1917 2024 107

RHODE ISLAND MEDICAL JOURNAL

Fifteen-Year History of Virilization in a 17th-Century Woman

See Contribution, page 16

MARCH 2024 VOLUME 107 • NUMBER 3 ISSN 2327-2228

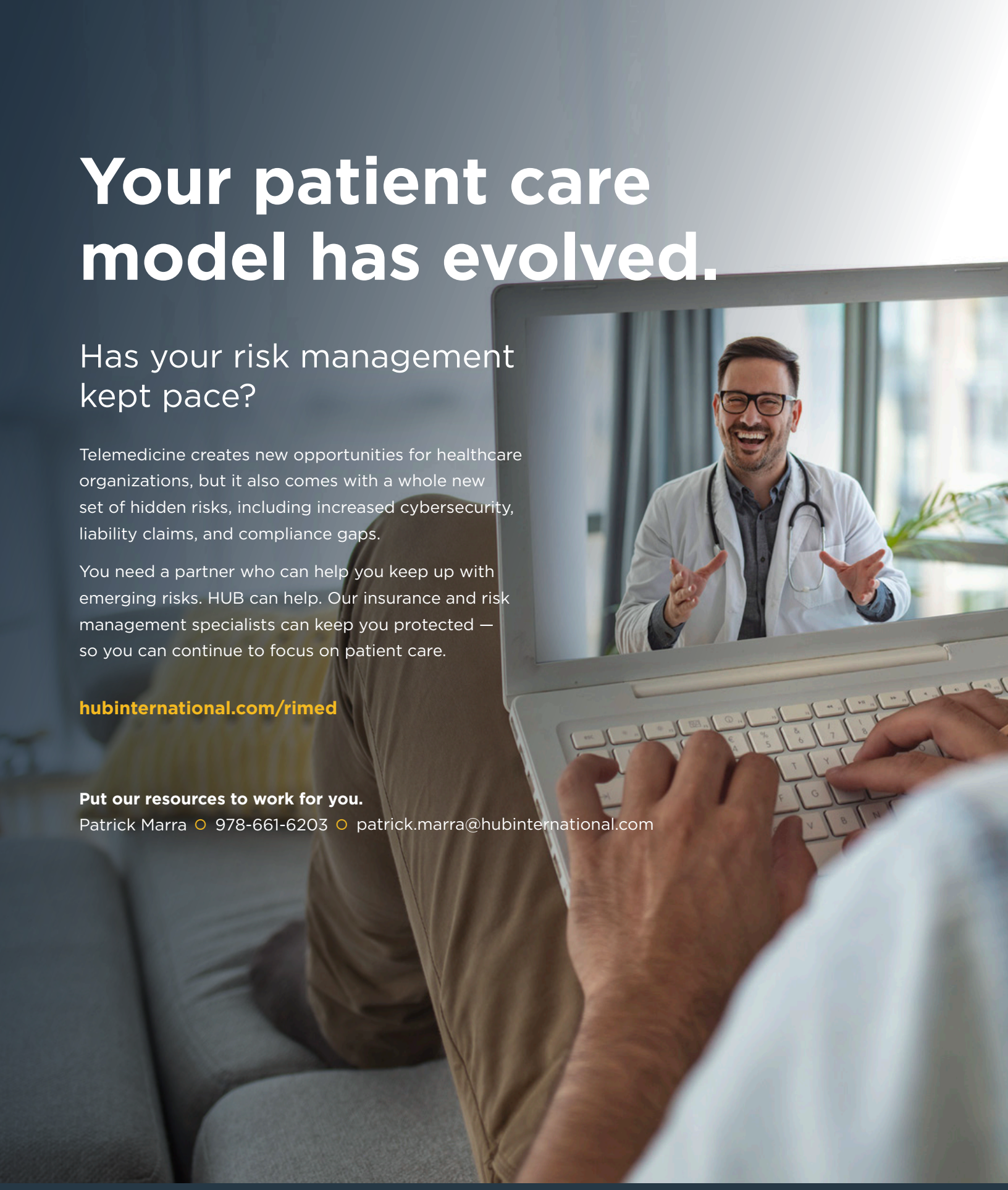
Your patient care model has evolved.

Has your risk management kept pace?

Telemedicine creates new opportunities for healthcare organizations, but it also comes with a whole new set of hidden risks, including increased cybersecurity, liability claims, and compliance gaps.

You need a partner who can help you keep up with emerging risks. HUB can help. Our insurance and risk management specialists can keep you protected — so you can continue to focus on patient care.

hubinternational.com/rimed



Put our resources to work for you.

Patrick Marra ○ 978-661-6203 ○ patrick.marra@hubinternational.com

HUB

Risk & Insurance | Employee Benefits | Retirement & Private Wealth

MARCH 2024
VOLUME 107 • NUMBER 3

RHODE ISLAND MEDICAL JOURNAL

RHODE ISLAND MEDICAL JOURNAL (USPS 464-820), a monthly publication, is owned and published by the Rhode Island Medical Society, 405 Promenade Street, Suite A, Providence RI 02908, 401-331-3207. ISSN 2327-2228.

RHODE ISLAND
MEDICAL JOURNAL

RHODE ISLAND
MEDICAL JOURNAL

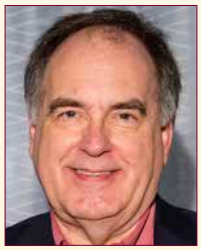
IN THE NEWS

Brain Waves Rhode Island

A. Mehrotra, MD, MPH

S. Rivkees, MD

B. Khokhar MD, MPH



M. Migliori, MD, FACS

PEOPLE/PLACES

OBITUARIES

Favorite
Healthcare Staffing

Rhode Island's Medical Staffing Experts

Favorite Healthcare Staffing provides a comprehensive range of staffing services at preferred pricing to RIMS members. Call today to see why we are the favorite choice of healthcare professionals and physician practices across the US!

401.354.7115

MedicalStaffing@FavoriteStaffing.com

Favorite Healthcare Staffing is a Valued Sponsor of the Rhode Island Medical Society

AA / EOE / M / F / V / D

Triad of Terror: Rapidly Progressive Austrian Syndrome in a 62-Year-Old Female

YONATHAN DANIEL, MD'24; IDIRIS MOHAMED; AARON P. WHEELER, MD

ABSTRACT

We report a case of a 62-year-old female presenting with shortness of breath, who was subsequently diagnosed with Austrian syndrome. The patient had a complicated clinical course, including invasive central nervous system pneumococcal disease, pneumococcal bacteremia, and mitral valve vegetation with possible leaflet perforation. Despite aggressive treatment, her condition continued to worsen. We will discuss the clinical features of this disease, approaches to diagnosis and treatment, and outcomes in light of this rare condition.

KEYWORDS: Austrian syndrome, Streptococcus pneumoniae, infective endocarditis, meningitis, pneumococcal vaccination

INTRODUCTION

Austrian syndrome is a rare triad of pneumonia, endocarditis, and meningitis caused by Streptococcus pneumoniae. Prompt recognition and aggressive treatment are crucial for reducing morbidity and mortality. Here, we present a case of a 62-year-old female who developed Austrian syndrome, and we discuss the challenges encountered in her management.

CASE PRESENTATION

A 62-year-old female with a past medical history of asthma, hypretension and morbid obesity presented for worsening shortness of breath and wheezing. She reported a three-day history of nonproductive cough, sweating and dyspnea that was frequently triggered by thoughts of her recently departed grandson. She otherwise denied chest pain, palpitations, headaches, abdominal pain, and changes in bowel or urinary habits. She had no history of PPSV-23, PCV-20, or PCV-15 vaccination and was not on home oxygen. She reported recently running out of her albuterol rescue inhaler but was otherwise adherent to her daily controller inhaler. On EMS arrival, she was hypoxemic with an oxygen saturation of 84%, which subsequently improved to 97% following the administration of two doses of nebulized Ipratropium Bromide 0.5 mg and Albuterol Sulfate 2.5 mg enroute to the Emergency Department (ED).

In the ED, her initial blood pressure was 127/83 mmHg, heart rate 116 bpm, and oxygen saturation 97% on room air. She was afebrile, and initial laboratory studies were notable for an elevated high-sensitivity troponin of 70 ng/L, with repeat increasing to 1209 ng/L without chest pain, and hypokalemia. Her white blood cell count was 5,600 cells/µL and a chest X-ray demonstrated patchy opacities in the right lung. Physical examination revealed a morbidly obese patient with clear lungs, moderately increased work of breathing, regular heart rate and rhythm, and no focal neurological deficits. An initial EKG showed sinus rhythm with mild ST depressions in the high lateral leads, and a subsequent EKG showed sinus rhythm with nonspecific T-wave inversions and flattening in the inferior leads. The patient was treated in the ED for an asthma exacerbation and admitted to the general medical floor overnight for further management of her dyspnea and Non-ST-elevation myocardial infarction (NSTEMI).

Following admission, steroids were discontinued owing to lack of clinical evidence of an acute asthma exacerbation or hypoxemic respiratory failure, and a 48-hour heparin infusion was initiated given the elevated troponin. Cardiology was consulted and a transthoracic echocardiography (TTE) was performed, revealing a 14 mm x 10 mm abnormal mass on the posterior mitral valve, raising suspicion for fibroelastoma, endocarditis, or valvular calcification. A left-heart catheterization was being considered, dependent upon her troponin trend. On hospital day two, the patient experienced diaphoresis, nausea, confusion, and was found to have a white blood cell count of 30,000 cells/µL. Infectious disease was consulted. She was still afebrile, but given her TTE findings and leukocytosis, vancomycin and ceftriaxone were initiated for presumed endocarditis, and blood and urine cultures were obtained. Throughout the day, her mental status continued to deteriorate, and a CT of the brain and repeat chest X-ray were obtained, both with no acute findings. Over the next 48 hours, her mental status continued to decline, initially as worsened confusion, then confusion with agitation, and finally somnolence with episodic agitation. Her white blood cell count increased to 39,000 cells/µL, and blood cultures grew gram-positive cocci. Ceftriaxone was increased to CNS dosing (2 g every 12 hours), and a lumbar puncture and brain MRI were planned to evaluate viral encephalitis or meningitis. Acyclovir (10 mg/kg every 8 hours) was added, and repeat cultures were drawn.

On hospital day four, she began spiking fevers (38.4 C) and became tachycardic and tachypneic, ranging from 110–130 bpm and 28–60 breaths/min, respectively. Initial blood cultures speciated to streptococcal pneumoniae, and her repeat cultures remained negative. A lumbar puncture and MRI were unable to be obtained given her agitation and hemodynamic instability, and she was subsequently transferred to the Medical Intensive Care Unit for sedation and elective intubation. Cerebral spinal fluid (CSF) analysis showed 238 nucleated cells, 56% PMNs, high protein, low glucose, and gram-positive cocci, consistent with bacterial meningitis. Antibiotics were broadened to include ampicillin (2 g every 4 hours). An MRI of the brain revealed findings consistent with florid meningitis, ventriculitis, and possible ischemic infarcts.

The patient was transferred to the Neuro Critical Care Unit at Rhode Island Hospital for neurosurgical evaluation and monitoring. Repeat MRI demonstrated progression of cerebritis and ischemic infarcts, and CT angiogram of the head and neck supported invasive pneumococcal disease with CNS progression. Repeat TTE showed a 19 mm x 12 mm partially mobile mass visualized on the posterior mitral valve, most consistent with vegetation in the setting of bacteremia. Compared to the TTE on admission, mitral insufficiency was better appreciated, possibly due to leaflet perforation and worsening of insufficiency due to infection progression. The final recommended treatment plan consisted of ceftriaxone (2 g every 12 hours) for a total of 28 days; however, given her very poor prognosis, she was transitioned to comfort measures only, and she passed away one day after extubation.

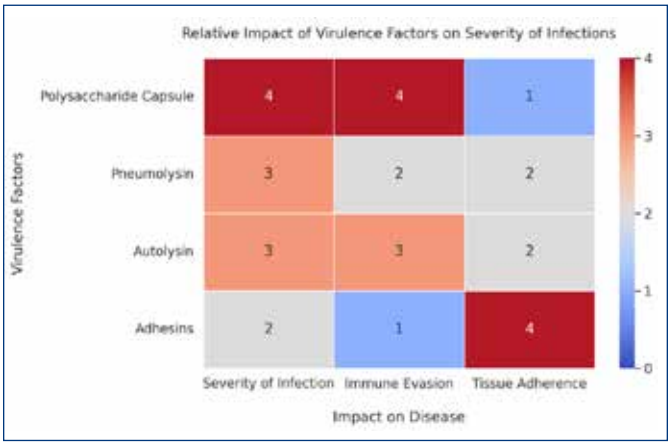
DISCUSSION

First identified in the 19th century, Austrian syndrome refers to a combination of three conditions – pneumonia, meningitis, and endocarditis – that often occur together following a Streptococcus pneumoniae (S. pneumoniae) infection.[1] This trio of ailments, also known as Osler's triad, historically had a mortality rate of 75%. The syndrome is more prevalent among individuals with alcohol use disorders, particularly in men, and was historically linked to alcoholism as part of a four-condition set.

S. pneumoniae presents unique challenges in treatment due to its virulence factors and ability to cause rapid, severe disease. One of the key characteristics that sets S. pneumoniae apart from other gram-positive organisms, such as Staphylococcus, is its polysaccharide capsule, a major virulence factor which allows the bacteria to evade the host's immune response and establish infection.[2] Moreover, certain capsular types have been associated with a higher frequency of nasopharyngeal colonization, potentially increasing the risk of developing severe infections. S. pneumoniae adheres to and invades host tissues, releases pneumolysin that damages host cells, and produces autolysin that leads to rapid bacterial lysis, resulting in a strong inflammatory response.[3] (See **Figure 1**.) Early identification and aggressive treatment are critical for reducing the morbidity and mortality associated with Austrian syndrome.[1] Current CDC guidelines emphasize the importance of pneumococcal vaccination for prevention; the routine administration of a one-time vaccination of PCV-20, or PCV-15 followed by PPSV-23, is recommended in all adults aged 19 to 64 with no history of pneumococcal vaccination or unknown vaccination history. In those with immunocompromising conditions, the CDC recommends an additional one-time dose of PCV-20 or PPSV-23 at least five years after completion of vaccinations.[10] There was an ongoing outpatient workup for hypogammaglobulinemia in our patient, which could have further predisposed her to invasive pneumococcal disease via humoral dysfunction, though this was not conclusively determined due to the patient's deferral of the diagnostic process. This case emphasizes the diagnostic challenges and management complexities associated with this rare condition, as well as the importance of lifelong healthy living and adherence to medical recommendations. Our patient's clinical course was complicated by her underlying medical conditions, including morbid obesity, asthma and hypertension, as well as her lack of pneumococcal vaccination, all of which likely predisposed her to invasive pneumococcal disease.[3]

Management of Austrian syndrome primarily focuses on the prompt initiation of appropriate antimicrobial therapy, with high-dose intravenous penicillin or ceftriaxone being the preferred treatments, and rifampicin if the bacterial isolate is resistant to cephalosporins.[4] Before the 1940s, S. pneumoniae was the cause of 15–20% of all endocarditis cases, but with the introduction of penicillin and pneumococcal vaccinations, the epidemiology of these infections shifted significantly. Today, S. pneumoniae accounts for less than 2% of endocarditis cases.[5] This underscores the role that antibiotic resistance plays in complicating treatment.

Figure 1. Heatmap depicting relative contributions of S. pneumoniae virulence factors to infection severity, immune system evasion, and tissue adherence.



Despite the initiation of broad-spectrum antibiotics, patients can rapidly deteriorate, as was observed in our patient.[4] Obtaining early and accurate culture and susceptibility data is especially important in guiding therapy.[3,6]

Our case highlights several valuable teaching points that may serve to improve the management and outcomes of patients with similar presentations. First, the diagnosis of meningitis must be considered even with minimal alteration of mental status with or without leukocytosis, especially if bandemia is present.[2] This went unrecognized in our patient because the initial changes in mental status were attributed to concurrent acute cystitis, and while the antibiotic type was promptly initiated, there was a delay in starting CNS dosing. Early suspicion and appropriate investigations, including lumbar puncture and brain imaging, are crucial to promptly diagnose and treat meningitis to minimize adverse outcomes.[7]

Second, our patient exhibited mostly neurological symptoms without any concomitant major cardiopulmonary symptoms, at least during the first week of her hospitalization, and did not have most of the classic risk factors.[5] As a result, the possibility of concurrent pneumococcal meningitis and endocarditis was not considered until later in the hospital course. This atypical presentation highlights the importance of maintaining a high index of suspicion for invasive pneumococcal disease in patients with unexplained neurological symptoms, even in the absence of traditional risk factors or overt cardiopulmonary manifestations.[8]

The literature on Austrian syndrome discusses the need for prompt surgical valve replacement, as studies suggest that only 17% of endocarditis cases respond successfully to medical treatment alone.[9] Nevertheless, the choice to move forward with surgery should be tailored to each individual situation, factoring in the patient's overall health status and prognosis. Given our patient's poor prognosis and rapid clinical decline, a conservative approach was chosen and the focus shifted to providing palliative care and, eventually, comfort care.

CONCLUSION

Austrian syndrome presents significant diagnostic and management challenges due to its rarity and nonspecific clinical features. Our case emphasizes the importance of maintaining a high index of suspicion for invasive pneumococcal disease, particularly in patients with unexplained neurological symptoms, and stresses the consideration of meningitis even with minimal alteration of mental status. Early recognition, aggressive antimicrobial therapy, and preventive vaccination are essential for reducing morbidity and mortality. This case serves as a reminder for clinicians to be vigilant for Austrian syndrome in patients presenting with pneumonia, endocarditis, and meningitis, and emphasizes the importance of vaccination against S. pneumoniae to prevent invasive pneumococcal disease and its complications.

References

1. Atkinson K, Augustine DX, Easaw J. Austrian syndrome: a case report and review of the literature. Case Rep. 2009; 2009:bcr0320091724.
2. Musher DM, Groover JE, Reichler MR, et al. Emergence of antibody to capsular polysaccharides of Streptococcus pneumoniae during outbreaks of pneumonia: association with nasopharyngeal colonization. Clin Infect Dis. 1997;24(3):441-446. doi:10.1093/clinids/24.3.441
3. van der Poll T, Opal SM. Pathogenesis, treatment, and prevention of pneumococcal pneumonia. Lancet. 2009;374(9700):1543-1556. doi:10.1016/S0140-6736(09)61114-4
4. Baddour LM, Wilson WR, Bayer AS, et al. Infective Endocarditis in Adults: Diagnosis, Antimicrobial Therapy, and Management of Complications: A Scientific Statement for Healthcare Professionals From the American Heart Association [published correction appears in Circulation. 2015 Oct 27;132(17):e215] [published correction appears in Circulation. 2016 Aug 23;134(8):e113] [published correction appears in Circulation. 2018 Jul 31;138(5):e78-e79]. Circulation. 2015;132(15):1435-1486. doi:10.1161/CIR.0000000000000296
5. García-Cabrera E, Fernández-Hidalgo N, Almirante B, et al. Neurological complications of infective endocarditis: risk factors, outcome, and impact of cardiac surgery: a multicenter observational study. Circulation. 2013;127(23):2272-2284. doi:10.1161/CIRCULATIONAHA.112.000813
6. Daudin M, Tattevin P, Lelong B, et al. Characteristics and prognosis of pneumococcal endocarditis: a case-control study. Clin Microbiol Infect. 2016;22(6):572.e5-572.e5.72E8. doi:10.1016/j.cmi.2016.03.011
7. Brouwer MC, Tunkel AR, van de Beek D. Epidemiology, diagnosis, and antimicrobial treatment of acute bacterial meningitis. Clin Microbiol Rev. 2010;23(3):467-492. doi:10.1128/CMR.00070-09
8. Aronin SI, Mukherjee SK, West JC, Cooney EL. Review of pneumococcal endocarditis in adults in the penicillin era. Clin Infect Dis. 1998;26(1):165-171. doi:10.1086/516279
9. Vuille C, Nidorf M, Weyman AE, Picard MH. Natural history of vegetations during successful medical treatment of endocarditis. Am Heart J. 1994;128(6 Pt 1):1200-1209. doi:10.1016/0002-8703(94)90752-8
10. Kobayashi M, Pilishvili T, Farrar JL, et al. Pneumococcal Vaccine for Adults Aged ≥19 Years: Recommendations of the Advisory Committee on Immunization Practices, United States, 2023. MMWR Recomm Rep 2023;72(No. RR-3):1–39. DOI: http://dx.doi.org/10.15585/mmwr.rr7203a1

Authors

Yonathan Daniel, MD'24,The Warren Alpert Medical School of Brown University, Providence, RI.

Idiris Mohamed, Department of Computer Science, College of Computer, Mathematical, & Natural Sciences, University of Maryland, College Park, MD.

Aaron P. Wheeler, MD, Assistant Professor of Medicine, Clinician Educator, The Warren Alpert Medical School of Brown University; Division of Hospital Medicine, The Miriam Hospital, Providence, RI.

Disclosures

No conflict of interest or financial disclosures.

Correspondence

Yonathan Daniel

Box G-9339, Brown University, Providence, RI 02912-G

Yonathan_daniel@brown.edu

'I Thought It Was My Diabetes': An Acute Presentation of Neuromyelitis Optica Spectrum Disorder

PRESTON NICELY, BS; GRACE SUN, MD; SIMRAN GUPTA, MD; MAXWELL LAWLOR, MD, MPH; VIJAIRAM SELVARAJ, MD, MPH

ABSTRACT

Neuromyelitis Optica Spectrum Disorder (NMOSD) is an immune-mediated neuroinflammatory disease of the central nervous system. Patients typically present with sensory deficits, weakness, and incontinence. This is a case of a 43-year-old female with diabetes mellitus admitted for acute onset leg weakness and stool incontinence. Spinal MRI imaging revealed transverse myelitis, and her lab work was significant for an anti-aquaporin 4 (AQP4) antibody titer of 1:2,560. Initial treatment consisted of a high-dose steroid taper and plasmapheresis. This unique case illustrates the importance in recognizing delayed presentations of rare neuroinflammatory conditions previously assumed to be a sequela of diabetic neuropathy.

KEYWORDS: NMOSD, Neuromyelitis Optica, transverse myelitis, NMO, Devic's Disease

BACKGROUND

Neuromyelitis Optica Spectrum Disorder (NMOSD) is an immune-mediated inflammatory disease resulting in demyelination, axonal damage, and perivascular lymphocytic infiltrations within the spinal cord and optic nerves.[1] NMOSD has a prevalence of 0.01%, with a predominantly female-to-male ratio of 10:1, though robust epidemiological studies are lacking.[2] We discuss an unusual presentation of NMOSD, where the patient may have had misinterpreted signs and symptoms of the disease years before her initial presentation, illustrating the importance of NMOSD awareness and early intervention.

CASE REPORT

A 43-year-old female with a history of type 2 Diabetes Mellitus (DM) was admitted for acute onset bilateral leg weakness and stool incontinence. Two days prior, the patient reported cervical to mid-back pain, urinary urge incontinence, and an involuntary loss of anal sphincter control. The patient reported similar symptoms one year prior to presentation, which subsequently resolved after being diagnosed with DM and treated with metformin. She had no recent medication adjustments, smoked a quarter pack of cigarettes daily, and did not endorse alcohol or recreational drug use.

On initial presentation, she was afebrile, normotensive, and tachycardic to the 120s. Her physical exam was notable for left lower extremity 2/5 strength to hip flexion, knee flexion and extension, and 4-/5 strength for plantarflexion and dorsiflexion. During an ocular exam, the patient had diminished reactivity to light and accommodation in the left eye as compared to the right. Visual fields were full to confrontation bilaterally. There were no gross abnormalities appreciated on anterior eye exam. Sensation to light touch, crude touch, nociception, and temperature was grossly diminished in the left leg as compared to the right in the L4–L5 dermatomes. Though more pronounced on the left, she had sensory deficits to the umbilicus. There was a positive Babinski sign bilaterally and diminished patellar reflexes on the left. Her initial labs were significant for a WBC of 17.2 x 10^9/L (**Table 1**). Total spine MRI was significant for a segment of patchy enhancement extending from C7 to T10, consistent with transverse myelitis (**Figure 1**). An MRI of her brain without contrast showed T2 FLAIR hyperintensities. A lumbar puncture was performed, and the patient was started on a five-day course of high dose (1,000 mg) methylprednisolone. Neurology was consulted and recommended a broad work-up for the etiology of the transverse myelitis (**Figure 2**). Notable CSF findings included the absence of oligoclonal bands, bloodwork positive for an SSA of 1.6, and a mildly positive ANA titer of 1:40. On hospital day 12, her anti-AQP4 antibody resulted and was positive with a titer of 1:2,560 (**Table 1**).

The positive anti-AQP4 finding suggested a diagnosis of NMOSD, and the patient was started on a two-week 60 mg prednisone taper. Additionally, she underwent five sessions of plasmapheresis over the course of 10 days. In the setting of prolonged steroid administration, she received trimethoprim-sulfamethoxazole for pneumocystis jirovecii (PJP) prophylaxis. Physical therapy was utilized extensively for rehabilitation and pelvic floor strengthening. After 21 days of hospitalization and steroid treatment, the patient noticed significant improvement in her left peripheral vision previously believed to be a chronic complication of her diabetes, strength in her left lower extremity, and sensation. Remarkably, she was able to improve her strength to 3/5 for left hip flexion, and 4/5 for left knee extension prior to discharge to an acute rehabilitation center for further strengthening and initiation of an immunosuppressive regimen (**Figure 3**).

Table 1. Bloodwork results on admission and notable lab findings during hospitalization.

Lab	Result
BMP	
Na+	137 mEq/L
K+	3.8 mEq/L
Cl-	102 mEq/L
HCO3-	23 mEq/L
BUN	26 mg/dL
Cr	1.17 mg/dL
Glucose	67 mg/dL
CBC	
WBC	17.2 x 109/L
Hgb	12.1 g/dL
Hct	36.7%
Plt	349 x 109/L
Infectious	
EBV IgG	16.1 units/mL
HIV, HTLV I/II	NEGATIVE
RPP	NEGATIVE
Enterovirus D68	NEGATIVE
West Nile	NEGATIVE
Borrelia Burgdorferi & Lyme Ab	NEGATIVE
Blood & CSF Cultures	No Growth
Autoimmune	
anti-AQP4	1:2,560
SSA	1.6
ANA (speckled)	1:40
CRP	54.6 mg/dL
ESR	58 mm/hr
SSB	NEGATIVE
Anti-MOG	NEGATIVE
CSF	
CSF oligoclonal bands	NEGATIVE
CSF WBC	Elevated WBC, CSF IgG index
CSF Studies	NEGATIVE VDRL, VZV
CSF Cytology	13 nuc cells, 4% polys

EBV=Epstein Barr Virus, HIV=Human Immunodeficiency Virus, HTLV=Human T-cell Lymphotropic Virus, RPP=Respiratory Pathogen Panel

Figure 1. Spinal MRI showing patchy enhancement of the spinal cord extending from the level of the C7 vertebral body to the T10 level.

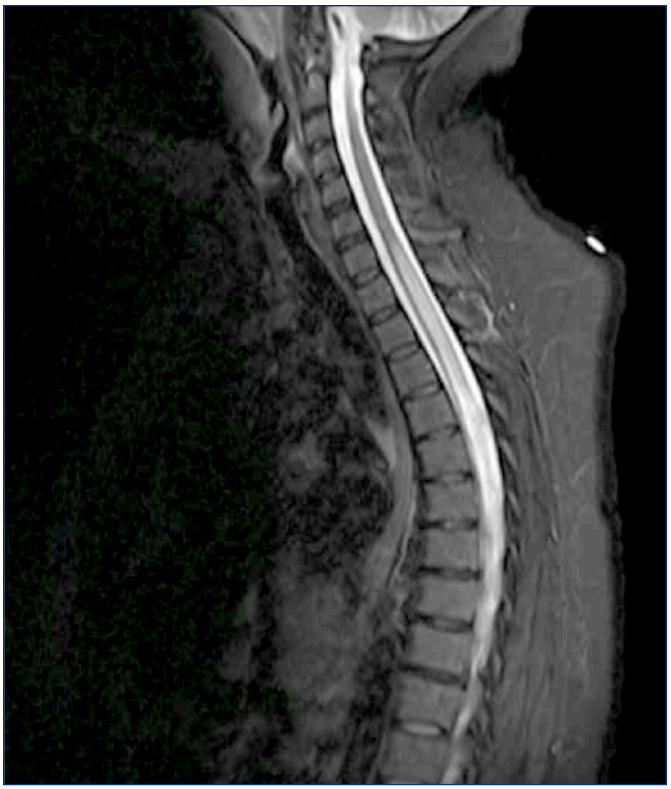
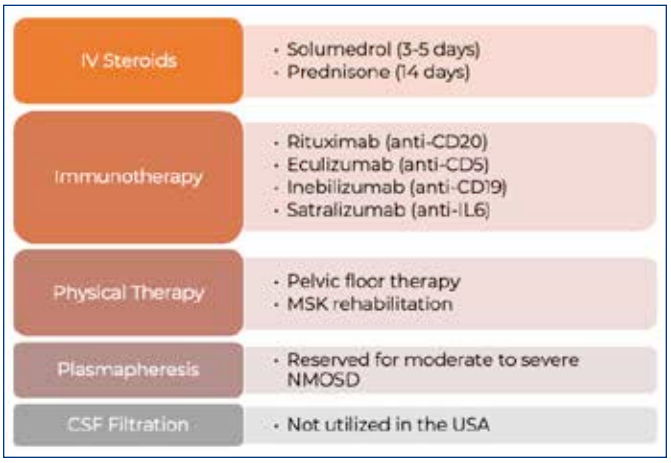


Figure 2. Differential Diagnoses for Transverse Myelitis etiologies[10]

Figure 3. Therapeutic approaches in the treatment of NMOSD[13-15]



DISCUSSION

NMOSD (Devic's Disease) is an inflammatory, relapsing demyelinating syndrome of the central nervous system that preferentially affects the optic nerves and spinal cord. In NMOSD, antibodies target aquaporin-4 (AQP4) channels on the surface of astrocytes, resulting in destruction of the blood-brain barrier. Subsequently, the neuroparenchyma becomes necrotic and loses astrocyte scaffolding.[3] Anti-AQP4 antibodies have been shown to approach 100% sensitivity to NMOSD, though small studies have demonstrated 40% of patients as anti-AQP4 negative.[4,5] There appears to be a strong phenotypic overlap between NMOSD and multiple sclerosis (MS), yet the discovery of anti-AQP4 antibodies, the distinct differences in clinical responsiveness to immunotherapy, and unique histopathologic and imaging features, cements MS as a separate entity from NMOSD.[6] Unlike MS, the demyelination occurring in NMOSD is secondary to the primary immune-mediated destruction of astrocytes, concentrated in the periventricular, periaqueductal grey, and area postrema, creating the possibility for brainstem syndromes like nausea, vomiting, and intractable hiccups.[7]

Patients typically present with optic neuritis and transverse myelitis, with symptoms of acute vision loss, weakness, sensory loss, bowel/bladder incontinence, and leg pain.[8] NMOSD presenting symptoms vary widely, but optic neuritis is present in approximately 35% compared to transverse myelitis in 50% of cases. Specifically for our patient, 10 months prior to presentation, she underwent a dilated fundoscopic exam which revealed left-sided optic disc pallor and thin retinal nerve fibers concerning for optic neuritis. Despite her sequelae of symptoms, it is important to note the classic dyad of optic neuritis and transverse myelitis occurs in only 10% of patients.[9]

Patients with NMOSD have a high predilection for an array of autoimmune conditions.[10,11] Relapses are common and occur in up to 90% of individuals within one to three years of initial presentation; untreated NMOSD can lead to paraplegia, blindness, and even death within five years of the first attack.[12] Recent advancements focus on long-term immunosuppressives such as mycophenolate mofetil, azathioprine, and rituximab, with oral prednisolone for refractory cases.[13] Ongoing clinical trials investigating satralizumab, an anti-IL6 monoclonal antibody, have shown promising results with a reduction in relapses by 70–90%.[14] Similar results also exist with eculizumab, an anti-CD5 monoclonal antibody, and inebilizumab, an anti-CD19 monoclonal antibody.[15]

This presentation of seropositive NMOSD illustrates several important concepts in the management of rare disease. With typical presenting symptoms such as in our patient, it is imperative to first rule out life-threatening conditions like cerebrovascular accident (CVA) or cauda-equina syndrome. Spinal MRI with contrast is important in diagnosis to locate and characterize the degree of transverse myelitis. Our patient developed an AKI after contrast administration, thus further imaging studies including brain MRI had limited diagnostic utility. The lack of MS plaques on MRI, the patient's aggressive onset of sensory deficits, and transverse myelitis of more than three consecutive segments, ultimately made MS less likely. Furthermore, the absence of oligoclonal bands in CSF, as well as high titers of anti-AQP4 antibody, supported a diagnosis of NMOSD in the patient.

Due to the aggressive, relapsing nature of NMOSD, intravenous corticosteroid therapy is commonly the first line treatment for acute attacks. Patients who do not respond promptly to steroids may benefit from plasmapheresis. When not contraindicated, it is important to initiate early steroid administration as preventing acute relapses is the mainstay of treatment compared to preventing progression, unlike in MS.[16] Recent treatment advancements in NMOSD include long-term immunosuppressives such as mycophenolate mofetil, azathioprine, and rituximab.[13]

Despite suggestion of optic neuritis on fundoscopy prior to admission, the lack of orbital sequence studies with contrast during hospitalization precluded the diagnosis. It remained unclear whether the presenting visual deficits were from diabetic retinopathy or acute neuritis from brewing NMOSD. However, given the acute improvement in the patient's vision over the course of her hospitalization, it is most likely that the patient had optic neuritis that improved with an aggressive steroid regimen with superimposed bilateral diabetic retinopathy.

In summary, it is crucial for providers to gather comprehensive histories and neurological exams from patients, particularly those presenting with obvious deficits. In this particular case the localization and onset of symtpoms as well as the patient demographic suggested an autoimmune process over a CVA. Throughout a 24-day hospital course, the patient experienced a remarkable improvement in her visual acuity and leg strength with plasmapheresis and steroids, despite a delayed presentation. Though these symptoms may be commonly misattributed as diabetic retionapthy or neuropathy in patients with DM, it is important to consider that sometimes, something more sinister like NMOSD, may be the culprit.

References

1. Wingerchuk DM, Lennon VA, Lucchinetti CF, et al. The spectrum of neuromyelitis optica. Lancet Neurol. 2007 Sep;6(9):805-15. doi: 10.1016/S1474-4422(07)70216-8. PMID: 17706564.
2. Papp V, Magyari M, Aktas O, et al. Worldwide Incidence and Prevalence of Neuromyelitis Optica: A Systematic Review. Neurology. 2021 Jan 12;96(2):59-77. doi: 10.1212/WNL.0000000000011153. Epub 2020 Dec 11. PMID: 33310876; PMCID: PMC7905781.
3. Mandler RN, Davis LE, Jeffery DR, et al. Devic's neuromyelitis optica: a clinicopathological study of 8 patients. Ann Neurol. 1993 Aug;34(2):162-8. doi: 10.1002/ana.410340211. PMID: 8338340.

4. Schmetzer O, Lakin E, Roediger B, et al. Anti-aquaporin 4 IgG Is Not Associated With Any Clinical Disease Characteristics in Neuromyelitis Optica Spectrum Disorder. Front Neurol. 2021 Mar 12;12:635419. doi: 10.3389/fneur.2021.635419. PMID: 33776892; PMCID: PMC7994757.
5. Zekeridou A, Lennon VA. Aquaporin-4 autoimmunity. Neurol NeuroimmunolNeuroinflamm.2015;2(4):e110. doi:10.1212/NXI.0000000000000110
6. Barnett MH, Sutton I. Neuromyelitis optica: not a multiple sclerosis variant. Curr Opin Neurol. 2012 Jun;25(3):215-20. doi: 10.1097/WCO.0b013e3283533a3f. PMID: 22487568.
7. Popescu BF, Lennon VA, Parisi JE, et al. Neuromyelitis optica unique area postrema lesions: nausea, vomiting, and pathogenic implications. Neurology. 2011 Apr 5;76(14):1229-37. doi: 10.1212/WNL.0b013e318214332c. Epub 2011 Mar 2. PMID: 21368286; PMCID: PMC3068006.
8. Ghezzi A, Bergamaschi R, Martinelli V, et al. Clinical characteristics, course and prognosis of relapsing Devic's Neuromyelitis Optica. J Neurol. 2004 Jan;251(1):47-52. doi: 10.1007/s00415-004-0271-0. PMID: 14999489.
9. Mealy MA, Wingerchuk DM, Greenberg BM, Levy M. Epidemiology of neuromyelitis optica in the United States: a multicenter analysis. Arch Neurol. 2012;69(9):1176-1180.
10. Leite MI, Coutinho E, Lana-Peixoto M, et al. Myasthenia gravis and neuromyelitis optica spectrum disorder: a multicenter study of 16 patients. Neurology. 2012 May 15;78(20):1601-7. doi: 10.1212/WNL.0b013e31825644ff. Epub 2012 May 2. PMID: 22551731; PMCID: PMC3348852.
11. Iyer A, Elsone L, Appleton R, et al. A review of the current literature and a guide to the early diagnosis of autoimmune disorders associated with neuromyelitis optica. Autoimmunity. 2014 May;47(3):154-61.doi:10.3109/08916934.2014.883501.Epub2014 Feb 10. PMID: 24512514.
12. Wingerchuk DM, Hogancamp WF, O'Brien PC, et al. The clinical course of neuromyelitis optica (Devic's syndrome). Neurology. 1999 Sep 22;53(5):1107-14. doi: 10.1212/wnl.53.5.1107. PMID: 10496275.
13. Palace J, Leite MI, Jacob A. A practical guide to the treatment of neuromyelitis optica. Pract Neurol. 2012 Aug;12(4):209-14. doi: 10.1136/practneurol-2012-000237. Erratum in: Pract Neurol. 2012 Oct;12(5):342. Leite, Isobel corrected to Leite, Maria Isabel. PMID: 22869762.
14. Traboulsee A, Greenberg BM, Bennett JL, et al. Safety and efficacy of satralizumab monotherapy in neuromyelitis optica spectrum disorder: a randomised, double-blind, multicentre, placebo-controlled phase 3 trial. Lancet Neurol. 2020 May;19(5):402-412. doi: 10.1016/S1474-4422(20)30078-8. PMID: 32333898; PMCID: PMC7935419.
15. Pittock SJ, Lennon VA, McKeon A, et al. Eculizumab in AQP4-IgG-positive relapsing neuromyelitis optica spectrum disorders: an open-label pilot study. Lancet Neurol. 2013 Jun;12(6):554-62. doi: 10.1016/S1474-4422(13)70076-0. Epub 2013 Apr 26. PMID: 23623397.
16. Carnero Contentti E, Correale J. Neuromyelitis optica spectrum disorders: from pathophysiology to therapeutic strategies. J Neuroinflammation 18, 208 (2021). https://doi.org/10.1186/s12974-021-02249-1

Authors

Preston Nicely, BS, The Warren Alpert Medical School of Brown University, Providence, RI.

Grace Sun, MD, The Warren Alpert Medical School of Brown University; Department of Medicine, The Miriam Hospital, Providence, RI.

Simran Gupta, MD, The Warren Alpert Medical School of Brown University; Department of Medicine, The Miriam Hospital, Providence, RI.

Maxwell Lawlor, MD, MPH, The Warren Alpert Medical School of Brown University; Department of Medicine, The Miriam Hospital, Providence, RI.

Vijairam Selvaraj, MD, MPH, The Warren Alpert Medical School of Brown University; Department of Medicine, The Miriam Hospital, Providence, RI.

Disclosures

The authors have no conflicts of interest to report.

Correspondence

Preston Nicely, BS
preston_nicely@brown.edu

Vijairam Selvaraj, MD, MPH
vijairam_selvaraj@brown.edu

Seronegative Autoimmune Encephalitis with Evanescent Focal T2FLAIR Lesions

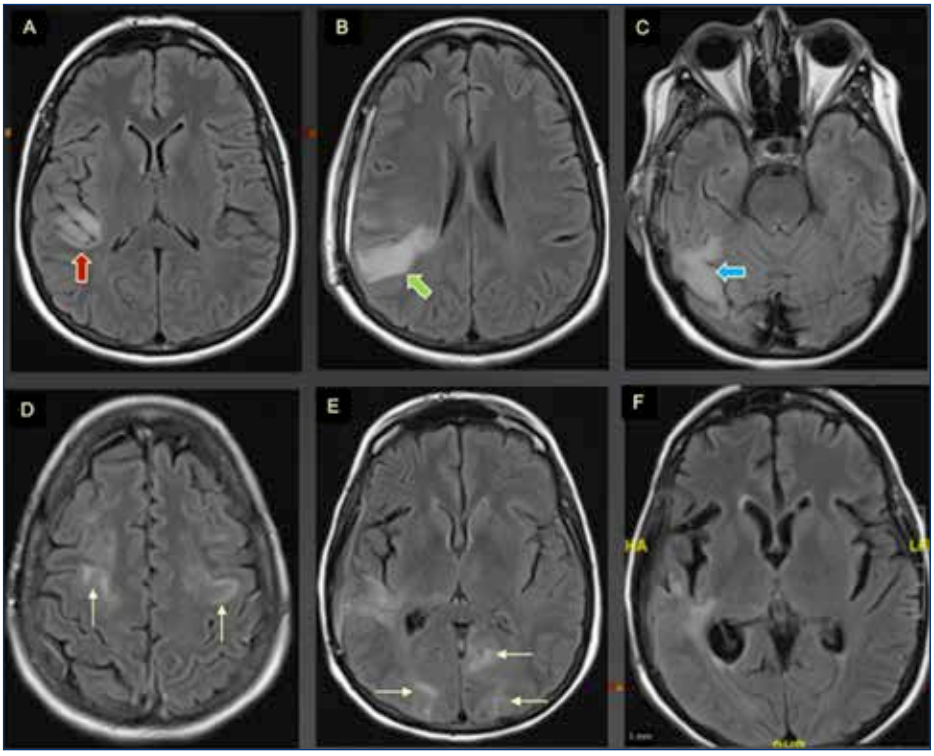
CAMERON STEWART, MD; GLENN A. TUNG, MD, FACR

Autoimmune encephalitis is a misdirected immune response against self-antigens expressed in the central nervous system. The prevalence is estimated to be 13.7/100,000.[1] About half of the cases are seronegative. They do not have a recognized neural-specific IgG[2]. Typical autoimmune encephalitis causes rapid progression of new psychiatric symptoms (psychosis, aggression, catatonia, short-term memory deficits, or decreased level of consciousness) with one of the following: new focal CNS deficits, new seizures, CSF pleocytosis, or MRI features of encephalitis.[3]

Here, we present the MRI findings of evanescent focal T2FLAIR lesions in a 53-year-old female patient with seronegative autoimmune encephalitis who developed refractory epilepsy. Her past medical history was notable for plaque psoriasis, well controlled for six years with ustekinumab, an anti-IL-12 and anti-IL-23 monoclonal antibody which inhibits T-cell activation. She developed paroxysms lasting one to five minutes of seeing a spinning fan in her left upper visual field, of hearing indistinct voices, and of having left facial twitching, each sometimes associated with loss of consciousness. These were not recognized as seizures until five months after first seeing a spinning fan, when she crashed a vehicle due to a secondarily generalized seizure.

EEG at that time captured intermittent slowing over temporal regions (right greater than left) and occasional sharp waves in the right mid-temporal region. MRI showed a 2.5cm, non-enhancing, T1-hypointense and T2-hyperintense lesion in the right temporal lobe initially thought to represent a low-grade glioma (See **Figure 1A–F**). This was biopsied, and pathology demonstrated focal encephalitis without glioma. CSF showed pleocytosis with lymphocytic predominance (14 nucleated-cells), increased protein concentration of 73 mg/dl, and increased CSF-specific oligoclonal bands (12). Serum aquaporin-4 and myelin oligodendrocyte glycoprotein (MOG) antibody tests were negative. An infectious work-up including tests for HIV, JC virus, and a broad meningitis/encephalitis panel were negative. An autoimmune encephalitis cell-based immunofluorescence panel was negative.

Figure 1. Migratory and evanescent T2-FLAIR lesions associated with seronegative autoimmune encephalitis. [**A**] Five months after first seizure, focal lesion (red arrow) in right posterosuperior temporal lobe involving Heschl gyrus. Biopsy revealed "encephalitis." [**B**] One month later, a new lesion (green arrow) in cortex and white matter of the right inferior parietal lobule. Lesion in the right posterosuperior temporal gyrus had decreased in size (not shown). [**C**] Seven months after first seizure, another new lesion (blue arrow) in cortex and white matter of right posterior temporal lobe. [**D**,**E**] Nine months after first seizure, new subcortical white matter lesions (small arrows) in both posterior frontal and occipital lobes, resembling posterior reversible encephalopathy syndrome. [**F**] Ten months after first seizure, residual gliosis at site of initial lesion (compare to A). All other lesions had resolved but note interval brain atrophy with ventriculomegaly and wide Sylvian fissures.



While being evaluated, she had increasingly refractory seizures. Nine months after her first seizure she developed suicidal and homicidal thoughts, was found searching for a dog which did not exist, and she forgot the existence of her granddaughter. Shortly thereafter, she had a prolonged admission for status epilepticus. She was treated empirically with methylprednisolone 1250 mg daily for three days, followed immediately by IVIG 0.4 mg/kg over five days, followed two weeks later by methotrexate 1g monthly. At the time of receiving her first dose of rituximab she was minimally responsive and required a tracheostomy, a PEG tube, and five anti-epileptic drugs. Three months after her first dose she followed up as an outpatient and was living with her family, her tracheostomy was decannulated, she could eat by mouth, she could follow a conversation, and she could start to wean her antiepileptic drugs.

References

1. Dubey D, Pittock SJ, Kelly CR, et al. Autoimmune encephalitis epidemiology and a comparison to infectious encephalitis. Ann Neurol. 2018;83(1):166-177. doi:10.1002/ana.25131
2. Orozco E, Valencia-Sanchez C, Britton J, et al. Autoimmune Encephalitis Criteria in Clinical Practice. Neurol Clin Pract. 2023;13(3). doi:10.1212/CPJ.0000000000200151
3. Graus F, Titulaer MJ, Balu R, et al. A clinical approach to diagnosis of autoimmune encephalitis. Lancet Neurol. 2016;15(4):391-404. doi:10.1016/S1474-4422(15)00401-9

Authors

Cameron Stewart, MD, Resident Physician, Brown Department of Neurology, Providence, Rhode Island.

Glenn A. Tung, MD, FACR, Professor of Diagnostic Imaging, The Warren Alpert Medical School of Brown University, Providence, Rhode Island.

Disclosures

The authors have no conflicts of interest relevant to this article to disclose.

Correspondence

Cameron Stewart, MD
593 Eddy St.
APC Building, 5th floor
Providence, RI, 02903
Fax 701-204-7992
cstewart2@lifespan.org

Fifteen-Year History of Virilization in a 17th-Century Woman

GLENN D. BRAUNSTEIN, MD

ABSTRACT

The Spanish artist, Jusepe de Ribera, painted a portrait of a virilized woman in 1631. He provided a brief clinical history on stone tablets, which indicates that the woman most likely harbored a benign, androgen-secreting ovarian tumor for 15 years.

KEYWORDS: hirsutism, virilization, ovarian adenoma, Jusepe de Ribera, androgens

INTRODUCTION

Currently residing in the Museo Nacional del Prado in Madrid, Spain, on loan from the Medinaceli Foundation, is a portrait of a virilized woman and her husband, along with a brief clinical history inscribed on a stone plinth (**Figure 1**). The artist, Jusepe de Ribera (1591–1652), was a Spaniard living in Naples, Italy, who was commissioned by his patron, Don Fernando Enriquez Afan de Ribera (1583–1637), the third Duke of Alcala and Viceroy of Naples, to paint the woman, Magdalena Ventura, in 1631. The Duke had an interest in individuals with medical abnormalities and had invited Magdalena to his palace to sit for Ribera.[1] Of interest, this painting had previously resided in the Hospital de Tavera in Toledo, which, after the Spanish Civil War (1936–1939), had been renovated and converted into an orphanage for girls. The portrait was housed by itself behind a closed door, presumably to not expose the young residents to the bizarre, realistic painting.[2]

La Mujer Barbuda (The Bearded Woman)

The painting, *La Mujer Barbuda* (The Bearded Woman), used the Caravaggio tenebrism style of contrasting light and dark shades to highlight the central figure.[3] Magdalena, in a finely embroidered dress, is clearly virilized with a luxurious beard and mustache, coarse skin, masculinized hands, as well as prominent frontal balding. She is holding an infant who is in a position to nurse from an engorged midline breast that is not covered with coarse, terminal hair. Her husband is standing behind her and also possesses a beard, mustache and frontal balding, but not nearly as well demarcated as that of his wife. To the right of Magdalena sit stone tablets with the following text translated from the Latin: "A great miracle of nature. Magdalena Ventura from the town of Accumulus

Figure 1. La Mujer Barbuda by Jusepe de Ribera in the Museo Nacional del Prado, Madrid, Spain, on loan from the Medinaceli Foundation. [COURTESY OF THE MEDINACELI FOUNDATION]

in Samnium, in the vulgar tongue Abruzzo in the Kingdom of Naples, aged 52, and what is unusual is when she was in her 37th year she began to go through puberty and thus a full growth of beard appeared such that it seems rather that of a bearded gentleman than a woman who had previously given three sons to her husband, Felici de Amici, whom you see next to her. Joseph de Ribera, a Spaniard, marked by the Cross of Christ, a second Apelles of his own time, by order of

Duke Ferdinand II of Alcala, Viceroy at Naples, depicted in a marvelously lifelike way. 16 February 1631."

The veracity of these events was confirmed by the Ambassador of Venice in Naples, Marc' Antonio Padovanino, who wrote on February 11, 1631: "In the rooms of Your Excellency, a very famous painter was making a portrait of a married Abruzzo woman and mother of many children, who has a totally virile face, with more than an inch of beautiful black beard, and a very hairy chest. His Excellency's pleasure in showing it to me, as a marvelous thing, and truly so."[3]

Thus, we have a 52-year-old woman who had given birth to three sons and then, at age 37, started to become virilized ("go through puberty"). We can assume that Ribera did not appreciate the physiology of the hypothalamic-pituitary-ovarian axis, as that was not described until the 20th century.[4] He may have been unaware that it would be very likely that a 52-year-old woman in the 17th century would have undergone menopause and therefore be unable to conceive the infant she was holding.[5,6] Although the association of the testes and virilization in men was known since antiquity, the concept of the testes secreting a substance was firmly established in 1849 by Berthold's studies of castration and reimplantation of testicles in roosters, followed by Brown-Sequard's classical human studies in 1889.[7]

The first descriptions of adrenal or ovarian pathology and virilization in women took place after Ribera's death.[8] Ribera also would not have been aware of the fact that androgen levels sufficient to fully virilize a woman would not only suppress ovulation, and hence pregnancy, but also lactation.[9] So, the infant and the misplaced breast were undoubtedly Ribera taking "artistic license" to make sure that the viewer knew that Magdalena, indeed, was a woman. The fact that her breast did not display the hirsutism that the Ambassador commented upon adds credence to this interpretation. In addition, he painted two items on top of the stone tablets. One is clearly a spindle of wool with a metal hook (i.e., a bobbin), a symbol of femininity. The other is less clear, but may be a container with unspun wool threads, which would also signify femininity. However, some authors have interpreted this as a snail or mollusk shell.[3] Since snails and some mollusks are known to be hermaphrodites, it has been proposed that Ribera was suggesting that Magdalena was a hermaphrodite (i.e., intersex), which would not be unreasonable, considering that she was clearly a woman with masculine features.[3,10] However, the first demonstration that snails are hermaphrodites was made by John Ray in 1660, a full 29 years after Ribera completed his painting.[11]

Despite there being no information concerning an abdominal exam for adrenal masses; a pelvic exam to look for clitoromegaly, ambiguity of her external genitalia such as fusion of labioscrotal folds, or ovarian masses; measurement of sex steroid hormones and gonadotropins; chromosomal analysis or imaging studies, we can use the information contained in the painting to arrive at a reasonable diagnosis.

DIFFERENTIAL DIAGNOSIS OF VIRILIZATION

The differential diagnosis of virilization in an adult female is listed in **Table 1**.

Exogenous androgens can be excluded since neither purified testosterone, testosterone precursors nor anabolic steroids were discovered nor available in the 17th century. Although an intersex disorder (hermaphroditism) with Magdalena having an ovary and a testis or ovotestes is possible, the three prior pregnancies and onset of virilization at age 37 makes this a very unlikely possibility. Hirsutism or virilization in individuals with hermaphroditism tends to appear during adolescence and young adulthood and pregnancies are rare.[12] Late-onset congenital adrenal hyperplasia generally manifests with mild hirsutism in adolescence and infertility, neither of which were present here.[13,14] Similarly, polycystic ovarian syndrome is found in adolescents and young adults and results in oligo- or anovulation, infertility, and hirsutism, but rarely is associated with virilization.[14] Hyperthecosis may cause hirsutism and virilization but is a condition that occurs in postmenopausal women whose ovarian theca cells produce excessive testosterone under the influence of elevated levels of luteinizing hormone.[15] Although it is conceivable that Magdalena went through a premature menopause and also developed hyperthecosis, this is less likely than other sources of pathological androgen secretion.

Adrenocortical carcinoma may cause virilization but usually in association with excessive production of glucocorticoids and mineralocorticoids. She does not have the physical

Table 1. Causes of Virilization in Adult Women

Exogenous Androgens
Intersex (Disorder of Sexual Development; hermaphroditism)
Adrenal Disorders • Late Onset Congenital Adrenal Hyperplasia • Neoplasms Adenoma Carcinoma
Ovarian Disorders • Polycystic Ovarian Syndrome • Hyperthecosis • Hyperreacto luteinalis • Neoplasms Luteoma of pregnancy Sex Cord tumors Sertoli Cell tumor Granulosa Cell tumor Stromal Cell tumor Thecoma Leydig Cell tumor Sertoli-Leydig Cell tumor Mixed Ovarian and Testicular (gyandroblastoma) Metastatic mucinous carcinoma (Krukenberg tumor)

stigmata of Cushing syndrome and the 15-year history of virilization is a vanishing rare duration of life for a woman with an adrenocortical carcinoma or an androgen-secreting ovarian carcinoma.[15] Similarly, excessive androgen secretion and virilization may be found in a patient with a mucin-producing adenocarcinoma that has metastasized to the ovary (Krukenberg tumor), but again, a 15-year survival of a Stage IV untreated breast or gastrointestinal carcinoma would be quite unlikely.[16]

Thus, four diagnoses remain. On the surface, a portrait of a virilized woman nursing a newborn brings to mind the possibility that the virilization occurred during pregnancy from either hyperreacto luteinalis with cystic enlargement of the ovaries from multiple theca-lutein cysts or a luteoma, both of which may produce sufficient androgens to cause hirsutism or virilization.[16,17] However, the virilization improves or disappears following delivery. Neither of these disorders fit the clinical history of virilization occurring 15 years before the portrait was painted.

The final two possibilities are a benign adrenal or ovarian neoplasm. Androgen-secreting adrenal adenomas are less common than androgen-secreting ovarian neoplasms, and classically present with rapid onset of hirsutism, virilization and menstrual abnormalities in women in their mid-20s to mid-30s.[15,18] Sertoli cell, Leydig cell, or combined Sertoli-Leydig cell ovarian neoplasms, which comprise the category of androblastomas, can occur in both reproductively-aged women and women who are post-menopausal and may lead to rapid virilization.[15] Because these tumors are more common than pure androgen-secreting adrenal adenomas, it is likely that Magdalena harbored an androgen-secreting ovarian adenoma, although an androgen-secreting adrenal adenoma cannot be excluded based upon the clinical information that Ribera provided. Indeed, in his excellent analysis of the cause of Magdalena's virilization, W. Michael G. Tunbridge, MD, FRCP, Emeritus Physician, Nuffield Department of Medicine, Oxford, UK, also concluded that Ribera's subject suffered from a Sertoli-Leydig cell ovarian tumor.[19]

Although we do not have biochemical, imaging, or pathological confirmation of the diagnosis, Ribera's painting and brief clinical history provide sufficient information to arrive at a probable diagnosis. Today, we would measure testosterone and dehydroepiandrosterone sulfate, perform imaging, and, if necessary, a venous catheterization study of the ovarian and adrenal veins with testosterone measurements to confirm the diagnosis and recommend treatment.

References

1. Brown J, Kagan RL. The Duke of Alcala: His collection and its evolution. The Art Bulletin. 1987;69:231-255.
2. Sears JB. The bearded lady (from some travel notes). N Engl J Med. 1958;258:1099-2000.
3. http://en.fundacionmedinaceli.org/coleccion/fichaafondo.aspx?id=la-mujer-barbuda
4. Plant TM. The hypothalamo-pituitary-gonadal axis. J Endocrinology. 2015;226:T41-T54.
5. Post JB. Ages at menarche and menopause: some Mediaeval authorities. Population Studies. 1971;25:83-87.
6. Amundsen DW, Diers CJ. The age of menopause in Medieval Europe. Human Biology. 1973;45:605-612.
7. Rostom M, Ramasamy R, Kohn TP. History of testosterone therapy through the ages. Your Sexual Medicine J. 2022;34:623-625.
8. Azziz R. A brief history of androgen excess. In Contemporary Endocrinology: Androgen Excess Disorders in Women: Polycystic Ovary Syndrome and Other Disorders, Second Edition. R. Azziz, et al. (eds). Humana Press, Inc., Totowa, NJ. 2006;3-16.
9. Duffy PV, Corsaro J. Suppression of lactation by testosterone. JAMA. 1941;116:33-36.
10. Valasco S. Hairy women in textural and visual culture in early modern Spain. South Atlantic Review. 2007;72:62-75.
11. Orstan A. John Ray's hermaphrodite snails on their 350th anniversary. Mollusc World. 2010;23:3-4.
12. Witchel SF. Disorders of Sex Development. Best Pract Res Clin Obstet Gynaecol. 2018;48:90-102.
13. Witchel SF. Congenital adrenal hyperplasia. J Pediatr Adolesc Gynecol. 2017; 30:520-534.
14. Cussen L, McDonnell T, Bennett G, et al. Approach to androgen excess in women: clinical and biochemical insights. Clin Endocrinol. 2022;97:174-186.
15. Hirschberg AL. Approach to investigation of hyperandrogenism in a postmenopausal woman. J Clin Endocrinol Metab. 2023;108:1243-1253.
16. Kanova N, Bicikova M. Hyperandrogenic states in pregnancy. Physiol Res. 2011; 60:243-252.
17. Masarie K, Katz V, Balderston K. Pregnancy luteomas. Clinical presentations and management strategies. Obstet Gynecolog Surv. 2010;65:575-582.
18. Cavlan D, Bharwani N, Grossman A. Androgen- and estrogen-secreting adrenal cancers. Semin Oncol. 2010;37:638-648.
19. Tunbridge WMG. *La Mujer Barbuda* by Ribera, 1631: a gender bender. Q J Med. 2011; 104:733-736.

Author

Glenn D. Braunstein, MD, Professor of Medicine, Cedars-Sinai Medical Center, Los Angeles, CA.

Disclosures

Conflicts of Interest: None
Funding Source: None

Acknowledgments

The author appreciates the helpful information provided by Ms. Matilde Fernandez Balsera and Ms. Andrea Perez of the Fundacion Medinaceli.

Correspondence

Glenn D. Braunstein, MD
9 Chatham Ct, Newport Beach, CA 92660
310-500-7675
Glenn.Braunstein@cshs.org

Weight Recovery in an Outpatient Medical Eating Disorders Clinic: A Retrospective Review

HAILEY FULKERSON; GIORGINA GIAMPAOLO; DARBY MELIA; ABIGAIL A. DONALDSON, MD

ABSTRACT

BACKGROUND: The purpose of this study was to identify rates of weight recovery among adolescents and young adults with restrictive eating disorders (RED) as part of a quality improvement assessment in an Adolescent Medicine outpatient clinic in Rhode Island.

METHODS: A retrospective chart review was completed on 94 randomly selected patients ages 10–21 years old. Demographics, descriptors, time to weight recovery, and participation in other care were recorded.

RESULTS: The average age of participants was 15 years; most were female, cis-gender, White, had private insurance, and had one or more co-morbid psychiatric diagnosis. At intake, 81% were <95% treatment goal weight (TGW), with 27% at <80% TGW. Among participants who started at <95% of TGW, 51% achieved ≥95% of TGW; participants who engaged in a higher level of care were more successful.

CONCLUSIONS: This study identifies outcomes and highlights the challenge of weight recovery among patients with RED, even when managed by an expert clinical team.

KEYWORDS: eating disorder program, weight recovery, outcomes

BACKGROUND

Eating disorders among children, adolescents and young adults (AYA) ages 5 to 26 years are increasingly common,[1] and the process of recovery can be hampered by setbacks and relapse.[2] Identifying outcomes among AYA with restrictive eating disorders (RED) is challenging due to multiple factors, including absence of a clear definition of recovery and difficulty with sustained follow-up;[2-4] however, achieving or maintaining a healthy body weight is a well-established primary goal of treatment.[5]

Most AYA with RED are medically managed in the primary care or eating disorder-specialized outpatient setting. A retrospective chart review by the National Eating Disorders Quality Improvement Collaborative examined treatment outcomes among patients with RED in 14 Adolescent Medicine clinics.[2] The Collaborative used ≥90% of the mean body mass index (BMI) as its definition of weight recovery and showed that patients do make progress towards this goal in the first year of treatment. Engagement in a higher level of care (HLOC) did not improve weight outcomes. Though ≥90% mean BMI has been used as a minimum goal to establish physical recovery,[6] some studies suggest that using a higher target might better support physical and psychological recovery.[7,8] As a reference point, medical hospitalization is recommended for increased risk of physiologic complications when a patient is <75% of an appropriate body weight. The current study was undertaken as part of a program assessment determine how AYA with RED in an Adolescent Medicine-based eating disorders program fared with weight recovery to and maintenance at ≥95% of treatment goal weight (TGW) over time as a key indicator of progress towards recovery from the eating disorder.[9] In addition, it examines whether engagement in a higher level of care during treatment enhanced the weight recovery process.

METHODS

The Hasbro Children's Hospital Eating Disorders Program (HEDP) in Providence, Rhode Island, serves AYA with eating disorders in an outpatient Adolescent Medicine clinic, including medical providers, dietitians, and social work program support; it does not include individual or family therapy. Principles of Family-Based Treatment are integrated into the HEDP medical setting.[10] Patients are required to engage in community-based eating disorder-focused psychotherapy as part of treatment, but the method(s) used depends on the individual clinician's approach. Higher levels of care available through the HEDP include medical inpatient, medical-psychiatric inpatient, and medical-psychiatric partial hospital programs. An institutional review board-approved retrospective chart review was conducted on a randomly selected sample of 94 patients who followed in the HEDP between January 2012 and May 2022 and reported restrictive eating. Patients were randomized using an alphabetized list by last name of active patients, and by selecting every 5th patient. Charts were reviewed for information at the initial appointment and at 6, 12, 24, 36 months and/or the most recent appointment to clinic.

Collected data included demographic information, anthropometrics, additional eating disorders behavior(s), and any

HLOC treatment (**Tables 1,2**). Participants included patients who reported a restrictive eating pattern; some reported additional disordered eating behavior as well. Each patient's TGW was identified by an eating disorder-experienced dietitian based on individual patient growth chart review and consideration of mean BMI at the 50th percentile for age and gender.[9] REDCap was used for data de-identification and storage Data analysis included percent of patients who achieved ≥95% of TGW.

RESULTS

The average participant age was 15 years (range 10–21 years). Most were female, cis-gender, White, and had private insurance. At intake, 81% were <95% TGW, with 27% at <80% TGW. During the study period, 79% reported at least one co-morbid psychiatric diagnosis. **Table 1** describes participant characteristics. Among participants who started at <95% of TGW, 51% achieved ≥95% of TGW. Participants who engaged in HLOC more often achieved ≥95% of TGW. **Table 2** describes weight recovery to ≥95% of TGW among participants.

Table 1. Demographic and descriptive features

	Total sample N=94 (%)
Female	84 (89)
Transgender or non-binary	6 (6)
Non-White	24 (26)
Public insurance	30 (32)
Eating Disordered behavior reported in addition to restricting*	
Vomiting	31 (33)
Excessive exercise	35 (37)
Calorie counting	19 (20)
Binge eating	10 (11)
Weight loss pills/supplements/laxatives	6 (6)
Percent of TGW[i] at intake	
<80	25 (27)
80–84	19 (20)
85–95	33 (35)
>95	18 (19)
Started >95% TGW and lost to <95% TGW	3 (3)
Comorbid psychiatric Diagnoses*[o]	
0	19 (20)
1	23 (24)
2	15 (16)
>2	39 (41)
Participated in higher level ED care*[x]	32 (34)
Medical inpatient setting only*	20 (21)

*at any point during study period
[i] treatment goal weight
[o] including depression, anxiety, attention deficit disorder/attention deficit hyperactivity disorder, obsessive compulsive disorder, post-traumatic stress disorder, oppositional defiant disorder, adjustment disorder, passive suicidal ideation, suicidal ideation with a plan, suicide attempt, self-harm, substance use, history of trauma
[x] including residential, partial hospital, intensive outpatient, and/or medical inpatient

Table 2. Patients who started at <95% and reached ≥95% treatment goal weight over time

	N (%) ever achieved ≥95% TGW	N (%) at ≥95% TGW at <7 months	N (%) at ≥95% TGW at 8–13 months	N (%) at ≥95% TGW in 14+ months
Patients who started at <95% TGW* (N=77)	40 (51)	25 (32)	9 (12)	6 (8)
Initial % TGW weight				
<80 (N=25)	14 (56)	8 (32)	4 (16)	2 (8)
80–84 (N=19)	9 (47)	2 (11)	5 (26)	2 (11)
85–95 (N=33)	17 (50)	15 (88)	0 (0)	2 (12)
Participated in other ED care (N=28)[ox]	20 (71)	12 (43)	5 (18)	3 (11)
Admitted to medical inpatient setting (N=18)[o]	13 (72)	8 (44)	4 (22)	1 (6)

*Treatment goal weight
[o] at any point during the study period
[x] including residential, partial hospital, intensive outpatient, and/or medical inpatient

DISCUSSION

Our study shows that just over half of AYA with RED who started out underweight achieved ≥95% TGW during the study period; most achieved this goal relatively early in treatment, suggesting that the first few months of treatment in an eating disorder clinical setting can be critical to successful weight recovery. In addition, those who engaged in HLOC were more likely to successfully weight restore.

The current study aligns with the findings of the National Eating Disorders Quality Improvement Collaborative showing successful weight recovery can occur in the Adolescent Medicine clinical setting,[2] though fewer patients in our study achieved this goal. Our less robust findings are likely explained by several factors. When a lower target weight range is used (≥90% of TGW, as in the Collaborative study) the proportion of patients who achieve the goal will be greater than when a higher (≥95% of TGW) target range is used. In our study we used the higher range because it is more likely to support both physical and therapeutic recovery.[7,8] In addition, nearly half of the current sample had >2 co-morbid psychiatric diagnoses, suggesting significant emotional complexity, a recognized challenge to successful weight restoration.[4]

Our findings show that HLOC engagement was more common among patients who achieved target TGW, which differs from the Collaborative's findings among a similar

population.[2] The current study did not explore whether weight gain during HLOC participation was maintained long-term, but past studies suggest that assertive weight gain early in treatment might improve chances for sustained recovery,[11] making any weight gain in the early phase of treatment an opportunity to establish a path to wellness.

STRENGTHS AND LIMITATIONS

Our study provides a closer examination of outcomes in a specific treatment setting; findings will be applied to future quality improvement efforts in the participating clinic and might inform practice in similar outpatient eating disorder medical settings elsewhere. The study was limited by several factors. Data reflected a random sample of patients, some long-term and others relatively new to treatment. This inconsistency in length of time in care and small sample size prevented analysis of average length of time to weight recovery; some participants may not have been in treatment long enough to allow for weight recovery, and others may have started treatment in a HLOC setting where weight gain was established more aggressively, giving them a "jump start" in weight recovery compared to patients who only engaged in outpatient treatment. In addition, though the chart review included extraction of private vs public insurance data as one measure of socioeconomic status, it did not use other methods (zip codes, for example) that might have allowed a better understanding of contributing social determinants of health (e.g., density of grocery stores by zip code) in recovery. Finally, there were time constraints on the study's first three authors (graduation from training programs (GG, DM) and transition to medical clerkship (HF)) such that the period for chart review was limited.

CONCLUSIONS

This descriptive study of patient progress in an Adolescent Medicine eating disorders program provides an assessment of program outcomes to enhance quality improvement efforts and highlights the challenge of weight recovery among patients with RED, even when managed by an expert clinical team. While weight restoration is a prerequisite for recovery, using it alone over-simplifies the assessment of recovery. Future outcomes studies in this population should work towards standardized measures of physical and emotional recovery that can be better applied to the interdisciplinary care settings so often utilized in eating disorder treatment.

References

1. Hartman-Munick SM, Lin JA, Milliren CE, et al. Association of the COVID-19 Pandemic With Adolescent and Young Adult Eating Disorder Care Volume. JAMA Pediatr. 2022; doi: 10.1001/jamapediatrics.2022.4346.
2. Forman SF, McKenzie N, Hehn R, et al. DSM-5 restrictive eating disorders: report of the national eating disorders quality improvement collaborative. J Adolesc Health. 2014; doi: 10.1016/j.jadohealth.2014.06.014.
3. Wade TD, Lock J. Developing consensus on the definition of remission and recovery for research. Int J Eat Disord. 2020; doi: 10.1002/eat.23165.
4. Guarda A. Treatment of anorexia nervosa: Insights and obstacles. Physiol Behav. 2008; doi: 10.1016/j.physbeh.2007.11.020.
5. Campbell K, Peebles R. Eating Disorders in Children and Adolescents: State of the Art Review. Pediatrics. 2014; doi.org/10.1542/peds.2014-0194.
6. Golden NH, Jacobson MS, Schebendach J, et al. Resumption of Menses in Anorexia Nervosa. Arch Pediatr Adolesc Med. 1997; doi:10.1001/archpedi.1997.02170380020003
7. Murray SB, Loeb KL, Le Grange D. Treatment Outcome reporting in anorexia nervosa: time for a paradigm shift? J Eat Disord. 2018; doi: 10.1186/s40337-018-0195-1.
8. Golden NH, Cheng J, Kapphahn CJ, et al. Higher Calorie Refeeding in Anorexia Nervosa: 1-Year Outcomes From a Randomized Controlled Trial. Pediatrics. 2021; doi: 10.1542/peds.2020-037135.
9. Golden NH, Katzman DK, Sawyer SM, et al. Update on the Medical Management of Eating Disorders in Adolescents. J Adolesc Health. 2015; doi: 10.1016/j.jadohealth.2014.11.020.
10. Katzman DK, Peebles R, Sawyer SM, et al. The Role of the Pediatrician in Family-Based Treatment for Adolescent Eating Disorders: Opportunities and Challenges. J Adolesc Health. 2013; doi: 10.1016/j.jadohealth.2013.07.011.
11. Treasure J, Russell G. The case for early intervention in anorexia nervosa: theoretical exploration of maintaining factors. Br J Psychiatry. 2011; doi: 10.1192/bjp.bp.110.087585.

Authors

Hailey Fulkerson, The Warren Alpert Medical School of Brown University, Providence, RI.

Giorgina Giampaolo, The Warren Alpert Medical School of Brown University, Providence, RI.

Darby Melia, Brown University, Providence, RI.

Abigail A. Donaldson, MD, The Warren Alpert Medical School of Brown University, Providence, RI; Rhode Island Hospital/Hasbro Children's Hospital Department of Pediatrics, Division of Adolescent Medicine.

Disclosures

Disclaimer: The views herein are those of the authors and do not necessarily reflect the views of any of the author-affiliated employers or universities.

Authors' contributions: Chart review was conducted by HF, DM, GG, and AD. Data analysis was conducted by GG. Manuscript preparation and review was conducted by AD and DM. All authors read and approved the final manuscript.

Ethics approval and consent to participate: The study was approved by the Rhode Island Hospital Institutional Review Board (IRB). Consent was waived by the IRB due to study design (retrospective, de-identified chart review).

Correspondence

Abigail A. Donaldson, MD
593 Eddy Street
Potter 200.5
Providence, RI 02903
401-444-4712
Fax 401-444-6220
adonaldson@lifespan.org

Diversity, Equity, and Inclusion in Orthopaedic Surgery: Local and National Efforts

LAUREN E. PIANA, MS, MD; ELEANOR BURSTEIN, MD; SARAH CRIDDLE, MD; ELAINE HE, BA; JULIA A. KATARINCIC, MD; BRETT D. OWENS, MD; RAYMOND Y. HSU, MD

ABSTRACT

Orthopaedic surgery has not experienced the same increase in diversity as other surgical subspecialties over time. Professional orthopaedic societies across the nation, including the American Academy of Orthopaedic Surgeons, are now making sincere efforts to improve diversity, equity, and inclusion (DEI) within the field. Several national groups provide funding to support DEI -related research as well as scholarships to national meetings. Others are more focused on mentorship and mitigation of residency attrition amongst underrepresented minorities (URMs). Individual residency programs, including the Department of Orthopaedics at Brown University, are engaging in community outreach to attract more diverse candidates to orthopaedics and providing away rotation scholarship support for medical students that identify as female or URMs. These local and national efforts will hopefully lead to a more inclusive environment for all trainees and practitioners within orthopaedics and ultimately improved orthopaedic care for all patients.

KEYWORDS: orthopaedics, residency education, diversity, equity, inclusion

INTRODUCTION

Despite continued improvements in diversity in surgical disciplines, orthopaedic surgery has not experienced improvements on par with its peers. The most recent American Academy of Orthopaedic Surgeons (AAOS) census in 2018 found that only 5.8% of practicing orthopaedists identified as female and only 15.3% of practitioners were non-White. Although gender and ethnic diversity was better amongst younger surgeons, large disparities remained across all age groups.[1]

This is in stark contrast to the improvements made in the past decades for medical education as a whole. Based on the most recent Association of American Medical Colleges (AAMC) data for matriculants to US medical schools in 2022, 10% of first-year medical students were Black or African American, 12% were Hispanic or Latino, and 56% identified as female.[8] While there is still much room for improvement in diversity in medical education in order to match racial distribution amongst the US population (14.2% Black or African American, 18.7% Hispanic or Latino), it is clear that medical education as a whole is far ahead of orthopaedics in terms of overall diversity.[9]

Encouraging diversity and inclusivity within the field of orthopaedics is important for a myriad of reasons. First, orthopaedics may be losing some of the best future physicians to other specialties that better demonstrate a commitment to diversity. In addition, patients who desire care from a provider from a similar background may struggle to find a doctor or fail to seek care given the current demographics of orthopaedic surgeons. Moreover, prior research has shown that diverse healthcare teams improve both patient outcomes and financial success in medicine.[2] Educating aspiring physicians about orthopaedics will encourage those with less access and exposure to consider it as a career and will also benefit the field as a whole. The obvious way to bridge the existing gap is to recruit and retain a wider range of orthopaedic trainees through diversity, equity, and inclusion (DEI) efforts, but this has proven to be a challenge.

CURRENT MAKE-UP OF ORTHOPAEDIC TRAINEES

Lack of diversity in orthopaedics is not limited to those in practice, as orthopaedic surgery remains the surgical subspecialty with the fewest women and underrepresented minorities (URMs) as residents. In 2019, Poon et al showed that while the number of female orthopaedic residents increased from 10.9% to 14.4% between 2006–2015, it did so at a slower rate than all other surgical subspecialties save for urology. They also found that the number of White residents increased and there was actually a decrease in URMs during that time.[3] Another recent study found that URMs had a lower likelihood of matching into an orthopaedic residency when compared to their peers when controlling for academic performance. Interestingly, this effect was not observed amongst female applicants, suggesting that different strategies may be required to recruit URMs versus women as trainees.[4]

There is a dearth of research regarding the prevalence of LGBTQ+ or sexual and gender minorities (SGMs) amongst orthopaedic residents and attendings. Given the field's otherwise homogeneous demographics, it is conceivable that this is another area in which orthopaedics lags behind. In fact, a

study of graduating medical students from 2016–2019 found that the specialty with the lowest percentage of self-identifying SGMs (1.8%) matriculating into residency was orthopaedics.[5] Importantly, AAOS and the Pediatric Orthopaedic Society of North America (POSNA) have recently published articles drawing awareness to this issue, calling for improved training regarding LGBTQ+ patient care as well as education about bias and allyship.[6,7]

ONGOING DEI EFFORTS NATIONALLY

There are several groups working to promote diversity in orthopaedics at the national level. The AAOS now has a Diversity Advisory Board (DAB) with the stated goal of educating the orthopaedic community about the importance of diversity and culturally competent care as well as increasing the diversity within the field. They do this through outreach efforts to promote AAOS membership among women and URMs as well as to increase representation from these groups on AAOS committees. In addition, in 2022, the DAB awarded $300,000 to 20 programs focused on DEI initiatives and published more than 30 articles related to diversity in the AAOS publication *AAOS NOW*.[10]

The Ruth Jackson Orthopaedic Society (RJOS) is the most active group focused on sex and gender diversity. It is a professional society for women and offers support and programming for female medical students, trainees, and practicing surgeons. They award scholarships for research and traveling fellowships as well as fund attendance at the RJOS national meeting. In addition, they have a mentorship program that connects trainees with attending surgeons across the country. Furthermore, they offer resources and webinars focused on sex-specific issues such as pregnancy, infertility, and how to navigate training and practicing in a male-dominated field, as well as more generalized topics including career advancement, leadership, combating harassment and microaggressions, care for the transgender patient, and DEI in orthopaedics.

The J. Robert Gladden Orthopaedic Society is another professional society that focuses on efforts to improve diversity in orthopaedics in relation to URMs. It is a pluralist multicultural organization, celebrating diversity in its ability to improve musculoskeletal care for all patients, especially those in underserved groups.[11] One area of recent focus is the disparate rates of attrition between resident URMs and their counterparts. In fact, a recent study funded by the Gladden Society showed that both female and URM residents are more likely to experience attrition than their male or White counterparts. Indeed, between 2001–2018, more than 19% of residents affected by attrition were URMs, but this group only accounted for roughly 10% of residents overall.[12] The society provides support and mentorship to URMs currently involved in the field by offering grants to residents, fellows, and practicing surgeons to encourage research on diversity and inclusion, and has a strong mentorship program where medical students and residents are paired with a practicing surgeon.[11]

Pride Ortho is a community of individuals involved in orthopaedic and musculoskeletal care who identify as LGBTQ+. The group was created both to foster supportive relationships between LGBTQ+ providers and to improve the orthopaedic care of patients who identify as LGBTQ+. Professional enrichment of LGBTQ+ providers is accomplished through meetings at national conventions, such as AAOS, online forums, newsletters, and even a book club. The community also offers scholarships for medical students in order to promote diversity of sexual and gender minorities in the field of orthopaedics, primarily in association with New York Medical Schools. Pride Ortho has an abundance of resources available online for education, as well as providing a list of LGBTQ+ friendly residencies and fellowships to support members applying into orthopaedic education.[13]

There are several organizations that are working to increase the diversity within the field through pipeline initiatives with outreach to those who may not otherwise consider orthopaedics as a career choice. Nth Dimension is a nonprofit organization that aims to decrease health disparities in communities by increasing the diversity of the physician workforce. This began specifically for the field of orthopaedic surgery, but now also includes other specialties as well. They aim to recruit URMs and women into the field by providing early exposure, hands-on experience, and mentorship to undergraduates, medical students and residents. Similarly, the Perry Initiative is an organization that has developed curriculum for programs targeted at high school and medical school students in order to promote the fields of orthopaedics and engineering to young women at key junctures in their education.

DEI EFFORTS AT BROWN UNIVERSITY

At Brown University, the Department of Orthopaedics has a Diversity, Equity, and Inclusion (DEI) Committee made up of clinical and research faculty, residents, and student researchers aimed at promoting diversity efforts within the department through outreach, scholarship, and recruitment. The DEI committee meets on a regular basis to discuss opportunities for DEI initiatives and community engagement, both within the Department of Orthopaedics and the wider community, and to coordinate strategies for matriculating and graduating a diverse residency class. The DEI Committee aims to cultivate racial, ethnic, gender, and sexuality diversity in the Brown Orthopaedics program in order to provide understanding and compassionate care to patients from a wide spectrum of backgrounds.

The Brown University Orthopaedic Department offers multiple scholarships to medical students for fourth-year rotations in efforts to support DEI initiatives as outlined

by the active DEI committee. Brown Orthopaedics and the Warren Alpert Medical School's Office of Diversity and Multicultural Affairs have joined many orthopaedic programs across the country in supporting a scholarship that provides housing and travel stipends in order to facilitate access to an away rotation. More unique to Brown is the scholarship it sponsors for women interested in fourth-year away rotations. The program leadership has made it clear that diversity is a priority in its approach to residency recruitment process. In the 2022-2023 cycle, the program leadership intentionally interviewed a higher proportion of women and URMs than in years past, which led to one of the most diverse classes of residents in recent history. In this new resident class, 3/6 identified as women and 1/6 identified as URM.

In addition, the Brown Orthopaedics Department has closely examined internal policies with an eye towards how they affect women and URMs who are a part of the program, or who may be considering Brown for their orthopaedic residency. Family planning and difficulties of childbearing during residency are often cited as a barrier to recruiting women into the field of orthopaedics. As discussed by Compton et al, lack of formalized parental leave policies, and even lack of awareness of such policies, can be associated with potential difficulties in retention of residents.[14] In 2022, a new formalized Parental Leave policy for the Brown Orthopaedics Department was developed by residents in conjunction with program leadership that guarantees up to 13 weeks of parental, family or medical leave, six weeks of which are paid.[15] Brown's policy ensures compliance with the graduation requirements set by the American Board of Orthopaedic Surgery (ABOS) while allowing the six weeks of paid parental, caregiver, or medical leave mandated by the Accreditation Council for Graduate Medical Education (ACGME) in 2022.[16,17] At Brown, residents returning from leave are given six additional weeks without overnight call responsibilities to assist with transitioning back to work.[15]

Brown Orthopaedics has also partnered with two local high schools to expose young students to careers in orthopaedics. Orthopaedics in Action is a curriculum developed by the Perry Initiative designed to engage high school students in hands-on learning to increase their interest in orthopaedics and STEM fields. Brown successfully implemented Orthopaedics in Action in 2022 and will continue and expand the program in Providence.

CONCLUSION

Diversity amongst practicing orthopaedic surgeons and trainees is improving but remains suboptimal. This is problematic, as it may indicate a failure to create as welcoming of an environment as possible within the orthopaedic community at large. Furthermore, it may represent an inability to engage with well-qualified potential residency applicants that are dissimilar from the majority of current orthopaedic surgeons. In light of this, the AAOS has demonstrated a commitment to DEI efforts over the past several years and there are multiple national organizations aimed at attracting trainees with a wide variety of backgrounds. Furthermore, residency programs, including the Department of Orthopaedics at Brown, have taken a more active role in the recruitment and retention of a diverse set of residents. Prior studies have demonstrated that the barriers to entry across various groups may differ, suggesting that strategies needed to attract candidates may need to vary accordingly. Continued research in this area is necessary to understand why diversity in orthopaedics has failed to improve in comparison to other fields, including competitive surgical subspecialties. We must discern if new DEI initiatives have any meaningful impact on the demographics of the field in the coming years. While the overall trend is positive, it is clear that more must be done to create a welcoming environment for all who wish to practice orthopaedics so that we may provide the best care for the diverse patients that we treat.

References

1. AAOS Department of Clinical Quality and Value. Orthopaedic Practice in the U.S. 2018. Jan 2019. https://www.aaos.org/globalassets/quality-and-practice-resources/census/2018-census.pdf.
2. Gomez L, Bernet P. Diversity Improves Performance and Outcomes. J Natl Med Assoc. 2019 Aug;111(4):383-392. PMID: 30765101
3. Poon S, Kiridly D, Mutawakkil M, Wendolowski S, Gecelter R, Kline M, Lane L. Current Trends in Sex, Race, and Ethnic Diversity in Orthopaedic Surgery Residency. J Am Acad Orthop Surg. 2019 Aug 15;27(16):E725-E733. PMID: 30676512
4. Poon S, Nellans K, Gorroochurn P, Chahine N. Race, but Not Gender, Is Associated with Admissions into Orthopaedic Residency Programs. Clin Orthop Relat Res. 2022 Aug 1;480(8):1441-1449. PMID: 33229901
5. Mori W, Gao Y, Linos E, Lunn M, Yeung H, Obedin-Maliver J, Mansh M. Sexual Orientation Diversity and Specialty Choice Among Graduating Allopathic Medical Students in the United States. JAMA Netw Open. 2021 Sept 30;4(9):6-10. PMID: 34591110
6. Feroe A. Inclusion and Allyship in Orthopaedic Surgery Training and Practice. J Pediatr Orthop Soc North Am. 2023 Feb 15;5(S1). doi:10.55275/jposna-2023-558
7. Chu A, Lin J, Moontasri N, Hammouri Q, Samora J. LGBTQ+ in Orthopaedics: Creating an Open and Inclusive Environment. J Am Acad Orthop Surg. 2022 Jul 1;30(13):599-606. PMID: 35609262
8. Association of American Medical Colleges. Diversity Increases at Medical Schools in 2022. 22 Dec 13. https://www.aamc.org/news/press-releases/diversity-increases-medical-schools-2022
9. United States Census Bureau. Improved Race and Ethnicity Measures Reveal U.S. population is Much More Multiracial. 2021 Aug 12. https://www.census.gov/library/stories/2021/08/improved-race-ethnicity-measures-reveal-united-states-population-much-more-multiracial.html
10. Diversity & AAOS. American Academy of Orthopaedic Surgeons. Accessed 2023 Jun 22. https://www.aaos.org/about/diversity-in-orthopaedics/
11. Mission. J. Robert Gladden Orthopaedic Society. Accessed 2023 Aug 9. https://www.gladdensociety.org/mission

12. Haruno L, Chen X, Metzger M, Lin C, Little M, Kanim L, Poon S. Racial and Sex Disparities in Resident Attrition in Orthopaedic Surgery. JBJS Open Access. 2023 Jun 20; 8(2): e22.00148. PMID: 37351087
13. Mission. PrideOrtho. Accessed 2023 Aug 9. https://prideortho.org/
14. Compton J, Hajewski C, Pugely A. Pregnancy and Parental Leave During Orthopaedic Surgery Residency. Iowa Orthop J. 2021. PMID: 34552399
15. Hsu R. Brown University Department of Orthopaedics Residency Parental, Family and Medical Leave Policy. 2022 Nov 20. https://orthopaedics.med.brown.edu/sites/default/files/2022-10/Brown%20Ortho%20Residency%20Family%20Medical%20Leave%20Policy%2011.22.pdf
16. American Board of Orthopaedic Surgery. Rules and Procedures for Residency Education, Part I, and Part II Examinations. 2022 May 11. https://www.abos.org/certification/part-i/rules-and-procedures/
17. Accreditation Council for Graduate Medical Education. ACGME Institutional Requirements. 2022 Jul 1. https://www.acgme.org/globalassets/pfassets/programrequirements/800_institutionalrequirements_2022.pdf

Authors

Lauren E. Piana, MS, MD, Department of Orthopaedic Surgery, Alpert Medical School of Brown University, Providence, RI.

Eleanor Burstein, MD, Department of Orthopaedic Surgery, Alpert Medical School of Brown University, Providence, RI.

Sarah Criddle, MD, Department of Orthopaedic Surgery, Alpert Medical School of Brown University, Providence, RI.

Elaine He, BA, Alpert Medical School of Brown University, Providence, RI.

Julia A. Katarincic, MD, Department of Orthopaedic Surgery, Alpert Medical School of Brown University, Providence, RI.

Brett D. Owens, MD, Department of Orthopaedic Surgery, Alpert Medical School of Brown University, Providence, RI.

Raymond Y. Hsu, MD, Department of Orthopaedic Surgery, Alpert Medical School of Brown University, Providence, RI.

Disclaimer

The views expressed herein are those of the authors and do not necessarily reflect the views of the Alpert Medical School of Brown University or the Department of Orthopaedics.

Correspondence

Lauren Piana, MD
2 Dudley Street, Suite 200
Providence, Rhode Island 02905
401-457-1500
laurenepiana@gmail.com

Increasing Incidence of Gonorrhea at an Urban STI Clinic in the United States

SARA E. VARGAS, PhD; JUN TAO, PhD; ALEXI A. ALMONTE; LESLIE RAMIREZ; PHILIP A. CHAN, MD

ABSTRACT

Medical record data was extracted from a sexually transmitted infection (STI) clinic in Providence, Rhode Island to characterize trends in *Neisseria gonorrhoeae* (GC) infection and explore risk factors. Of 16,601 clinical encounters, 6% (n=991) tested GC positive: 5.28 GC case rate (per 100 encounters) in the first two years of data collection (2015–2016) and 7.04 in the last two years (2020–2021). Analysis suggested a single linear trend line over time ($p<.05$). Overall, in more recent years, patients were older and more like to identify as male, Black, and Hispanic/Latino, as well as to have reported a previous STI, current symptoms, and specific risk behaviors. GC-positive patients in 2020–2021 were older and more like to identify as female and Black compared to 2015–2016. Lower rates of condom use were especially salient among female patients. These findings may reflect GC trends in the community.

KEYWORDS: sexually transmitted diseases; gonorrhea; health status disparities

INTRODUCTION

The rate of *Neisseria gonorrhoeae* (GC) has been on the rise for many years in the United States (US).[1] When left untreated, GC can lead to severe complications including pelvic inflammatory disease, ectopic pregnancy, female and male infertility, and potentially life-threatening disseminated gonococcal infection.[2] The Centers for Disease Control and Prevention (CDC) estimates that GC accounts for $271 million in direct medical costs annually.[3] Additionally, over the last 100 years, GC has rapidly developed resistance to most antibiotics limiting effective treatment.[4] Swift identification and treatment of GC are critical to preventing long-term complications and transmission, as well as reducing medical expenditures.

There are an estimated 1.6 million new cases of GC each year in the US.[1] GC disproportionately affects males, adolescents, young adults, and Black or African American individuals.[5,6] Beyond basic demographics (i.e., age, sex, race, and ethnicity), there has been limited in-depth behavioral data to better understand these trends and increased annual infection rates in recent years. We examined rates of GC diagnoses, as well as demographic and behavioral trends in infections, over seven years (2015–2021) at an urban STI clinic in Providence, Rhode Island. The goal was to identify local trends and identify targets for future public health intervention.

METHODS

Data were reviewed for clinical encounters at an outpatient STI clinic from January 2015 to December 2021, including both patient-reported demographic and behavior intake forms as well as clinical data collected from their medical record. Those who were confirmed positive for GC based on laboratory testing and documented in the medical record were considered infected for the current analysis. Data collection and management procedures were approved by the local institutional review board. Descriptives were calculated for the entire clinical population by year for key demographic and sexual history variables: age, gender identity, ethnicity, race, HIV and STI history and whether they tested positive for GC. Joinpoint analysis[7] was conducted to examine whether trends in GC infection were linear or segmented (e.g., multiple sequential trends) over time. Analyses were conducted using Joinpoint software[8] developed by the National Cancer Institute. Among those who had confirmed (tested positive) GC, chi squares and analysis of variance were used to determine trends in demographics and sexual risk behaviors between the two years with the lowest rates of GC infection (2015–2016) and the highest rates of GC infection (2020–2021) among clinical encounters. Further, demographics and sexual risk behaviors were compared between 2015–2016 and 2020–2021 among the subset of encounters with a confirmed positive GC test.

RESULTS

Annual Clinic Profile

A total of N=16,601 clinical encounters occurred at the STI clinic from 2015-2021 (**Table 1**). The number of encounters increased from 2015 to 2019 and dropped precipitously in 2020 and 2021 due to the COVID-19 pandemic. The mean age increased slightly over time from 31.34 in 2015 to 33.58 in 2021. The percentage of patients who identified as male

Table 1. Annual Clinic Profile (valid percentages of all available data >16,000 cases minimum)

Year	2015	2016	2017	2018	2019	2020	2021
Encounters	2155	2635	3014	3144	3155	1296	1202
Mean Age [in years] (range)	31.34 (13–76)	31.02 (14–81)	32.29 (15–87)	32.69 (15–89)	33.37 (15–81)	33.32 (16–79)	33.58 (17–82)
Gender Identity							
Male	74%	75%	73%	74%	74%	76%	75%
Female	26%	25%	26%	26%	25%	23%	23%
Other	<1%	1%	1%	1%	1%	1%	2%
Hispanic/Latino	22%	25%	26%	26%	29%	28%	27%
Race							
White	53%	49%	47%	47%	46%	46%	44%
Black	17%	17%	22%	22%	24%	24%	26%
Asian	3%	4%	4%	4%	4%	3%	3%
AI/AN	1%	1%	<1%	1%	1%	1%	2%
NH/OPI	<1%	<1%	<1%	<1%	<1%	<1%	<1%
More Than One	4%	2%	3%	3%	3%	2%	3%
Other	20%	26%	21%	21%	9%	9%	8%
HIV+	2%	2%	3%	4%	4%	2%	2%
STI+							
Ever	35%	37%	38%	41%	42%	48%	48%
Last 12 Mos	17%	18%	20%	22%	21%	24%	24%
Symptomatic at Encounter	10%	22%	22%	25%	25%	19%	23%
Gonorrhea [GC]+ Rate per 100 Encounters (cases)	5.80 (125)	4.86 (128)	5.87 (177)	6.30 (198)	5.93 (187)	6.64 (86)	7.49 (90)
Percent Genital GC+	2.3% (49)	1.8% (46)	2.0% (59)	2.7% (86)	2.4% (76)	3.3% (43)	3.7% (44)
Percent Oral GC+	3.4% (73)	2.9% (75)	3.4% (102)	3.5% (110)	3.4% (106)	3.6% (47)	5.0% (60)
Percent Rectal GC+	2.8% (60)	1.8% (47)	2.4% (71)	2.6% (81)	2.6% (83)	2.6% (33)	3.2% (39)

stayed relatively constant, while the percent identifying as female decreased slightly over time from 26% in 2015 to 23% in 2021. During this time, the percentage of those who provided another gender identity increased slightly. The percent of those identifying as Hispanic/Latino and Black increased over time (from 22% to 27% and 17% to 26%, respectively), while the percent identifying as White decreased (from 53% to 44%; p<0.01). The percentage of patients who are HIV positive stayed relatively consistent, peaking in 2018 and 2019. Those who have had an STI ever or in the past year increased steadily over time from 35% to 48% and 17% to 24%, respectively. Rates of confirmed GC infection rose over time from 5.8% in 2013 to 7.5% in 2021 including increases in GC infection at all sites: genital, oral, and rectal.

From 2015 to 2021, the annual rate of positive GC tests ranged from 4.86 per 100 encounters in 2016 to 7.49 per 100 encounters in 2021. When the joinpoint model was set to identify a single joinpoint, two segments were identified: an annual percent change (APC) of 3.05 from 2015–2019 and an APC of 10.30 from 2019–2021. However, when allowed to select 0 or 1 joinpoints, the model with 0 joinpoints was selected using the permutation test selection criteria with 4499 permutations; thus the difference between the two segments (i.e., 2015–2019 and 2019 to 2021) was not statistically significant. The model with 0 joinpoints had a significant increase in slope from 2015–2021 (p<0.05) and an overall APC of 4.77.

Demographic Trends by Time Period

Overall, patients with encounters during 2020-2021 (compared to 2015-2016) were, on average, older and more likely to identify as male, Hispanic/Latino, and Black (**Table 2**). Among only those patients who had a confirmed GC diagnosis, individuals with encounters during 2020–2021 were more likely to be older and identify as female or another gender and Black (**Table 3**).

Behavioral Trends by Time Period

We also examined risk history and sexual behaviors (**Table 4**). Overall, patients with encounters during 2020–2021 (compared to 2015–2016) were more likely to have been

Table 2. Demographics and STI History Among Encounters from 2015–2016 versus 2020–2021

	2015–2016 n=4790	2020–2021 n=2498	
Mean Age (SD)	31.16 (11.27)	33.45 (12.07)	F(1,7276)=64.03 p<.001
Gender Identity Male Female Other	 74% 25% 1%	 76% 23% 1%	 χ2(2) = 23.91 p<.001
Hispanic/Latino	24%	27%	χ2(1) = 10.11 p=.001
Race White Black Asian Other	 51% 17% 4% 28%	 53% 29% 3% 15%	 χ2(3) = 199.49 p<.001
HIV+ (cases)	2% (83)	2% (45)	χ2(1) = 0.40 non-significant
STI+ Ever (cases) Last 12 Mos (cases)	 36% (1727) 18% (858)	 48% (1083) 24% (537)	 χ2(1) = 91.87 p<.001 χ2(1) = 33.41 p<.001
Symptomatic at Encounter	17% (807)	21% (532)	χ2(1) = 21.74 p<.001

Table 3. Demographics and STI History Among Encounters with Patients with a Confirmed Gonorrhea (GC)+ Diagnosis from 2015–2016 versus 2020–2021

	2015–2016 n=253	2020–2021 n=176	
Mean Age (SD)	29.57 (9.52)	31.49 (10.30)	F(1,426)=3.90 p<.005
Gender Identity Male Female Other	 91% 8% 1%	 83% 13% 4%	 χ2(2) = 7.83 p=.02
Hispanic/Latino	23%	29%	χ2(1) = 2.4 non-significant
Race White Black Asian Other	 54% 14% 5% 27%	 49% 34% 3% 14%	 χ2(3) = 25.13 p<.001
HIV+ (cases)	8% (19)	6% (10)	χ2(1) = 0.33 non-significant
STI+ Ever (cases) Last 12 Mos (cases)	 46% (117) 27% (69)	 59% (95) 34% (55)	 χ2(1) = 6.76 p<.01 χ2(1) = 2.35 non-significant
Symptomatic at Encounter	41% (104)	51% (90)	χ2(1) = 4.22 p=.04

Table 4. Health-Risking Sexual Behaviors Among Encounters from 2015–2016 versus 2020–2021

	2015–2016 n=4790	2020–2021 n=2498	
Oral Sex Partners (of all patients) No condom (n=5957) 0 1 2 3 4	 6% (282) 30% (1310) 38% (1646) 14% (614) 12% (509)	 13% (204) 31% (501) 36% (580) 12% (193) 7% (118)	 χ2(4) = 82.16 p<.001
Female Sex Partners (of male and transgender patients) No condom (n=2897) 0 1 2 3 4	 12% (241) 41% (856) 40% (826) 5% (111) 2% (37)	 12% (103) 41% (339) 40% (329) 5% (44) 1% (11)	 χ2(4) = 1.20 non-significant
Male Sex Partners (of male and transgender patients) No condom (n=2129) 0 1 2 3 4	 20% (309) 35% (523) 33% (497) 6% (99) 6% (85)	 14% (85) 29% (176) 38% (231) 10% (63) 10% (61)	 χ2(4) = 37.47 P<.001
Male Sex Partners (of female and transgender patients) No condom (n=1572) 0 1 2 3 4	 6% (72) 46% (530) 44% (506) 4% (48) 1% (8)	 12% (49) 47% (193) 37% (151) 3% (13) 1% (2)	 χ2(4) = 17.41 P<.01
Other Risk Behaviors			
Sex with Anonymous Partner	40% (1895)	41% (929)	χ2(1) = 1.10 non-significant
Sex with Unknown HIV Status	36% (1721)	30% (679)	χ2(1) = 24.73 p<.001
Sex While Intoxicated	34% (1611)	28% (627)	χ2(1) = 25.82 p<.001
Exchanges Sex	2% (85)	2% (34)	χ2(1) = 0.73 non-significant
Sex with Partner Who Exchanges Sex	4% (212)	3% (72)	χ2(1) = 6.36 p<.02

Table 5. Health-Risking Sexual Behaviors Among Encounters with Patients with a Confirmed Gonorrhea (GC)+ Diagnosis from 2015–2016 versus 2020–2021

	2015–2016 n=253	2020–2021 n=176	
Oral Sex Partners (of all patients) No condom (n=349)			
0	9% (22)	14% (16)	$\chi2(4) = 9.85$
1	10% (24)	18% (20)	$p<.05$
2	31% (74)	34% (39)	
3	23% (54)	18% (20)	
4	26% (62)	16% (18)	
Female Sex Partners (of male and transgender patients) No condom (n=104)			
0	24% (14)	11% (5)	$\chi2(4) = 6.32$
1	27% (16)	47% (21)	non-significant
2	46% (27)	36% (16)	
3	2% (1)	4% (2)	
4	2% (1)	2% (1)	
Male Sex Partners (of male and transgender patients) No condom (n=262)			
0	13% (24)	9% (7)	$\chi2(4) = 6.69$
1	26% (49)	15% (11)	non-significant
2	41% (77)	45% (34)	
3	9% (17)	13% (10)	
4	11% (20)	17% (13)	
Male Sex Partners (of female and transgender patients) No condom (n=39)			
0	15% (3)	0% (0)	$\chi2(3) = 5.10$
1	30% (6)	37% (7)	non-significant
2	55% (11)	53% (10)	
3	0% (0)	10% (2)	
4	0% (0)	0% (0)	
Other Risk Behaviors			
Sex with Anonymous Partner	60% (153)	55% (89)	$\chi2(1) = 1.09$ non-significant
Sex with Unknown HIV Status	43% (108)	40% (64)	$\chi2(1) = 0.39$ non-significant
Sex While Intoxicated	45% (114)	38% (62)	$\chi2(1) = 1.73$ non-significant
Exchanges Sex	4% (9)	6% (10)	$\chi2(1) = 1.58$ non-significant
Sex With Partner Who Exchanges Sex	7% (17)	8% (12)	$\chi2(1) = 0.08$ non-significant

diagnosed with a STI ever or in the last 12 months. They were also more likely to be symptomatic at the encounter. Patients who identified as male reported a higher number of male partners with whom a condom had not been used, while patients who identified as female reported fewer male partners with whom a condom had not been used. Additionally, those with encounters during 2020–2021 were less likely to report having sex while intoxicated and having sex with partners of unknown HIV status and with partners who exchange sex for money or other goods.

Among only those patients with confirmed GC diagnosis, those with encounters during 2020–2021 (compared to 2015–2016) were more likely to have ever been diagnosed with a STI and to be symptomatic at the encounter (**Table 5**). Similar to the overall group, patients who identified as male reported a higher number of male partners with whom a condom had not been used, but, unlike the overall group, patients who identified as female also reported a higher number of male partners with whom a condom had not been used.

DISCUSSION

Rates of many STIs are on the rise nationally in the United States, with especially pronounced increases in GC incidence.[1] Individuals who are younger and people of color bear a disproportionate burden of STI infections[5,6] and GC differentially impacts those who identify as male.[5] In this sample of over 16,000 clinical encounters at outpatient STI clinic in Providence, Rhode Island from 2015–2021, we explored changes in demographics, risk history, and sexual behaviors over time among the entire patient population and those who were diagnosed with GC infection. Overall, in more recent years, patients were older and more like to identify as male, Black, and Hispanic/Latino, as well as to have reported a previous STI, symptoms at the encounter, and specific risk behaviors (e.g., less condom use). Among only those who were GC positive, patients in 2020–2021 were older and identified as female and Black in 2021–2022 compared to 2015–2016. Behavioral trends among GC positive were similar to the overall population, with less condom use being especially salient among female patients. This retrospective study has a large sample size and draws from a clinical population engaged in high-risk behaviors with a high rate of patients (>30% in most years of data collection) with a prior STI diagnosis. While data was collected from nearly all encounters – and the general trends did mirror those at the local and national level – attention should be paid to generalizability of the results when considering how these findings may apply in other regions or settings.

Years with higher rates of GC infection also saw changes in the demographic profile of the patient population. Specifically, when examining all 16,601 encounters, there were more encounters with Black patients over time. Black

patients were also disproportionately represented among those with a positive GC test. This mirrors national trends in greater disease burden for people of color, specifically Black individuals and suggests the need for tailored intervention approaches in communities with historically limited access to health care and greater disease burden. In terms of gender identity, in the overall patient population, there was a trend toward a greater percentage of patients who identified as male over time. However, when examining just those who had a positive GC test, there was a disproportionate number of patients who identified as female or another gender in the later years (2020–2021). Nationally, we have seen higher rates of GC infection among males[5] and, thus, intensive efforts to track GC trends and antibiotic resistance (e.g., the Gonococcal Isolate Surveillance Project, or GISP) have focused on males.[9] However, observations from this sample suggest that – at least among women attending an urban STI clinic – women have been taking on an increasingly large disease burden in recent years. It will be critical to continue to monitor these trends and examine whether they are replicated at the local and state level to inform both individual health care and larger public health surveillance, education, and interventions.

In terms of sexual history and behaviors that might help inform our understanding of these changes in rates and demographics, there are several noteworthy findings. Lack of condom use emerged as a key sexual behavior in terms of increased GC risk. When looking at the overall sample, patients who identified as female reported fewer partners with whom a condom was not used for vaginal or anal sex. However, among those who tested positive for GC infection, female patients reported more partners with whom a condom was not used. Additionally, men in both the overall sample and GC positive subgroup reported more sexual partners with whom a condom had not been used over time (2020–2021 versus 2015–2016). Other risk behaviors, including having sex with anonymous partners or partners of unknown HIV status either stayed roughly static over time or improved – that is, patients were less likely to report engaging in these specific sexual risk behaviors. Taken together, this suggests that as rates of GC rise, infections are more common outside of individuals and sexual networks that would traditionally be considered higher risk (e.g., sex with anonymous partner, sex while intoxicated, sex workers). Thus, intervention approaches will need to penetrate groups that may not perceive themselves to be at high risk and may want to focus on more universal precautions (i.e., wearing condoms with all partners).

The effects of the COVID-19 pandemic are evident in the annual clinic profiles including steep drop-off in clinical encounters in 2020 and 2021 after a period of expansion of the clinic from 2015 to 2019. While the difference in the annual percent change (APC) in GC infection rate between 2015–2019 and 2019–2021 was determined to be non-significant, Joinpoint analysis revealed an observable difference in APC between 3.05 from 2015–2019 and 10.30 from 2019–2021 that mirror overall trends in clinical encounters as well as nationwide trends in primary and secondary preventive care during COVID-19. Nationally in the US, it has been estimated that in the first three months of the COVID-19 pandemic nearly 6,000 cases of GC were missed due to reductions in asymptomatic routine STI testing.[10] This is consistent with our data that show higher rates of symptomatic patients presenting for care and testing GC positive in 2020 and 2021. Further, the percent of patients who were HIV positive dropped in 2020 and 2021 after several years where the percent increased. Fewer people were tested for HIV or prescribed pre-exposure prophylaxis during the pandemic,[11] and some who were HIV positive had difficulty accessing in person or remote care during the height of the pandemic due to concerns related to secondary infections and immunosuppression.[12] Given the overlap between being HIV positive and infection, it is not clear if HIV-positive patients missed or delayed STI testing during the pandemic or sought care at other clinics. The COVID-19 pandemic shed light on the complexity of delivering care – especially among those who are immunocompromised – during an infectious disease outbreak and highlighted disparities in access to services such as telehealth.

At this urban STI clinic, we found alarming trends in increased GC infections from 2015–2021, especially among people of color, similar to what has been documented locally and nationally. Our in-depth exploration of risk histories and behaviors generate new findings related to these documented trends, specifically, the uptick in cases among women and the salience of condom use, that warrant greater focus at the local and national level. If these findings are replicated and further elucidated in future work, they can be used to inform and target interventions aimed to reduce the spread of GC infection. Ongoing national and local studies are needed for public health and healthcare to stay agile in the face of changing trends.

References

1. Centers for Disease Control and Prevention (CDC). Preliminary 2021 STD Surveillance Data. www.cdc.gov. Published September 1, 2022. https://www.cdc.gov/std/statistics/2021/default.htm
2. CDC. Detailed STD Facts – Gonorrhea. Centers for Disease Control and Prevention. Published April 12, 2022. https://www.cdc.gov/std/gonorrhea/stdfact-gonorrhea-detailed.htm
3. CDC. STI Prevalence, Incidence, and Cost Estimates Infographic. Centers for Disease Control and Prevention. Published 2021. https://www.cdc.gov/std/statistics/prevalence-2020-at-a-glance.htm
4. CDC. Drug-Resistant Gonorrhea – STD information from CDC. www.cdc.gov. Published December 23, 2022. https://www.cdc.gov/std/gonorrhea/drug-resistant/default.htm
5. CDC. Sexually Transmitted Disease Surveillance 2021.Table 9. Gonorrhea – Reported Cases and Rates of Reported Cases by Age Group and Sex, United States, 2017-2021. Published April 11, 2023.

6. CDC. Sexually Transmitted Disease Surveillance 2021. Table 10B. Gonorrhea – Rates of Reported Cases* by Race/Hispanic Ethnicity, Age Group, and Sex, United States, 2017-2021. Published April 11, 2023.
7. Kim HJ, Fay MP, Feuer EJ, et al. Permutation tests for joinpoint regression with applications to cancer rates. Stat Med. 2000;19:335-351: (correction: 2001;20:655).
8. Joinpoint Regression Program, Version 5.0.2 – May 2023; Statistical Methodology and Applications Branch, Surveillance Research Program, National Cancer Institute.
9. Nielsen KE, Sancta BSC, Pham CD, et al. Representativeness of estimates of antimicrobial-resistant urogenital Neisseria gonorrhoeae in US men, Gonococcal Isolate Surveillance Project 2008-2018. Sex Trans Dis. 2023;50(4):196-202.
10. Pinto CN, Niles JK, Kauman HW, et al. Impact of the COVID-19 pandemic on chlamydia and gonorrhea screening in the U.S. Am J Prev Med. 2021;61(3):386-393.
11. Hoover KW, Zhu W, Gant Z, et al. HIV services and outcomes during the COVID-19 pandemic – United States, 2019–2021. MMWR. 2022;71(48):1505-1510.
12. Meyer D, Slone SE, Ogungbe O, et al. Impact of the COVID-19 Pandemic on HIV Healthcare Service Engagement, Treatment Adherence, and Viral Suppression in the United States: A Systematic Literature Review. AIDS Behav. 2022;27(1):344-357.

Authors

Sara E. Vargas, PhD, Center for Behavioral and Preventive Medicine, The Miriam Hospital, Providence, RI; Department of Psychiatry and Human Behavior, Alpert Medical School of Brown University, Providence, RI.

Jun Tao, PhD, Infectious Disease, The Miriam Hospital, Providence, RI, 02906; Department of Medicine, Alpert Medical School of Brown University, Providence, RI.

Alexi A. Almonte, Infectious Disease, The Miriam Hospital, Providence, RI.

Leslie Ramirez, Center for Behavioral and Preventive Medicine, The Miriam Hospital, Providence, RI.

Philip A. Chan, MD, Infectious Disease, The Miriam Hospital, Providence, RI; Department of Medicine, Alpert Medical School of Brown University, Providence, RI.

Acknowledgment

This work was supported by a pilot project awarded to Sara E. Vargas under the COBRE Center for Antimicrobial Resistance and Therapeutic Discovery parent award from National Institute of General Medical Sciences (P20HM121344; Mylonakis, PI).

Disclaimer

The views expressed herein are those of the authors and do not necessarily reflect those of our employers or affiliates or those of the National Institute of General Medical Sciences.

Correspondence

Sara Vargas, PhD
The Miriam Hospital, Coro West Suite 309
164 Summit Avenue, Providence, RI, 02906
401-793-8014
svargas@lifespan.org

Unexpected Medical Conditions Discovered During Live Donor Kidney Evaluation: Single Center Study

ALEXANDRA LEE, BA; GEORGE BAYLISS, MD; ADENA OSBAND, MD; PAUL MORRISSEY, MD; REGINALD GOHH, MD; CHRISTINA RAKER, ScD; BASMA MERHI, MD

ABSTRACT

OBJECTIVES: Living donor kidney transplantation (LDKT) is the preferred method of treatment for patients with end-stage kidney disease. Potential living kidney donors (PLKD) are evaluated through a thorough medical, psychological and surgical work-up to ensure successful transplantation with minimal risks to all parties involved. The transplant center at Rhode Island Hospital has noticed an increasing number of PLKDs excluded from donation due to conditions newly diagnosed during the screening process. Our objective is to understand the local trends underlying the high PLKD exclusion rates in the context of newly diagnosed conditions, age, race, and sex of the excluded donors.

STUDY DESIGN AND METHODS: Our study is a retrospective electronic medical record review of the 429 PLKDs screened at Rhode Island Hospital Kidney Transplant Center between December 2012 and April 2023. Age, race, gender, relationship to recipient, and reasons for exclusion were collected from the medical record for each PLKD.

CONCLUSION: 115 of the 429 total PLKDs screened were excluded for newly diagnosed conditions, the most common of which were renal issues (49%), diabetes mellitus (33%), and hypertension (13%), with many comorbid diagnoses. While these donors were able to receive proper treatment after their diagnosis, the earliest intervention possible yields the best prognosis. The high prevalence of treatable yet undiagnosed conditions raise many public health concerns, such as primary care gaps or discontinuous healthcare, and increases awareness about the importance of follow-up care for the excluded PLKDs.

KEYWORDS: Live kidney donor, hypertension, diabetes mellitus, kidney transplantation

BACKGROUND

Kidney transplantation is the best renal replacement therapy for patients with end-stage kidney disease.[1] Due to the severe shortage of deceased donor kidneys and the prolonged waiting time on the transplant list, living donor kidney transplantation (LDKT) remains the preferred method of treatment for these patients, with greater survival outcomes and better graft success rates than transplants from deceased kidney donors.[2] Despite the many benefits of LDKT, there are many barriers with ensuring the safety of the donor being the essential goal.[3]

Determining the suitability of donor candidates requires balancing potential risks and anticipated benefits for the donor. The evaluation of a live kidney donor is a very thorough and meticulous process. Being a kidney donor encounters the short-term risk of peri-operative complications and the long-term risk of developing chronic kidney disease, end-stage kidney disease, hypertension and possible pregnancy-related complications.[4] Therefore, minimizing these short- and long-term risks after donation should be the foundation of the donor evaluation.

The live donor candidate undergoes a thorough evaluation by having a complete medical, psychological and surgical work-up, in addition to the candidate approval by a multidisciplinary team, with an anticipated outcome of donation. The Kidney Disease Improving Global Outcomes (KDIGO) clinical practice guidelines on the evaluation and care of living kidney donor advocates for replacing decisions based on assessments of single risk factors in isolation with a comprehensive approach to risk assessment using the best available evidence,[5] and recommends that each transplant program determine an acceptable end-stage kidney disease (ESKD) risk threshold for living donor candidates.[6] The precise evaluation protocols and decision criteria on the medical, psychological and surgical work-up still vary between countries and transplant centers, respectively.[7]

While exclusion criteria vary from center to center and are amended over time after periodic review, we have noticed an increasing number of otherwise healthy potential living kidney donors (PLKDs) who were excluded from donation due to a new medical diagnosis during the medical evaluation process at our transplant center.

Our objective is to understand the trends underlying the high PLKD exclusion rates despite the shortage of living kidney donors. This study aims to identify the most common newly diagnosed conditions precluding donation for the previous decade (December 2012–April 2023) at our center and evaluate trends in these diagnoses to achieve a better understanding on how to improve LDKT. We also aim to make meaningful comparisons between the age, race, and sex of these excluded donors.

METHODS

Study Population

We performed a retrospective electronic medical record review of PLKDs screened between December 2012 and April 2023 at the Rhode Island Hospital Kidney Transplant Center to identify which individuals were excluded from being potential donors. Our center evaluated 429 prospective donors during this time. Per our center's criteria, all PLKDs screened must be above 18 years of age, and were generally from the greater Providence region, with some exceptions from southern Massachusetts and northern Connecticut. The data collected on these excluded individuals included age, race, gender, relationship to recipient, and reasons for exclusion. For those who were excluded for conditions first discovered during the donor screening process, the method of diagnosis was also included.

Our transplant center serves the greater Providence community, which has a large Hispanic population. In the 2020 census, the Providence population was 42.9% Hispanic, compared with 19% nationally.[8,9]

Screening Criteria

The PLKD screening process is quite rigorous and involves many moving parts. It is first ensured that the donor has a comprehensive overview of the process and procedure in order to obtain proper consent. Afterwards, the PLKD undergoes extensive medical and psychosocial work-up in order to best gauge their candidacy for successful donation. While the multi-disciplinary donor team at our transplant center evaluates every PLKD and their testing and interview results, there are a few absolute contraindications that are important to note.

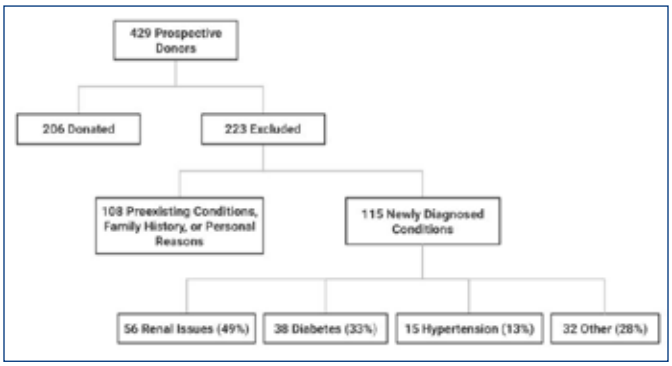
This process includes evaluating kidney function by checking creatinine-based estimated glomerular filtration rate (eGFR) by measured urinary creatinine clearance twice, as it is the cornerstone of living kidney donor screening, urinalysis with urine microscopy, quantification of proteinuria and albuminuria using urine protein/creatinine ratio, and urine culture. We follow the KDIGO guidelines: an eGFR >90 mL/min/1.73 m^2 is always compatible with LKD, and an eGFR of <60 mL/min/1.73 m^2 is always a contraindication. Cardiovascular and metabolic work-up include blood pressure readings twice in the office, hemoglobin A1c including glucose tolerance test (GTT) for high-risk patients, electrocardiogram, and fasting lipid profile. Routine laboratory testing, chest X-ray, infectious work-up, and cancer screening according to national guidelines are done on all patients. Ambulatory blood pressure monitoring is performed on patients to confirm office hypertension, and an echocardiogram is done on patients with an abnormal electrocardiogram.

RESULTS

We performed a retrospective analysis of all living kidney donor candidates who had presented for potential living kidney donation at Rhode Island Hospital Transplant Center between December 2012 and April 2023.We screened 429 PLKDs, of which 223 individuals (52%) were excluded. Of these 223 excluded PLKDs, 108 (25%) of total, (48% of excluded), were dismissed due to preexisting health conditions, significant family medical history, psychiatric concerns, opted-out voluntarily, or their intended recipient did not need a donor anymore. Meanwhile, 115 PLKDs (27%) of total, (52% of excluded), were diagnosed with new medical conditions during the screening process (**Figure 1**).

Figure 1. Outcome of the living donor evaluation process

Of the 429 overall PLKD candidates, 206 were cleared and successfully donated. Of the 223 PLKD-excluded candidates, 108 were due to pre-existing conditions, family history or personal reasons, and 115 due to newly diagnosed medical conditions discovered during the live kidney donor evaluation process. Renal issues (49%), diabetes (33%) and hypertension (13%) represent the three most common newly medical conditions. Other diagnoses represent only 28%. It is important to note that some patients were diagnosed with more than one condition.



Renal issues, diabetes mellitus marked by high hemoglobin A1c or an impaired GTT, and hypertension were the most diagnosed new medical conditions and represented 49% (56/115), 33% (38/115), and 13% (15/115) respectively. Other candidates who were excluded are due to cardiovascular issues (11%), pulmonary issues (7%), abnormal genetic testing (3%), and cancer (2%). Individuals with other health conditions such as a hepatic lesion, sexually transmitted infection, extended spectrum beta-lactamase *E coli*, lymphoproliferative disorder, or abnormal liver enzymes represented the smallest percentage of the cases. Some patients were diagnosed with more than one medical condition.

Detailed information regarding the newly diagnosed conditions of those 115 PLKDs is categorized in **Table 1**. The causes of the renal conditions discovered during the evaluation are summarized in **Table 2**.

Table 3 provides a gender and race breakdown of all the excluded donors compared to distribution in the total

patient pool. In general, females were more willing to donate than males, as 68% of excluded donors were female. This trend was echoed by the proportions in diabetes mellitus (39% male, 61% female) and renal issues (22% male, 78% female), while hypertension had a greater proportion of men (67% male, 33% female). PLKDs were also predominantly White/Caucasian (76%), followed by Hispanic/Latino (12%), Black/African American (5%), and (Asian 5%); 2% of excluded donors did not report their race. Black/African American PLKDs are overrepresented in diabetes and hypertension diagnoses, making up 11% and 13% of diagnoses respectively.

Table 1. Categorizations of Newly Diagnosed Medical Conditions

Condition	Number of Patients	Percent of Total
Renal Issues	56	49%
Diabetes Mellitus	38	33%
Hemoglobin A1C (>5.7)	37	32%
Impaired Glucose Tolerance Test	4	3%
Newly Diagnosed Hypertension	15	13%
Cardiovascular	13	11%
Left Ventricular Hypertrophy	5	4%
Coronary Artery Disease	9	8%
Fibromuscular Dysplasia	1	1%
Infrarenal Aortic Dissection	1	1%
Valvular Disease	2	2%
Pulmonary	8	7%
Lung Nodules	4	3%
Emphysema	3	3%
Ground Glass Opacities	1	1%
Genetics	3	3%
Sickle Cell Trait	1	1%
COL4A4	2	2%
Cancer	2	2%
Breast	1	1%
Anal	1	1%
Hepatic Lesion	2	2%
Sexually Transmitted Infection	1	1%
Infection (ESBL EColi)	1	1%
Lymphoproliferative Disorder	1	1%
Abnormal Liver Enzymes	1	1%

The number of patients and percentages will add up to greater than 1 because many patients had comorbid new conditions, and thus were counted for multiple disease categories.

Table 2. Renal Conditions' Breakdown

Renal Condition	Number of Patients	Percent of Total
Abnormal Creatinine Clearance	24	21%
Multiple or Bilateral Renal Cysts	7	12.5%
Hematuria	6	5%
Kidney Anatomy	4	3%
Kidney Stones	6	5%
Focal Segmental and Global Glomerulosclerosis (FSGS)	3	3%
Polycystic Kidney Disease (PCKD)	2	2%
Proteinuria	1	1%
Kidney mass	1	1%
IgA Nephropathy	1	1%
Thin Basement Membrane Nephropathy	1	1%
Horseshoe Kidney	1	1%

Table 3. Gender and Race Breakdown of Excluded Donors

Category	Gender Breakdown		Race Breakdown				
	Male	Female	White	Hispanic	Black	Asian	Not Listed
Renal	23%	77%	81%	13%	2%	4%	0%
Diabetes Mellitus	39%	61%	68%	11%	11%	8%	3%
Hyper-tension	67%	33%	80%	7%	13%	0%	0%
Total	32%	68%	76%	12%	5%	5%	2%

DISCUSSION

Living kidney donation is considered the ideal method of treatment for patients with end-stage kidney disease due to superior outcomes. However, as living kidney donation poses both short-and long-term risks for the donor, the objective of the donor evaluation process is to predict and minimize the potential for complications. Diabetes mellitus, hypertension and obesity are contraindications to kidney donation because of the postsurgical complications and the future development of renal failure and cardiovascular disorders. Thus, it is crucial to detect metabolic syndrome before living donation in order to avoid these complications in the long-term.[10]

Also, eGFR is the cornerstone in evaluating PLKDs. The 15-year risks of ESRD that have been observed among kidney donors in the United States were 3.5 to 5.3 times as high as the projected risks among non-donors, with similar patterns of risk according to race and sex in the absence of donation and in the presence of donation.[11] Long- and short-term outcomes of mortality, life expectancy, quality of life, risks

of ESRD, and hypertension for patients who have undergone living donor nephrectomy have been assessed and validated by several studies.[12,13] As a result, the evaluation of PLKDs is quite rigorous, involving a comprehensive medical, surgical and psychosocial work-up as well as a collaborative review of every PLKD by a multidisciplinary team. Our retrospective study examines excluded PLKDs from December 2012 to April 2023 and investigates the trends in the newly medical conditions discovered during the evaluation and leading to excluding these potential donors.

Our study showed that over half of excluded donors were diagnosed with new medical conditions, all of which would have severe long-term consequences on the donor's health if not discovered and properly treated. The most common newly diagnosed conditions during live kidney donor evaluation were renal issues (49%), diabetes mellitus (33%), hypertension (13%). Some patients were diagnosed with more than one medical condition.

Renal issues represented 49% of undiagnosed medical conditions. In our study, three patients underwent a diagnostic kidney biopsy in the setting of microalbuminuria and were found to have biopsy-proven secondary focal segmental glomerulosclerosis (FSGS). Due to microscopic hematuria, one patient was found to have biopsy proven IgA nephropathy, and another patient had thin basement membrane disease. Because microalbuminuria is a factor in the progression of nephropathy and increases the cardiovascular risk,[14,15] and microscopic hematuria can have long- term outcomes with a higher risk of developing ESRD in the general population,[16] these patients were excluded from donating. These patients were unaware of their kidney disease prior to the donor evaluation. Currently, they are following closely with a nephrologist and getting appropriate treatment, which will allow for favorable long-term outcomes with respect to their kidney function.

Three other patients were diagnosed with kidney stones on their CT scan, in addition to an abnormal stone panel. Given the high risk of acute kidney injury and its complication in case of a stone in single kidney,[17] these candidates were excluded from donating. They were referred to the stone clinic and are being treated accordingly.

Polycystic kidney disease (PCKD) was diagnosed in two patients with a strong family history of PCKD, but they had never been diagnosed or checked for it previously. Public education and awareness about PCKD, the most frequent genetic cause of renal failure, is pivotal. Its detection at a young age allows an early intervention for a better outcome as patients need to be educated about the complications that may include cerebral aneurysms, kidney stones, and end-stage renal disease.

Diabetes and hypertension were the next two most diagnosed conditions in our study. These conditions are particularly crucial to exclude donors for as they are two of the major risk factors for cardiovascular disease.[18-19] Additionally, studies on 10 years follow-up post-donation demonstrate that diabetes and hypertension are the leading causes of long-term risk of ESRD.[20] The increase in diagnoses of diabetes and hypertension in our study can be explained in part by the incremental trends in these conditions. There is a predicted increase in the number of cases of type 2 diabetes from 415 million to 642 million by 2040, due to an increasingly common lifestyle associated with low energy expenditure and high caloric intake.[21] Upregulation of the renin-angiotensin-aldosterone system, oxidative stress, inflammation, and activation of the immune system will likely contribute to the close relationship between diabetes and hypertension and resulting growth in hypertension prevalence.[22]

Additionally, the diagnoses and management of hypertension are a challenge for many patients more broadly. Following the Affordable Care Act, 37.3% of patients had undiagnosed hypertension and 27.0% of patients with diagnosed hypertension were without a prescribed anti-hypertensive medication.[23] Access to health insurance is a critical aspect of hypertension detection, treatment and control, and a lack of insurance can greatly exacerbate barriers to successful hypertension care and management. Therefore, the high levels of previously undiagnosed diabetes and hypertension could reflect greater public health trends of these conditions.[3]

Incidentally discovered malignancy is a major finding in the cohort of potential donors and was previously reported with rates of 0.2–0.8%.[24, 25] Malignant disease was discovered in 2% of our retrospective study. One candidate was diagnosed with breast cancer and the other candidate with anal cancer. The early detection of these asymptomatic malignancies allowed for immediate intervention with great impact on their prognosis and recovery.

In addition, genetic testing is a rapidly evolving strategy for the evaluation of potential donors that has the potential to improve risk assessment and optimize the safety of donation.[26] The growing accessibility and falling costs of genetic sequencing techniques has expanded the utilization of genetic testing in clinical practice. Although genetic testing can be a valuable tool in living kidney donor evaluation, its overall benefit in donor assessment has not been demonstrated and it can also lead to confusion, inappropriate donor exclusion, or misleading reassurance.[27] In our study, family history necessitated performing genetic testing, which resulted in three candidates being excluded. One patient was diagnosed with sickle cell trait, and two others were diagnosed with heterozygous pathogenic COL4A4. It is well known that the presence of sickle cell traits is associated with an increased risk of CKD, decline in eGFR, and albuminuria, compared with non-carriers.[28] In view of heterozygous COL4A4, there are reports of 14% to 20% of cohort of COL4A3 and COL4A4 heterozygotes with kidney failure.[29,30] Our patients in the study were excluded from donation due to these newly diagnosed genetic diseases.

Most of the new diagnoses in our study are ones frequently discovered in the primary care setting, and the high rates of new PLKD diagnoses indicates there could be issues with underutilization of primary care or discontinuous medical care in general, both of which can stem from a variety of factors. This is concerning, as many of these patients would have benefited from preventative measures or earlier treatment interventions. Furthermore, while our center takes the task of protecting PKLD's safety from organ donation seriously, we ultimately focus on the long-term health and follow-up care of the donation recipients and approved donors.

These new diagnoses could be considered a benefit of PLKD evaluation. Patients who do not have reliable access to a primary care physician can benefit from a full physical and medical work-up by agreeing to proceed with the work-up for donation. However, this presents ethical concerns regarding donor coercion and incentivized donation. We believe that this demonstrates the crucial need for greater public education regarding accessing healthcare. It is important that physicians empower patients to take control of their own healthcare and stress the importance of routine check-ups for prevention and early detection of treatable conditions.

It is important to note the gender and race breakdown in our study. Overall, we saw a marked difference in gender, as 68% of excluded donors with newly diagnosed conditions were female, a distribution that stays constant over the top three diagnosed conditions except for hypertension. This could suggest that more females are interested in being living donors overall, or that females have a higher rate of newly diagnosed conditions. In 1988, when UNOS/OPTN began to collect living donor data, the ratio of female-to-male living donors was 55%:45%, although in the past five years men now comprise less than 40% of all living kidney donors.[31] The over-representation of female living donors over the past 30 years is not unique to the US.[32] In all countries except Iran, women account for over 50% of living donors.[33]

Regarding race, White Caucasians represent most donors excluded in our center (76%). In contrast, 12% of PLKDs were Hispanic, 5% were Black, and 5% were Asian. While the lower numbers of Black and Asian candidates reflect general population demographics, the lower numbers of Hispanic candidates are significant due to the large Hispanic population of the greater Providence area. The study by Alvarado et al suggests that the lower rate of Hispanic donors in the US could be due to a lack of culturally competent care, as the Hispanic ethnicity is historically reported in different and inaccurate ways by healthcare providers.[34] Furthermore, availability of translation services also poses a challenge for accessibility of presenting as a PLKD. Barriers to LDKT specific to Hispanics are due to misconceptions about living kidney donation, fears about not being able to have children or shortening the donor's life expectancy,[35] and lack of educational materials about transplantation in Spanish.[36,37] In our study, African Americans represent only 5% of the excluded donors. Although little is known about the long-term outcomes of African American LKDs, these patients experience a substantial incidence of hypertension and modest drop in eGFR post-donation, and obesity may increase the magnitude of renal decline.[38] In addition, APOL1 genotyping may have a role in the evaluation and informed consent process of these potential donors.[39]

Limitations

Our study has some limitations. First, it is a retrospective study. Second, the data is sourced solely from one transplant center, whose donor criteria and evaluation guidelines might vary from other centers. It is important to recognize that this data does not represent all transplant centers. Importantly, because electronic health records were introduced during this time, the charts of PLKDs screened before this transition were on paper and have been scanned into the system, limiting our access to labs, imaging, and other data. Our study is restricted by the rigor and specificity of these charts, and some are not as thorough as would be ideal.

In summary, the diagnosis of new conditions during the PLKD screening process allowed patients to get proper treatment that they would not have otherwise received. Furthermore, these results also yielded information regarding the physical health and societal wellness of the population our center serves. This included the prevalence of certain conditions like diabetes and hypertension, societal barriers to healthcare, importance of empowering patients to take charge of their own personal health, and the unique challenges specific racial and gender demographic populations face.

CONCLUSION

Our study found that half of excluded donors at our center were diagnosed with new medical conditions that should have been discovered in a primary care setting. The three most common diagnosis were renal issues, diabetes mellitus and hypertension. These patients were able to receive proper treatment after their diagnosis. However, for many of these conditions, the earliest intervention possible yields to the best prognosis. The high prevalence of treatable yet undiagnosed conditions raises many public health concerns, such as primary care gaps or discontinuous healthcare, as well as the importance of follow-up care for excluded PLKDs. Overall, we believe that looking at potential living kidney donor screening could be an unconventional yet fruitful method of measuring the health of our population.

References

1. Abercassis M, et al. Kidney transplantation as primary therapy for end-stage renal disease: a National Kidney Foundation/Kidney Disease Outcomes Quality Initiative NKF/KDOQITM conference. Clin J Am Soc Nephrol. 2008 Mar;32:471-80
2. Hart A, Smith JM, Skeans MA, et al. OPTN/SRTR 2018 annual data report: kidney. *Am J Transplant*. 2020; 20suppl s1:20–130
3. Kasiske B, Waterman A, et al. Outcomes of Living Kidney Donor Candidate Evaluations in the Living Donor Collective Pilot Registry. Transplant Direct. 2021 May; 75: e689.
4. Tantisattamo E, et al. Is It Time to Utilize Genetic Testing for Living Kidney Donor Evaluation? Nephron Clin Pract. 2022 Mar; 1462: 220–226.
5. Lentine KL, Kasiske BL, Levey AS, et al. Summary of kidney disease: improving global outcomes KDIGO clinical practice guideline on the evaluation and care of living kidney donors. *Transplantation*. 2017; 101:1783–1792
6. Lentine KL, Kasiske BL, Levey AS, et al. KDIGO clinical practice guideline on the evaluation and care of living kidney donors. *Transplantation*. 2017; 101suppl 1: S1–S109
7. Terasaki PI, Cecka JM, Gjertson DW, Takemoto S. High survival rates of kidney transplants from spousal and living unrelated donors. *N Engl J Med*. 1995; **333**6: 333-336.
8. United States Quick Facts. *United States Census Bureau*. https://www.census.gov/quickfacts/providencecityrhodeisland
9. Providence Quick Facts. *United States Census Bureau*. https://www.census.gov/quickfacts/fact/table/US/RHI725222
10. Hernández D, Alvarez A, Armas A, Rufino M, Porrini E, Torres. Metabolic syndrome and live kidney donor: is this syndrome a contraindication to donation? Nefrologia. 2009;291:20-9. doi: 10.3265/Nefrologia.2009.29.1.20.1.
11. Morgan E. Grams, M.D, Dorry L. Segev, M.D., Ph.D et al. Kidney-Failure Risk Projection for the Living Kidney-Donor Candidate. N Engl J Med 2016; 374:411-421DOI: 10.1056/NEJMoa151049126
12. Wirken L, van Middendorp H, Hooghof CW, Rovers MM, Hoitsma AJ, Hilbrands LB, Evers AW. The Course and Predictors of Health-Related Quality of Life in Living Kidney Donors: A Systematic Review and Meta-Analysis. Am J Transplant. 2015;1512:3041–54.
13. Grams ME, Sang Y, Levey AS, et al. Kidney-failure risk projection for the living kidney-donor candidate. N Engl J Med. 2016; 374:411–421
14. Halbesma N, Kuiken DS, Brantsma AH, et al. Macroalbuminuria is a better risk marker than low estimated GFR to identify individuals at risk for accelerated GFR loss in population screening. J Am Soc Nephrol. 2006; 17:2582–2590
15. Matsushita K, van der Velde M, Astor BC, et al. Association of estimated glomerular filtration rate and albuminuria with all-cause and cardiovascular mortality in general population cohorts: a collaborative meta-analysis. Lancet. 2010; 375:2073–2081.
16. Vivante A, Afek A, Frenkel-Nir Y, et al. Persistent asymptomatic isolated microscopic hematuria in Israeli adolescents and young adults and risk for end-stage renal disease. JAMA. 2011; 306:729–736.
17. Lorenz EC, Lieske JC, Vrtiska TJ, et al. Clinical characteristics of potential kidney donors with asymptomatic kidney stones. Nephrol Dial Transplant. 2011; 26:2695–2700.
18. Alloubani A, Saleh A, Abdelhafiz I. Hypertension and diabetes mellitus as a predictive risk factor for stroke. Diab Metab Syndr. 2018;124:577–84.
19. Gutierrez J, Alloubani A, Mari M, et al. Cardiovascular Disease Risk Factors: Hypertension, Diabetes Mellitus and Obesity among Tabuk Citizens in Saudi Arabia. Open Cardiovasc Med J. 2018; 12:41–9.
20. Anjum S, Muzaale AD, Massie AB, Bae S, Luo X, Grams ME, et al. Patterns of end-stage renal disease caused by diabetes, hypertension, and glomerulonephritis in live kidney donors. *Am J Transplant.* 2016 Dec;1612:3540–7.
21. Ogurtsova K., da Rocha Fernandes J.D., Huang Y. IDF Diabetes Atlas: Global estimates for the prevalence of diabetes for 2015 and 2040. *Diabetes Res Clin Pract.* 2017; 128:40–50
22. Petrie JR, et al. Diabetes, Hypertension, and Cardiovascular Disease: Clinical Insights and Vascular Mechanisms. Can J Cardiol. 2018 May; 345: 575–584.
23. Huguet N, DeVoe J, et al. Rates of Undiagnosed Hypertension and Diagnosed Hypertension Without Anti-Hypertensive Medication Following the Affordable Care Act. Am J Hypertens. 2021 Sep 22;349:989-998.
24. Hoffman A, Tendulkar K, Merani S, Maskin A, Langnas A. Fortuitous benefits of living kidney donation: diagnosis of serious medical conditions during the living donor evaluation. *Clin Transplant*. 2018; **32**3:e13204.
25. Moore DR, Feurer ID, Zaydfudim V, et al. Evaluation of living kidney donors: variables that affect donation. *Prog Transplant*. 2012; **22**4: 385-392.
26. Caliskan Y, et al. Evaluation of Genetic Kidney Diseases in Living Donor Kidney Transplantation: Towards Precision Genomic Medicine in Donor Risk Assessment. Curr Transplant Rep. 2022 Jun; 92: 127–142.
27. Caliskan Y, et al. Genetic evaluation of living kidney donor candidates: A review and recommendations for best practices. American Journal of Transplantation. Volume 23, Issue 5, May 2023, Pages 597-607
28. Rakhi P. Naik, MD, MHS, Alexander P. Reiner, et al. Association of Sickle Cell Trait with Chronic Kidney Disease and Albuminuria in African Americans. JAMA. 2014 Nov 26; 31220: 2115–2125.
29. Pierides A, Voskarides K., Athanasiou Y, et al. Clinico-pathological correlations in 127 patients in 11 large pedigrees, segregating one of three heterozygous mutations in the COL4A3/COL4A4 genes associated with familial haematuria and significant late progression to proteinuria and chronic kidney disease from focal segmental glomerulosclerosis. Nephrol Dial Transplant. 2009; 24:2721–2729. doi: 10.1093/ndt/gfp158.
30. Voskarides K, Damianou L, Neocleous V, et al. COL4A3/COL4A4 mutations producing focal segmental glomerulosclerosis and renal failure in thin basement membrane nephropathy. J Am Soc Nephrol. 2007; 18:3004–3016. doi: 10.1681/ASN.2007040444.
31. OPTN Organ Procurement and Transplantation Network. *National data*. https://optn.transplant.hrsa.gov/data/view-data-reports/national-data/.
32. Lainie Friedman Ross and J. Richard Thistlethwaite. Gender and race/ethnicity differences in living kidney donor demographics: Preference or disparity? Transplant Rev Orlando. 2021 Jul; 353: 100614.
33. Goldberg I, Krause I. The role of gender in chronic kidney disease. EMJ. 2016;1: 58–64
34. Alvarado F, Cervantes CE, Crews DC, Blanck J, Al Ammary F, Ng DK, Purnell TS. Examining post-donation outcomes in Hispanic/Latinx living kidney donors in the United States: A systematic review. Am J Transplant. 2022 Jul;227:1737-1753. doi: 10.1111/ajt.17017. Epub 2022 Apr 18. PMID: 35258164; PMCID: PMC9546009.
35. Alvaro E, Siegel J, Turcotte D, Lisha N, Crano W, Dominick A. Living kidney donation among Hispanics: a qualitative examination of barriers and opportunities. Prog Transplant. 2008; 18:243–50.

36. Lopez-Quintero C, Berry E, Neumark Y. Limited English proficiency is a barrier to receipt of advice about physical activity and diet among Hispanics with chronic diseases in the United States. J Am Diet Assoc. 2009;10910:1769–74.
37. Gordon EJ, Mullee J, Ramirez D, et al. Hispanic/Latino concerns about living kidney donation: a focus group study. Prog Transplant. 2014;242:152–62.
38. Joseph M Nogueira, Matthew R Weir, Stephen Jacobs, Abdolreza Haririan, Denyse Breault, David Klassen, Deb Evans, Stephen T Bartlett Matthew Cooper. A study of renal outcomes in African American living kidney donors. Transplantation. 2009 Dec 27;8812:1371-6.
39. Prakash Gudsoorkar, Manish Anand, Bassam G Abu Jawdeh. APOL1 Genotyping in Potential African American Living Kidney Donors: Utility and Cost-Effectiveness Am J Nephrol 2020;512:116-118. doi: 10.1159/000505719. Epub 2020 Jan 15.

Authors

Alexandra Lee, BA, Medical Student, Alpert Medical School of Brown University.

George Bayliss, MD, Brown Medicine, Division of Nephrology and Hypertension, Alpert Medical School of Brown University, Division of Kidney Transplantation, Rhode Island Hospital.

Adena Osband, MD, Brown Surgery, Alpert Medical school of Brown University, Division of Kidney Transplantation, Rhode Island Hospital.

Paul Morrissey, MD, Brown Surgery, Alpert Medical school of Brown University, Division of Kidney Transplantation, Rhode Island Hospital.

Reginald Gohh, MD, Brown Medicine, Division of Nephrology and Hypertension, Alpert Medical School of Brown University, Division of Kidney Transplantation, Rhode Island Hospital.

Christina Raker, ScD, Lifespan Biostatistics, Epidemiology, Research Design, and Informatics Core, Providence Rhode Island.

Basma Merhi, MD, Brown Medicine, Division of Nephrology and Hypertension, Alpert Medical School of Brown University, Division of Kidney Transplantation, Rhode Island Hospital.

Disclosures

None

Correspondence

Basma Merhi, MD
Division of Kidney Transplantation, Department of Medicine
Rhode Island Hospital
593 Eddy Street, Providence, RI 02903
bmerhi@lifespan.org

Understanding the Relationship between Oral Health and Chronic Disease among Rhode Island Adults 45 years and Older

MONIKA DROGOSZ, MPH; STEPHANIE MUNTHE, DDS; SAMUEL ZWETCHKENBAUM, DDS, MPH

INTRODUCTION

Maintaining good oral health is a critical component of overall health and quality of life. Oral conditions are frequently considered separate from other chronic conditions, but they are inter-related. Studies have suggested that there is a relationship between chronic disease and oral health,[1] including shared risk factors between good oral health and chronic conditions. Age increases the risk of chronic disease and may pose challenges for older adults in maintaining their oral health and preventing disease.[2] Tooth loss can pose a significant impact on an individual's ability to function, including chewing foods and maintaining a satisfactory diet.[3]

There is also a significant psychosocial impact of tooth loss, with adults who have lost teeth more likely to experience social isolation[4] and impaired dental esthetics, increasing the difficulty in getting hired for work.[5] While there are national data on the connection between oral health and chronic conditions, there is less known about this in Rhode Island. This report examines the relationship between oral health and chronic disease among RI adults aged 45 years and greater with the goal of helping primary care clinicians identify patients at greater risk of tooth loss who may benefit from preventive dental care.

METHODS

Data are from the 2021 Rhode Island Behavioral Risk Factor Surveillance System (RI BRFSS). The BRFSS is a telephone survey of non-institutionalized Rhode Islanders aged 18 years or older which is administered by the Rhode Island Department of Health (RIDOH). The BRFSS survey collects data related to health, health-risk behaviors, preventive measures, and healthcare access among adults in Rhode Island. Survey data are weighted to obtain statewide population estimates. Self-reported status of chronic conditions was coded from questions which asked, "Has a doctor, nurse, or other health professional ever told you that you had any of the following?": diabetes, pre-diabetes, hypertension, skin cancer or other types of cancer, angina or coronary heart disease (CHD), asthma or arthritis, gout, rheumatoid arthritis, lupus, or fibromyalgia. Chronic disease status was based on this language and there is no method to verify diagnosis. Current smoker refers to adults who report they are an everyday or some day smoker. Recent dental visit was defined as a visit within the last year. Tooth loss severity refers to the number of teeth removed due to tooth decay or gum disease and was divided into three categories: no tooth loss, moderate tooth loss (one to five teeth removed), and severe tooth loss (six or more teeth removed). Chi-square tests were used to test for significance ($p<.05$) between groups. SAS survey procedures were used for the analysis to account for the sampling design.

RESULTS

5,639 individuals completed the BRFSS in 2021, representing a weighted population of 889,340 adults. 3,962 were 45 years or older. Prevalence of chronic conditions and oral health, by age and gender, are shown in **Table 1**. Arthritis, CHD, cancer, diabetes/prediabetes, and hypertension were more prevalent among adults aged 45 and older, compared to adults under the age of 45. Adults 45+ had a higher prevalence of a recent dental visit and were more likely to have any teeth extracted. Adults 45+ who were ever told they had diabetes/pre-diabetes, CHD or hypertension were less likely to report having had a recent dental visit (**Figure 1**). The percentage of adults 45+ with severe tooth loss was higher among those who reported being told they had asthma, arthritis, CHD, cancer, diabetes/prediabetes, or hypertension (**Figure 2**). A significant difference between tooth loss severity and recent dental visit was observed among adults 45+ with a chronic condition or on blood pressure medication (**Table 2**). Additionally, adults 45+ who are current smokers were less likely to have a recent dental visit than non-smokers (55% vs 72%, $p<.0001$) and were more likely to have severe tooth loss compared to non-smokers (36% vs 24%, $p=.001$). Adults 45+ who reported being on blood pressure medication were more likely to have had a recent dental visit compared to those not on blood pressure medication (70% vs 62%). Severe tooth loss was more common among adults 45+ on blood pressure medication than those not on blood pressure medication (13% vs 9%).

DISCUSSION

Although oral diseases are mostly preventable, they continue to persist with high prevalence and with significant physical, mental, and social implications for those impacted.[6] Good oral health is critical for overall health and well-being and is a contributing factor to an individual's overall quality of life.[7] The bidirectional relationship between oral health and chronic conditions is important to understand as are the shared risk factors among both.

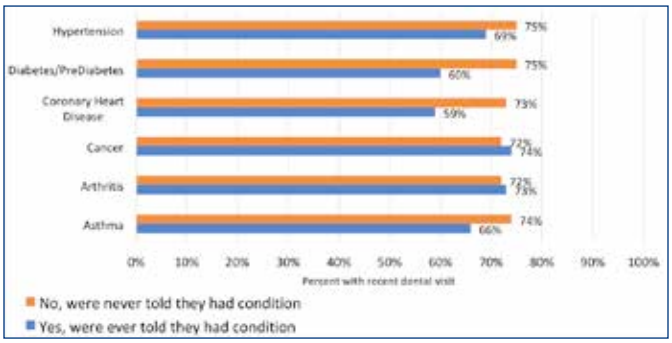
Adults with hypertension, coronary heart disease and diabetes/prediabetes were less likely to have visited a dentist

Table 1. Chronic Disease and Oral Health prevalence, by Sex and Age Group

	N	Hypertension % (95% CI)*	Asthma % (95%CI)	Arthritis % (95%CI)	Coronary Heart Disease % (95%CI)	Diabetes % (95%CI)	Cancer % (95%CI)	Recent Dental Visit % (95%CI)	Any teeth extracted % (95%CI)
Sex									
Male	2504	35.4% (33.0–37.8)	15.7 (13.6–17.8)	25.0 (22.8–27.3)	4.2 (3.4–5.1)	10.9 (9.3–12.5)	5.8 (4.8–6.9)	68.4 65.9–70.9)	40.7 (38.1–43.3)
Female	3105	30.6 (28.5–32.7)	18.9 (17.1–20.8)	31.6 (29.5–33.7)	3.2 (2.5–4)	10 (8.7–11.3)	8.6 (7.3–9.9)	70.8 (68.6–73)	37.9 (35.6–40.2)
Age Group									
18–34	900	11.7 (9.0–14.3)	20.5 (17.1–24.0)	5.6 (3.3–7.9)	X	2.8 (1.2–4.3)	1.5 (.2–2.9)	65.0 (61–68.9)	17.4 (14.2–20.6)
35–44	747	20.7 (16.8–24.6)	17.5 (14.1–21.0)	17.8 (14.4–21.3)	X	4.6 (2.5–6.7)	2.3 (1.1–3.6)	66.2 (62–70.5)	31.4 (27.3–35.5)
45–64	2157	39.1 (36.4–41.7)	16.9 (14.9–18.8)	34.7 (32.1–37.3)	2.9 (2.1–3.8)	12.9 (11.1–14.8)	7.0 (5.7–8.4)	71.4 (69–73.9)	46.5 (43.8–49.2)
65+	1805	60.6 (57.7–63.5)	14.3 (12.2–16.4)	56.8 (53.9–59.8)	10.2 (8.4–12.1)	20.5 (18–23)	18.4 (16.1–20.9)	73.8 (71–76.6)	64.1 (61.1–67)

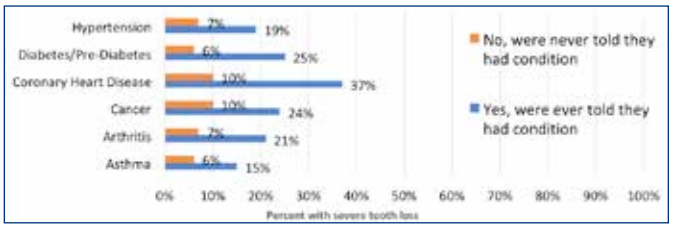
*Note: 95% Confidence Interval

Figure 1. Percent of RI Adults aged 45+ with recent dental visit, by chronic condition



*Note: Language used above is based on how the survey question is phrased in BRFSS, there is no method to verify diagnosis.

Figure 2. Percent of RI Adults 45+ with severe tooth loss, by chronic condition



*Note: Language used above is based on how the survey question is phrased in BRFSS, there is no method to verify diagnosis.

Table 2. Tooth Loss Severity among Adults 45+ with Chronic Conditions, with and without a Recent Dental Visit

	Recent Dental Visit						
	Yes			No			
	Tooth Loss Severity			Tooth Loss Severity			
Current Condition	None	Moderate	Severe	None	Moderate	Severe	P Value
Asthma	46%	34%	20%	26%	34%	39%	.0007
Arthritis	44%	38%	18%	24%	33%	43%	<.0001
Cancer	42%	39%	19%	24%	26%	49%	<.0001
Coronary Heart Disease	28%	41%	31%	13%	34%	52%	.02
Diabetes/Pre-Diabetes	38%	41%	21%	19%	38%	44%	<.0001
Hypertension	46%	39%	15%	27%	34%	38%	<.0001
Taking Blood Pressure Medication	44%	40%	16%	42%	41%	39%	<.0001

within the last year. Lower dental service utilization among adults with chronic conditions is likely attributed to varying dental insurance coverage, income, and various other factors.[8] Medical professionals for the at-risk adult population can consider integrating oral health risk assessments into chronic disease management plans or identify opportunities for better care coordination for adults with chronic diseases. Adults who reported currently taking blood pressure medication and a recent dental visit were less likely to experience severe tooth loss compared to those on the medication with no recent dental visit. Given the potential increased risk of oral complications such as hyposalivation that can occur with polypharmacy,[9] maintaining regular dentist visits can aid in providing recommended preventive measures and check-ups.

Oral and chronic diseases share common risk factors such as tobacco use.[10] Current smokers with chronic conditions are more likely to have severe tooth loss compared to non-smokers. Educating patients that their oral health is connected to the rest of the body and certain behaviors can contribute to both oral and chronic conditions is critical. Addressing shared risk factors can prevent the impact of both and emphasize the significance of an integrated approach to healthcare which accounts for both oral and overall health. Screening for chronic diseases within the dental setting and early intervention or referral can impact chronic disease outcomes, especially those at high risk or with shared risk factors who may otherwise be missed through the medical setting. Continued collaboration between medical and dental health professionals is critical, as clinicians have an opportunity to educate their patients and make referrals.

Studies have suggested that older adults with chronic conditions have an increased risk of tooth loss.[11] Our findings suggest a similar conclusion; however, having a recent dental visit may lessen tooth loss severity in this population. Maintaining regular dental visits is not only important for tooth loss but also for overall quality of life. Adults with chronic conditions are more likely to experience severe tooth loss, which can negatively impact their self-esteem, quality of diet and life.[12] Primary care professionals referring patients with chronic conditions for routine preventive dental care can reduce risk of tooth loss and promote overall quality of life for these patients. Additionally, incorporating an equity focus is essential for recognizing that health outcomes, including oral health outcomes, are multifactorial and widely influenced by various social determinants including access to care, socioeconomic status, education, and food security.

LIMITATIONS

Responses are self-reported and are subject to bias. This article cannot establish a causal relationship between oral health and chronic disease. Any observed relationship between oral health and chronic conditions may be influenced by various underlying factors not captured in the survey. Prevalence of some chronic conditions were low in this study. More research is needed on the association between oral health and chronic disease with consideration of various covariates including race/ethnicity and income which were not addressed here.

References

1. Borgnakke WS, Ylöstalo PV, Taylor GW, Genco RJ. Effect of Periodontal Disease on Diabetes: Systematic Review of Epidemiologic Observational Evidence. J Clin Periodontol. 2013 Apr;40 Suppl 14:S135-52. PMID: 23627324.
2. Griffin SO, Jones JA, Brunson D, Griffin PM, Bailey WD. Burden of Oral Disease among Older Adults and Implications for Public Health Priorities. Am J Public Health. 2012 Mar;102(3):411-8. PMID: 22390504.
3. Locker D, Quiñonez C. Functional and Psychosocial Impacts of Oral Disorders in Canadian Adults: a National Population Survey. J Can Dent Assoc. 2009 Sep;75(7):521. PMID: 19744362.
4. Koyama S, Saito M, Cable N, et al. Examining the Associations Between Oral Health and Social Isolation: A Cross-National Comparative Study between Japan and England. Soc Sci Med. 2021 May;277:113895. PMID: 33882441.
5. Halasa-Rappel YA, Tschampl CA, Foley M, Dellapenna M, Shepard DS. Broken Smiles: The Impact of Untreated Dental Caries and Missing Anterior Teeth on Employment. J Public Health Dent. 2019 Sept; 79(3):231-237. PMID: 30990228.
6. Peres MA, Macpherson LMD, Weyant RJ, et al. Oral Diseases: a Global Public Health Challenge. Lancet. 2019 Jul 20; 394(10194):249-260. PMID: 31327369
7. Oral Health in America: Advances and Challenges [Internet]. Bethesda (MD): National Institute of Dental and Craniofacial Research(US); 2021 Dec. PMID: 35020293.
8. Patel N, Fils-Aime R, Li C, Lin M, Robison V. Prevalence of Past-Year Dental Visit Among US Adults Aged 50 Years or Older, With Selected Chronic Diseases, 2018. Prev Chronic Dis 2021;18:200576. PMID: 33914679.
9. Nederfors T. Xerostomia: Prevalence and Pharmacotherapy. With Special Reference to Beta-adrenoceptor Antagonists. Swed Dent J Suppl. 1996;116:1-70. PMID: 8813731.
10. Ahmed N, Arshad S, Basheer SN, et al. Smoking a Dangerous Addiction: A Systematic Review on an Underrated Risk Factor for Oral Diseases. Int J Environ Res Public Health. 2021 Oct 20;18(21):11003. PMID: 34769523.
11. Parker ML, Thornton-Evans G, Wei L, Griffin SO. Prevalence of and Changes in Tooth Loss Among Adults Aged ≥50 Years with Selected Chronic Conditions - United States, 1999-2004 and 2011-2016. MMWR Morb Mortal Wkly Rep. 2020 May 29;69(21):641-646. PMID: 32463807.
12. Atanda AJ, Livinski AA, London SD, et al. Tooth Retention, Health, and Quality of Life in Older Adults: a Scoping Review. BMC Oral Health. 2022 May 18;22(1):185. PMID: 35585618.

Authors

Monika Drogosz, MPH, is the Oral Health Epidemiologist at the Rhode Island Department of Health.

Stephanie Munthe, DDS, is an MPH candidate at Brown University.

Samuel Zwetchkenbaum, DDS, MPH, is the Dental Director at the Rhode Island Department of Health.

UTPALA BANDY, MD, MPH
DIRECTOR, RHODE ISLAND DEPARTMENT OF HEALTH
COMPILED BY ROSEANN GIORGIANNI, DEPUTY STATE REGISTRAR

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

VITAL EVENTS	REPORTING PERIOD		
	JULY 2023	12 MONTHS ENDING WITH JULY 2023	
	Number	Number	Rates
Live Births	947	10,956	10.3*
Deaths	828	10,896	10.3*
Infant Deaths	3	49	4.5#
Neonatal Deaths	1	31	2.8#
Marriages	648	6,746	6.4*
Divorces	192	2,615	2.5*

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

Underlying Cause of Death Category	REPORTING PERIOD			
	JANUARY 2023	12 MONTHS ENDING WITH JANUARY 2023		
	Number (a)	Number (a)	Rates (b)	YPLL (c)
Diseases of the Heart	230	2,378	216.7	3,2674.0
Malignant Neoplasms	196	2,198	200.3	4,457.0
Cerebrovascular Disease	44	503	45.8	669.5
Injuries (Accident/Suicide/Homicide)	96	1,071	97.6	14,103.0
COPD	54	458	41.7	392.5

(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 1,097,379 for 2020 (www.census.gov)
(c) Years of Potential Life Lost (YPLL).

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

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

ANCHOR MEDICAL ASSOCIATES

BROWN EMERGENCY MEDICINE
BROWN PHYSICIANS, INC.

BROWN MEDICINE
BROWN PHYSICIANS, INC.

BROWN SURGICAL ASSOCIATES
BROWN PHYSICIANS, INC.

COASTAL MEDICAL

Diabetes & Endocrinology Associates, Inc.

east bay community action program
THE BRIDGE to SELF-RELIANCE

Orthopaedic Associates, Inc.

Ortho Rhode Island

SKIN PROS

The Providence CENTER

Thundermist HEALTH CENTER

Tri-County CommunityAction Agency
Helping people. Changing lives.

UNIVOTO
University Otolaryngology

Wood River Health Services
The Heart of South County since 1976

For more information about group rates, please contact Ali Walz, RIMS Director of Member Services

The View from Parkinson Land

JOSEPH H. FRIEDMAN, MD

Many years ago I put together a collection of vignettes[1] from my colleagues in the Parkinson Study Group, unusual anecdotes reported by patients with Parkinson's disease (PD) who had fallen into a parallel universe due to their PD and its treatment. Their reality had been altered, sometimes with preserved insight, and sometimes without. That collection, probably my most interesting paper (co-authored by the many contributors) had difficulty finding a home. Most journals would not publish anything like that, too 19th century. No academic medical paper in the 21st century should have an entertaining story to tell. No abstract, methods section, discussion or conclusion. "No template, no publication," and no high impact journal had a template it would fit. Eventually a low impact journal agreed to publish it. I give the article to students to try to get them interested in neurology. It's somewhere between an amateur Oliver Sacks' paper and Ripley's Believe it or Not.

When I think of my patient interactions, mostly with people with PD, I often think of a brief story the chair of my training program, Dr. Lewis P. Rowland, told the residents at morning report. He was a wonderful and very distinguished neuromuscular expert. "When I finished training I started with a clinical practice. My first patient walked in and I saw immediately that he had Parkinson's disease. I asked myself, 'What am I going to do for the next hour?'" This was in the 1950s, before L-Dopa, and most neurology cases were referred for diagnosis, not many treatments being available.

We've come a long way since then. We now have many treatments for the disorder, and are much better at treating it than we were then, although still limited, and our treatments often cause side effects. Our understanding of the disease, even just the clinical features, show us that the more we study it, the more interesting it gets. It's like a fractal, structure within structure, without end. So that the question, "What do I do for the next hour?" or, the more up-to-date question, "What do I do for the next 10 minutes?" rarely arises. "Ask and listen," is the answer.

Recently one of my patients, when asked if she sometimes saw things that others didn't, that is, have visual hallucinations, said that she had had a most unusual vision. She looked up from the book she was reading and saw Mickey Mouse and a polar bear climbing on the lampshade.

MEDICATION SIDE EFFECTS

Visual, auditory hallucinations

Recently one of my patients, when asked if she sometimes saw things that others didn't, that is, have visual hallucinations, said that she had had a most unusual vision. She looked up from the book she was reading and saw Mickey Mouse and a polar bear climbing on the lampshade.

Another was disturbed by drones that flew at night, spying on the neighborhood. They were operated by people who were watching out their windows, with the lights in their home turned off. The patient, knowing that people wouldn't believe it, took videos of the drones and pictures of the neighbors in the windows. Neither the spouse, nor the police, were able to see the drones or the people on the cell phone images, although the patient did.

A different patient saw people working on the pond that was at the periphery of his property. They were cutting down trees, which he found mildly disturbing. He, too, took pictures of them and brought them to me to convince me that they were real. And he saw them in the photos, although no one else did.

I wrote an essay[2] on my current "favorite" hallucination and the previous favorite. The previous favorite was reported by a patient who did not volunteer the presence of hallucinations, but readily answered my question about them. "I see people outside my house." I asked, "How do you know they're hallucinations and not real?" "Every morning when I sit down to eat breakfast, I see a group of nuns wearing habits, who start building a deck," he answered.

An older man said, with a smile, "I see a baby every night. It's such a good baby. It never cries."

An old woman saw her dead husband. "How does that make you feel?" I asked. "How should it make me feel? He's dead."

Paranoid delusions

Sometimes the medications can produce paranoid delusions. A professor was obsessed with the notion that people broke into his office in his home. He could hear them from other

parts of the house, but he never saw them or found evidence that they had been there. Nothing had been moved. He set a recording machine (before motion-activated video recorders were developed) to capture sounds they made. He refused to reduce his medications despite being told repeatedly that these were medication-induced auditory hallucinations. Then he was hospitalized and his medications were reduced. When he returned home, he no longer heard the sounds, but still believed in the intruders and refused to allow further alterations of his medications. "But you stopped hearing them when we lowered the medication," I said. "Has anyone investigated whether that medicine is good for hearing?" he responded.

Compulsions

It is widely known that dopamine agonists, drugs that have activity similar to dopamine, may cause gambling or hypersexuality. They often cause other compulsive activity as well. It is uncommon for patients to mention this without being asked directly, since we think of medicine side effects in terms of rashes, nausea, constipation, dizziness, sleepiness, and similar somatic symptoms, less in terms of behaviors, particularly unusual ones.

One patient, whom I had told about the possibility of compulsive behavior when she started a new medication, told me at the next visit that she had developed a strange interest in vacuum cleaners. "I went to the store and saw a sign that vacuum cleaners were on sale. I thought I needed one, so I bought it. When I got home, I figured that it would be easier if I had one on each floor so that I wouldn't need to carry it up and down the stairs. I also thought that a handheld vacuum would make life easier, and my son could use a new one for his house. And now, when I go to the store, I spend time checking out the vacuum cleaners. I know that's weird."

And there's the man who baked a cherry pie every night although he didn't like cherry pie; the man who traveled to flea markets collecting uranium glass; the woman who had to change her clothes two or three times before she went to work; the man whose excessive fishing contributed to his divorce; the man who collected broken lawn mowers.

What could be more interesting than this? ❖

References

1. Friedman JH, Agarwal P, Alcalay R, et al. Clinical vignettes in Parkinson's disease: a collection of unusual medication-induced hallucinations, delusions and compulsive behaviors. Int J Neuroscience. 2011;121:472-6.
2. Friedman JH. My newest favorite hallucination. Rhode Island Med J. 2021;104(9):85-86.

Author

Joseph H. Friedman, MD, Stanley Aronson Chair in Neurodegenerative Disorders and Professor, Department of Neurology, at the Alpert Medical School of Brown University; Director of Butler Hospital's Movement Disorders Program, Providence, RI.

Correspondence

joseph_friedman@brown.edu

Masking the Facts: Addressing Misinformation and Masking During the COVID-19 Pandemic

MENAKA NAIDU, BA; WILLIAM BINDER, MD

Since the emergence of SARS-CoV-2 in early 2020 in the United States, Rhode Island has reported over 400,000 cases of COVID-19 and over 4,000 associated fatalities. In clinical settings, masking is considered an essential aspect of infection control and prevention for SARS-CoV-2 and other respiratory viruses. However, significant misinformation on social media and other online sources has distorted some of the public's perception of masking and COVID-19. Here, we review current evidence and provide an update on common sources of misinformation.

The history of mask use is a recent development. While there are paintings of masked doctors (**Figure 1**) during times of the bubonic plague, masks were not routinely used in healthcare until the 20th century.[2,3] There appears to have been an intuitive use of masks during times of respiratory infections – masks were distributed during the influenza epidemic in 1918–1919 and regulations requiring their use were enacted throughout the country.[5,6,7] However, the recognition of the infectious origins of disease and respiratory illness, and the importance of reducing "hospital gangrene" led to the increasingly customary use of cloth masks in the operating room in the 1920s and 1930s.[2,4] Routine use of disposable masks began in the 1960s.[2]

Data related to masking and COVID-19 often centers around the belief that there are no evidence-based studies demonstrating that masks are effective. Research on the effectiveness of masks in preventing COVID-19 transmission has been limited, partly because masks are often studied in conjunction with other infection-control methods and because monitoring correct mask usage in community settings can be difficult. Furthermore, the dynamic nature of the pandemic and the emergence of new variants have continued to complicate research on masking and COVID-19. A major concern surrounding masks is the potential for adverse health effects, as misinformation has centered on the belief that masks can trap exhaled carbon dioxide and reduce oxygen levels for the wearer. Another concern is that masks can interfere with learning, particularly in children, as covering the lower half of the face may hinder speech recognition, interpretation of emotions, and overall communication skills.

Figure 1. Paul Furst, engraving, c. 1656, of a plague doctor of Marseilles. The nose case is filled with herbal material to ward off the plague. [WIKIPEDIA: PLAGUE DOCTOR, IN THE PUBLIC DOMAIN]

Although data on masking for COVID-19 continues to be limited, the mechanism of transmission of SARS-CoV-2 is well established. A susceptible individual can acquire COVID-19 when infectious particles are inhaled (i.e., airborne transmission) or when droplets come into direct contact with an individual's eyes, nose, or mouth (i.e., droplet transmission).[8] Historically, the primary purpose of masks has been "source control" to minimize the release of virus-containing droplets into the environment by the infected wearer. Additionally, masks provide a layer of protection for the wearer by reducing the inhalation of droplets from the surrounding environment. The effectiveness of masks in controlling the spread of COVID-19 can be attributed to the combined impact of these two functions. In addressing concerns and subsequent propagation of misinformation related to masking, clinical and public health guidance needs to be grounded in science. Communication with the public needs to include current scientific-based evidence and also address the fact that science is constantly evolving. Some concerns related to masking may be valid, and clinical and public health institutions need to appropriately and objectively study these concerns to determine ideal approaches to mitigate COVID-19 and other respiratory viruses.

A recent Cochrane Review published in January 2023 reviewed the effectiveness of interventions to interrupt or

reduce the spread of acute respiratory viruses. This review reported, with moderate certainty, that wearing a mask would "probably make little or no difference" in the transmission of COVID-19-like or influenza-like illnesses.[9] This review has been referenced as evidence that masking is ineffective. In a rare occurrence, the editor-in-chief of the Cochrane Library issued a statement on March 10, 2023, clarifying that the interpretation of the review as "masks don't work" was both inaccurate and misleading.[10] The statement emphasized the study's limitations, including a relatively low adherence with interventions, particularly with mask usage. This represented a significant study limitation, as masks can only be effective when worn correctly and consistently. Other limitations included that the review did not specifically focus on masking for COVID-19, as only six of the 78 trials were conducted during the COVID-19 pandemic. Additionally, the review focused on interrupting the spread of viruses, without addressing whether masks reduce an individual's risk of contracting or spreading the virus. As clarified by the editors, the review did not provide sufficient evidence to support the claim that masks were ineffective.

A recent analysis of mask effectiveness reached different conclusions. A systematic review in the *Annals of Internal Medicine* used data from three randomized controlled trials (RCTs) and 21 observational studies, specifically focusing on the effectiveness of masks in preventing SARS-CoV-2 infection.[11,12] The results of this review, which varied significantly from the Cochrane Review, were that masks may be associated with a small reduction in risk (around 10–18%) for SARS-CoV-2 infection in community settings. Although this review examined more up-to-date evidence, including studies published through January 2023, it was also limited by a lack of high-quality RCTs focused on masking and COVID-19. However, it is important to not misconstrue "an absence of evidence for effectiveness, with evidence for the absence of effectiveness."[13] Further research is necessary to investigate the effectiveness of masks, including a comparison of different mask types, in preventing COVID-19 infection. Additionally, and importantly, a valid critique of both the Cochrane Review and the study in Annals is that RCTs are a significantly flawed methodology for studying mask efficacy.[14] As several authors note, many effective policies that reduce illness have been instituted without RCTs, including speed limits, seat belts, placing babies on their backs to reduce sudden infant death syndrome, and (facetiously) the use of parachutes for jumping out of planes![14,15]

In terms of adverse health effects from masks, numerous studies have established that masking is safe and does not demonstrate any clinically significant impacts on respiration or gas exchange under most circumstances.[16] While one study published in *JAMA Pediatrics* was commonly cited as support of the belief that masks can reduce oxygen levels for the wearer, this study was retracted due to issues raised by the scientific community regarding the validity of the study's conclusions.[17] Additionally, there is no clear evidence of masking impairing emotional or language development in children, although available data is still limited. Overall, this information highlights the general safety of mask-wearing as a preventive measure against COVID-19.

Current CDC guidelines recommend the use of well-fitting masks or respirators in areas that are experiencing high hospital admission levels for COVID-19.[18] The current science on mask-wearing suggests that masking mitigates the spread of COVID-19 with little to no harm but is likely dependent on correct use of masks in the community. Continued investigation is needed to evaluate and quantify the effectiveness of masks across different populations and settings, as well as in the context of other respiratory diseases. While resistance to mask regulations is not new – resistance to mask-wearing and public health measures was recognized during the 1918–1919 influenza pandemic – obtaining the necessary data to inform evidence-based public health measures and protect the well-being of individuals and communities will contribute to better preparation for future pandemics.[4] ❖

References

1. RI Department of Health Covid-19 Response Data Hub. Rhode Island Department of Health. Retrieved July 12, 2023, from https//ri-department-of-health-covid-19-data-rihealth.hub.arcgis.com/
2. Matuschek C, Moll F, Fangerau H, Fischer JC, Zänker K, van Griensven M, Schneider M, Kindgen-Milles D, Knoefel WT, Lichtenberg A, Tamaskovics B, Djiepmo-Njanang FJ, Budach W, Corradini S, Häussinger D, Feldt T, Jensen B, Pelka R, Orth K, Peiper M, Grebe O, Maas K, Bölke E, Haussmann J. The history and value of face masks. Eur J Med Res. 2020 Jun 23;25(1):23. doi: 10.1186/s40001-020-00423-4. PMID: 32576263; PMCID: PMC7309199.
3. Wikipedia: Plague Doctor. https://en.wikipedia.org/wiki/Plague_doctor. Accessed January 11, 2024.
4. Morens DM, Taubenberger JK, Fauci AS. A Centenary Tale of Two Pandemics: The 1918 Influenza Pandemic and COVID-19, Part II. Am J Public Health. 2021 Jul;111(7):1267-1272. doi: 10.2105/AJPH.2021.306326. Epub 2021 Jun 10. PMID: 34111372; PMCID: PMC8493155.
5. Navarro JA. Mask Resistance During a Pandemic Isn't New—in 1918 Many Americans Were 'Slackers.' Michigan Medicine. 2020 (October 29). https://www.michiganmedicine.org/health-lab/mask-resistance-during-pandemic-isnt-new-1918-many-americans-were-slackers
6. Nakayama DK. Surgical Masks During the Influenza Pandemic of 1918-1920. American Surgeon. 2020; 86:557-559.
7. Korr M. Quarantine and Infection Control: From the 'Black Death' to the 21st Century. *Rhode Island Medical Journal*. 2020; 103(3):87-91.
8. Coronavirus Disease (COVID-19): How is it Transmitted? World Health Organization. 2021 Dec 23; from https://www.who.int/news-room/questions-and-answers/item/coronavirus-disease-covid-19-how-is-it-transmitted

9. Jefferson T, Dooley L, Ferroni E, Al-Ansary LA, et al. Physical Interventions to Interrupt or Reduce the Spread of Respiratory Viruses. Cochrane Database of Systematic Reviews. 2023 January 30; Issue 1. Art. No.:CD006207. PMID: 36715243
10. Statement on "Physical Interventions to Interrupt or Reduce the Spread of Respiratory Viruses" Review. Cochrane. 2023, Mar 10; from https://www.cochrane.org/news/statement-physical-interventions-interrupt-or-reduce-spread-respiratory-viruses-review
11. Chou R, Dana T. Major Update: Masks For Prevention of SARS-CoV-2 in Health Care and Community Settings—Final Update of a Living, Rapid Review. Annals of Internal Medicine. 2023;176:827–835. PMID: 37186920
12. Laine C, Chang S. Getting to the Truth About the Effectiveness of Masks in Preventing Covid-19. Annals of Internal Medicine. 2023;176:870–871. PMID: 37186919
13. Da Zhou C, Sivathondan P, Handa A. Unmasking the surgeons: The evidence base behind the use of facemasks in surgery. J R Soc Med. 2015;108:223-228.
14. Cash-Goldwasser S, Reingold AL, Luby SP, Jackson LA, Frieden TR. Masks During Pandemics Caused by Respiratory Pathogens—Evidence and Implications for Action. JAMA Netw Open. 2023;6(10):e2339443. doi:10.1001/jamanetworkopen.2023.39443
15. Oliver M, Ungrin M, Vipond J. Masks Work. Distorting Science to Dispute the Evidence Doesn't. Scientific American. 2023; May 5, 2023. https://www.scientificamerican.com/article/masks-work-distorting-science-to-dispute-the-evidence-doesnt/. Accessed January 11, 2024
16. Coronavirus Disease 2019 (COVID-19). Centers for Disease Control and Prevention. 2021 December 6; from https://www.cdc.gov/coronavirus/2019-ncov/science/science-briefs/masking-science-sars-cov2.html
17. Walach H, Weikl R, Prentice J, Diemer A, et al. Experimental Assessment of Carbon Dioxide Content in Inhaled Air With or Without Face Masks in Healthy Children: A Randomized Clinical Trial. JAMA Pediatrics. 2021 Jun 30; PMID: 34190984
18. Use and Care of Masks. Centers for Disease Control and Prevention. 2020 Feb 11; from https://www.cdc.gov/coronavirus/2019-ncov/prevent-getting-sick/about-face-coverings.html

Authors

Menaka Naidu, BA, Brown University, Providence, RI.

William Binder, MD, Professor, Department of Emergency Medicine, Warren Alpert Medical School of Brown University, Providence, RI.

Correspondence

william_binder@brown.edu

Block Island doctors heralded its salubrious summertime climate in late 1800s

Cottages, small hotels, sanitarium catered to seasonal visitors

MARY KORR
RIMJ MANAGING EDITOR

View of the Vaill Hotel and cottages on the South Bluffs of Block Island. [CREATIVE COMMONS, RHODE ISLAND POSTCARD COLLECTION, PROVIDENCE PUBLIC LIBRARY DIGITAL COLLECTIONS]

The creation of a channel and new harbor into Block Island in the 1870s allowed steamships to safely transport visitors to its rocky shores in summertime. **C.H. HADLEY, MD**, described it as "a natural sanitarium…a harbor of refuge for those battling disease," in an 1885 article in *The New England Medical Gazette* (vol. 20) titled "Block Island as a Resort for Invalids."

He wrote: "In regards to consumptives, a short sojourn in the summer months is very beneficial," and in his experiences as a practitioner on the island, observed a "reduction in night sweats, harassing coughs, and lack of appetite." He credited the clime, where "the heat is never oppressive and the nights cool and the mosquitos, the pest of summer resorts, is hardly seen."

He also noted the freedom from epidemics among the 1,300 residents, with no outbreak of measles, no cases of diphtheria or croup, and an average of two cases of typhoid fever a year, malaria unknown, and a rare case of dysentery, cholera-infantum, and acute inflammatory rheumatism with a low mortality rate, citing the 10 years from 1873 to 1883 as less than 8/10ths of 1 percent.

Dr. Hadley also owned a small hotel on the island. According to the National Register of Historic Places, the Hygeia House, originally constructed by Dr. Hadley as the Seaside House, was built in 1885 and moved to its present site in 1907 with several additions. A small room in the rear, the record states, was "originally the office of the hotel's owner, a medical doctor." Ten guest rooms, later expanded to 15, were located on the second floor and were regularly rented to summer visitors.

In 1887, Dr. Hadley sold his practice to **DR. JOHN CARDER CHAMPLIN**, and moved to Brooklyn, NY, according to a 1991

The pathway and front of the Hygeia Hotel in a 1901 postcard published by the A. C. Bosselman Co. [CREATIVE COMMONS, RHODE ISLAND COLLECTION, PROVIDENCE PUBLIC LIBRARY DIGITAL COLLECTIONS.]

(Top) This screenshot is from a Block Island Historical Society film, which presents an overview of the island's history and the museum's collections, available at: https://www.blockislandhistorical.org/our-collection

document published by the Rhode Island Historical Preservation Commission in cooperation with the Block Island Historical Society.

Dr. Champlin was an island native and the island's physician, and moved the Seaside House to the grounds of his own hotel, the Hygeia, and renamed it the Hygeia Annex. In 1916, the large hotel burned down, and Dr. Champlin moved his offices to the Annex and renamed it the New Hygeia.

The National Register summarizes the Hygeia as "reflecting a minor theme in Block Island's history as a resort – the association of seaside vacations with health and vitality."

The SS Block Island steamer began operations in July 1882 and is shown here at Block Island harbor. [CREATIVE COMMONS, RHODE ISLAND COLLECTION, PROVIDENCE PUBLIC LIBRARY DIGITAL COLLECTIONS.]

Sanitarium complex

During its heyday, another physician, **ABBY EVEREST VAILL, MD**, arrived. Records at the Rhode Island Historical Preservation Commission state that in 1884 Dr. Vaill purchased 16 acres on the south side of the island and the following year erected three cottages – two for patients and one for herself.

The National Register of Historic Places documents the 1885 construction project as a "sanitarium complex, which included two small cottages and a 3-and-a-half story hotel." The hotel was built in 1893.

Dr. Vaill (sometimes spelled in historical records as Vail), was a native of Litchfield, CT, who practiced in New York. Archival records from the University of Michigan indicate she was an 1877 medical graduate of the College of Surgery and Medicine and passed away in 1897 in New York at the age of 59. One can surmise that she spent her summers on Block Island, tending to patients who arrived at the complex for its salubrious effects.

Upon her death in 1897, advertisements in *The Brooklyn Eagle* and other New York newspapers advertised the Vaill Cottages for summer rental, with proprietors listed as her sister, Julie Vaill, and a nephew.

The legacy of these physicians in the late Victorian era can be seen in the extant cottages and hotels in which they lived and worked, and in the records, videos and memorabilia housed at the Block Island Historical Society. What has not changed, of course, is the sea, sand, and summertime escape the island still offers visitors. ❖

We are read everywhere

In 2023, approximately **59,000** unique viewers worldwide read *Rhode Island Medical Journal* articles or researched topics from its archives, rimedj.org.

Top 10 countries:

1. US
2. Canada
3. India
4. UK
5. Germany
6. China
7. Philippines
8. Australia
9. Brazil
10. Taiwan

EPHESUS, TURKEY

Editor-in-Chief **William Binder, MD**, is shown here visiting the **Library of Celsus**, located in Ephesus, western Turkey, on the coast of the Aegean Sea. The two-story structure is made of marble and hearkens back to the Greek and Roman civilizations of antiquity.

The library was commissioned in 114 CE by Tiberius Julius Acquila to commemorate his father, Tiberius Julius Celsus Polemaeanus, who had been a member of the Roman Senate and was, from 105 to 107 CE, the proconsul of Ephesus. Completed in 117 CE, Celsus was then entombed in a lead coffin encased in a marble sarcophagus at the site.

At its height, the library held more than 12,000 papyrus and parchment scrolls ensconced in the niches of the structure. Like many other Roman ruins, the original Library of Celsus has long since collapsed. Its facade was reconstructed in the 1970s using fragments that had been found during excavations. It is a popular tourist attraction in Turkey today.

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**.

Brain Waves Rhode Island presents brain fair March 9th

Brown Brain Fair 2023. [PHOTOS BY JUSTIN CASE, COURTESY OF BRAIN WAVES RI]

PAWTUCKET – For the ninth year, Brain Waves Rhode Island (BWRI), formerly Brain Week Rhode Island, returns with its annual celebration of International Brain Week, a global campaign to increase public awareness of the progress and benefits of brain research. Young, old, and in-between are invited to immerse themselves in the mysteries and intricacies of the brain during BWRI's Pawtucket Brain Fair, on March 9, 10am–2pm, at Hope Artiste Village, 1005 Main Street, Pawtucket.

Each year, BWRI also collaborates with the Brown Brain Fair, which will take place on Saturday, March 16 at Brown Engineering Research Center. 345 Brook Street, Providence, 10am–2pm. These special events invite the community to learn about basic science, brain health, interact with brain science labs, familiarize themselves with community resources and experience the thrill of discovery. Both events are free of charge and open to the public.

DR. VICTORIA HEIMER-MCGINN, Co-Chair and President of BWRI, said, "We've had a very busy year. We obtained our status as a not-for-profit 501(c3) organization, we rebranded to Brain Waves Rhode Island to better represent the work we do year-round, and we added new members to our board of directors." She continued, "BWRI's mission has not changed. We continue to present programs that will inspire and empower more people to choose science as a career, especially people from communities that are underrepresented in the sciences." Dr. Heimer-McGinn is an Assistant Professor at Roger Williams University, where she and her students study how neuropsychiatric conditions like bipolar disease affect cognition. In 2019 she received the Next Generation Award from the international Society for Neuroscience in recognition of her contributions to public neuroscience education and outreach.

(Left) **Dr. Victoria Heimer-McGinn**, Co-Chair and President, Brain Waves RI. (Right) **Dr. Kristin Scaplen**, Co-Chair, Brain Waves RI.

DR. KRISTIN SCAPLEN, Co-Chair of BWRI said, "I love any opportunity to bring neuroscience out of the lab into our local community and get students excited about their most precious commodity – their brain." She added, "This year we have so many great things happening – from our name change to a new pilot program that allow schools to incorporate brain science activities and experiments into their curriculum. This program will give students an opportunity to showcase the work they have done in the classroom at the Pawtucket Brain Fair. We intend to expand this program to include more schools over the next couple of years." Dr. Scaplen is an Assistant Professor of Neuroscience at Bryant University and an Adjunct Professor of Neuroscience at Brown University. At Bryant Dr. Scaplen runs a lab powered by undergraduates that studies how the brain changes in the context of alcohol addiction. She and her work have been featured on GBH News: All Things Considered with Arun Rath and numerous news outlets.

Since 2016, BWRI has highlighted the wonders of the human brain and the wealth of neuroscience research happening in the Ocean State. Through BWRI, specialists in many fields are brought together to make brain science and brain health accessible for everyone. In addition to the Brain Fair, BWRI provides free in-classroom BRAINY visits to K–12 schools in Providence, Pawtucket and Central Falls throughout the months of February and March. Since its inception, BWRI has actively been to more than 30 schools, reached more than 4,000 students, held more than 50 events, and created more than 20 online resources for participants. ❖

RIDOH, RIAG make public The Centurion Foundation HCA application

PROVIDENCE – The Rhode Island Department of Health (RIDOH) and Rhode Island Attorney General **PETER F. NERONHA** have released the Initial Hospital Conversion application submitted to the State for the proposed sale of Roger Williams Medical Center and Our Lady of Fatima Hospital.

The application was submitted by the Centurion Foundation Inc. and Prospect Medical Holdings, Inc. The Centurion Foundation is looking to acquire the two hospitals, which are operated by CharterCARE and are currently owned by Prospect Medical Holdings, Inc. The Centurion Foundation Inc. is a Georgia-based non-profit company. This proposed transaction is subject to the review and approval of RIDOH and the Attorney General, the two regulatory entities empowered to oversee hospital conversions in Rhode Island.

Consistent with the standard process set forth by The Hospital Conversions Act (HCA), the Attorney General and RIDOH deemed Centurion's application complete in December. The Attorney General and RIDOH have now released the application to the public with redactions for confidential commercial information of the parties, in accordance with the provisions of the HCA. The application is available on the sites of Attorney General Neronha (https://riag.ri.gov/about-our-office/divisions-and-units/civil-division/public-protection/healthcare) and RIDOH (https://health.ri.gov/programs/hospitalconversionsmerger/).

Additionally, the Attorney General and RIDOH are announcing that two public hearings will be held in the near future on this proposed transaction. The dates, times, and locations of these meetings will be announced shortly and will include options of joining in person and virtually. The purpose of these meetings is to hear from members of the public about their thoughts and opinions regarding the application.

Public comments will be taken into consideration by the Attorney General and RIDOH as they complete their review of this application.

Following the informational public meetings, the Attorney General and RIDOH will continue their review of the application. Under the HCA, the review must be completed within 180 days of the date that the application is accepted for review, which is June 11, 2024. ❖

VA announces available grants for community organizations addressing suicide prevention

WASHINGTON – Recently, the Department of Veterans Affairs (VA) announced the availability of $52.5 million in funding for grants to community-based organizations that provide or coordinate suicide prevention services for Veterans and their families – including conducting Veteran mental health screenings, providing case management and peer support services, delivering emergency clinical services, reaching out to Veterans at risk of suicide, and more.

These grants will be awarded through VA's Staff Sergeant Parker Gordon Fox Suicide Prevention Grant Program. The Notice of Funding Opportunity provides information about the program, eligibility, and award process. Applications are due by 11:59 pm E.T., April 26 and awards will be granted to eligible entities by Sept. 30, 2024. The funds will be used by the selected organizations in fiscal year 2025.

Ending Veteran suicide is VA's top clinical priority and a key part of fulfilling President Biden's Unity Agenda for the nation. Since 2021, VA has worked aggressively to expand support for Veterans in crisis, including offering no-cost health care to Veterans in suicidal crisis at VA or non-VA facilities; launching the 988 (then press 1) to help Veterans connect more quickly with caring, qualified responders through the Veterans Crisis Line; partnering with community-based suicide prevention organizations to provide Veterans with on-the-ground support; expanding firearm suicide prevention efforts; and encouraging Veterans to reach out for help through a national Veteran suicide prevention awareness campaign. Moving forward, VA and the Biden-Harris Administration will continue to work urgently to end Veteran suicide through a public health approach that combines both community-based and clinically based strategies to save lives.

"Veterans in crisis should always have access to the services and support they need – including mental health screenings, peer support, emergency services, and more," said VA Secretary **DENIS MCDONOUGH**. "There are countless great organizations across America that work side-by-side with VA to do this life-saving work, and we are proud to support their efforts."

This will be the third round of grants awarded as part of VA's Staff Sergeant Parker Gordon Fox Suicide Prevention Grant Program. In September 2023, VA awarded grants totaling $52.5 million to 80 community-based organizations in 43 states, Washington, D.C., Guam, and American Samoa. The grant program is named after Parker Gordon Fox, a sniper instructor who died by suicide at the age of 25.

Grant funding will be divided into two priorities. Under Priority 1, VA will provide opportunities for funding to those entities with existing SSG Fox SPGP awards. Under Priority 2, new organizations can apply for grants worth up to $750,000. Following the selection of Priority 1 grantee applicants, any remaining funds will be awarded according to Priority 2. VA may prioritize the distribution of suicide prevention services grants under this priority to: (i) Rural communities; (ii) Tribal lands; (iii) Territories of the United States; (iv) Medically underserved areas; (v) Areas with a high number or percentage of minority Veterans or women Veterans; and (vi) Areas with a high number or percentage of calls to the Veterans Crisis Line. ❖

Blue Cross & Blue Shield of Rhode Island gives $648K in 2024 community grants to programs focused on housing as the foundation of health

PROVIDENCE – Blue Cross & Blue Shield of Rhode Island (BCBSRI) has once again committed its annual BlueAngel Community Health Grant program to addressing housing-related health inequities, awarding $648,000 in 2024 to initiatives led by 10 area non-profit social service organizations. This is the fifth consecutive year that the grants, established in 2002, have focused on supporting access to safe, stable, and affordable housing throughout Rhode Island.

The funding includes $313,000 for five organizations being awarded new grants and an additional $335,000 in transitional funding for five grantees from 2023 to continue their successful initiatives.

The projects address a range of housing-related issues that are foundational to wellness, including housing and wraparound services for families with children, housing and outreach to individuals who are experiencing homelessness, and housing support and advocacy for individuals with substance use disorder.

"Too many Rhode Islanders face significant health-related needs and housing continues to be one of the most challenging areas," said BCBSRI President & CEO **MARTHA L. WOFFORD**. "We're proud to partner with community organizations who share our unwavering commitment to improved access to safe and affordable housing and a healthier and more equitable Rhode Island."

BCBSRI's philanthropy is guided, in part, by the annual RI Life Index, a statewide survey of Rhode Islanders administered in partnership with the Brown University School of Public Health. The Index, now in its sixth year, has consistently shown that access to safe, stable, and affordable housing is a top concern for Rhode Islanders across the state. In 2023, a year after the affordable housing Index score plummeted from 40 to 33 on a scale of 100, the results were essentially unchanged at 32. High interest rates, steep home prices, low vacancy rates and increasing rents continued to prevent Rhode Island families from affording housing.

BCBSRI Managing Director of Corporate Social Responsibility **CAROLYN BELISLE** said, "The RI Life Index, since its very first year, has underscored that housing is perceived by Rhode Islanders to be one of the most significant barriers to health and well-being in in our state and led us to begin directing our health grants toward housing-related programs. The Index's annual results continue to demonstrate the urgency of supporting organizations committed to working proactively and effectively to develop housing solutions. As in previous years, we're pleased that our community partners are addressing the critical needs of a highly diverse and vulnerable group of Rhode Islanders."

The 2024 awards bring the five-year total investment in affordable housing to nearly $2.7 million. Since the grant program began in 2002, BCBSRI has donated more than $6.9 million to local organizations, funding critical work that has impacted the lives of more than 336,000 Rhode Islanders.

These five organizations and projects have been chosen to receive 2024 grants:

Foster Forward – Utilizing a Housing First approach to house youth/young adults ages 18 to 24 who are experiencing housing instability and homelessness and are at-risk of system involvement. The grant will fund the Your Way Home program, a short-term crisis intervention that provides rental assistance and case management services.

Child & Family Services of Newport County – Child & Family's Supportive Housing Program in Newport provides safe, secure housing to homeless families that come from throughout the state. Through participation in this program, parents are provided with wraparound case management and access to a continuum of care that provides the resources necessary for them to secure permanent housing and improve the overall health and well-being of their families.

Thundermist Healthcare Center – Housing support specialists work in partnership with people who are or are in danger of becoming unhoused, to build resources that promote independence, ensure that they can meet the obligations of tenancy, and successfully obtain and maintain housing. Specialists guide patients through paperwork and connect them to resources for legal and financial support to gain or retain permanent housing.

Project Weber/RENEW – Supports housing for people who have substance use disorder and people in early recovery, including assistance with expungement of criminal records and advocacy and education at the state level on policies and practices around Housing First and harm reduction models.

House of Hope CDC – Preserve and upgrade 20 units of existing permanent affordable housing units in Warwick for men, women, and children and, in collaboration with Amenity Aid, promote community health through the distribution of hygiene supplies across the state. House of Hope CDC Street outreach teams will use the hygiene kits as a trust-building engagement tool.

A year after being awarded a BlueAngel Community Health Grant, recipients are eligible for, and encouraged to apply for, transitional funding to build upon programs that have demonstrated success. Transitional funding totaling $335,000 is being provided this year to the following: **Adoption Rhode Island**, **Habitat for Humanity of South County**, **Jonnycake Center for Hope**, **West Elmwood Housing Development Corporation**, and **Westbay Community Action, Inc**.

Funding is made available through the Blue Cross & Blue Shield of Rhode Island Community Health Fund, a donor advised fund at the Rhode Island Foundation. The grant selection process began in July with a call for letters of intent.

More information about the grant program is available at bcbsri.com/about/blueangel. ❖

Coastal Medical switches to Lifespan's EHR

PROVIDENCE – Coastal Medical, a Lifespan entity, transitioned to Lifespan's electronic health record (EHR), LifeChart, and patient portal, MyLifespan, using Epic software.

The new platform will enhance the patient experience with:

- The ability to view health records for Lifespan primary care locations, hospitals, specialists, laboratories, and imaging in one patient portal (MyLifespan).
- Streamlined portal alerts for Lifespan test results, such as lab and imaging.
- Added functionality like online scheduling, appointment waitlists, and video visits for some appointment types.
- Speedier check-in process that allows patients to update information prior to their visit.

"Coastal Medical's adoption of Lifespan's EHR is cause for much excitement because it allows for one patient record to be shared by all Lifespan entities," said **ED MCGOOKIN**, president of Coastal Medical. "This change will help to improve continuity of care, increase patient safety and enhance operational efficiencies – a win-win situation for both our patients and our employees." ❖

Six Lifespan Physician Group (LPG) Primary Care Practices rebranded as Coastal Medical

PROVIDENCE – Throughout 2023, Lifespan Physician Group (LPG) Primary Care and Coastal Medical worked closely together to provide a wider array of primary care services and programs to patients.

As of February 5, 2024, Coastal Medical announced that six LPG Primary Care practices have officially taken on the Coastal Medical name and brand:

- Coastal Medical Cranston Primary Care
  1500 Pontiac Ave., Suite 101, Cranston
- Coastal Medical Jamestown Primary Care
  20 Southwest Ave., Jamestown
- Coastal Medical Metacom Primary Care
  639 Metacom Ave., Warren
- Coastal Medical Newport County Primary Car
  formerly 50 Memorial Blvd (see satellite locations)
- Coastal Medical Tiverton Primary Care
  711 Main Rd., Tiverton
- Coastal Medical Warwick Primary Care
  501 Centerville Rd., Suite 101, Warwick

In addition to the current Coastal clinical services and programs already being offered, patients at these practices who are 18 and older now have access to Coastal365 locations, which offer adult sick visits (by appointment only) after-hours, on weekends, and holidays. Patients will be notified of additional primary care clinical services/programs as they become available.

The integration and rebranding to Coastal Medical will be seamless for patients. For patients at these locations, their clinicians, practice locations, care teams, appointments, and patient portal will not change due to this integration. ❖

University Orthopedics launches Comprehensive Spasticity Management Clinic

EAST PROVIDENCE – With the formation of its Comprehensive Spasticity Management Clinic, University Orthopedics recently announced it is now able to offer a multidisciplinary and comprehensive approach to spasticity treatment that is unique in Rhode Island and Greater Boston.

The clinic is led by **ZACHARY BOHART, MD**, a board-certified physiatrist and an expert in spasticity management.

Spasticity, which can be the result of stroke, multiple sclerosis, or other neurological conditions, causes certain muscles to contract involuntarily. The resulting stiffness can impede voluntary movement, making everyday tasks like self-care, physical therapy, and even sleep, difficult.

Zachary Bohart, MD, a board-certified physiatrist and an expert in spasticity management, will lead the new Comprehensive Spasticity Management Clinic at University Orthopedics. [COURTESY UNIVERSITY ORTHOPEDICS]

"Timely treatment for spasticity really can help improve a patient's quality of life. Unfortunately, there is a tremendous shortage of doctors treating this debilitating condition in our area," Dr. Bohart said. "We believe that the Comprehensive Spasticity Management Clinic will help more patients find relief from their symptoms without having to travel far from home."

The Comprehensive Spasticity Management Clinic at University Orthopedics offers three of today's most effective treatments for spasticity:

- Botox injection therapy
- Phenol nerve-block injection therapy
- Intrathecal baclofen (ITB) pump placement and therapy

"When given early, before contracture sets in, injection therapy can ease symptoms and help patients better participate in physical and occupational therapy to gain strength, flexibility, and the ability to work on everyday self-care skills," Dr. Bohart said.

While the causes vary, UOI's Spasticity Management Clinic most often treats spasticity that is the result of:

- Stroke
- Multiple Sclerosis
- Spinal Cord Injury
- Brain Injury
- Cerebral Palsy

Additional effective, non-surgical treatment options the clinic offers include:

- Exercise programs
- Pharmacological management
- Bracing and splinting
- Therapeutic heat, cold, and electrical stimulation

When injection treatment isn't appropriate and surgical treatment may be warranted, Dr. Bohart's team works closely with their surgical colleagues at University Orthopedics to help find the best, least invasive solution, to maximize a patient's comfort and functioning. ❖

Aquablation therapy now available at South County Hospital

WAKEFIELD – **ARNOLD SARAZEN, MD**, Chief of Surgery and Urology at South County Health, performed the first Aquablation procedure at South County Hospital on January 20, 2024. This procedure, Aquablation therapy, is the latest in medical technology for men suffering from Benign Prostatic Hyperplasia (BPH), also known as enlarged prostate.

Now available at South County Hospital, Aquablation therapy is an advanced, minimally invasive treatment that allows surgeons to use the power of water delivered with robotic precision to provide long-lasting BPH relief without compromise and minimal risk of irreversible complications like incontinence, erectile dysfunction, and ejaculatory dysfunction, all with a fast recovery time.

"We are proud to be the first in Southern Rhode Island to offer a solution for men with BPH that provides significant, long-lasting symptom relief, with lower risk to sexual function and continence," said Dr. Sarazen. "Aquablation therapy is the next step to furthering our commitment to innovation and providing access to new technological advancements to our community. Being able to provide this treatment, right here in South County, is going to significantly improve the lives of our patients."

Arnold Sarazen, MD, Chief of Surgery and Urology at South County Health, performed South County Hospital's first Aquablation procedure on January 20, 2024 using the AquaBeam System. He's pictured here with Kristin Pearce, surgical technician, and Patrice Rocha, operating room RN. [SOUTH COUNTY HEALTH]

Aquablation therapy is performed by board-certified surgeons specializing in urology using the AquaBeam® Robotic System. The procedure combines real-time, multi-dimensional imaging, automated robotics, and heat-free waterjet ablation for targeted, controlled, and immediate removal of prostate tissue. This technology allows for the creation of a personalized treatment plan tailored to each patient's anatomy. Aquablation therapy is performed under anesthesia in South County Hospital's operating room. ❖

Rhode Island Hospital, Alpert Medical School to join national clinical trials resource center

MORGANTOWN, WV; PROVIDENCE – Rhode Island Hospital and Advance Rhode Island-Clinical and Translational Research, a National Institute of General Medical Sciences (NIGMS)-funded research partnership out of the Alpert Medical School are now part of a new clinical trials resource center. This National Institutes of Health (NIH)-funded project is headquartered at West Virginia University.

Launched in fall 2023, the IDeA State Consortium for Clinical Research Resource Center (ISCORE-RC) will enhance training and resources to ultimately increase the number of clinical trials in Institutional Development Award (IDeA) states, those 23 states and the Commonwealth of Puerto Rico, that traditionally have relatively low rates of funding from the NIH and limited numbers of NIH-funded clinical trials.

This five-year grant, with estimated funding of approximately $2.85 million, was awarded to **DR. SALLY HODDER**, West Virginia Clinical and Translational Science Institute (WVCTSI) director, associate vice president for clinical and translational science at WVU, and Chancellor's Preeminent Scholar Chair.

A variety of assets will be provided through the creation of the ISCORE-RC to establish two distinct resources: 1) a clinical research coordinator development program (CRCDP) and 2) a clinical trials service center (CTSC). The CRCDP will train clinical research coordinators at sites across the country with self-paced online learning modules paired with mentorship and supervised hands-on training. The CTSC will address common barriers using a multifaceted approach including communication of upcoming clinical trials opportunities to IDeA investigators and effective marketing of IDeA states.

"Clinical trials are an important step in the cycle of bringing

advances in medicine to the patients who need them most, and we have to ensure that underserved populations are not left out of the process. ISCORE-RC will help us provide cutting-edge care to all Rhode Islanders," said **MUKESH K. JAIN, MD**, senior vice president for health affairs and dean of medicine and biological sciences at Brown University.

DR. SHARON ROUNDS, principal investigator of the Advance RI-CTR program, noted, "We've been impressed with the organization at WVCTSI under Dr. Sally Hodder and are pleased to support this successful award. The training that will be given to clinical trial coordinators as part of ISCORE-RC dovetails perfectly with Advance RI-CTRs mission to support clinical and translational research in Rhode Island."

The grant is led by Brown advance-CTR principal investigator Dr. Rounds and **DR. GHADA BOURJEILY**, professor of medicine, health services, policy and practice at Brown University and Lifespan.

"We are very excited to participate in this key opportunity to enhance clinical trials at the institution and the state of RI and strengthen our clinical research workforce so that we can offer cutting edge research to our patient population," said **JOHN R. FERNANDEZ**, president and CEO of Lifespan. ❖

Research reported in this publication was supported by the National Institute of General Medical Sciences of the National Institutes of Health under Award Number U24GM150446. The content is solely the responsibility of the authors and does not necessarily represent the official views of the National Institutes of Health.

Legorreta Cancer Center at Brown announces 2023 Pilot grant recipients

PROVIDENCE [BROWN UNIVERSITY] – The Legorreta Cancer Center at Brown University announces the awardees of the 2023 Pilot grant competition. These one-year awards were made after applications were received from throughout Brown University and affiliated hospitals. The goal of the request for pilot grant applications was to encourage collaboration and basic-translational research across the academic medical center and within the Legorreta Cancer Center's research programs in Cancer Biology, Cancer Therapeutics, and Population Science. In addition, a special request was made for projects addressing the role of nutrition, metabolism, and cancer. Two progress reports are expected from the awardees (at six months and at the end of the award) who will also be invited to present updates of their research at Cancer Center venues. ❖

Below is a list of the projects that have been approved for funding:

MORGANNE A. KAINES, PhD
Assistant Professor (Research)
Department of Psychiatry and Human Behavior
Butler Hospital
Project Title: Adapting 'Finding Peace in a Frantic World' for Caregivers of Cancer Patients: A Qualitative Study

JOANNE WILKINSON, MD
Associate Professor (Research)
Department of Family Medicine
Kent County Memorial Hospital
Project Title: Exploring and Improving Psychological Distress Related to Abnormal Mammograms

AMANDA M. JAMIESON, PhD
Associate Professor
Molecular Microbiology and Immunology
Project Title: Fighting Lung Cancer by controlling the respiratory microbiota

KARL T. KELSEY, MD
Professor
Pathology & Laboratory Medicine, Epidemiology
Project Title: Immune Cell Profiling in Response to Immunotherapy

MAMIKO YAJIMA, PhD
Assistant Professor
Molecular Biology, Cell Biology and Biochemistry
Project Title: Functional Contribution of DDX4 in small cell lung cancer regulation

OLIN LIANG, PhD
Associate Professor (Research)
Medicine
Project Title: Enabling CAR T Cell Immunotherapy in Glioblastoma by Modifying Tumor Microenvironment via Oncolytic Adenoviruses Encoding Bi-specific T Cell Engagers

BENEDITO A. CARNEIRO, MD, MS
Associate Professor of Medicine
SHAOLEI LU, MD, PhD
Associate Professor
Pathology & Laboratory Medicine
Project Title: Investigating cellular Senescence as a mechanism of treatment resistance in prostate cancer

Whitehouse applauds federal expansion of opioid treatment rules, calls for passage of TREATS Act

WASHINGTON, D.C. – U.S. Senator **SHELDON WHITEHOUSE** (D-RI) cheered the Biden administration's new rule extending Covid-era policies that expanded access to medication-assisted treatment initiated at Opioid Treatment Programs (OPTs). The rule change allows methadone and buprenorphine to be administered at home and ends a yearlong requirement of opioid addiction before entering treatment. These changes, which take effect on April 2, mark the first time in 20 years that the federal OPT rules have been updated.

"I applaud the Biden administration's efforts to expand access to opioid treatment and support individuals from all walks of life on the noble road to recovery," said Whitehouse, who authored the bipartisan Comprehensive Addiction and Recovery Act, the primary law guiding the federal response to the opioid epidemic. "This new rule marks an important step in our fight against the opioid epidemic, and passing my TREATS Act would expand access to buprenorphine across all health care settings. HHS has taken the first step, but more work is needed to ensure that everyone who wants recovery support can access it."

Last November, Whitehouse reintroduced the Telehealth Response for E-prescribing Addiction Therapy Services (TREATS) Act to increase access to medication for substance use disorder through telehealth. The bipartisan legislation will waive regulatory restrictions for accessing care, preserving flexibilities put in place to save lives during the COVID-19 pandemic.

Overdose deaths involving opioids rose to a peak of nearly 83,000 Americans in 2022. Last year, 434 Rhode Islanders died of accidental overdoses. Despite strong evidence that medication is the most effective treatment for opioid use disorder, only one in five Americans with opioid addiction receive medication treatment that could help them quit and stay in recovery.

During the COVID-19 Public Health Emergency, the Drug Enforcement Agency and the Department of Health and Human Services temporarily removed the in-person exam requirement for prescribing medication via telemedicine for people with opioid use disorder. Telehealth flexibilities helped a broad range of patients – including veterans, those living in rural areas, people experiencing homelessness, individuals in the criminal justice system, and racial and ethnic minorities – access treatment. The flexibilities are set to expire on December 31, 2024.

The TREATS Act would make the changes permanent, allowing providers to waive the in-person visit requirement and instead use audio-only or audio-visual telehealth technology. ❖

BCBSRI, School of Public Health launch 6th annual RI Life Index

PROVIDENCE – Beginning in early March, Rhode Islanders will once again be asked at random to participate in an annual telephone survey for the RI Life Index. Now entering its 6th year, the Index captures Rhode Islanders' perceptions of a wide range of social and economic factors that contribute to health and well-being.

Survey topics include affordable housing, food security, cost of living, job opportunities, childcare, education, and other social determinants of health. The results are used to update the Index every year, providing both a detailed current portrait of how Rhode Islanders view their quality of life as well as emerging and evolving trend lines in the challenges they face.

Blue Cross & Blue Shield of Rhode Island (BCBSRI) created the Index in 2019 in partnership with the Brown University School of Public Health. The annual results have significantly informed BCBSRI's philanthropy, including more than $8 million in investments in recent years in community initiatives focused on the nexus of affordable housing and health.

"The RI Life Index is strategically designed to capture the voices of ALL Rhode Islanders by ensuring that we hear from people of color, underrepresented urban neighborhoods, and other traditionally marginalized groups. We urge you to take part if you're contacted so that the Index continues to reflect the collective voices of our diverse communities," said **MICHELE LEDERBERG**, BCBSRI executive vice president, chief legal officer & chief administrative officer. "Thanks to Rhode Islanders who have responded to the survey every year since its launch, the Index continues to shine the light on unacceptable health inequities and serve as a valuable resource for researchers, policymakers, and community-based organizations devoted to eliminating these disparities."

The random digit dial survey will again be conducted in both English and Spanish, by Siena College Research Institute. The survey will continue through May, with results expected to be released to the community in fall 2024.

The survey is guided by the RI Life Index Coalition, a group of 14 community and statewide organizations working through an equity lens to address social needs and improve health. Member organizations include AARP; BCBSRI; Brown University School of Public Health; Community Provider Network of Rhode Island; the Economic Progress Institute; HousingWorks RI; Latino Policy Institute; Lifespan Community Health Institute; MLBP; Rhode Island Community Food Bank; the Rhode Island Department of Health; the Rhode Island Foundation; Rhode Island Kids Count; and United Way of Rhode Island.

"We are extremely grateful to Brown and our community partners, whose support has been critical in allowing us to launch the RI Life Index for a sixth consecutive year," Lederberg said.

For more information, visit RILifeIndex.org. ❖

BCBSRI grants $75K to Chris Collins Foundation's school mental-health programs

PROVIDENCE – Blue Cross & Blue Shield of Rhode Island (BCBSRI), as part of its multi-pronged effort to address the youth behavioral health crisis in Rhode Island, has granted $75,000 to The Chris Collins Foundation. The foundation, based in Rhode Island, administers school-based programs that raise awareness of mental health challenges in youth, reduce social stigma, and promote early interventions for students experiencing emotional difficulties.

The grant comes as the foundation is poised to expand its Peer-to-Peer Mental Health Awareness Program, a student-led, evidenced based initiative currently operating in 10 high schools and five middle schools in Rhode Island. The foundation is in the process of establishing the program at another six schools, positively impacting more than 10,000 students across the state.

"The Chris Collins Foundation is doing remarkable work in our schools to reduce the stigma of mental illness and encourage kids who are struggling to seek help. At a time when there are not enough mental health professionals to support all kids who need help, this peer-to-peer program harnesses the power of kids to normalize mental health conversations," said **MARTHA L. WOFFORD**, president and CEO of BCBSRI. "Our grant will help more students benefit from the foundation's program as part of our efforts to expand access to mental health treatment and evidence-based school and community programs."

The grant was announced at BCBSRI's annual all-associate summit on Jan. 30, during which foundation founder **MARK COLLINS** was invited to take the stage for a panel discussion on youth mental health. He was joined by keynote speaker and child and adolescent psychiatric expert **HENRY T. SACHS III, MD**, president of Bradley Hospital, and **SARAH FLEURY**, BCBSRI managing director for behavioral health.

Collins' son, Chris, attended South Kingstown schools and died by suicide at 20 after struggling for several years with anxiety and depression. "Chris was open about his illness and was a tremendous support to others who were struggling," said Collins. His family established the foundation in his name to continue his selfless legacy of care and concern for others. Understanding that the middle school and high school years are when signs of mental health challenges often first emerge, the foundation partnered with the University of Michigan Depression Center to bring its evidence-based, student-led Peer-to-Peer program to Rhode Island. The program, based on the idea that teens are more likely to listen to other teens than to well-meaning adults, emphasizes fighting stigma and seeking help when needed.

"This grant will help us to continue expanding this essential Peer-to-Peer program to more schools in Rhode Island and spread the message that it's okay to share that you are struggling and to get the help you need. Chris' love for his family and friends was endless. Anyone who met him felt heard and seen. All this lives on through his foundation," Collins said. "We commend Blue Cross & Blue Shield for stepping up to play an active role in responding to the state's youth mental health crisis and we're grateful for its generous gift."

BCBSRI is working comprehensively to address youth mental health in Rhode Island, with a goal of positively impacting the behavioral health of 110,000 children and adolescents from 2023–2025. Efforts include:

- Committing to invest $1.06 million to Rhode Island Student Assistance Services (RISAS) to support its school-based substance abuse prevention and mental health program, Project SUCCESS.
- Expanding funding for urgent access appointments
- Partnering to train providers in evidence-based care
- Embedding community health workers in PCP offices
- Training youth organizations in mental health first aid
- Enhancing access to care by partnering with virtual care providers
- Producing a new parent's guide to mental healthcare in Rhode Island, "Finding Help for Kids and Teens." ❖

Bradley announces telehealth platform collaboration for students in mental-health crisis situations

PROVIDENCE – Bradley Hospital announced this week a first-of-its-kind collaboration with Cartwheel, a Boston-based telehealth platform helping school districts tackle the student mental health crisis. Available today to 200,000 students in more than 50 school districts across Massachusetts, Rhode Island, and Connecticut, the collaboration allows school counselors to refer students in crisis rapidly to a higher level of care through the Bradley REACH virtual Partial Hospitalization Program (PHP).

Cartwheel already provides outpatient therapy and psychiatry services via telehealth for a range of common mental health needs. Now, students will also have access to more intensive support through Bradley's fully virtual program that allows teens to get the psychiatric care they need in their own homes.

The program works as a step-up for students who are struggling in outpatient care, and as a step-down following an Emergency Department visit or hospital stay. It lasts six and a half hours a day, Monday through Friday, and consists of individual, group and family therapy, and tutoring to keep up with school work. Patients can stay in the program as long as they need to, with the length of stay averaging three to four weeks. Bradley REACH provides care for adolescents ages 13 to 18 experiencing a wide range of issues and conditions, including depression, anxiety, suicidal ideation and self-harm. The evidence-based model provides individualized care that meets children and families where they are.

"When a student is facing an acute mental health need, school districts and families often struggle to find effective and timely support. But most telehealth solutions can't safely serve students in crisis. We're thrilled to now offer schools working with Cartwheel seamless access to Bradley REACH's virtual partial hospitalization program," said **JULIANA CHEN, MD**, Cartwheel's chief medical officer and board-certified child-adolescent psychiatrist. The program further advances Cartwheel's mission to be the trusted mental health partner to schools.

"Bradley REACH is committed to increasing access to high-quality, intensive behavioral health support for adolescents in need. We take a tailored approach to care that results in significant improvements for our patients and families and a flexible and safe environment that drives better outcomes," said **ELLEN HALLSWORTH**, Director of Bradley REACH. "Partnering with Cartwheel allows us to strengthen school districts' ability to get students the right care where and when they need it most and avoid future hospitalization."

Due to a well-documented shortage of care providers, schools are taking the lead on providing mental health support for students. But more severe mental health challenges, such as self-harming behaviors and suicidal ideation, require more intensive support. Students will now be able to access this support through the Bradley REACH Partial Hospitalization Program. ❖

Appointments

Ateev Mehrotra, MD, MPH, to join School of Public Health as Chair of the Department of Health Services, Policy and Practice

PROVIDENCE – **ATEEV MEHROTRA, MD, MPH**, will be joining the School of Public Health as chair of the Department of Health Services, Policy and Practice, effective July 1, 2024. In addition to his new role as chair, he will also serve as professor of health services, policy and practice.

He is currently at Harvard Medical School, where he serves as professor of health care policy. He also is a hospitalist at the Beth Israel Deaconess Medical Center in Boston.

In an email announcement, **ASHISH K. JHA MD, MPH**, Dean, School of Public Health wrote: "Dr. Mehrotra's work has been deeply influential in shaping the way we think about innovative models of care delivery. He has led seminal work evaluating the impact of telemedicine on costs and quality, how the rise of urgent care has reshaped the health care landscape, and other critical issues around consumerism, price transparency and benefit design. He has published hundreds of peer reviewed papers and is a prominent voice in the field of health services and health policy."

Dr. Ateev received a BS from MIT, an MD from the University of California, San Francisco, and completed his residency in internal medicine and pediatrics at the Massachusetts General Hospital and Children's Hospital of Boston. His clinical work has been both as a primary care physician and as an adult and pediatric hospitalist. He has also received formal research training, earning an MPH from the University of California, Berkeley, and a master of science in epidemiology from Harvard's T.H. Chan School of Public Health. ❖

Scott Rivkees, MD, to take the helm at Brown's Master of Science in Healthcare Leadership

PROVIDENCE [BROWN UNIVERSITY] – Following a transformational tenure, Master of Science in Healthcare Leadership Academic Director Dr. Anthony Napoli passes the torch to **SCOTT RIVKEES, MD**, ensuring a seamless transition for the program's continued success. The reimagined Master's in Healthcare Leadership launches in the summer of 2024, marking a new era for this 11-year old program.

Dr. Rivkees, a pediatric endocrinologist and physician-scientist, served as Florida's State Surgeon General and Secretary of Health from June 2019 to September 2021, during the height of the COVID-19 pandemic. Prior to that, he was Chair of Pediatrics at the University of Florida and Physician-in-Chief at Shands Children's Hospital.

Dr. Rivkees joined Brown University in 2022, and currently serves as a Professor of the Practice of Health Services, Policy and Practice and Director of the Accelerated Master of Public Health program at Brown's School of Public Health.

"I am honored to join the Healthcare Leadership team as the Academic Director. I look forward to building on the strengths of an incredibly strong and effective program led by Dr. Anthony Napoli and the team," said Dr. Rivkees.

Over the coming years, he hopes to build upon the strengths of the program, including training in leadership, communication, workforce growth and management, healthcare finance and operations, and policy. New areas he'd like to explore include how policy can improve healthcare, effective communications amongst colleagues, patients and the public, and how healthcare and public health can enrich one another. A large effort will also be given to helping students foster rich connections with classmates and faculty to build a network of healthcare leaders who can inspire and support each other well beyond graduation.

"Healthcare is dynamic and constantly evolving to meet the challenges of the communities we serve. The Master's in Healthcare Leadership has and will continue to provide the skills healthcare professionals need to be effective leaders now and adapt to future needs," he said. "I look forward to serving an important role in the education of our current and future healthcare leaders."

Dr. Rivkees is a graduate of Rutgers University and the University of Medicine and Dentistry of New Jersey. He received residency, fellowship, and postdoctoral training and served as faculty at Massachusetts General Hospital and Harvard Medical School. ❖

Appointments

Babar Khokhar, MD, MBA, named Lifespan's Executive Vice President, Chief Physician Officer

PROVIDENCE – Lifespan has hired **BABAR KHOKHAR, MD, MBA**, for the role of Executive Vice President and Chief Physician Officer, overseeing medical affairs, physician practices, outpatient care locations, and community health services, effective as of February 1, 2024. Dr. Khokhar will also serve as Associate Dean for Clinical Affairs (Lifespan) at the Warren Alpert Medical School of Brown University.

Dr. Khokhar comes to Lifespan from Yale School of Medicine and Yale-New Haven Health System in Connecticut, where he most recently served as chief medical officer at Yale Medicine and chief ambulatory medical officer at Yale-New Haven Health System. He previously served as the chief clinical transformation officer and interim chief executive officer at Yale Medicine.

Dr. Khokhar oversaw regional medical directors, risk management, patient relations, credentialing, clinical innovation, population health, and helped improve the clinical operations of ambulatory locations across the enterprise. He established a system-wide ambulatory operations group that developed ambulatory practice standards and ambulatory dashboards for clinicians, managers, and leadership. He helped create an innovative model that gave the emergency departments and acute care teams same-day access to schedule patients, which helped facilitate timelier discharges.

Dr. Khokhar founded and led the Yale Clinical Optimization Services, which implemented initiatives that helped reduce provider workloads, such as changing workflows to improve efficiencies and using virtual scribes and novel care team models. He helped develop and support the population health platform for Yale Medicine with innovative programs such as the behavioral health collaborative and eConsult initiative. Lastly, Dr. Khokhar was instrumental in laying the groundwork for aligning physician groups across the health system and ensuring support for the wellbeing of the staff and clinicians.

"Lifespan is fortunate to have recruited such a talented and visionary executive during a critical time in healthcare, when operational innovation is becoming more and more essential to long term success in this industry," said Lifespan President and CEO **JOHN FERNANDEZ**."With his history of enterprise-level clinical care delivery transformation, Dr. Khokhar is a welcome addition to the Lifespan team, and I look forward to working with him."

While at Yale, Dr. Khokhar also held academic and clinical positions as associate dean for clinical affairs at the Yale School of Medicine and vice chair for operations in the Department of Neurology.

He holds a BA in neuroscience and economics from Johns Hopkins University, and an MD and MBA from Tufts University School of Medicine. He completed an internship in internal medicine and a residency in neurology at Yale-New Haven Hospital, where he was chief resident. He also completed a fellowship in neuromuscular medicine at the Yale School of Medicine. ❖

Recognition

RIDOH honors health professional loan repayment program recipients and donors at State House ceremony

PROVIDENCE – The Rhode Island Department of Health (RIDOH) and the Board of the Health Professional Loan Repayment Program (HPLRP) recently recognized the 2020–2023 HPLRP award recipients for their service and commitment during one of the most challenging times in healthcare. The event, held at the Rhode Island State House, also recognized the donors whose generosity makes this loan repayment program possible.

The HPLRP is a critical component of the State's efforts to increase healthcare access and reduce health disparities through recruiting and retaining quality, community-oriented health professionals. Through the support of generous donors, each year, the Board of the HPLRP has provided loan repayment awards to health professionals who have committed to providing care in Health Professional Shortage Areas statewide.

From 2020 to 2023, the Health Professional Loan Repayment program made awards to 104 healthcare professionals, including physicians, dentists, nurses, and behavioral healthcare providers. In accepting their loan repayment awards, the recipients have committed to practicing in medically underserved communities in Rhode Island for at least two years.

"All Rhode Islanders in every ZIP code deserve access to high-quality health services and care," said **UTPALA BANDY, MD, MPH**, Interim Director of Health and Chair of the Health Professional Loan Repayment Board. "The Health Professional Loan Repayment Program is a critical component of our efforts to address health workforce shortages, increase access to primary care, dental, and behavioral health services, and reduce health disparities among our most vulnerable populations."

The COVID-19 pandemic put great stress on the healthcare workforce nationally and in Rhode Island, creating burnout, exhaustion, and trauma that led to workforce shortages. During the public health emergency, RIDOH and the Health Professional Loan Repayment Program Board provided $3.85 million in loan repayment awards to help strengthen the healthcare workforce and narrow health disparities by increasing the number of providers in medically underserved communities. The program is an essential tool for recruiting and retaining high-quality healthcare providers.

Funding for the program comes from the federal government and from various health and community organizations. The Rhode Island Health Center Association solicited matching funds from many of these organizations.

"As Rhode Island faces a severe healthcare workforce shortage, the commitment of the donors and supporters to this program is more important than ever," said **ELENA NICOLELLA**, president and CEO of the Rhode Island Health Center Association. "Today, we celebrate their investment in the State's primary medical, behavioral, and oral health care workforce and recognize the health care professionals who work hard to ensure all Rhode Islanders have access to high-quality care."

Donors to the Health Professional Loan Repayment Program include Blue Cross Blue Shield of RI, Delta Dental of Rhode Island, Landmark Medical Center, Neighborhood Health Plan of RI, Point32Health, Prospect CharterCARE, the Rhode Island Foundation, the Rhode Island Medical Society, the Rhode Island Health Center Association, and the UnitedHealthcare Community Plan. In addition, the program receives federal funding in the form of a grant to RIDOH by the US Health Resources & Services Administration (HRSA).

Learn more about the Health Professional Loan Repayment Program at health.ri.gov/programs/healthprofessionalloanrepayment. ❖

Recognition

Commitment to Advocacy award presented to Division of Ophthalmology at AMS

AUSTIN, TEXAS – The American Academy of Ophthalmology is the world's largest association of eye physicians and surgeons. Its Commitment to Advocacy Award annually recognizes an ophthalmology training department and its leadership for outstanding support of the Academy's Ambassador Program. The Advocacy Ambassador Program is a collaboration with state, subspecialty and specialized interest societies, along with training programs, to support attendance by residents and fellowship trainees at the Mid-Year Forum.

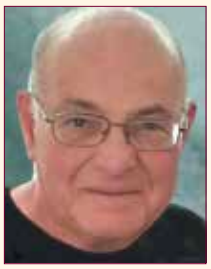
The Division of Ophthalmology of the Warren Alpert Medical School of Brown University is the recipient of the Academy's 2023 Commitment to Advocacy award. The award was presented to the Division of Ophthalmology of the Warren Alpert Medical School by the Academy and the Association of University Professors of Ophthalmology (AUPO) leaders on February 1, 2024 during AUPO's annual meeting.

The Academy's Secretariat for State Affairs created the award to recognize a training program and its leadership for demonstrating a commitment to the Academy's Advocacy Ambassador Program. The Advocacy Ambassador Program gives residents and fellowship trainees hands-on training in advocacy and policy development and supports their attendance at the Academy's annual Mid-Year Forum and Congressional Advocacy Day.

The Division of Ophthalmology at the Warren Alpert Medical School has demonstrated an ongoing commitment to engaging and educating members in training about the importance of advocating for their patients and their profession, fostering Advocacy Ambassadors' engagement with the Rhode Island Society of Eye Physicians and Surgeons (RISEPS), and collaborating closely with RISEPS. ❖

Academy CEO **Stephen D. McLeod, MD**, presents the 2023 Commitment to Advocacy award to the Division of Ophthalmology, the Warren Alpert Medical School of Brown University during AUPO's annual meeting in Austin, Texas, in early February. **Michael E. Migliori, MD, FACS**, Ophthalmology Division Chief, accepted the award on behalf of the Warren Alpert Medical School.

Obituaries



JOSEPH DeMARTINO, MD, passed away on January 26, 2024, at home surrounded by his loving family.

Born in Teaneck, New Jersey, he and his family moved back to Italy where he grew up. He encountered many challenges but found a way to attend the University of Naples where he received his medical degree. This dedication to medicine would last him the rest of his life as his greatest passion was medicine. In his nearly 40 years of practice, he delivered thousands of babies and helped countless people.

He served as an Adjunct Professor at Brown University and each year the OB/GYN residents would honor him with an outstanding teaching award. He had an extraordinary mind and was a gifted surgeon. He was a board-certified fellow with the American College of Gynecology, and he was recognized as one of the Top Docs in Rhode Island Monthly. He was always seeking more knowledge and skills to help his patients.

He and his wife managed a thriving private practice in Providence in which every patient was treated like family. Even outside of his practice, people knew they could count on him, and he helped friends and family here and in Italy to get the best medical care possible when they needed it. All in all, he was truly one of the last of the old-fashioned doctors who prioritized his patients, getting to know them and even making house calls.

Outside of medicine, he had a variety of interests. He was an avid gardener with a green thumb that, like his surgical skills, he was always honing. He was always proud of his tomatoes and would try to share them with everyone he encountered. He loved visiting museums of all kinds and was obsessive about learning as much as he could. He dove into history, linguistics, geography, sociology, anthropology, politics, and so many other subjects and managed to memorize an incredible amount of information that he was always happy to share, whether you wanted to hear it or not. His quest for knowledge was something he sought to pass on to his children by traveling extensively with them from a very early age and expanding their horizons.

His family will always be inspired by his dogged persistence through years of illness and the unwavering strength and determination he showed until the very end. The family would like to thank Dr. Vito Ferri and Dr. Joseph Mazza for their exceptional care throughout the years. The family would also like to extend a special thanks to Stacey, RN of Hope Health for her kindness, guidance, and dedication through this difficult time.

He will be deeply missed by his wife of 35 years, Anne-Marie (née Finelli) DeMartino, his son Joseph Vincent DeMartino, his daughter Angelica Marie DeMartino, and his dog Sofia whom he always referred to as "the best dog in the world".

He also leaves his dedicated best friend, chosen brother, and surgical partner of over 50 years, Dr. Frank Pensa.

Donations in his honor, can be made to St. Jude Children's Research Hospital or the American Heart Association. www.OneillFuneralHomes.com ❖

EUGENE B. McKEE, MD, 90, of Narragansett, passed away on February 14th, 2024.

Dr. McKee graduated from The College of the Holy Cross in 1955, where he was a member of the ROTC. He received his medical degree from the Royal College of Physicians and Surgeons in Ireland in 1961, the first graduate from the United States. He completed his medical internship and residency at Pawtucket Memorial Hospital.

Dr. McKee was a flight surgeon in the United States Air Force, and served as the Chief of Aerospace Medicine at Otis Air Force Base. After leaving active duty, his transition to civilian life included a role as medical director for United Airlines. He continued to serve in the Air National Guard, and retired after 29 years of service with the rank of colonel.

Dr. McKee started his family practice in Wakefield, touching many lives in the South County community in over 40 years of practice. He was also the medical director at the Electric Boat facility in North Kingstown, and quality assurance director at South County Hospital. He finished his career as the medical director at the Treatment Center in North Kingstown, retiring at age 80.

After retiring from medical practice, Dr. McKee embarked on a life-long passion to write, publishing four books. He was a member of the Mensa Society, a docent at the John Brown House in Providence and a member of the South County Writers Group.

He was also an avid runner and a long-time participant in the annual Blessing of the Fleet race in Narragansett. He completed a total of three marathons, in Dublin, Berlin and Boston, at the age of 70. He was a longtime member of the Dunes Club and a former member of the Point Judith Country Club.

He is survived by his wife Patricia (Dalton), children Matthew, his wife Melissa (Danchik), their daughters Emily and Adeline; Mary Ellen and her husband Michael Staebler, MD, their four children, Jack, Julia, Kathryn, Aidan; Kathleen Ann; Sean and his wife Stacey (Pevzner). He was predeceased by his beloved daughter, Clare Margaret.

Donations in his memory may be made to Christ the King Food Pantry, 180 Old North Road, Kingston RI 02881; RI Food Bank, 104 Hay Street, West Warwick, RI 02893; or Special Olympics Rhode Island, 170 George Washington Highway, Smithfield, RI 02917.

JOSEPH R. PELTIER, MD, 95, passed away on February 17th, 2024 in Wellington, Florida, leaving behind a legacy of love and service.

He served in the U.S. Army during World War II, and returned home to attend Providence College before earning his medical degree from Georgetown University in 1956. He met his wife, Joan, during residency while she was working as a nurse. They were soon married and moved to Warwick where he established a vibrant pediatric practice. His dedication to exceptional care spanned over four decades reflecting his unwavering commitment to caring for children.

Beyond his medical achievements, he embraced a vibrant social life whether on the Solitude II or on the tennis courts at Warwick Heights. He also enjoyed playing the violin as part of the Warwick Symphony Orchestra. He was a P.C. Friars basketball fan, loved skiing in his younger years and golf in his later years.

He is survived by his beloved wife, Joan; daughter, Tricia; brother, Roger; triplet grandchildren, two step-grandchildren, six great-grandchildren, numerous nieces and nephews, and countless patients whose lives he touched.

A celebration of life will be held in Rhode Island this summer. ❖