms - it has gotten better but I was taking my temperature like 10 times a day."</li> </ul>
Lifestyle changes	<ul style="list-style-type: none"> <li>• 49 yo M: "I am avoiding everyone until there is a vaccine or a treatment. I'm definitely a little worried."</li> <li>• 27 yo F: "Just trying to avoid the world pretty much. My anxiety pretty much stems from going back to work. I just don't want to be a part of the reopening."</li> <li>• 23 yo F: "It's hard to stay active because it's such a risk for us to go out and be around people."</li> </ul>
Concerns of family	<ul style="list-style-type: none"> <li>• 29 yo M: "It actually puts a lot of stress on my [partner]. Because I'm a new father and she worries about me getting it, because she says you know, I get it and I'm dead. She worries every time I step out of the house."</li> </ul>
Concern for work	<ul style="list-style-type: none"> <li>• 29 yo F: "It's keeping me out of work. I guess I'm a little more worried because I know it impacts people with lung problems."</li> <li>• 46 yo M: "Work is challenging in the sense that I work at [a university] and so I'm having to avoid places I usually oversee. I think it's only going to get more challenging."</li> <li>• 27 yo F: "Pretty much I decided once everyone was on board that this was an actual issue, I left work before it was mandated just to be safe...My anxiety pretty much stems from going back to work. I just don't want to be a part of the reopening."</li> </ul>
Feelings of isolation	<ul style="list-style-type: none"> <li>• 27 yo F: "I really haven't gone anywhere since like March. My parents are doing grocery shopping for me." [May 2020]</li> <li>• 24 yo F: "God forbid you are in the aisle and you cough, people walk away like you're diseased and it's like 'I mean, I am but I am not.' It has impacted me."</li> </ul>
Hospital experience	<ul style="list-style-type: none"> <li>• 37 yo F: "It was ... way more shortness of breath compared to what I'm used to. All my exacerbations in the past I've never had to be on oxygen. I was thinking to myself, this doesn't follow the typical course of my exacerbation." "I think the diarrhea was worse than the breathing – like the breathing and the chest pain was bad, but not being able to eat and being worried because I knew I had to keep the weight on, and constantly having to go to the bathroom and really be on top of my fluid intake, that was really difficult."</li> <li>• 27 yo M: "I think I was a little more apprehensive about coming into the hospital, and since I've been here, I've noticed all the extra precautions that are being taken."</li> </ul>

In addition to the increased concern among PwCF and family members, many participants reported significant changes to their daily lives to minimize their exposure risk despite already practicing infection-control measures for their CF prior to the pandemic. Given the known psychosocial consequences of social isolation that the pandemic has forced on the general population, extreme quarantine for PwCF may have long-term impact on psychologic and emotional well-being.<sup>4</sup> Early in the pandemic, study participants described staying home from work or leaving work

completely, a decision that can have lasting consequences for re-entry into the workforce. Many participants reported an increased sense of isolation compared to peers without CF and felt that their measures to avoid exposure were leading to further separation from loved ones.

Several participants were concerned about contracting SARS-CoV-2 infection in the hospital, and at least one reported delaying their presentation for concern about exposures during a hospital stay, a practice which can have grave ramifications. The Cystic Fibrosis Foundation reported 1,232 known COVID-19 infections of adults with CF and an additional 548 cases of children in the United States as of September 2021, with 14 deaths related to the infection.<sup>5,6</sup>

Continued mental health screening and support remains a priority given the increased risk of depression and anxiety with lengthy periods of isolation and stress. Further rigorous qualitative study is warranted to better serve the CF community and other vulnerable populations during this time of transition and to clarify what the long-term psychological impact of the pandemic will be.

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## Q&A with Newell E. Warde, PhD, Executive Director of the Rhode Island Medical Society

*Dr. Warde retires this month after almost four decades of service*

MARY KORR  
RIMJ MANAGING EDITOR

The May 1984 issue of the *Rhode Island Medical Journal* (RIMJ) reported on the selection of a new Assistant Executive Director at the Rhode Island Medical Society (RIMS):

*“Society Executive Director Dr. Norman A. Baxter announced the appointment of Dr. Newell E. Warde as Assistant Executive Director... responsible for monitoring legislative developments and providing staff support for continuing RIMS activities. He replaces Brian R. Clarke who left the Society in March to accept a position with BCBS of RI.*

*“Currently Assistant Professor of German at Bates College in Lewiston, Maine, Warde received his undergraduate degree at Hamilton College (NY) and completed his doctoral training at the University of Massachusetts in Amherst. A native of Schoharie, NY, he has been associated with Bates College since 1977.”*

Dr. Warde is retiring this month as Executive Director of RIMS, after serving in that capacity for more than three decades. Two years ago, the American Medical Association (AMA) bestowed on him the Medical Executive Lifetime Achievement Award, which honors a medical association executive who has contributed substantially to the goals and ideals of the medical profession. Dr. Warde, a senior member of a group of New England Medical Society executives, served two terms as chair of the AMA Litigation Center Board, among his numerous contributions. At the award presentation, held during the interim meeting of the AMA in November 2019, then AMA President Patrice A. Harris, MD, acknowledged his professional accomplishments and contributions: “Newell E. Warde has provided continuity, experience, and a steady hand during challenges, crossroads, and legislative battles waged by the Rhode Island Medical Society. A talented writer, advocate, and jack-of-all-trades, Warde

has led RIMS during a period of rapid change in health care – and done so with a clear and fair mind, as well as bold focus on the task at hand and the future.”

In the spirit of those sentiments, the editors of RIMJ, which is published by RIMS, asked Dr. Warde to reflect on his tenure.

**Q. What enticed you to accept the position in 1984 at RIMS and switch professions?**

**A.** I was impressed with the historic beauty of Providence and excited by the prospect of working with a true team of professionals (doctors, lawyers, consultants) on real-life public policy issues at a time of ferment in American health care. What could be more important? I had also experienced the opposite of teamwork in academia, so there was a push as well as a pull.

**Q. Who has been the most important influence on your professional pathways?**

**A.** Frank O. Stred was Executive Vice President of the Maine Medical Association from 1979 to 1993. Frank and I got to know each other as volunteer officials at college track and cross-country meets. It was Frank who introduced me to the challenges and satisfactions of working for a state medical association.

**Q. Of all the roles you assumed as Executive Director of RIMS for 33 years, which resonated with you the most?**

**A.** My four years as chair of the executive committee of the Litigation Center made for challenging and rewarding teamwork with a national perspective. Back home, I enjoyed planning and executing RIMS’ bicentennial celebration in 2012. The events of that year spilled over at both ends into 2011 and 2013 and gave me opportunities to realize a number of my own long-gestated ideas as well as collaborate in new ways with wonderful people, institutions, and organizations I might otherwise not have gotten to



Dr. Newell E. Warde received the AMA's Medical Executive Lifetime Achievement Award in 2019. Congratulating him, at right, is Jesse M. Ehrenfeld, MD, MPH, then Chair of the AMA Board of Trustees. [COURTESY OF THE AMA]

know. I am proud of the ways RIMS found to give to the community in celebrating itself that year.

**Q. What do you see as the greatest challenge(s) facing state medical societies today?**

**A.** As long as the environment of medical practice continues to be governed by state laws, state regulations, and state courts, strong state medical societies will remain vitally important organizations for both doctors and patients. However, the inexorable consolidation of the hospital industry and the fragmentation of medicine into subspecialties are two trends that are challenging state societies. Both phenomena tend to alienate physicians from one another and cloud their perception of where their common interests truly lie.

**Q. What are your plans post-RIMS?**

**A.** Family, cooking, reading, writing, and lots of travel.

**Q. My advice to my successor is:**

**A.** Savor the privilege of working with Rhode Island's physician leaders and medical students, who are some of the world's most talented, committed, and admirable people. ❖

## We are read everywhere



### DUBLIN, IRELAND

**Newell E. Warde, PhD**, RIMS Executive Director, viewed the journal archives outside the **Royal College of Physicians of Ireland** which was established in 1654 to regulate the practice of medicine in Ireland.

Dr. Warde humorously shares research on shellfish allergies with the 1988 statue of **Molly Malone**. The popular Irish song, first published in 1876, tells the story of the fictitious fishwife who peddled cockles and mussels in Dublin before dying of a fever.

### CLIFFS OF MOHER, IRELAND

Spanning nine miles along the west coast of Ireland, the Cliffs rise between 400 and 700 feet above the Atlantic Ocean, providing a dramatic location to view the November issue of the journal.



In 2021 to date, more than **46,000** unique viewers from **120** countries have read articles in the *Rhode Island Medical Journal* or researched topics in its archives.

### Top 10 countries:

- |              |                 |
|--------------|-----------------|
| 1. US        | 6. China        |
| 2. Canada    | 7. Germany      |
| 3. UK        | 8. Italy        |
| 4. Australia | 9. Brazil       |
| 5. India     | 10. Netherlands |



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](mailto:mkorr@rimed.org).



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## Celebrating 100 issues of 'e-RIMJ' & thanks to Guest Editors of 2021

This issue marks the completion of the 100th e-publication format of the *Rhode Island Medical Journal* (RIMJ), which went totally online in 2013. Although the platform of the Journal has changed to a digital one, with live links, and imaging and video enhancements, its mission remains the same as it has for the past 104 years – to report on innovations, initiatives and advances in medicine and healthcare in Rhode Island and Southern New England.

To be successful, a medical journal should be relevant to the needs of its readership, and RIMJ analytics bear this out. When the Journal was a print-only publication, it was mailed to members of the Rhode Island Medical Society (RIMS), publisher of the Journal. Going digital and a LinkOut icon to free articles indexed on pubmed.gov has enhanced its scope exponentially.

As RIMJ is about to enter its 105th year in January 2022, we thank the guest editors and contributors of this year and over the decades. Without them the success of RIMJ for more than a century would not be possible. ❖

### RIMJ Seeks Volunteer Physician Editor

The *Rhode Island Medical Journal* (RIMJ) is seeking a Rhode Island physician with an interest and expertise in editing and writing to assist with issue planning, theme development, peer review, and author correspondence.

This volunteer editorial position, with a flexible time commitment, is a unique opportunity for a physician familiar with the State's healthcare landscape to engage with colleagues, faculty, students and allied healthcare professionals.

RIMJ publishes 10 online issues a year (available at [rimedj.org](http://rimedj.org)), with a hiatus in January and July. The publisher is the Rhode Island Medical Society (RIMS), and editors are approved by the RIMS Board for a three-year tenure, with an option to renew for an additional term.

Interested candidates should submit a cover letter and CV to **Editor-in-Chief William Binder, MD**, at [william\\_binder@brown.edu](mailto:william_binder@brown.edu).



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MARCH 2021

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MAY 2021

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**Association of Home-Based Primary Care Enrollment with Social Determinants of Health for Older Veterans**

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SEPTEMBER 2021

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NOVEMBER 2021

**CLIMATE CHANGE AND HEALTH**WILLIAM BINDER, MD  
THEME EDITOR**Examining the impacts of climate change on health, health care institutions, and mitigation strategies**

WILLIAM BINDER, MD

## COMMENTARY

**Climate Change and Human Health**

NITIN S. DAMLE, MD, MS, MACP

**Medical Society Consortium/RIMS on Climate and Health Consensus Statement****Who's at Risk in a Changing Climate? Mapping Electricity-Dependent Patient Populations in a Coastal City**EMMA WEBB, BA  
LAKSHMAN BALAJI, BDS, MPH  
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BENJAMIN GALLO MARIN, AB, MD'23  
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JOHN ROTA, BA  
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PAUL BIDDINGER, MD**Providence's Vulnerability to Floods: Impacts of Sea Level Rise, Stronger Storms, and Heavier Rainfall**ANDREW E. BINDER, BA  
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WILLIAM BINDER, MD



# Adventures

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# Working for You: RIMS advocacy activities

## November 1, Monday

RIMS Board of Directors meeting:  
**Elizabeth Lange, MD**, President

## November 2, Tuesday

RIMS Physician Health Committee (PHC): **Herbert Rakatansky, MD**, Chair  
Harm Reduction Centers (HRC) Advisory Committee: **Elizabeth Samuels, MD; Rahul Vanjani, MD**

## November 3, Wednesday

Workers' Compensation Advisory Committee (WCAC) meeting

## November 4, Thursday

RIMS' hosted Zoom meeting regarding Harm Reduction Centers with community proponents  
NOURISH RI (sugar beverage tax) Advocacy Coalition meeting

## November 9, Tuesday

Harm Reduction Centers (HRC) Advisory Committee: **Elizabeth Samuels, MD; Rahul Vanjani, MD**  
American Medical Association (AMA) Advocacy Resource Center (ARC) call: American Academy of Physician Assistants (AAPA) proposed title change from Physician Assistant to Physician Associate

## November 10, Wednesday

RI Department of Health (RIDOH) Board of Medical Licensure and Discipline (BMLD)  
Governor's Overdose Intervention and Prevention Task Force: **Sarah Fessler, MD**, RIMS Past President  
Meeting with Project Weber Renew regarding Harm Reduction Centers, possible sites

## November 11, Thursday

Meeting with firm producing new, stronger opioid antagonist/RI regulatory language

## November 12, Friday

RIMS' hosted Zoom meeting regarding Harm Reduction Centers with community proponents  
Rhode Island Society of Addiction Medicine (RISAM) State Strategy meeting  
AMA House of Delegates (HOD) interim meeting: **Peter Hollmann, MD**, Senior Delegate; **Alyn Adrain, MD**, Delegate; **Sarah Fessler, MD**, Alternate Delegate; **Elizabeth Lange, MD**, President, Alternate Delegate

## November 13, Saturday

AMA House of Delegates (HOD)

## November 14, Sunday

AMA House of Delegates (HOD)

## November 15, Monday

AMA House of Delegates (HOD)

## November 16, Tuesday

AMA House of Delegates (HOD)  
Harm Reduction Centers (HRC) Advisory Committee: **Elizabeth Samuels, MD; Rahul Vanjani, MD**  
Office of the Health Insurance Commissioner (OHIC) Health Insurance Advisory Committee (HIAC): **Catherine A. Cummings, MD**, Past President

## November 17, Wednesday

RIDOH Primary Care Physicians Advisory Committee (PCPAC): **Elizabeth Lange, MD**, President  
Diabetes Prevention Programs (DPP) Stakeholder's call  
RIDOH Health Professional Loan Repayment Program (HPLRP) Board: **Steve DeToy**, RIMS Staff, Board member

## November 18, Thursday

RIMS' hosted Zoom meeting regarding Harm Reduction Centers with community proponents  
Health Information Technology (HIT) Steering Committee meeting

## November 22, Monday

OHIC Payment & Care Delivery Advisory Committee

**RIMS NOTES: News You Can Use**  
Our biweekly e-newsletter is published on alternate Fridays exclusively for RIMS members. Contact Dulce Cosme if you've missed an issue, [dcosme@rimed.org](mailto:dcosme@rimed.org).





## RIMS CORPORATE AFFILIATES

The Rhode Island Medical Society continues to drive forward into the future with the implementation of various new programs. As such, RIMS is expanding its Affinity Program to allow for more of our colleagues in health-care and related business to work with our membership. RIMS thanks these participants for their support of our membership.

Contact Marc Bialek for more information: 401-331-3207 or [mbialek@rimed.org](mailto:mbialek@rimed.org)



[www.nhpri.org](http://www.nhpri.org)

Neighborhood Health Plan of Rhode Island is a non-profit HMO founded in 1993 in partnership with Rhode Island's Community Health Centers. Serving over 185,000 members, Neighborhood has doubled in membership, revenue and staff since November 2013. In January 2014, Neighborhood extended its service, benefits and value through the HealthSource RI health insurance exchange, serving 49% the RI exchange market. Neighborhood has been rated by National Committee for Quality Assurance (NCQA) as one of the Top 10 Medicaid health plans in America, every year since ratings began twelve years ago.

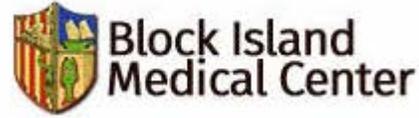


[www.ripccp.com](http://www.ripccp.com)

RIPCPC is an independent practice association (IPA) of primary care physicians located throughout the state of Rhode Island. The IPA, originally formed in 1994, represent 150 physicians from Family Practice, Internal Medicine and Pediatrics. RIPCPC also has an affiliation with over 200 specialty-care member physicians. Our PCP's act as primary care providers for over 340,000 patients throughout the state of Rhode Island. The IPA was formed to provide a venue for the smaller independent practices to work together with the ultimate goal of improving quality of care for our patients.



RIMS gratefully acknowledges the practices who participate in our discounted Group Membership Program



Orthopaedic Associates, Inc.



Ortho Rhode Island



## RI delegation delivers \$81.7M for new state-of-the-art public health lab

*New federal Epidemiology and Laboratory Capacity grant will upgrade RI's public health infrastructure and improve coordination and integration of laboratory with epidemiology and health information systems*

WASHINGTON, DC – U.S. Senators **JACK REED** and **SHELDON WHITEHOUSE** and Congressmen **JIM LANGEVIN** and **DAVID CICILLINE** recently announced a new \$81.7 million federal grant to enable the Rhode Island Department of Health (RIDOH) to build a new public health laboratory facility.

From its current facility on Orms Street in Providence, the RIDOH State Health Laboratories (RISHL) play a critical role in the State's efforts to investigate and mitigate life-threatening diseases, including COVID-19, as well as other public health threats like Eastern equine encephalitis (EEE), Ebola, H1N1, and Zika. RISHL also provides important services for State and municipal agencies to ensure the safety of drinking water and food products; monitor pollution of air and water; and aid public safety and criminal investigations through police officer training, DNA testing, and illegal drug identification.

The Orms Street facility was commissioned in 1978 and has become outdated, with insufficient laboratory space, inadequate building systems, and equipment in need of repair. According to RIDOH, over \$500,000 annually is spent in capital expenditures to keep the facility working efficiently.

Last year, when commercial testing services weren't yet widely available, insufficient laboratory space limited the number of COVID-19 samples that could be tested at the State Health Laboratories. In fact, the State's pandemic response required limited renovation/construction of the facility in order to accommodate processing of thousands of samples for testing.

In the wake of the COVID-19 pandemic, Senators Reed and Whitehouse and Congressmen Langevin and Cicilline voted to include nearly \$50 billion for COVID-19-mitigation and public health infrastructure, such as testing, contact tracing, enhanced genomic sequencing and Epidemiology and Laboratory Capacity grants. This federal funding may be used to "prevent, prepare for, and respond to coronavirus."

"COVID-19 revealed a serious gap in our health care infrastructure. This new federal funding will help Rhode Island bridge that gap and create a new state-of-the-art lab facility for the 21st century. This is a wise investment in upgrading our public health infrastructure and ensuring that advanced diagnostics tests and other clinical capabilities are readily available here in Rhode Island," said Senators Reed and Whitehouse and

Congressmen Langevin and Cicilline in a joint statement.

The state will receive \$81,716,590 to construct a new laboratory building that is expected to be LEED Silver certifiable and contain state-of-the-art equipment. The new facility will enable RISHL to continue to provide high-quality scientific test results more efficiently through improved workflows, while avoiding the expensive recurring maintenance and allow for spatial flexibility in the event of another pandemic or as new public health initiatives unfold.

Plans for the facility also call for a newly created section of the RISHL Center for Biological Sciences that will function as a dedicated Genomics Sequencing Core Laboratory.

Like the State Health Lab on Orms Street that it will replace, the new lab would be categorized as a Level 3 biosafety facility that is equipped to handle dangerous materials, microbes, and pathogens.

Federal support for the project will be allocated to the state through the Epidemiology and Laboratory Capacity grant funds administered by the U.S. Centers for Disease Control and Prevention (CDC). ❖

## Westerly Hospital introduces micro-ultrasound device for enhanced prostate biopsies

WESTERLY – Westerly Hospital is the first hospital in New England to use a state-of-the-art micro-ultrasound device that more precisely visualizes prostate tumors for patients undergoing prostate-specific antigen (PSA) screening and prostate biopsies.

The new system allows for real-time, high-resolution imaging that guides the surgeon during the biopsy and produces images that allow the urologist to better distinguish cancerous tissue from normal tissue, which can enhance the quality of the biopsy.

Because of its superior resolution, an accompanying MRI of the prostate may not always be necessary. Current practice suggests that to get optimal biopsy results, men with high PSA levels or suspected prostate cancer should get an MRI in addition to ultrasound.

Patients undergoing the procedure remain awake and receive only a local anesthetic. The images appear in real time on a console monitor to help guide the urologist to perform the biopsy. The procedure takes no more than 15 minutes.

"This is an outstanding addition to the tools that we can use in the office to better detect prostate cancer," said **JOSEPH F. RENZULLI, MD**, regional medical director and chief of urology for both L+M Hospital and Westerly Hospital. "With this new device we can better detect smaller abnormalities within the prostate gland and more accurately direct our biopsies to enhance the pathologic evaluation of the grade and stage of the cancer." ❖

## AG, RIDOH deem Lifespan/CNE merger application complete under Hospital Conversions Act

*The Attorney General and Director of RIDOH will have 120 days to determine whether to approve, approve with conditions, or deny the application*

PROVIDENCE – Attorney General **PETER F. NERONHA** and Director of Health **NICOLE ALEXANDER-SCOTT, MD, MPH** announced November 16 that the Lifespan/Care New England Hospital Conversions Act (HCA) application has been deemed complete and accepted for review. The review period under the HCA will commence November 17, 2021.

### What does “complete” mean?

An HCA application is deemed complete when enough information has been provided by the transacting parties to begin the review. It is a procedural milestone in the review process of this transaction.

“Completeness’ does not mean that regulators have resolved all of their questions or that new questions will not arise as the review moves forward. During the review period, the Attorney General and the Rhode Island Department of Health (RIDOH) will gather the information necessary to evaluate the transaction described in the application, as required under the HCA, which includes taking testimony, requesting and reviewing more documents, and conducting public meetings

“As a regulator with the immense responsibility of evaluating hospital transactions in our state, our goal is clear. We need to determine whether the transaction is legal and understand how, if approved, it will impact cost, quality and access to care for the people of Rhode Island,” said Attorney General Neronha. “While the goal is clear, the path toward accomplishing that goal is complex and requires a thorough and careful vetting of

an enormous amount of information. We need to sift through all that information, with the help of our experts, to ensure compliance with the law. A determination of completeness is the first step toward conducting a thorough review that will, importantly, include input from the public.”

“RIDOH will conduct a thorough review of this application to ensure that quality, access, and affordability of healthcare is maintained throughout Rhode Island, with a focus on communities that have historically experienced health disparities,” said Director of Health Nicole Alexander-Scott, MD, MPH. “This review process will be rigorous and thorough and will involve the gathering of feedback from people throughout Rhode Island in public comment sessions.”

### Next Steps

- Now that the application has been deemed complete, consistent with the standard process set forth in the HCA, the Attorney General’s Office will perform confidentiality determinations, which will be complete on or before December 30, 2021.
- At that point, the application will be made public, and public meetings will be scheduled within two months of that date.
- Under the HCA, the deadline for a decision approving, approving with conditions, or denying the transaction falls 120 days from the date of completeness. In this case, the deadline falls on March 16, 2022. ❖

## RIDOH approves Kent for Hospital-at-Home Pilot Program

PROVIDENCE – Kent Hospital’s request to offer the state’s first-ever Hospital-at-Home program was approved on Nov. 16th by the Rhode Island Department of Health (RIDOH). The Program, also approved by the Centers for Medicare & Medicaid Services (CMS), is designed to provide patients with acute hospital-level care in a patient’s home.

Hospital-at-Home programs provide more direct contact and clinical oversight of patients than what is available through typical home care services. Patients are only admitted to the Program from Emergency Departments and inpatient hospital beds, and an in-person physician evaluation is required before starting services at home. Other requirements of the program include:

- Clinical care must include a visit from a registered nurse at least once a day,

at least two in-person daily visits by a registered nurse or mobile integrated health paramedic, and once-daily check-in with a physician.

- The patient must have immediate, remote audio technology that can connect the patient with the Hospital-at-Home care team.
- If a patient’s condition declines and they need care at the hospital, emergency response must be able to get to the patient’s home within 30 minutes.
- The hospital must report monthly to CMS on establish quality metrics.

Kent Hospital will be only the third hospital in New England that has been approved to have a Hospital-at-Home Program. The other two hospitals are Brigham & Women’s Hospital and Massachusetts General Hospital, both in Boston.

“As a geriatrician, to be able to offer acute hospital level care at home for our older adults who prefer it, after years of seeing the adverse outcomes of multiple transitions of care for older adults, is amazing. I’m so proud of the work Kent Hospital has done to become an Age Friendly Health system, and now the first hospital in RI to be able to offer Acute Hospital Care at Home. Care at home is the future, and the Kent team looks forward to building this option and sharing lessons learned with other systems of care both local and national,” said **ANA TUYA FULTON, MD, MBA**, Executive Chief of Geriatrics & Palliative Care, Care New England; Health System Chief Medical Officer, Integra Community Care Network)

For information on CMS’ Acute Hospital Care at home, visit <https://qualitynet.cms.gov/acute-hospital-care-at-home>. ❖

## Lung Association report: RI ranks as #2 state for 5-year survival

PROVIDENCE – The American Lung Association’s 4th annual “State of Lung Cancer” report, released Nov. 16th, highlights how the toll of lung cancer varies by state and examines key indicators throughout the U.S. including: new cases, survival, early diagnosis, surgical treatment, lack of treatment and screening rates. The report showed positive results in Rhode Island, with the state landing top 5 rankings for 5-year survival, early diagnosis, surgical treatment rate and people receiving treatment.

The report reveals that the lung cancer five-year survival rate increased 14.5% nationally to 23.7% yet remains significantly lower among communities of color. In fact, while the national lung cancer survival rate increased, it remains at only 20% for communities of color and 18% for Black Americans. This is the second year that the “State of Lung Cancer” report explores the lung cancer burden among racial and ethnic minority groups at the national and state levels.

“While we celebrate that more Americans are surviving lung cancer, too many people are being left behind, and the disease remains the leading cause of cancer deaths,” said **DANIEL FITZGERALD**, director of advocacy for the American Lung Association in Rhode Island. “Much more can and must be done in Rhode Island to prevent the disease and support those facing the disease, such as ensuring everyone who is at high risk is screened for lung cancer, funding tobacco prevention and cessation programs, and promoting testing of homes for radon.”

The report found that Rhode Island ranked:

- **2nd in the nation for survival at 28.4%.** The national average of people alive five years after a lung cancer diagnosis is 23.7%.
- **5th in the nation for early diagnosis at 27.4%.** Nationally, only 24.5% of cases are diagnosed at an early stage when the five-year survival rate is much higher.
- **2nd in the nation for surgery at 28.5%.** Lung cancer can often be treated with surgery if it is diagnosed at an early stage and has not spread. Nationally, 20.7% of cases underwent surgery.
- **2nd in the nation for lack of treatment at 14.8%.** Nationally, 21.1% of cases receive no treatment.
- **26th in the nation for lung cancer screening at 6.3%.** Lung cancer screening with annual low-dose CT scans for those at high risk can reduce the lung cancer death rate by up to 20%. Nationally, only 5.7% of those at high risk were screened.
- **43rd in the nation for lung cancer incidence at 69.3 per 100,000.** Incidence refers to the number of new cases of lung cancer in each state. The national lung cancer incidence is 57.7 per 100,000.

While the “State of Lung Cancer” report findings show significant work to be done, there is hope. In March of 2021, the United States Preventive Services Task Force expanded its recommendation for screening to include a larger age range and more current or former smokers. This dramatically increased the number of women and Black Americans who are eligible for lung cancer screening. ❖

## U.S. multi-society task force on colorectal cancer releases updated screening recommendations

The United States Multi-Society Task Force (MSTF) on Colorectal Cancer (CRC) represents the American College of Gastroenterology, the American Gastroenterological Association, and the American Society for Gastrointestinal Endoscopy.

The MSTF updated the CRC screening recommendations that were last published in 2017, focusing on the specific questions of when to start and when to stop CRC screening in average-risk individuals (those without family history of colorectal neoplasia and those without gastrointestinal symptoms).

### New guidance:

- The MSTF suggests CRC screening in average-risk individuals ages 45–49.

### Unchanged from 2017:

- The MSTF strongly recommends CRC screening in all individuals aged 50 to 75 who have not already initiated screening.
- For individuals ages 76 to 85, the decision to start or continue screening should be individualized and based on prior screening history, comorbidity, life expectancy, CRC risk, and personal preference.
- Screening is not recommended after age 85.

The MSTF made these determinations based upon evidence demonstrating an increasing incidence and mortality from CRC in individuals under age 50, with data suggesting that the yield of screening in 45–49-year-olds is similar to the yield of screening 50–59-year-olds, and that the benefits of screening in younger individuals outweigh the harms and costs based on modeling studies. In addition, the MSTF summarized new data since 2017 regarding the risks and benefits of screening beyond age 75 and the appropriate age to stop screening.

This updated guidance from the MSTF is aligned with multiple other professional societies, including the United States Preventive Services Task Force, the National Comprehensive Cancer Network and the American Cancer Society.

The full recommendations have been published jointly online via Gastrointestinal Endoscopy, Gastroenterology, and The American Journal of Gastroenterology, and will be available in the January 2022 print issues. ❖

## Alzheimer's Association announces national registry to collect 'real world' data on newly-approved treatments

BOSTON AND CHICAGO – The Alzheimer's Association, the American College of Radiology, the American Society of Neuroradiology and the Department of Biostatistics, Brown University School of Public Health, along with other clinical research experts, announced on Nov. 9th a national registry, The National Treatment and Diagnostic Alzheimer's Registry. This new national registry will be an FDA-approved-agent agnostic approach to gathering routine clinical practice data and outcomes for sharing quickly and transparently with all stakeholders.

Earlier this year, the FDA gave accelerated approval for Aduhelm (Biogen/Eisai). This is the first treatment approved to treat patients in the Alzheimer's disease stage studied in the clinical trials – people with mild cognitive impairment (MCI) or mild dementia stage of disease. The sponsors of at least two other disease-modifying drugs for Alzheimer's are on record that they are applying to the FDA for accelerated approval. These, along with other experimental treatments in the pipeline, make a national registry essential for researchers, clinicians and people living with the disease.

"Creation of a national provider registry for disease-modifying Alzheimer's treatments, and for the associated diagnostic tests and biomarkers, is meant to swiftly advance the science," said **MARIA C. CARRILLO, PhD**, Alzheimer's Association chief science officer. "The pipeline is growing and more exciting advances are around the corner, including several more disease-modifying therapies that may be approved in the next two to three years."

Similar successful registries in heart disease and cancer have enabled stakeholders to track the long-term performance of

therapies using a large, real-world evidence dataset.

"There is an urgent unmet need to provide effective treatments for all who need them, and a transparent approach that allows for immediate sharing of data will not only accelerate advances, but identify gaps in effectiveness and safety, and highlight opportunities to improve care and treatment for all affected by Alzheimer's," said Carrillo.

The registry will be designed to continuously collect routine clinical practice data over time from healthcare providers caring for patients diagnosed with Alzheimer's who are taking an FDA-approved disease-modifying treatment. The registry will be designed to grow with scientific and medical advancements. As new drugs are approved and implemented in care, these will also be captured by the registry.

"We need to assess the benefits that people from all backgrounds and communities derive from this and future treatments in the real world – in other words, outside of narrowly constrained clinical trials. We also need to push for additional, even more effective therapies. This initiative aims to achieve this goal," said Carrillo.

The announcement of the National Treatment and Diagnostic Alzheimer's Registry was made by Carrillo at the Clinical Trials on Alzheimer's Disease conference (CTAD) in Boston.

The Alzheimer's Association will provide the initial seed funding to launch the project. The Association will then seek additional funding from government and philanthropic sources.

"The Alzheimer's Association is perfectly positioned to lead this effort – and we have the experience, team and infrastructure already in place through registries we've built and operated for our IDEAS and New IDEAS studies," Carrillo said. ❖

## FDA issues final orders reclassifying certain Hepatitis C diagnostic tests from Class III to Class II

WASHINGTON, DC – On Nov. 19th, The FDA issued two final orders, reclassifying certain HCV diagnostic tests from class III to II. These orders allow these HCV tests to use FDA's 510(k) pathway rather than the PMA pathway.

The two types of HCV diagnostic tests being reclassified are nucleic acid-based HCV ribonucleic acid (RNA) devices intended for the qualitative or quantitative detection or genotyping of HCV RNA and certain HCV antibody devices intended for the qualitative detection of HCV.

**TIMOTHY STENZEL, MD, PhD**, direc-

tor of the Office of In Vitro Diagnostics and Radiological Health in FDA's Center for Devices and Radiological Health, said:

"Today's action allows manufacturers of certain types of Hepatitis C virus (HCV) tests to seek marketing clearance through the less burdensome premarket notification (510(k)) pathway rather than submitting a premarket approval application (PMA), the most stringent type of FDA medical device review.

"We are confident that following reclassification, with adherence to the special controls, these devices will continue

to provide a reasonable assurance of safety and effectiveness. Additionally, the reclassification may support the potential for more manufacturers to develop these tests, which can increase competition and increase access to these important tests.

"These reclassifications will also benefit the Department of Health and Human Services' National Viral Hepatitis Action Plan, as increased access to tests will likely aid patients in seeking the appropriate treatment and likely reduce transmission." ❖

## Association of Migraine Disorders funds two innovative research projects

PROVIDENCE – The Association of Migraine Disorders (AMD) recently announced it has approved and funded two migraine research projects in 2021. With a mission to expand the understanding of migraine disease, the organization has a goal to fund three additional projects by year's end.

Research to help personalize migraine treatment

The first research project includes developing a program to help identify the various forms of migraine and how patients respond to treatments. This will help physicians personalize migraine treatment.

"We aim to build a tool that will allow rapid extraction of migraine patients from electronic medical records and their associated symptoms and treatment response, allowing us to study these more homogenous cohorts," said **DR. WILLIAM**

**RENTHAL**, Director of Headache Research, Brigham and Women's Hospital and Harvard Medical School. "We aim to understand genetic differences that may drive treatment response to CGRP monoclonal antibodies."

The second project focuses on understanding the association between sleep apnea and migraine.

"The project will foster a more detailed understanding of the causal nature between sleep disorders – especially sleep-disordered breathing, such as obstructive sleep apnea – and migraine, and address the question of whether proven therapies for sleep-disordered breathing also improve migraine outcomes, such as migraine frequency and intensity," said Dr. Eric Gruenthal, Sleep Medicine Fellow at the Cleveland Clinic Foundation and Cleveland Clinic Lerner College of Medicine. ❖

## Appointments

### Samir A. Shah, MD, elected president of the American College of Gastroenterology

LAS VEGAS, NV – **SAMIR A. SHAH, MD, FACG**, was elected 2021–2022 President of the American College of Gastroenterology (ACG). Dr. Shah is Clinical Professor of Medicine at the Alpert Medical School and Chief of Gastroenterology at the Miriam Hospital. He is a partner with Gastroenterology Associates, Inc., a private practice GI group affiliated with Brown and Lifespan.

Dr. Shah officially took his position as President during the College's Annual Scientific Meeting and Postgraduate Course held recently in Las Vegas. In this position, Dr. Shah will direct ACG's programs, which include continuing medical education in the clinical, scientific, and patient-related skills of gastroenterology, activities involving national and state medical affairs, health policy issues, and clinical investigation.

Dr. Shah earned his BA in Biochemistry magna cum laude at Brown and his MD at Harvard Medical School. After graduating, he completed his residency in internal medicine at the Harvard-affiliated Beth Israel Deaconess Medical Center. He continued on for a fellowship in gastroenterology at the same institution where he was awarded a Howard Hughes Postdoctoral Fellowship for Physicians and spent two years in the laboratory studying murine models of inflammatory bowel disease.

A member of the ACG Board of Trustees since 2013, Dr. Shah has served as an officer of the College since 2017. From 2002 to 2006, he was elected ACG Governor for Rhode Island and in 2003 received the Freshman Governor's Award for Outstanding Service. His leadership path with the Board of Governors included a term from 2005 to 2008 as Vice-Chair, and from 2008 to 2010 as Chair. In 2012, Dr. Shah was honored with the distinguished William D. Carey Award for outstanding service to the College and the Board of Governors.

His service to the College has included significant roles in a number of committees, including a long tenure from 2000 to 2017 on the Practice Management Committee, from 2004 to 2005 on the Credentials Committee, Chair of the Membership



Committee from 2005 to 2008, and a member of the Awards Committee from 2011 to 2017. He also serves as co-chair of the IBD Circle, an online professional networking community sponsored by The Crohn's and Colitis Foundation and ACG.

Active and engaged in legislative and regulatory matters impacting GI practices, Dr. Shah became involved as ACG representative to the

Digestive Diseases National Coalition (DDNC) and from 2018 to 2020 served as DDNC President.

Dr. Shah has co-authored more than 100 articles, book chapters, and abstracts and has given over 100 invited presentations primarily devoted to inflammatory bowel disease. He is the recipient of numerous honors and awards, including Brown University's Teaching Recognition Award, the Dean's Teaching Excellence Certificate, Brown University's Excellence in Teaching Award for Clinical Faculty, and the Beckwith Family Award for Outstanding Teaching. He has participated in several multi-center clinical trials of cutting-edge therapies for IBD and was co-principal investigator for OSCCAR (Ocean State Crohn's and Colitis Area Registry). His group participates in the IBD QORUS program through the Crohn's and Colitis Foundation.

"The ACG is the professional home of the clinical gastroenterologist. If an immigrant son of immigrants from India and Kenya can become President of the ACG, the ACG is clearly open to all and a place where anyone can and will thrive," said Dr. Shah. "So, my message is: if you are engaged in clinical gastroenterology – physician, nurse, advanced practice provider, researcher, etc. – the ACG should be your professional home regardless of race, ethnicity, gender, nationality, academic or private practice," he added. ❖



### SCH welcomes Dr. Michael Mason to its medical staff

WAKEFIELD – Dr. Michael Mason is a board-certified orthopedic surgeon with Ortho Rhode Island who specializes in total joint replacement of the hip and knee, including robotic-assisted, as well as replacement of the shoulder.

He earned his Doctor of Osteopathic Medicine degree at the Philadelphia College of Osteopathic Medicine in 1987.

He then completed his residency in orthopedic surgery at Community General Osteopathic Hospital in Harrisburg, Pennsylvania and his fellowship training at

Massachusetts General Hospital and Brigham and Women's Hospital, affiliates of Harvard Medical School.

In addition to working with patients, Dr. Mason is a member of the Walk Strong Foundation, a nonprofit humanitarian organization that provides hip and knee replacements to underserved communities in economically challenged developing countries.

He also has a strong interest in biomechanics and material science, and has both designed and been on the design teams of multiple medical implants and instruments that are used worldwide. ❖

## Brown School of Public Health welcomes new faculty to advance the School's work on pandemic preparedness and mis/disinformation

PROVIDENCE – The Brown University School of Public Health is welcoming new leaders bringing global and national expertise to advance the school's work on pandemic preparedness and mis/disinformation. These hires mark the ongoing efforts and commitment of Dean Ashish K. Jha to expanding the impact and reach of the school across the most urgent issues in public health.



**JENNIFER NUZZO, DrPH**, Senior Scholar at the Johns Hopkins Center for Health Security, will lead a new effort on Pandemic Preparedness and Response at SPH, expanding a deep and accomplished Brown team to address the urgent issues exposed in this pandemic and intrinsic to every pandemic, to alleviate human suffering and economic loss.



**SCOTT RIVKEES, MD**, former Florida Surgeon General and Secretary of Health, brings to SPH unique frontline experience managing the COVID-19 pandemic in the nation's third most populous state with the largest fully-integrated department of health system. He joins SPH as a Professor of the Practice.

**CLARE WARDLE, PhD**, the founder of First Draft News, will join an expanding effort at SPH on mis/disinformation and the information needs of communities as a Professor of the Practice. Building on the groundbreaking work she launched and grew to empower people with the knowledge, understanding, and tools needed to find and follow trustworthy sources of information, Wardle will work closely with SPH professor of the practice Stefanie Friedhoff in directing research, education, and policy efforts around these issues. ❖



## Retina Consultants

### Altin Pani, MD

is pleased to announce that



### Scott H. Greenberg, MD

has joined the practice specializing in diseases and surgery of the retina and vitreous.

Dr. Greenberg is a graduate of Upstate Medical University in Syracuse, New York. He completed a residency in ophthalmology and a fellowship in vitreoretinal surgery at Albany Medical College in New York.

### Referrals welcome

#### Providence

**401-274-5844**

#### North Kingstown

**401-294-9429**

**RetinaConsultantsRI.com**

## Recognition

### Dr. Ashish Jha among honorees at COVID-19 recognition event

MARY KORR  
RIMJ MANAGING EDITOR

WASHINGTON, DC – The Alliance for Health Policy recognized officials from Operation Warp Speed, researchers who developed a COVID-19 spike antibody program at the height of the pandemic, members of the care team who treated U.S. Patient Zero, and community leaders steering the efforts for an equitable pandemic response in a virtual event held Nov. 18th.

Among those honored was **ASHISH JHA, MD, MPH**, Dean and Professor of Health Services, Policy, and Practice, Brown School of Public Health. Speakers gathered in conversation virtually to highlight several key areas of pandemic response, sharing personal insights and lessons learned from their work in national policy, antibody and vaccine research, and public health.

Dr. Jha reflected on his role as a communicator of public health during the nascent to present period of the pandemic and his perspective on communicating complex health information.

“My first real concern came in late January 2020 with the data coming out of China. In late February, my second realization came that we had wasted five weeks doing no preparation and community spread here was probable. Five weeks is a lifetime to waste in a pandemic,” he said.

He called a meeting of his team at Harvard, where he then worked, to strategize. “My mental model was this would last a few weeks,” he said. By the spring of 2020, he believed the acute phase was going to be over by the summer.

However, he and his team continued to be flooded with requests from journalists, receiving sometimes 150 to 200 calls a day. Critical and credible information was lacking and White House briefings were not that helpful.

“In a public health crisis the public needs to know what is happening and how to keep themselves safe. You have to talk to people about process – there is a scientific process we use and it might change as evidence changes,” he said.

He concluded that it is inevitable “we are going to see more pandemics.” To address the response, “we need to build up our public health system. We need to invest more in science and scientific platforms and we need to do a better job in training public health officials to be better communicators and to speak up against misinformation.”



Dr. Ashish Jha during a panel discussion with Sarah J. Dash, president of the Alliance for Health Policy.

In addition to Dr. Jha, the honorees included:

**Col. (Retired) Matthew Hepburn, MD**,  
Senior Advisor on Pandemic Preparedness to the Director,  
White House Office of Science and Technology Policy

**Peter Marks, MD, PhD**,  
Director, Center for Biologics Evaluation and Research,  
U.S. Food and Drug Administration

**Lisa Macon Harrison, MPH**,  
Health Director, Granville Vance Public Health

**Anne Schuchat, MD**,  
Former Principal Deputy Director,  
Centers for Disease Control and Prevention

**Reed Tuckson, MD**,  
Founder, Black Coalition Against Covid

**Alina Baum, PhD**,  
Associate Director, Infectious Diseases, Regeneron

**George Diaz, MD**,  
Chief of the Division of Medicine,  
Providence Regional Medical Center Everett

**Sarah Wilkerson, MN, RN**,  
Regional Director, Infection Prevention,  
Providence Washington & Montana

**Robin Addison, BSN, RN**,  
Clinical Lead, Biocontainment,  
Evaluation and Specialty Treatment (BEST) Team,  
Providence Regional Medical Center Everett

**Lisa K. Fitzpatrick, MD, MPH, MPA**,  
CEO and Founder, Grapevine Health

The Alliance for Health Policy is a nonpartisan, nonprofit organization dedicated to helping policymakers and the public better understand health policy, the root of the nation's health care issues, and the trade-offs posed by various proposals for change. ❖

## Recognition

### Lifespan receives award for training, hiring of 1,000 BIPOC individuals

PROVIDENCE – Lifespan is expanding its suite of professional development programs and adding new career pathways for BIPOC (Black, Indigenous, and People of Color) individuals. Through support from the Papitto Opportunity Connection (POC), Lifespan will hire more than 1,000 BIPOC individuals over the next four years.

The POC award will accelerate Lifespan's efforts to build a comprehensive and forward-thinking career development program that provides opportunities for entry and advancement, particularly in high-need areas. The result will be greater access to career pathways into higher-paying jobs for the state's BIPOC community.

Lifespan's workforce development program aims to create a workforce of well-trained, diverse health care professionals who are representative of the communities they serve. With the POC award, Lifespan will be able to expand programs to provide no-cost certification for high-demand medical professions, such



Pictured left to right: **Joe Pannozzo**, vice president and chief development officer, Rhode Island Hospital and Hasbro Children's Hospital; **John Tarantino**, trustee, Papitto Opportunity Connection; **Dr. Timothy J. Babineau**; **Barbara Papitto**; **Lisa Abbott**. [PHOTO: LIFESPAN]

as nursing assistant, pharmacy technician, medical assistant, behavioral health specialist, and doula. Lifespan will also develop a paid job-training program for formerly incarcerated BIPOC individuals, and a succession program to prepare diverse employees for leadership roles. Additionally, there are plans to create a Nursing Leadership Fellowship program and offer academic scholarships for employees from underrepresented communities.

Opportunities through Lifespan's workforce development program will be made

available to both existing employees and non-employees. The organization has already begun recruitment efforts for training sessions that begin in December, and will continue recruiting into 2022. Interested candidates can contact Lifespan directly for more information about available opportunities, by visiting [lifespan.org/POC](https://lifespan.org/POC).

The \$10 million commitment from the Papitto Opportunity Connection (POC) was made to Lifespan's charitable arm, the Lifespan Foundation, and is the largest gift to the foundation in its history. ❖

### Deborah L. Myers, MD, receives Lifetime Achievement Award

PROVIDENCE – **DEBORAH L. MYERS, MD, FACOG**, vice chair of the Department of Obstetrics and Gynecology, director of the Division of Urogynecology and Reconstructive Pelvic Surgery, professor of obstetrics and gynecology at Brown University, and a member of the active staff at Women & Infants Hospital, has received the Jack Robertson Lifetime Achievement Award at the 2021 American Urogynecologic Society meeting.

The award recognizes an individual who has had a lifetime of outstanding achievements in the field of female pelvic medicine and reconstructive surgery and has served as a role model through service, basic or clinical research and teaching.

AUGS' most prestigious award is presented periodically to an individual selected for recognition of extraordinary contributions to AUGS and the profession.

Dr. Myers is a graduate of the State University of New York



at Stony Brook Medical School. She completed a medical-surgical internship at Rhode Island Hospital and a residency in obstetrics and gynecology at Women & Infants Hospital. She is director of Continuing Medical Education at Women & Infants Hospital and chair of the Promotions Committee of the Department of Ob/Gyn at Brown University. She is also the past president of the American Urogynecologic Society.

She is an oral examiner for the American Board of Obstetrics and Gynecology and a member of the FDA advisory panel on Ob/Gyn medical devices. ❖

## COBRE on Opioids and Overdose at Rhode Island Hospital holds community hackathon to stimulate creative solutions to the overdose epidemic

*Second annual event of the Center for Biomedical Research Excellence (COBRE) was virtual and finalists may move forward to apply for up to \$40K in additional funding*

PROVIDENCE – With innovation – there is hope. This was the message inspired by the COBRE on Opioids & Overdose Virtual Overdose ‘Hackathon’: a weekend-long event from Oct. 15–17 in which community members, researchers, students, and professionals worked together to develop innovative solutions to the overdose crisis in Rhode Island and beyond. An approach used widely in the design and technology fields, “hackathons” are a democratic process of interdisciplinary collaboration where design thinking is utilized to accelerate the development of novel products and services to address complex problems.

In 2019, the method was adapted by the COBRE’s Translational & Transformative Research Core as a mechanism to incubate research and project ideas and to offer everyone in the community an opportunity to voice their ideas for solving overdose – not just researchers, policymakers, and other usual decision-makers.

The following are the four groundbreaking projects selected to move forward to apply for up to \$40,000 in additional grant funding.

### Heal on Wheels

Heal on Wheels is a proposed mobile center that provides culturally competent, bilingual harm reduction and overdose prevention to historically underserved Hispanic and Latinx communities in Rhode Island. The mobile center would partner with local community organizations to deliver culturally responsive materials and determine optimal mobile site “pop up” locations.

Team members were **ASHLEY GAIPO, AMANDA BLOCK, PAOLA JIMENEZ, JHANAVI KAPADIA, SARAH TOKARZ,** and **SAGE MUELLER.**

### Access Express

Access Express is proposed as a physical solution to deliver harm reduction materials and other basic needs to people on their time. The idea is a modular, compact system of 24/7-access harm reduction dispensaries paired with a community engagement hub that democratizes harm reduction and facilitates movement of machines to be responsive to community needs.

Team members were **BRENDAN JACKA, PhD, LAURIE MACDOUGALL,** and **LEAH GERMINARA.**

### Naloxbox+

This team proposes to leverage an established IoT pipeline to ensure automated, hands-free supply monitoring and management for community naloxone programs in high-risk locations, in collaboration with Naloxbox team and Rhode Island DMAT. In addition to providing status updates on the box, the development of a web portal is proposed to collect metrics from owner-users of the boxes on the circumstances surrounding each use case.

Team members were **LEO KOBAYASHI, MD, GEOFF CAPRARO, MD, ASHESH GOHIL,** and **BROOKE LAWRENCE.**

### Portland Drug User’s Union Harm Reduction Center Model

This team proposes an initiative in partnership with a Rhode Island community organization that builds on a peer-centered, low barrier harm reduction model developed by people with lived experience of drug use. As future legalization efforts take hold, the guiding principles of this model will then be used to inform research opportunities and harm reduction initiatives.

Team members were **AVI YOCHED, JOSEPH CORDO, PEACH ANDERSON, FOREST TYLER,** and **ASHLEY PERRY.**

**DR. BRANDON MARSHALL, PhD,** Associate Professor at the Brown School of Public Health and Director of the Data and Research Methods Core at the COBRE, said, “A Hackathon democratizes the process of finding solutions. Anyone can participate and crucially are encouraged to work together to find solutions to a problem.”

**DR. TRACI GREEN,** who co-directs the COBRE and leads the Translational & Transformative Research Core stated, “Even within a pandemic and amidst the worst opioid and overdose crises we’ve experienced as a country, the energy and innovation of this Hackathon gives great hope for what more we can do to save lives.”

The group plans to continue the event into the future and to partner with other organizations to expand reach.

“As the only Hackathon event in the country focused on opioids and overdose, this COBRE event is a hallmark of Rhode Island innovation in public health and we can’t wait for the next one,” said Green. ❖

## Obituaries



### **WALTER C. COTTER, MD,** of

Stuart, FL, and late of Providence, RI, passed peacefully at home on Oct. 27, 2021 culminating a full and rewarding ninety-seven plus years of life, love and service. Head of a family spanning four generations, he was also a committed and expert physician/surgeon, a combat veteran of the Second World War, and an avid golfer and fisherman.



Known to his friends as Walt, he was raised in the greater Boston area, graduated from Roslindale High School and attended Boston College as a pre-med major before entering service in the United States Navy at the outset of the Second World War. Commissioned as an Ensign, he deployed to the Pacific and served as the gunnery officer aboard LST 1031 participating in several amphibious operations, including Iwo Jima. During his wartime service he earned the American and Asiatic Pacific Campaign Medals as well as the WW II Victory Medal. He was released from active duty in 1945 as a Lieutenant (JG) and resumed his premedical education at Brown University, graduating in 1947.

He attended medical school at Tufts University, graduated in 1951 and trained as a neurosurgical resident for five additional years before beginning practice in Rhode Island in 1958. During his long career as a physician he served on the staff of many RI hospitals including the eponymous facility in Providence as well as Roger Williams, Miriam, Pawtucket, South County, Kent and Newport hospitals. In the final two decades of his surgical practice he assumed a leading role in the development of and leadership in the major neurosurgical center at St. Joseph's Hospital in Providence serving as the Chief of Neurosurgery at both St Joseph's and Kent County Hospital. Dr. Cotter was a Fellow of the American College of Surgeons. He was frequently called upon by local media to provide medical insights, notably on the death of Robert F. Kennedy and the significant injury suffered by boxing champion Vinnie "Paz" Pazienza.

Never satisfied with being good enough, Dr. Cotter pursued professional development and growth throughout his career, pioneering the practice of micro-neurosurgery in the RI medical community. He was named president of both the Rhode Island and New England Neurosurgical Societies. He retired from active practice in 1995 and turned his considerable energies to his expanding family.

He had met and married his wife, Barbara Pearce, while at Brown and together they created a family of six children, three girls and three boys. He and his family were active in the community, enjoying membership at the Edgewood Yacht Club and the University Club. Barbara died suddenly in 1977 and he married his new partner, Mary Lynn McInnis, in 1981,

adding another daughter to the family in the process. Together they provided strong, central focus of family support for their children and for the new generation of 15 grandchildren.

He is survived by a devoted and saddened family including his wife, Mary Lynn, his children; Jean, David (Jane), Karen (Kurt Badynski), Betsy (Don Wischart), Stephen (Barbara), Thomas (Kerri) and Lisa (David Gray); his grandchildren Jonathan, Carolyn, Michael, Brian, Andrew, Gregory, Jennifer, Justin, Christopher, Tyler, Cameron, Harry, Tommy, Lindsey and Samantha; his great-grandchildren William, Timothy, Nicholas, Abigail, Theodore, James and Mason.

The family will arrange a memorial ceremony in the near future in Rhode Island and requests that any remembrances be made in his name to the Honor Flight online at Donate Now-Honor Flight, Inc. ([flipcause.com](http://flipcause.com)) or by mail at Honor Flight, Box L-4106, Columbus, OH 43260-4016. ❖

**ARIS CHARLES GARRO, MD,** 46, from North Kingstown, passed away peacefully with his loving family by his side on November 17, 2021, after a courageous battle with cancer. He was the loving husband of Christine (Followill) Garro, PA, and the loving father of their three children, Zoe, Arlo, and Isaac. They had been married 12 years.



He grew up in Glastonbury, CT, and graduated from Glastonbury High School in 1993 and the University of Virginia in 1997. He received his doctorate from Vanderbilt University School of Medicine in 2001, did his residency at Cincinnati Children's Hospital Medical Center, and his fellowship at Rhode Island Hospital. He was currently working as a clinician at the Hasbro Children's Hospital Emergency Department and a researcher affiliated with the Warren Alpert Medical School of Brown University and Rhode Island Hospital. He was a passionate researcher in the fields of emergency department-based interventions for children with asthma, and the treatment of pediatric Lyme disease and meningitis. He had recently been approved to be a professor of Pediatrics and Emergency Medicine at the Alpert Medical School.

Aris enjoyed playing soccer and was an avid fan of all things soccer, most notably the USA Men's National Team, but also loved watching University of Connecticut and University of Virginia basketball. He had a love for painting and music and learned to play the guitar for jam sessions with his close friends. Aris loved his garden and being out in nature. He loved reading Harry Potter with his daughter Zoe and teaching soccer skills to his son Arlo. He adored snuggling with his son Isaac while watching Paw Patrol. Aris enjoyed summers at his cottage with his family in Charlestown, RI.

Visit [carpenterjenks.com](http://carpenterjenks.com) for online condolences. In lieu of flowers, a donation website will be provided via Aris's Caring-Bridge site. ❖



**DAVID K. GUNASTI, MD**, 55, passed away on November 2, 2021. He was the husband of Sharon (Blanchard) Gunasti, MD, and they had been married for the past 28 years.

Born in New York, NY, he was the son of the late Dr. Sabri and Shirley Gunasti. After graduating from SUNY Downstate Medical Center (1992), and completing radiology residency training at the University of Rochester/Strong Memorial Hospital (1997), he resided in Lincoln, RI. He was a practicing radiologist for 29 years.

He was a devoted husband, father, colleague, and friend. Anyone who interacted with him professionally or personally knew that kindness, respect, and dedication defined him. He was a member of Lighthouse Christian Church and played a supporting role in various ministries. He took great pleasure in caring for the family dogs and, when at home, he could always be found with a dog by his side. He was an avid baseball and science fiction fan and particularly enjoyed Star Trek and Star Wars. He was a collector of comic books and Lionel trains and had a special interest in World War II history.

In addition to his wife, he leaves his children, Lauren, Jonathan, and Brandon Gunasti. Two of his children have been inspired by his example to enter the field of medicine.

In lieu of flowers, donations may be made in his memory to the Lighthouse Community Food Pantry, Cumberland, RI, c/o Lighthouse Christian Church. ❖



**ILDIKO ERSZEBET MEDVE, MD**, 58, of Providence passed away peacefully at home on November 7th, 2021, surrounded by her loving family.

She was the beloved wife of Paul Roderrick, MD. She is preceded by her mother Erszabet Julianna Toth and father Dr. Ferenc Medve, and is survived by her daughters Adria Sai-Halasz and Kathleen Sai-Halasz, as well as her older brother, Ferenc Medve Jr.

Ildiko grew up in Debrecen, Hungary, where she was a gymnast and dreamed of one day becoming a doctor in the US. Always a passionate and fighting spirit, she became a nephrologist in Providence, RI. Her great loves in life were her family, traveling the world, and selflessly helping others. She was one of the

seven founding members of the EGFR Resisters, a patient advocacy group with over 3,000 members worldwide. Their mission is to accelerate research and improve the outcomes for people with EGFR-positive lung cancer, which overwhelmingly affects never-smoking women.

The family will have a private burial, but a memorial service to celebrate Ildiko's life will be held in the near future. In lieu of flowers, please consider donating to the EGFR Resisters. Details about the memorial service and link to donate can be found here: [www.newnarrative.ca/ildikomedve](http://www.newnarrative.ca/ildikomedve) ❖



**JOHN CONNAUGHTON O'DONNELL, Jr., MD**, (1946–2021), of Vineland, New Jersey, formerly of Smithfield, passed away at Pennsylvania Presbyterian Hospital on November 7, 2021. He was the beloved husband of Christine (Scerbak) O'Donnell, cherished father of John (Deanna) O'Donnell, James O'Donnell

and Joseph O'Donnell, and the proud grandfather of Peyton O'Donnell who brought 7 years of added joy to his life.

Originally from Rhode Island, "Jack" graduated with honors from LaSalle Academy ('64) and Providence College ('68). In 1967 he was inducted into AED in "recognition of superior scholastic achievement" in a pre-med program. He received his MD from The New Jersey College of Medicine ('72) and went on to specialize in surgery. He was a member of The American College of Surgeons and was in practice for 45 years.

Upon retirement Jack began new ventures. He "returned to Rhode Island" via his novel, "The Lace Dagger," which he set in Providence. His second novel, set in New Jersey, was never completed. During retirement he also thoroughly enjoyed working with his three sons in the local agricultural industry as their "not so silent partner."

With boundless energy, expertise and intelligence, Jack gave every patient, friend, stranger and venture his best effort. With that same energy he fought multiple illnesses in his last years. Although illness may have ravaged his body, his indomitable spirit, insightful wit and generous heart remained to the very end.

A memorial service will be held on December 3, 2021 in Vineland, New Jersey. A celebration of his life will be held in Rhode Island at a later date. For online guest book, please visit [www.bellowsfuneralchapel.com](http://www.bellowsfuneralchapel.com). ❖