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Injury has a dominant role in our nation’s health. It is the leading cause of death in ages 1–44 and is one of the top ten causes of death in all age groups. In 2021, the Centers for Disease Control and Prevention (CDC) reported there were 306,086 fatal injuries nationally, but the scope of the injury problem is much greater, with approximately 40 million emergency department visits for injury and additionally over 57 million physician office visits. In 2019, the cost of caring for injury was estimated to be 4.2 trillion dollars. The CDC reports that our small state had 1,044 fatal injuries and the Rhode Island Department of Health reported 62,845 injury-related emergency department visits in 2022.

Injuries are frequently referred to as accidents, but that gives the impression that they are random events or bad luck that cannot be managed. Instead, like other diseases, injury has risk and protective factors to its occurrence. Although difficult to be immune from any injury, it can be controlled with mitigation of risk and adopting protective strategies that can stop its occurrence or minimize the resultant injury. For over 25 years, the Injury Prevention Center at Rhode Island Hospital has utilized community outreach, education, and research to control injury in Rhode Island. In April 2022, we were awarded NIH funding to create the Rhode Island Hospital Injury Control Center of Biomedical Research Excellence (COBRE). This augmented our ongoing research in allowing us to develop early career faculty researchers across the spectrum of injury control research that includes prevention, optimal treatment of injury, and rehabilitation and post-injury sequelae.

This issue of the Rhode Island Medical Journal addresses several topics of injury-control research across the lifecycle. DR. DANIEL ANTONSON et al examine using a frailty tool for older fall trauma patients in predicting inpatient mortality. DR. JILLIAN E BEVERIDGE et al discuss a new procedure for repair of anterior cruciate ligament (ACL) injury, and novel tools for the measuring of neurovascular function that could aid clinical decision-making. DR. MARTHA ORMANOSKI and DR. SUSAN DUFFY discuss the importance of safe sleep practices in preventing sudden infant death syndrome with the youngest members of the community. Unfortunately, some injuries are intentionally inflicted and ALEKSA M. KAYE et al reports on emergency department nursing screening for potential child abuse. DR. MARY KATHRYN CANCILLIERE et al explore the acceptability and feasibility of a navigator program with text messages in connecting self-injurious youths discharged from the emergency department to outpatient mental health care. DR. J. AUSTIN LEE’s team research takes us to Kenya and presents data on interpersonal violence among those seeking emergency care.

The burden of injury is substantial but through research we will continue to seek improved strategies for prevention, treatment, and rehabilitation to control injury’s impact on us.

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The Modified Five-Item Frailty Index, Mortality, and Hospital Length of Stay in Geriatric Traumatic Fall Injuries

DANIEL ANTONSON, MD, MSc; JULIE BROMBERG, MPH; STEPHANIE LUECKEL, MD; MICHAEL J. MELLO, MD, MPH

ABSTRACT
This study investigates the association between frailty, measured by the modified five-item frailty index (mFI-5), with inpatient mortality and hospital length of stay for geriatric patients with fall-related injuries. Despite falls being major contributors to morbidity and mortality in those over 65, the interaction between frailty and post-fall outcomes remains underexplored. Data for patients aged 65 and above, admitted between 2014–2020 to Rhode Island Hospital’s trauma service for fall-related injuries, were extracted from its Trauma Registry. Frailty scores were retrospectively assigned using mFI-5. Logistic- and linear-regression analyses examined the relationship between mFI-5 scores, mortality, and hospital length-of-stay. Among 6,782 patients (mean age: 81.7 ± 8.66 years), higher frailty scores correlated with increased inpatient mortality (OR: 1.259; 95% CI: 1.14–1.39; P<0.000) and longer hospital stays (Coeff.: 0.460; 95% CI: 0.35–0.57, P<0.000). Notably, age showed a negative association with hospital length of stay but no significant association with inpatient mortality.

KEYWORDS: frailty, geriatrics, falls, modified five-item frailty index [mFI-5]

INTRODUCTION
Geriatric adults, defined here as individuals aged 65 years and older, constitute an increasingly significant segment of the United States population. Traumatic falls represent a critical public health concern due to their association with significant morbidity and mortality in this population. In 2020 alone, falls resulted in more than 36,000 fatalities, triggered over 3 million emergency department visits, and incurred medical costs exceeding $50 billion. Beyond the immediate physical injury consequences, falls can precipitate a decline in functional independence, increasing the risk for institutionalization, especially among frail patients.

Given the prevalence of poor outcomes after fall-related injuries, methods to risk-stratify geriatric patients admitted with these injuries is of particular interest. While there is no standard for risk stratification, the concept of frailty has emerged as an important consideration and has shown to be associated with adverse postoperative outcomes across several surgical domains, including geriatric trauma.

Frailty can be conceptualized as a decrease in physiological reserve that results from impairments in multiple organ systems leading to increased vulnerability. Several methods can quantify frailty, but the modified five-item frailty index score (mFI-5) has gained traction due to its simplicity and strong predictive value.

Despite its simplicity, the mFI-5 has proven to be equally predictive as compared to other frailty index scores, such as the longer 11-item index score. The mFI-5 could potentially be a simple tool to help surgeons, patients, and family members on discussion regarding treatment decisions and goals of care. Previous studies have investigated the relationship between mFI-5 and outcomes in various surgical domains, but no research has directly evaluated its predictive value in traumatic falls in geriatric patients. This study seeks to meet this gap in knowledge.

METHODS
We conducted a retrospective analysis using data from the Trauma Registry at Rhode Island Hospital that encompassed all adult trauma patients admitted between January 1, 2014, and December 31, 2019, who met specific inclusion criteria. Inclusion criteria required patients to be over the age of 65 at the time of admission and to have presented for evaluation and treatment of fall-related injuries. Lifespan IRB reviewed and provided approval of the study protocol.

The trauma registry provided the data in the form of an Excel spreadsheet. The dataset included demographic and clinical variables including age, gender, race, ethnicity, ICD-10 diagnosis codes, e-codes for injury mechanisms, injury severity scores (ISS), preexisting comorbidities, indication for surgical intervention, hospital length of stay in days [LOS], discharge disposition, functional status upon...
admission, and patient medical record numbers (MRN). The primary outcomes of interest were in-hospital mortality and hospital length of stay in days.

After receiving the data set, the modified five-item frailty index was used to retrospectively determine each patient’s frailty level. Patients were assigned a score based on the presence of five predefined conditions within the preexisting comorbidities category of the data set: documented history of congestive heart failure, diabetes mellitus, chronic obstructive pulmonary disease, hypertension, and partial or total dependency in functional health status at the time of admission.

Each condition, if present, was assigned a score of ‘1’. The total mFI-5 score was calculated by summing the individual scores using Microsoft Excel (Microsoft Corporation 2019), with a potential range from 0 (least frail) to 5 (most frail). R-studio was used for statistical analysis of the data set. Logistic regression models were employed to assess the relationship between the mFI-5 scores and mortality. For evaluating the correlation between mFI-5 scores and hospital LOS, we utilized linear regression. All analyses were adjusted for potential confounders, including age, race, and gender. Results were presented with odds ratios (ORs), coefficients, and 95% confidence intervals (CIs). We set our significance value to 0.05.

Additionally, the association of ISS and mFI-5 was investigated using the Kruskal-Wallis Test. Post-hoc comparisons with pairwise Wilcoxon rank sum tests were conducted to identify specific group differences following a significant Kruskal-Wallis test result. Bonferroni correction was applied to adjust the p-values for multiple comparisons to control the family-wise error rate. Results are presented with a chi-squared value, degrees of freedom (df), and p-values. The significance value was similarly set to 0.05.

**RESULTS**

Out of the 6,749 patients’ data reviewed, all met the inclusion criteria. The mean age of the cohort was 81.7 years with a standard deviation of 8.66 years. Demographics shown in Table 2 demonstrate a homogeneous study population with more than 90% of patients identified as non-Hispanic White and 62.43% identified as female.

The distribution of the mFI-5 scores among the study population are shown in Table 3, with most patients scoring 1 or 2. There was a significant association between increasing mFI-5 scores and rising rates of mortality (OR: 1.259; 95% CI: 1.14–1.39; P<0.000). Notably, age was not a significant predictor of mortality (OR: 1.000; 95% CI: 0.99–1.01; P=0.888) in the study sample. A higher mFI-5 score was significantly associated with a prolonged hospital stay (Coeff: 0.460; 95% CI: 0.35–0.57; P<0.000). Conversely, increasing age was negatively associated with hospital length of stay (Coeff: –0.044; 95% CI: –0.06 to –0.03; P<0.000).

The Kruskal-Wallis test revealed that there were overall differences in ISS scores across the different levels of mFI5 (chi-squared = [12.513], df = [5], p-value = [0.0284]). Post-hoc pairwise comparisons using Wilcoxon rank sum tests with Bonferroni correction revealed significant differences in ISS scores between an mFI-5 of 0 compared with an mFI-5 of 2 and 3. This suggests, when comparing the mean ISS score for mFI-5 scores, excluding 0, there’s no significant difference. ISS was not significantly associated with age on linear regression (Coeff: –0.005; 95% CI: –0.02 to 0.01; P=0.544).

**DISCUSSION**

The findings suggest an association between an increased mFI-5 score and elevated inpatient mortality, along with prolonged hospital stays for older adults with traumatic fall injuries. Such outcomes accentuate the critical role of frailty...
in jeopardizing the life, health, and independence of geriatric individuals. Given these consequences, frailty assessments may have the potential to play a larger role in health evaluations, especially in light of the aging United States population. They may be incorporated at different levels of patient care, including during a primary care provider’s visit for health maintenance, to assist with future goals of care and treatment discussions.

Interestingly, while age is often viewed as a marker of vulnerability after injury, our results spotlight the potential of mFI-5 as a possible superior predictor. Notably, age alone did not demonstrate a significant correlation with increased mortality and was even negatively correlated with hospital length of stay. Since age did not correlate with a significant difference in ISS score, it is unlikely that this observed effect is due to differences in injuries.

It is unclear why age may be negatively associated, however, the relatively low R-squared value indicates that age is not a strong predictor of hospital stay length by itself, and there are likely other factors not included in our model that influence the length of stay, such as insurance status or prior living situation. Another potential explanation would be that older patients may already have significant resources in place at the time of their injury which could facilitate discharge. Further, given the small size of the effect, the relationship is likely not clinically significant. However, these observations further distinguish frailty from aging, bolstering the assertion that the former provides a more nuanced understanding of patient vulnerability.

Another compelling observation was the non-association between ISS and frailty. While more frail patients suffered worse outcomes than less frail patients, they did not suffer from more severe initial injury. This revelation further supports the idea that frailty may be a predictor of adverse outcomes regardless of what the initial injury may be.

While this study provides data on one crucial aspect of geriatric trauma care, it comes with certain limitations. The study’s focus was confined to patients registered with the trauma registry service and therefore excluded patients who were not admitted or may have died prior to admission. The outcomes assessed were limited, and future studies might consider a broader spectrum of post-fall complications or longer-term outcomes. The retrospective nature of our study could introduce biases related to missing or incomplete data. The study did not adjust for all potential confounders, such as alternative pre-existing health conditions not accounted for by the mFI-5, which could influence outcomes. Although the study sample was large with 6,749 participants, all data was extracted from a single site. Furthermore, the study population was overwhelmingly identified as non-Hispanic, female White individuals. Repetition of this study at multiple locations with a more diverse patient population is needed to generalize the results to a wider population.

Other frailty indices such as the TSFI, FS, and RFS are similarly being evaluated for their predictive value in trauma patients. One study suggests that the TSFI and RFS are better predictors of outcomes for geriatric trauma patients compared with the mFI-5 and the FS; however, additional studies may be necessary to definitely conclude the superiority of one index of another.

The mFI-5, given its simplicity and efficacy, could become a tool in clinical settings, helping physicians risk-stratify geriatric fall patients more effectively. This could aid in tailoring interventions, discussions about care goals, and optimizing resource allocation. Other future investigations might investigate the utility of prospectively integrating mFI-5 into clinical care, as most studies to date have focused on retrospective analysis.

CONCLUSIONS
Our study provides supporting evidence that the mFI-5 may serve as a predictor for both inpatient mortality and hospital length of stay in geriatric patients presenting with traumatic falls. Further, more expansive studies should investigate this relationship to better understand the predictive value of the mFI-5. Notably, in our study the mFI-5 emerged as a more reliable indicator than age, suggesting that frailty, rather than chronological age, could play a pivotal role in determining patient outcomes.

References

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INJURY PREVENTION AND CONTROL

Structure and Function Are Not the Same: The Case for Restoring Mechanoreceptor Continuity Following Anterior Cruciate Ligament Injury

JILLIAN E. BEVERIDGE, PhD; PAYAM ZANDIYEH, PhD; BRETT D. OWENS, MD; ATA M. KIAPOUR, PhD; BRADEN C. FLEMING, PhD

ABSTRACT

Anterior cruciate ligament (ACL) injury, particularly in increasingly young and active adolescents, continues to pose a clinical challenge with re-injury rates reported as high as 30%. Evidence also suggests that current standard-of-care ACL reconstruction (ACLR) does not mitigate post-traumatic osteoarthritis (PTOA) risk. Bridge-enhanced ACL restoration (BEAR) is a recently developed and tested ACL surgery that promotes primary healing of the native ACL with excellent early results. BEAR has shown to reduce signs of early PTOA compared to ACLR in an animal model. Here, we describe a theoretical framework related to re-innervation that can clarify why the outcomes of ACLR and BEAR surgeries differ. We also discuss how ongoing and new challenges in determining return-to-sport readiness following the competing surgeries may differ, and how emerging imaging tools and measures of neuromuscular function may aid in clinical decision-making to decrease the likelihood of re-injury and PTOA risk.

KEYWORDS: ACL, neuromuscular, kinematics, surgery, post-traumatic osteoarthritis

THE ONGOING CLINICAL CHALLENGE OF TREATING ACL INJURY

The anterior cruciate ligament (ACL) is one of the most frequently injured knee ligaments with up to 400,000 ACL tears occurring in the US annually.1 Of these occurrences, teenagers are the most at-risk population.5 This adolescent demographic presents a particularly challenging clinical problem as ACL tear increases the risk of post-traumatic osteoarthritis (PTOA), with up to 50–80% of these young patients developing symptomatic OA within 10 to 20 years of their injury.6,7 Given there are no known disease-modifying therapies for PTOA, the injury leaves these typically young adults to manage their condition over most of their lifespan. Further, ACL re-injury is not uncommon and has been reported to be as high as nearly 30% in athletes under the age of 208 with subsequent inferior patient outcomes after graft failure.9 These observations underscore the need to identify mechanisms that modulate re-injury and PTOA risk following ACL tear and to augment current treatment strategies to improve patient outcomes.

INNERVATION AND PTOA RISK

In developing the BEAR procedure, one of the exciting outcomes observed in the animals that underwent BEAR was...
that they had less cartilage damage—a hallmark of PTOA—compared to animals that underwent ACLR. Meanwhile, the biomechanical properties of the grafts and repaired ACLs were similar. Several subsequent pre-clinical studies have failed to identify biological modulators that might explain the differential cartilage outcomes observed by 12 months in the animal models. Interestingly, hind limb loading was similar between the competing surgeries up to six months after surgery, but it diverged between 6–12 months. This leads us to hypothesize that the functional divergence might reflect a different neuromuscular strategy conferred by the preservation of the mechanoreceptor anatomy that would occur with BEAR, but may not be present following ACLR because of the bone tunnel drilling required for graft placement and removal of the injured ligament. Evidence from small animal models adds further support to this working hypothesis, whereby severe osteoarthritis develops when the mechanoreceptor signaling pathway in the knee is surgically ablated without disturbance to the intra-articular connective tissues. With respect to the ACL specifically, the native ACL contains mechanoreceptors with the majority located in the epiligament and bony insertions. ACL mechanoreceptors—Ruffini corpuscles, Pacinian corpuscles, and Golgi-like tendon organs—relay afferent communication about joint position and ligament tension to the central nervous system, whereas free nerve endings are believed to contribute primarily to nociception. However, debate remains as to which tissues (e.g., synovium, capsule, menisci) contribute to proprioceptive and nociceptive information. Nevertheless, a reflex arc exists between the ACL and hamstring muscles, that when elicited by direct mechanical tensioning or electrical stimulation of the ACL, hamstring contraction is triggered. Because hamstrings are antagonists to anterior tibial translation—the direction of motion constrained primarily by the ACL—their activation under excessive ACL tension would off-load the ACL. This protective reflex arc is either absent or significantly diminished following ACLR. Thus the inability of the central nervous system to accurately detect changes in ligament tension and respond would result in joint proprioception deficits. Conversely, if BEAR restores the neural connectivity between the two torn ends of the ACL, its sensory function may also be restored and would promote more normal neuromuscular and kinematic function.

**PERSISTENT ABNORMAL NEUROMUSCULAR FUNCTION AND KNEE KINEMATICS**

When faced with reduced afferent proprioceptive input and compromised spatial awareness of a limb due to ACL injury, individuals may experience challenges in actively constraining joint orientation through coordinated musculoskeletal contractions. This hypothesis builds on the longstanding observations that ACLR patients demonstrate residual abnormal knee kinematics after surgery. Our recent work has shown that ACLR subjects land from a hop with their tibia positioned more anteriorly and that their neuromuscular function remains different from that of controls’ more than a decade after surgery. Greater anterior tibial translation and more rapid sliding between contacting tibiofemoral surfaces have shown a direct and linear correlative relationship to the amount of cartilage damage observed in a large animal model of ACL transection. Thus, if neuromuscular function does not adequately constrain this
motion, PTOA onset could result. What is known from the animal models in terms of damaging contact mechanics and their relationship to PTOA dovetails the variable rate of PTOA onset observed clinically, with some ACLR patients remaining asymptomatic for decades while others develop early degenerative changes.\textsuperscript{5,7,9} ACLR and post-operative rehabilitation aim to target these structural and functional mechanisms thought to be mechanical drivers of PTOA risk, though they fail to do so in many patients.\textsuperscript{10}

**REHABILITATION AND RETURN-TO-SPORT (RTS) READINESS**

Following either ACLR or BEAR surgery, the primary goal of rehabilitation is to diminish pain and swelling and to regain lower limb flexor and extensor muscle strength and function by implementing a progressive program that sequentially targets knee range of motion, lower limb strength, and dynamic plyometrics.\textsuperscript{10,31} Despite following best practices and careful clinical oversight, evidence suggests that few patients pass all functional test criteria designed to inform RTS readiness.\textsuperscript{52} Alarming re-injury rates as high as 30% within the first five years of injury have been reported.\textsuperscript{8} Of note, this statistic includes the risk of contralateral injury, which appears to be highest within the first year of index ACL injury.\textsuperscript{8} There is mounting evidence that peripheral and cortical processing changes indicative of central nervous system reprogramming\textsuperscript{44} also occur during this two-year post-injury time frame.\textsuperscript{53,54} Why these systemic changes occur is speculative, but because nature favors symmetry\textsuperscript{45} we posit that the central nervous system may undergo a degree of reorganization to re-establish lower limb symmetry. If the nervous system is undergoing a rapid state of flux by adapting both injured and contralateral limb function, it may heighten ACL injury risk already present because of underlying factors [e.g., posterior tibial slope, narrow notch width, ACL size, genetic susceptibility].\textsuperscript{56,57} To this point, our data demonstrate that neuromuscular\textsuperscript{47} and kinematic\textsuperscript{44} function of the contralateral limb appear more similar to the ACL-injured limb of ACLR patients than those of healthy controls 10+ years after injury. The cross-sectional nature of that work precludes us from ascertaining whether these neuromuscular and kinematic differences were inherent to these patients and could reflect why they were injured to begin with; however, longitudinal studies by others suggest contralateral kinematics gradually change over time, dovetailing the movement patterns of the ACLR limb.\textsuperscript{58,59} In a similar vein, PROs likewise change rapidly over the first two years after ACLR before plateauing.\textsuperscript{53,54} Taken together, there appears to be a rapid period of local, systemic, and psychological adaptation before reaching a steady state at two years post-surgery.

**SPECIAL CONSIDERATIONS FOR BEAR PATIENT REHABILITATION AND RTS READINESS**

Preliminary clinical studies have demonstrated that BEAR patients are passing functional benchmarks earlier, have a more rapid and complete restoration of knee flexor and extensor strength, and report greater psychological readiness to RTS.\textsuperscript{17,18} This accelerated recovery following BEAR poses a new set of challenges for the rehabilitation team, whereby the patient may feel ready to engage in more dynamic activity, but the healing ACL may not be sufficiently remodelled to withstand the magnitude of tensile loading it may undergo, as preclinical studies suggest the healing ACL continues to gain tensile strength and stiffness up to 12 months after repair.\textsuperscript{19} Further, there are temporal differences between the biological remodelling of an implanted tendinous graft and primary healing of the native ACL. The ACL graft undergoes “ligamentization”, during which it gets progressively weaker as it is revascularized before regaining ultimate tensile strength and stiffness as the collagen is remodelled; however, graft structural properties never fully recapitulate those of the native ACL with inferior graft stiffness and diminished tensile strength.\textsuperscript{60} In the case of BEAR, the repair is weakest in the immediate postoperative period followed by a gradual increase in structural properties as the provisional synovial scaffold is remodelled into organized collagen.\textsuperscript{61} Work in animal models suggests that the functional end point is ultimately the same between the competing surgeries,\textsuperscript{15,16} but there is currently no consensus on how best to promote optimal functional healing following BEAR, neither tools or metrics capable of probing the structural properties of the ACL directly to monitor how they may respond to mechanical cues. There is thus an opportunity to address these clinical gaps with novel metrics that capture the underlying biological healing processes and their relationship to neuromuscular function more directly.

**EMERGING TOOLS TO GAUGE RTS READINESS**

Clinical exams, functional tests, and PROs are staples of clinical and research toolboxes used to judge the integrity of the implanted ACL graft and a patient’s overall physical and psychological readiness to RTS; however, they are poor predictors of re-injury risk.\textsuperscript{52} Using magnetic resonance imaging (MRI) to predict when the tissue would be able to withstand tensile forces associated with sport participation would be a valuable tool. Our research group has made progress towards this end,\textsuperscript{62-65} where we have shown its promise in predicting graft/ACL failure.\textsuperscript{62,66} Nevertheless, the imaging approach does not capture the role that the neuromuscular system may play in graft/ACL remodelling or contralateral injury risk.

Using conventional motion capture (MoCap) to determine joint kinematics and kinetics has provided insight into the functional recovery following ACLR,\textsuperscript{30} but has yet to identify the “smoking gun” between biomechanical abnormalities.
and PTOA pathogenesis, possibly due to limitations associated with the accuracy required to record dynamic movements that are most likely to be associated with greater re-injury risk, such as jump landings and cutting maneuvers. Common to all kinematic measures is that they are largely the result of neuromuscular function, capturing how muscles are activated, the quality of their contraction, and their coordination may be a more direct measure of neuromuscular changes and their potential differential response to ACLR versus BEAR, as well as contralateral injury risk.

The most common and least invasive way to acquire measures of muscular activation entails using surface electrodes placed over the muscle bellies of interest to record electromyography (EMG) signals. We have recently demonstrated that analysis of the frequency content of signals acquired from EMG provides rich information capable of distinguishing subtle differences in muscle activation patterns between ACLR patients and healthy control subjects. Importantly, these differences were not detected in the same subjects using conventional EMG approaches that analyzed only the timing of muscle activation. Another important finding was that our approach additionally identified contralateral limb differences in ACLR patients, which could prove to be a useful metric for tracking systemic changes in neuromuscular function after ACL injury. With support from the Injury Control Center of Biomedical Research Excellence (COBRE) at Rhode Island Hospital, work is ongoing to determine the extent ACLR and BEAR neuromuscular activation patterns are different after two years of healing, and how they relate to knee kinematics and PROs. As the work matures and we learn more about the neuromuscular features that distinguish the two surgeries, we hope to develop a framework that uses lower limb EMG-based machine learning to identify rehabilitation milestones that would have utility in determining RTS criteria.

**THE ROLE OF INFLAMMATION**

It is worth noting that although we have focused on the structural and functional differences between ACLR and BEAR, it is possible that the molecular environment also plays an important role in the long-term risk of PTOA. As we eluded to earlier, several subsequent studies in the porcine model of ACLR and BEAR investigated whether pro-inflammatory cytokine concentrations and RNA expression in the synovium, synovial fluid, and articular cartilage differed between the competing surgeries. Two notable findings emerged: 1) there are no differences in the RNA transcriptome within the first four weeks post-op between the competing surgeries; 2) inflammatory mediators and metabolic markers detectable in the synovial fluid are upregulated following only BEAR, and only by 12 months are differences in synovial fluid proteome detectable with a greater abundance of cytokines being chondroprotective. It is also worth reiterating that the temporal emergence of the differential molecular outcomes parallels the emergence of a different gait strategy, which provides additional evidence that neuromuscular control may play an important chondroprotective role and may even influence the molecular environment. These are ongoing topics of investigation.

**SUMMARY**

Whereas ACLR continues to be a successful surgery insofar as it restores gross knee structure and stability following ACL tear, it may not restore the native ligament's neural connectivity and the more fine-tuned neuromuscular control necessary to fully recapitulate pre-injury function. BEAR is an emerging surgical approach that may preserve mechanoreceptor function and in-turn promote a more complete neuromuscular and kinematic recovery that mitigates PTOA risk. Emerging tools being developed in the research setting offer promise towards providing insight into the functional status of the healing ACL and the neuromuscular system with the goal of reducing re-injury risk and augmenting the clinician’s ability to guide RTS decision-making following ACL surgery.

**References**


42. Beveridge JE, Behnke AL, Karamchedu NP, Maldonado Rodas C and Fleming BC. Predicted ACL graft stiffness explains variations in increased anterior tibial alignment in ACL-reconstructed subjects at 10-12 year follow-up, presented at: Annual Meeting of the Orthopaedic Research Society;2020, Calgary, Alberta.


44. Beveridge JE, Behnke AL, Maldonado Rodas C, Karamchedu NP, Flannery SW and Fleming BC. Predicted ACL graft stiffness explains variations in increased anterior tibial alignment in ACL-reconstructed subjects at 10-12 year follow-up, presented at: Annual Meeting of the Orthopaedic Research Society;2020, Long Beach, CA.

45. Beveridge JE, Behnke AL, Maldonado Rodas C, Karamchedu NP, Flannery SW and Fleming BC. Predicted ACL graft stiffness explains variations in increased anterior tibial alignment in ACL-reconstructed subjects at 10-12 year follow-up, presented at: Annual Meeting of the Orthopaedic Research Society;2020, Long Beach, CA.

References 46–74 are available at: https://doi.org/10.26300/wara-wt03
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Disclaimer: The views expressed herein are those of the authors and do not necessarily reflect the views of authors’ affiliated institutions.

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Preventing Sleep-Related Deaths in Infants
MARTHA ORMANOSKI, MD, ScM; SUSAN DUFFY, MD, MPH

INTRODUCTION
It is early morning in the emergency department when EMS arrives with a previously healthy infant who was found unresponsive and lifeless in bed by the family upon awakening. The infant was last seen well during a feed at 3 a.m., after which the parents fell asleep with the infant in their bed surrounded by blankets and pillows. This is unfortunately an all-too-familiar occurrence for emergency medical teams. In most cases, immediate resuscitative measures at the scene and hospital are unsuccessful, and comforting a devastated family, gathering historical information, and arranging medical examiner investigations become the only interventions that medical teams can provide. The tragedy of such loss is compounded by historical information that suggests that the infant was sleeping in an unsafe environment, making the death preventable.\(^1,2\) Despite widespread public health campaigns that promote evidence-based safe sleep practices, infants continue to die from unsafe sleep environments.

IMPORTANCE
In the United States, approximately 3,500 infants die of sleep-related deaths each year.\(^3\) Furthermore, a recent examination of 7,595 sudden infant deaths in the US between 2011 and 2020 found that 76% of the infant deaths were associated with multiple unsafe sleep practices.\(^4\) In addition, the leading cause of injury-related deaths in infants in the US is unintentional suffocation, with 82% of these categorized as accidental suffocation and strangulation in bed (ASSB).\(^1\) In 2020, approximately 25 infants out of 100,000 live births died of ASSB in the United States.\(^5\)

Rhode Island is not immune. In 2022, six children under the age of one died in this state, increasing to 12 in 2023. In an average year, 50% of these Rhode Island infant deaths are shown to be due to unsafe sleep practices.\(^6\)

RISK FACTORS
Certain practices significantly increase the risk of infant suffocation while sleeping. Accidental infant suffocation is most often caused by airway obstruction from loose, soft objects such as pillows and blankets.\(^1,4\) Specifically, the use of soft-beding is associated with a 16-fold increase in the odds of suffocation.\(^7\) Infants placed in non-supine positions (e.g., not on their backs) have approximately two times the odds of sleep-related suffocation.\(^7\)

Infants sharing a sleep surface with another person are 2.5 times more likely to die of suffocation, most commonly from overlaying of a caregiver.\(^1,7\) Surface sharing becomes five to ten times riskier if the caregiver is using sedating medications or substances (such as alcohol), if there is prenatal or postnatal exposure to tobacco smoke, or if the infant is less than four months old.\(^3,4\)

In contrast to surface sharing, room sharing (i.e., having the infant in the same room as the caregiver, but on a different surface) is protective against sudden infant death syndrome (SIDS).\(^3\) Specifically, infants who do not room share with their caregiver are 19 times more likely to die of sleep-related suffocation.\(^7\)

There is also a four-fold increase in the odds of suffocation if a non-approved sleep surface is used, as wedging can occur.\(^2,7\) The key characteristics of an approved sleep surface are firm, flat, and non-inclined.\(^3\)

Additional risk factors for ASSB include male infant, low gestational age, low infant birth weight, multiple birth, high birth order, lack of prenatal care, young maternal age, and mothers with low educational attainment.\(^8\)

DISPARITIES
There are notable racial and ethnic disparities associated with sleep-related deaths. Specifically, non-Hispanic Black and American Indian/Alaska Native infants are disproportionately affected, both having a five-fold increase in the odds of sleep-related suffocation.\(^3,5,7\) These disparities often reflect socioeconomic inequities that may limit families’ choices in sleep surfaces and environments.\(^3\) It is important to remember that race and ethnicity have intersectionality with socioeconomic status, housing stability, employment status, and domestic violence, all of which are also documented risk factors for sleep-related infant deaths.\(^3,9,10\) Recognizing and addressing these disparities during routine maternal and pediatric care is essential to design the most effective, sustainable interventions to reduce sleep-related infant mortality.
**SAFE SLEEP RECOMMENDATIONS**

Among the strongest safe sleep recommendations in the updated 2022 AAP guidelines are the following: (a) place the infant in the supine position [i.e., on their back], (b) use a firm, flat, non-inclined sleep surface, (c) keep soft objects (such as blankets, pillows, stuffed toys, and bumper pads) away from the infant’s sleep area, and (d) room share without surface sharing. Instead of using blankets to keep infants warm, infant sleep clothing and/or non-weighted wearable blankets are recommended. Additional recommendations encourage breastfeeding, pacifier use, and routine immunizations and discourage smoke and nicotine exposure, as well as parental substance use.4

Local and national initiatives led by the Centers for Disease Control, the National Institute of Child Health and Development, HRSA Maternal and Child Health Bureau, and the Consumer Product Safety Council support research, education, and strategies to prevent infant sleep-related deaths. Programs providing no cost or low-cost safe sleep surfaces and education to families directly addresses disparities in access to safe sleep surfaces are available across the country including Rhode Island.22,23

**TIPS FOR PEDIATRIC PROVIDERS**

According to the 2022 AAP recommendations, it is essential for healthcare providers to “endorse and model safe infant sleep guidelines.”4 Parents consider healthcare providers to be trusted sources of information.14,17 Studies have shown that parents are likely to model practices their child’s healthcare provider engages in, whether or not it is consistent with the AAP guidelines.10,18 In fact, “seeing or hearing of a healthcare professional not following the AAP recommendations [has been shown to send] a clear message to mothers that these recommendations were unimportant.”10

Healthcare providers therefore play an integral role in reducing sleep-related infant mortality.

Accompanying these recommendations, the AAP has developed the Sudden Unexpected Infant Death (SUID) Prevention Program. This includes evidence-based counseling and educational resources for infant caregivers and providers. Its goal is to reduce disparities in SUID and decrease the overall SUID rates.19 In the most recent “Safe Sleep Initiatives Newsletter,” various tips for providers were emphasized including [a] applying an equity lens to safe sleep efforts, [b] forming multidisciplinary, diverse partnerships between physicians, other healthcare workers, and parents, and [c] engaging in frequent community outreach and education.19,21

Overall, healthcare providers must work collaboratively with families to explain and promote the AAP guidelines, model safe practices, and have thoughtful conversations with caregivers about the challenges they are experiencing in relation to infant sleep. Asking about what barriers they may be facing and normalizing that infant sleep is challenging can lessen parents’ fears and allow for more honest, productive conversations. These conversations must always be nonjudgmental, especially when discussing breastfeeding and surface sharing, and focus on risk reduction. Finally, pediatric providers must communicate that they have the same goals as caregivers – to make sure the infant is healthy and safe. Aligning themselves on the same team as the parents helps break down the communication barriers and establish trust.

**CONCLUSIONS**

Infants continue to die from unsafe sleep environments. These deaths can largely be prevented by encouraging caregivers to follow the AAP guidelines and helping them overcome barriers. Pediatric providers must work collaboratively with families to reduce ASSB and other causes of sleep-related infant mortality.

**References**


22. https://cribsforkids.org/


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Evaluation of a Child Abuse Screen Performed by Nurses Among Young Children with Fractures Seen in a Pediatric Emergency Department

ALEKSA M. KAYE, MPH; WILLIAM RUDMAN, MSc; STEPHANIE M. RUEST, MD, MPH

ABSTRACT

AIMS: To assess institutional compliance with, and test characteristics of, a child abuse screen performed by emergency department (ED) nurses for children <5 years old who were diagnosed with fractures.

METHODS: A secondary analysis of a retrospective observational study of children 0–5 years old with fractures seen at a pediatric ED between January 2018 and April 2023 was performed. We analyzed demographics, ED visit data, and results of the nurse-completed abuse screen. Screen results were compared to ED clinician concern for abuse to calculate test characteristics.

RESULTS: The mean age of the 2,705 children identified was 38.4 months (SD 19.8). Out of the total patient cohort, 2,449 (90.5%) had a nurse-completed screen. Among these, 65 patients (2.4%) screened positive for possible abuse. We found no statistically significant difference in screen completion by age group, race, ethnicity, language, or insurance type. Of 312 (11.5%) encounters with clinician concern for abuse, 17.6% screened positive, 76.0% screened negative, and 6.4% had an incomplete screen. The sensitivity and specificity among screened children aged 0–5 were 19.2% [95% CI 14.7–23.8%] and 99.5% [95% CI 99.3–99.8%]. The PPV and NPV were 84.6% [95% CI 75.8–93.4%] and 90.3% [95% CI 89.1–91.5%]. Comparatively, among children <12 months, the sensitivity was 24.4% [95% CI 18.0–30.8%], specificity was 98.1% [95% CI 95.4–100%], PPV was 95.5% [95% CI 89.3–100%], and NPV was 43.7% [95% CI 37.3–50.1%].

CONCLUSIONS: Although there was high compliance with this nurse-completed abuse screen, it is an inadequate sole modality for screening young children with fractures, with a low probability of a positive screen given clinician concern for potential abuse for the entire cohort and among high-risk infants.

KEYWORDS: Child abuse screen, electronic health record, pediatric emergency department

INTRODUCTION

Child abuse is a public health issue with severe short- and long-term consequences. Approximately 25% of children are abused or neglected in their lifetimes, with an estimated 18% experiencing physical child abuse.1,2 After bruising, fractures are the most common childhood injury from physical abuse.3 It is estimated that 25–56% of abusive fractures occur among children <12 months,4 up to 80% among children <18 months,5 and the vast majority among children <5 years,4 underscoring the importance of optimizing screening for this high-risk group.

The emergency department (ED) is an entry point into the healthcare system for many abused children. Children who have been abused are known to visit the ED more often than non-abused children, and ED providers may be their first and only medical contact.6-8 While early detection presents ED providers with a critical opportunity to reduce morbidity and mortality, healthcare providers either miss or misdiagnose abusive fractures in young children up to 20% of the time.9 Although the American Academy of Pediatrics (AAP) has developed evidence-based guidelines for evaluating physical child abuse, validated and universal child abuse screening tools remain lacking.10

To date, several screening tools have been published and validated, including injury-specific clinical decision rules and more general screens.11-15 However, because no comprehensive gold standard to screen for all forms of child abuse exists, many hospitals implement their own screens, which can be active [provider-completed], passive [utilize information embedded in the electronic health record (EHR)], universal [for all children irrespective of presenting complaint] and/or targeted [limited to certain age groups and/or complaints].9,16 Inconsistent screening compliance, insufficient clinician knowledge, and clinician biases, among other barriers, remain significant obstacles to accurate detection.9,13,17 As such, hospitals must critically review their screening protocols to ensure that there is high compliance, identify potential institution-based barriers, and evaluate screening test characteristics.

In 2018, the study site, Hasbro Children’s Hospital, implemented a mandatory abuse screen performed by ED nurses, similar to previously published screening questions.18 To date, no formal evaluation of this screen has been completed.
The aims of our study were to assess institutional screening compliance and test characteristics (sensitivity, specificity, negative and positive predictive values) compared to ED clinician concern for abuse and discussion with a child abuse pediatrician (CAP), among children <5 years who were diagnosed with a fracture.

**METHODS**

**Study design and population**

A secondary analysis of a larger retrospective observational study of children aged 0–5 years old who visited a regional tertiary pediatric ED between March 2015 and April 2023 was performed. All patients included in the primary study had at least one diagnosed fracture, identified by the International Classification of Disease 10th revision (ICD-10) codes (See Box). Full-text ED encounter notes and discrete data were provided by research information services in Microsoft Excel™ (Microsoft, Redmond, WA, USA). The institutional abuse screen became embedded in the EHR in January 2018; as such, encounters between January 2018 and April 2023 were included. The study was approved by the institutional review board.

**Box. ICD10 Codes for Fractures**

<table>
<thead>
<tr>
<th>Fractures</th>
<th>Codes</th>
</tr>
</thead>
<tbody>
<tr>
<td>Skull</td>
<td>S02.0*, S02.1*, S02.7*, S02.8*, S02.9*</td>
</tr>
<tr>
<td>Nasal bone, orbital floor, maxilla, mandible</td>
<td>S02.2, S02.3*, S02.4*, S02.6*; dental fractures (S02.5) were excluded</td>
</tr>
<tr>
<td>Pelvis and spine</td>
<td>S12*, S32*</td>
</tr>
<tr>
<td>Rib</td>
<td>S22.3*, S22.4*, S22.5*</td>
</tr>
<tr>
<td>Shoulder and humerus</td>
<td>S42*</td>
</tr>
<tr>
<td>Radius and ulna</td>
<td>S52*</td>
</tr>
<tr>
<td>Wrist, hand, and fingers</td>
<td>S62*</td>
</tr>
<tr>
<td>Femur</td>
<td>S72*</td>
</tr>
<tr>
<td>Tibia and fibula</td>
<td>S82*</td>
</tr>
<tr>
<td>Ankle, foot, and toes</td>
<td>S92*</td>
</tr>
</tbody>
</table>

Hasbro Children’s Hospital is the only level-one pediatric trauma center in Rhode Island with a catchment area also including parts of Connecticut and Massachusetts. Annually, an average of 55–60,000 patients are seen in this pediatric ED, of which approximately 52% are male, 47% White, and 14% Black. Nearly 40% of patients identify as Hispanic. More than 45% of patients have public insurance. Any ED clinician concern about potential abuse and/or neglect can be reviewed directly with a consultant child abuse pediatrician (CAP) 24 hours a day, 7 days a week.

**Measures**

Demographic features including sex, age, race, ethnicity, insurance payor, and primary language were collected. Sex, race, and ethnicity categories were self-reported by the patient/caregiver or assigned by hospital registration in accordance with the institution’s practices. We included race and ethnicity data because of previously described disparities in the screening and reporting of potential child abuse.

Encounter-level characteristics included date and time of visit and ED disposition (e.g., admit, discharge). Derived variables based on the date and time of ED presentation were day of the week, month of the year, and shift. The three shift periods corresponded to the institution’s standard nursing shifts [07:00–14:59, 15:00–22:59, and 23:00–06:59).

**Child Abuse Screen**

The four-question universal screen was to be completed by registered nurses for all children, regardless of age or chief complaint, to identify those who may have experienced abuse/neglect and potentially needed additional evaluation. Education regarding child abuse was provided in a lecture given by nurse educators or by an online educational module at the time of nursing onboarding. Education regarding the screening questions was provided during triage training by nurse educators.

Figure 1 shows the intended workflow of the screen. The screening questions are similar to the previously published Escape questionnaire. A screen was considered positive for potential abuse if any of the four questions were answered “yes.” A screen was considered negative if the first two questions were completed by the triage nurse and were answered “no” or if all four questions were completed by the room nurse and answered “no.” Although screening was intended to be mandatory and universal, nurses were able to defer the questions in the EHR; a screen was considered incomplete if questions were left unanswered.

**Emergency Department Clinician Concern for Abuse**

If the ED clinician had concerns for potential abuse/neglect, independent of or based on the nursing screen, a CAP was called to review the case. Encounters reviewed with a CAP were identified in two ways. The first was the presence of a CAP consultation or plan of care note associated with the ED encounter. Second, keyword identification from the clinicians’ notes for all encounters were identified through manual review of the dataset. Search terms included the child abuse pediatrics center eponym (“Aubin Center”), “child protect-” (-ion, -ive), “child safe,” “abuse,” “non-accidental,” “DCYF” and “DCF” [the local states’ acronyms for departments of children [youth] and families], and “skel-etal survey.” Encounters with these terms were included if a clinician documented that there was a discussion with
a CAP due to concerns of potential abuse/neglect related to the current encounter. Documentation of prior but not current abuse evaluation(s) or concerns, documentation of placement in child protective services custody prior to the time of the encounter but no concerns related to the current fracture visit, or explicit documentation of lack of concern, were coded as no concern.

**Statistical Analysis**

All data were exported into Microsoft Excel™ for coding and analyzed using SAS™ (version 9.4, SAS Institute, Inc., Cary, NC, USA). Descriptive analyses were performed to describe the study population and ED encounter characteristics, reporting results as frequencies and proportions, with mean and standard deviation when applicable. Bivariate analyses were conducted to determine associations between the patient and ED encounter characteristics by screening completion and results, with 95% confidence intervals reported. Chi-square tests were calculated for comparative analyses.

To calculate the test characteristics for the nursing screen, results were compared to the reference standard of ED clinician concern and discussion with a CAP. This reference standard was chosen rather than cases of confirmed abuse, as previously described, given that the purpose of the screen is to recognize potential or suspected abuse/neglect, and not to diagnoses cases. Furthermore, the diagnosis of abuse is not commonly made in the ED setting, and concern for abuse is essential to its potential identification. Sensitivity, specificity, positive predictive value (PPV), and negative predictive value (NPV) were calculated for the entire sample and stratified among children <12 months, 12 to <24 months, and 24 to <36 months, as younger children are at higher risk of sustaining and having missed abusive fractures. Children with incomplete screens (N=256) were excluded from these analyses. There was a small proportion of patients with more than one encounter during the 8-year study period; because the screen was to be completed at every encounter and the opportunity for child maltreatment could arise between visits, all encounters were included in the analysis.

**RESULTS**

There were 2,705 children who presented to the ED with fractures during the study period. The mean age was 38.4 months (SD 19.8) and 45.7% were <3 years old. Most patients were female (55.3%), White (59.7%), non-Hispanic (72.2%), and publicly insured (35.4%) (Table 1). 69.6% of encounters occurred between Monday and Friday, 60.1% during the 15:00–22:59 shift, and 14.3% were admitted (Table 2). A combined 86.7% presented with a chief complaint related to an injury or pain. The most common fractures were radius and/or ulna (24.1%), humerus (23.3%), and tibia and/or fibula (17.0%) (Table 2).

Overall, 90.5% (N=2,449) of patients were screened, of which 65 (2.4%) screened positive for nursing concern for potential abuse/neglect, and 88.1% screened negative. There were 256 (9.4%) encounters with an incomplete screen. We found no statistically significant differences in screening completion by age group (p=0.14), race (p=0.66), ethnicity (p=0.89), primary language (p=0.92), or insurance type (p=0.56). Furthermore, screen completion was not
statistically significant according to the day of the week (p=0.46), nursing shift (p=0.42), or triage acuity (p=0.36). The proportion of completed screens by sex was statistically significant (p=0.04), with a higher proportion of screens among males (54.7%). Screening by ED disposition was also statistically significant: 89.4% of discharged children were screened, versus 96.9% of admitted children (p<0.001).

There was a significant difference in positive, negative, and incomplete screens by age group, with 15.0% of children <12 months screening positive compared to <2% positive in each of the other age groups (p<0.001).

There were 312 (11.5%) encounters that had ED clinician concern for abuse and/or neglect. Of those with clinician concern, 55 (17.6%) had a positive screen, 237 (76.0%) had a negative screen, and 20 (6.4%) had an incomplete screen. Among encounters with negative or incomplete screens and clinician concern, 139 (54.1%) were <12 months, 44 (17.1%) were 12 to <24 months, and 31 (12.1%) were 24 to <36 months. The racial distribution of patients for whom there was a positive screen and ED clinician concern [45.5% White, 12.7% Black] was similar to that of the general ED population [47% White, 14% Black], however there was an

<table>
<thead>
<tr>
<th>Table 1. Patient Demographics, N=2,705</th>
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<tbody>
<tr>
<td><strong>N (%)</strong></td>
</tr>
<tr>
<td><strong>Sex</strong></td>
</tr>
<tr>
<td>Male</td>
</tr>
<tr>
<td>Female</td>
</tr>
<tr>
<td><strong>Mean age, months (SD)</strong></td>
</tr>
<tr>
<td>38.42 (19.8)</td>
</tr>
<tr>
<td><strong>Age group</strong></td>
</tr>
<tr>
<td>0 to &lt;12 months</td>
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<tr>
<td>12 months to &lt;24 months</td>
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<tr>
<td>24 to &lt;36 months</td>
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<tr>
<td>36 to &lt;48 months</td>
</tr>
<tr>
<td>48 to &lt;60 months</td>
</tr>
<tr>
<td>&gt;60 months</td>
</tr>
<tr>
<td><strong>Race</strong></td>
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<tr>
<td>White or Caucasian</td>
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<tr>
<td>Black or African American</td>
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</tr>
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</tr>
<tr>
<td><strong>Ethnicity</strong></td>
</tr>
<tr>
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<tr>
<td><strong>Language</strong></td>
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<tr>
<td>English</td>
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<td>Spanish</td>
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<tr>
<td>Other</td>
</tr>
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<td>Unknown</td>
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<tr>
<td><strong>Insurance</strong></td>
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<tr>
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<tr>
<td>Private</td>
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<table>
<thead>
<tr>
<th>Table 2. Emergency Department (ED) Encounter Characteristics, N=2,705</th>
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<tbody>
<tr>
<td><strong>N (%)</strong></td>
</tr>
<tr>
<td><strong>Day of week</strong></td>
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<tr>
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</tr>
<tr>
<td>Tuesday</td>
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<td>Wednesday</td>
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<td>Thursday</td>
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<td>Friday</td>
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<tr>
<td>Saturday</td>
</tr>
<tr>
<td>Sunday</td>
</tr>
<tr>
<td><strong>Shift</strong></td>
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<tr>
<td>07:00-14:59</td>
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<tr>
<td>15:00-22:59</td>
</tr>
<tr>
<td>23:00-06:59</td>
</tr>
<tr>
<td><strong>Emergency Severity Index (ESI)</strong></td>
</tr>
<tr>
<td>1</td>
</tr>
<tr>
<td>2</td>
</tr>
<tr>
<td>3</td>
</tr>
<tr>
<td>4</td>
</tr>
<tr>
<td>5</td>
</tr>
<tr>
<td>Missing</td>
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<tr>
<td><strong>ED disposition</strong></td>
</tr>
<tr>
<td>Discharge</td>
</tr>
<tr>
<td>Admit</td>
</tr>
<tr>
<td>Other/Unknown</td>
</tr>
<tr>
<td><strong>Mode of arrival</strong></td>
</tr>
<tr>
<td>Car/Walk-in</td>
</tr>
<tr>
<td>Ambulance/Emergency Medical Services</td>
</tr>
<tr>
<td>Helicopter/Other</td>
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<td>Missing</td>
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<tr>
<td><strong>Chief complaint</strong></td>
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<tr>
<td>Injury</td>
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<tr>
<td>Pain</td>
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<tr>
<td>Medical</td>
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<tr>
<td>Fussy</td>
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<tr>
<td>Concern for abuse</td>
</tr>
<tr>
<td>Other</td>
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<tr>
<td>Missing</td>
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<tr>
<td><strong>Fracture type</strong></td>
</tr>
<tr>
<td>Forearm (radius and/or ulna)</td>
</tr>
<tr>
<td>Humerus</td>
</tr>
<tr>
<td>Tibia and/or fibula</td>
</tr>
<tr>
<td>Clavicle</td>
</tr>
<tr>
<td>Skull</td>
</tr>
<tr>
<td>Fingers, metacarpals, and/or carpal bones</td>
</tr>
<tr>
<td>Toes, metatarsals and/or tarsal bones</td>
</tr>
<tr>
<td>Femur</td>
</tr>
<tr>
<td>Orbital and/or nasal</td>
</tr>
<tr>
<td>Multiple bones in disparate body regions</td>
</tr>
<tr>
<td>Spine (cervical, thoracic, lumbar)</td>
</tr>
<tr>
<td>Rib</td>
</tr>
</tbody>
</table>

a Based on standard nursing shifts.
b Chief complaints categorized as “injury” specifically included the following terms: fall, “injury,” known fracture, laceration, motor vehicle crash, trauma. Those categorized as “medical” included the terms: abdominal pain, cough, emesis, fever, hematemesis, joint swelling, “medical,” mouth lesions, otalgia, seizures, shortness of breath, sore throat. Those categorized as “other” had a chief complaint specifically of “other.”
DISCUSSION

We sought to assess compliance with and test characteristics of an institution-specific child abuse screening among children aged 0–5 diagnosed with a fracture[s]. The overall compliance rate of 90.5% was comparable to other findings on universal child abuse screening in EDs.\textsuperscript{3,24} Moreover, the proportion of children who screened positive (2.4%) is also comparable to other studies of universal screening.\textsuperscript{13,25-26} We found no differences in the proportion of patients screened based on sociodemographics, with the exception of sex. While this may be due to the expectation of universal rather than targeted screening, evidence regarding the relationship between universal screening and human biases is still inconclusive.\textsuperscript{14} We found the screen’s overall sensitivity to be poor among children <5 who ultimately were diagnosed with fractures, markedly lower than that of previously published screens,\textsuperscript{12,13,28-30} and signifying that few encounters raising clinician concern for potential abuse would be identified with a positive screen.

This institutional screen has similar questions to the Escape questionnaire,\textsuperscript{13} yet the specific language and complete set of questions were not used. Studies assessing the diagnostic accuracy of Escape found its sensitivity, specificity, PPV, and NPV to be 80–100%, 98.3–99%, 10–25.5%, and 99–100% respectively when using reference standards of confirmed\textsuperscript{12} and suspected\textsuperscript{13} child abuse. However, these study populations included children who were up to age 18 years,\textsuperscript{12,13} and overall, at lower risk of abuse than just infants and toddlers, possibly impacting the test characteristics. As previously described,\textsuperscript{4,13} clinician concern for potential abuse was intentionally chosen as the reference standard over confirmed abuse, as the goal of the screen is to identify high-risk cases that warrant further consideration, and not to diagnose abuse. The prevalence of abusive fractures among infants and toddlers is high,\textsuperscript{4-5} and fracture identification should prompt consideration of abuse, particularly among infants <1 year. Thus, we chose to err on the side of including encounters that ultimately may not have been determined to be abuse as to minimize the potential for missed cases.

Our findings revealed a large discrepancy between clinician and nurse concerns, as 76.0% of children for whom clinicians were concerned for abuse had a negative screen. There were notable differences in test characteristics when stratified by the youngest and highest-risk patients. One possible explanation for these findings is that nurses may have suspected abuse to be more likely among children <12 months, thus increasing sensitivity and PPV compared to the entire cohort of children 0–5 years; however, 54.1% of cases with clinician concern but a negative nurse screen occurred in this age group. Although screening nurses were not aware of the final diagnosis, 86.7% of chief complaints were related to pain and/or injury, which should have prompted consideration of abuse, particularly among infants. Conversely, potential abuse among ambulatory

<table>
<thead>
<tr>
<th>Test characteristics of nursing-completed abuse screen for the entire cohort ages 0–5 years, and stratified by age group\textsuperscript{a}</th>
</tr>
</thead>
<tbody>
<tr>
<td><strong>1–5 years</strong></td>
</tr>
<tr>
<td>Sensitivity</td>
</tr>
<tr>
<td>Specificity</td>
</tr>
<tr>
<td>Positive predictive value</td>
</tr>
<tr>
<td>Negative predictive value</td>
</tr>
<tr>
<td><strong>0–12 months</strong></td>
</tr>
<tr>
<td>Sensitivity</td>
</tr>
<tr>
<td>Specificity</td>
</tr>
<tr>
<td>Positive predictive value</td>
</tr>
<tr>
<td>Negative predictive value</td>
</tr>
<tr>
<td><strong>12–&lt;24 months</strong></td>
</tr>
<tr>
<td>Sensitivity</td>
</tr>
<tr>
<td>Specificity</td>
</tr>
<tr>
<td>Positive predictive value</td>
</tr>
<tr>
<td>Negative predictive value</td>
</tr>
<tr>
<td><strong>24–&lt;36 months</strong></td>
</tr>
<tr>
<td>Sensitivity</td>
</tr>
<tr>
<td>Specificity</td>
</tr>
<tr>
<td>Positive predictive value</td>
</tr>
<tr>
<td>Negative predictive value</td>
</tr>
</tbody>
</table>

\textsuperscript{a} Age was stratified up to age 36 months given the higher risk of abuse among infants and toddlers, and the estimate that up to one in five abusive fractures are missed among children under the age of 3 years.\textsuperscript{5}
children 12 to <36 months could have been misinterpreted as a developmentally appropriate unintentional injury, resulting in lower screening sensitivity in this age group. These discrepancies were likely influenced, at least in part, by a combination of limited child abuse training for nurses at the study institution, the use of a modified screen that has not been validated, and a suboptimal workflow. Questions 1 and 2 of the screen, typically completed in triage, relied on nurse assessment when 1) the history and exam were brief and limited; 2) the child was typically dressed and in the presence of a caregiver; and 3) multiple other assessments were required, which may have reduced screening accuracy.

Despite the lack of a gold standard screen, hospitals have been increasingly integrating clinical decision support systems into their EHRs to comply with AAP guidelines. These systems should layer active and passive approaches, incorporate real-time data on clinical characteristics, integrate into the clinical workflow, mitigate disparities, and be accompanied by ED staff training. Although the screen in this study was brief and integrated into the EHR, workarounds allowed for nearly 10% of screens to remain incomplete, undermining the goal of universal screening. The sole reliance on nursing assessment as well as verbal communication of results to the responsible clinician limits its impact and value, and it is clear that this screen is not optimal for identifying the most vulnerable patients presenting with fractures. While our findings are not generalizable to hospitals with different screening tools, these findings support the need for institutions to assess their screens and utilize evidence-based validated methods, when possible, rather than institution-specific tools.

**Limitations**

Although a keyword search for common terms and phrases related to concern for child abuse, cases with ED clinician concern may have been overlooked if documentation did not include the identified keyword terms. Additionally, we designated clinician concern for abuse as the reference standard in lieu of confirming child abuse cases. This could have introduced misclassification bias into our test characteristics and limits comparability to other validated screens. Finally, we did not review all cases without the presence of the keywords, which may have introduced partial verification bias.

**CONCLUSION**

This study corroborates existing evidence on child abuse screening limitations and further emphasizes the need for institutions to perform ongoing assessment and validation of screening tools used to identify children who may have been abused across the pediatric age spectrum and in high-risk subgroups. Although the screen used in this study demonstrated high compliance, test characteristics varied by age, and there were notable differences compared to clinician concerns, highlighting potential knowledge gaps, biases, and opportunities for screening improvements. Based on our findings, we recommend implementation of automated multidimensional screening systems that incorporate evidence-based, objective, and discrete data elements and validated tools (e.g., TEN-4 FACESp), and more robust nursing education about child maltreatment. Universal screening with special attention to high-risk groups (e.g., an infant presenting with an injury) is critical to improve the identification of potentially abused patients.

**References**


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Development of an Emergency Department Family Navigator and Text Message Intervention for Caregivers to Reduce Youth Risk of Suicide and Self-injurious Behavior

MARY KATHRYN CANCILLIERE, PhD; KATE M. GUTHRIE, PhD; KATHLEEN DONISE, MD; TIMMY LIN, MPH; LINDSAY ORCHOWSKI, PhD; ANTHONY SPIRITO, PhD

ABSTRACT

BACKGROUND: Suicide and self-injurious behavior (SSIB) in youth 10 to 14 years old has rapidly increased, with suicide rates for youth 10 to 18 years being the second leading cause of death. Youth with SSIB seen in the Emergency Department (ED) are often discharged to the community, yet less than 40% receive subsequent mental health (MH) care within 30 days. This open pilot study examined the feasibility, acceptability, and sample characteristics of a two-component Family Navigator with text messaging intervention, ED REaCH, for caregivers of youth with SSIB discharged from the ED.

METHODS: Sixteen dyads of youth (M=12.67, SD=1.09) seeking emergency care for SSIB and their caregivers were enrolled from the ED of a pediatric hospital in the northeast US from November 2023 to March 2024. Dyads were enrolled in the ED REaCH intervention consisting of navigation procedures to promote linkage to care, engagement in community-based MH care for youth with SSIB, and a digital platform to extend purported mechanisms underlying the intervention’s efficacy [MH literacy, MH communication, and MH engagement]. Data was collected on measures of social identities, demographics, functioning, MH services, and intervention satisfaction.

RESULTS: All (100%) caregivers accepted the text messages. Most (75%) utilized the Family Navigator and completed the intervention feedback interviews. Overall, caregivers endorsed positive experiences and satisfaction with the two-component intervention. All caregivers who utilized the Family Navigator reported that 100% of youth attended MH care.

CONCLUSION: Preliminary findings suggest that the content and delivery methods of this intervention are perceived by caregivers as feasible and acceptable. As such, next steps include the evaluation of the ED REaCH intervention in a randomized clinical trial design. Future directions need to focus on intervention scalability, adaptability, personalization, and sustainability.

KEYWORDS: Youth, Suicide, Emergency Department, Family Navigator, Text Messages
efficacious in facilitating patient engagement and the linkage to community-based services (time spent and services completed). Navigation models can provide a “warm handoff” for youth and their families who have experienced a hospital admission and are discharged with referrals to community-based care. Research demonstrates effective navigation models in pediatric specialty clinics, and adherence to complicated and life-dependent treatments. The literature also showcases the effectiveness of navigation models in community settings and in adult populations. However, to our knowledge, there is no evidence regarding navigation models for youth with SSIB in pediatric EDs, particularly integrated protocols that seek to both promote linkage to care and the extension of information, support, and encouragement for families in their natural environment.

Digital platforms, such as text messaging, have been shown effective in providing information, support, and encouragement to individuals within their natural environments. Text-based platforms are highlighted in the literature due to their effects promoting healthy behavior change. For example, in a pediatric ED study, sending educational text messages to infant caregivers was effective in reducing the number of visits to the ED. Given the accessibility and small expense of sending text messages, the results have direct implications on the cost of health care, in addition to improving continuity and quality of care for pediatric patients. Studies suggest that text messaging with caregivers is feasible and acceptable. However, to our knowledge, the integration of navigation models and text messaging to extend and help promote greater ED intervention reach and access does not exist.

The present study examines feasibility, acceptability, and qualitative outcomes of a navigation- and text message-based intervention that employs an ecological model within a socio-cultural theoretic framework of MH service disparities and barriers to treatment that is grounded in motivation enhancement theory. Foundational data for this intervention was derived from key stakeholder interviews (n=40; youth with SSIB utilizing the ED, their caregivers, ED psychiatric emergency service clinicians, and community-based MH clinicians) from 2022 to 2023 that support this intervention development by identifying barriers and facilitators to youth linkage to MH service after an ED admission. Specifically, stakeholders’ highlighted information included gaps in securing community-based MH care (with long wait times, little availability); limited youth and caregiver MH literacy (i.e., MH symptoms, coping/tolerance of distress, normative youth development, reasons for care, and levels of care/types of treatment), limitations in youth and caregiver MH communication (i.e., symptom severity, how to ask for help, how to discuss concerns, and language used to talk about MH and distress); and the engagement and navigation of the MH system (i.e., system structure, barriers to care). The intervention described here combines navigation procedures to promote linkage to care, engagement in and adherence to community-based MH care for youth with SSIB, as well as a digital platform to extend purported mechanisms underlying the intervention’s efficacy (MH literacy, MH communication, and MH engagement). An open pilot trial of the intervention was conducted with caregivers of youth with SSIB after discharge from a pediatric ED acute care admission. The primary objective of this pilot intervention was to examine preliminary indices of feasibility, acceptability, and qualitative outcomes of the developed intervention [ED REaCH].

METHODS
Participants and Procedures
An open pilot trial of the ED REaCH intervention was conducted in the ED of a pediatric hospital in the northeast US. Youth met study eligibility criteria if they were 10 to 14 years old, living at home with a legal guardian/caregiver, presenting to the ED with SSIB, and had a discharge plan home. Youth were excluded from the study if they had a presentation of psychosis, sexual assault, or child abuse, were in police custody, unable to assent due to severity of symptoms, illness, or developmental disabilities, referred to inpatient psychiatric care, not fluent in English, or if no caregiver/legal guardian was able to provide consent and participate. Caregivers were eligible for the study if they were the youth’s legal guardian and lived with the youth. Institutional Review Board (IRB) approval was obtained prior to study implementation. The study was registered at ClinicalTrials.gov: NCT05954585.

Sixteen dyads of youth (mean age =13.00, SD=0.73) seeking emergency care for SSIB and a caregiver were approached and enrolled into this study via three waves of recruitment from November 2023 to March 2024. All electronic health records (EHR) of youth presenting to the ED during a convenience sample of daytime shifts were screened for eligibility. If found eligible, caregivers and youth were approached by study staff to determine interest. Study procedures and time commitments were explained to interested youth and caregivers. Written caregiver consent and youth assent were obtained. Directly after consent/assent, each youth and caregiver completed a battery of self-report measures while in the ED. Caregivers who consented to the study agreed to share specific data within their youth’s EHR with the study: Reason for admission, SSIB evaluation information, and disposition. Study procedures were completed in the ED with families during the youth’s ED admission wait times (frequently greater than 60 minutes). Once the battery of assessments was complete, caregiver participants scheduled their first appointment with the study Family Navigator. At the end of the study, each caregiver completed exit interviews to provide feedback about the study intervention. Youth and caregivers were each compensated for their time completing...
This theory-driven study was conducted to further develop and refine the intervention.27,28 See Figure 1 for an overview of the trial. This iterative process involved three waves: The 1st wave over four weeks with six dyads, the 2nd wave over eight weeks with five dyads, and the 3rd wave over 12 weeks with five dyads. Feedback after each wave informed the next wave of modifications to the intervention to maximize acceptability and usefulness. Queries on intervention satisfaction, usability, and acceptability were collected via a qualitative exit interview with caregivers to explore attitudes and opinions regarding intervention content, conditions, and delivery. The primary questions were related to the two-component (Navigator and text messaging) intervention’s feasibility, acceptability, burden, engagement, helpfulness, usability, and satisfaction. Target enrollment for this study was between 16 to 20 youth and caregiver dyads.

**External Advisory Board**
An External Advisory Board was established for this study and made up of four nationally recognized experts (psychologists, research physicians, and research scientists within academic medical centers) in the field of ED injury control and suicide prevention. The Board met twice annually with the Primary Investigator (MKC) and provided feedback that was integrated in the intervention’s scalability, sustainability, acceptability, and translation.

**ED REaCH (RESILIENCE EDUCATION AND CAREGIVER HELP)**
ED REaCH emphasizes the importance of resilience, education, and caregiver support via the two-component family navigation and text messaging intervention to reduce youth SSIB risk.

**Family Navigator**
The Family Navigator was a research staff member trained in motivational interviewing principles.31 The Navigator protocol was not designed to provide SSIB crisis intervention. The protocol (~20 mins) was based on prior navigator models and designed for caregivers, not youth.17,18 Contact was made biweekly with caregivers during the 1st wave. Following caregiver feedback requesting more frequent contact, Navigator contact was increased to weekly in the 2nd and 3rd waves. Caregivers were contacted for their bi-weekly Navigator appointment for four weeks (wave-1), eight weeks (wave-2), or 12 weeks (wave-3) or until their youth attended community-based MH services, whichever came first. If families did not follow up with MH services after a 12-week period, they were able to remain in the study until services were obtained (though, this did not occur during this trial). During the bi-weekly communications, the Navigator spoke with caregivers and provided education, support, and assistance on youth MH symptoms and severity, MH communication, and MH service(s); discussed the ED discharge plan including the youth’s safety plan (and facilitated another copy of the plan when needed) and referral to MH care; discussed SSIB safety procedures and the restriction of lethal means; addressed barriers to MH care and coordinated MH services; provided other requested resources (i.e., education on gender-affirming care, LGBTQ+ peer groups) for families and youth.

**Text Messages**
Automated text messages were delivered via Qualtrics online survey platform and based on the intervention putative mechanisms (i.e., MH literacy, MH communication, and MH engagement). The text messages were sent to caregivers three times per week until the end of the study. Youth did not receive text messages. Text message content included two to three sentences on caregiver communication strategies, MH literacy, encouragement, support, the importance for youth MH services, and SSIB safety procedures including lethal means restriction. See Figure 2 for an example text message.

**Measures**

**Sample Characteristics**
All participant dyads completed pretreatment quantitative self-report measures to assess youth social identities, SSIB,
psychological symptoms, MH services to date, family demographics, communication, MH literacy, and motivation for youth MH care, and caregiver life stressors and sources of support. See Table 1 for questionnaire details.

Feasibility, Acceptability, and Safety
Feasibility was evaluated through [a] recruitment rate of four to six dyads per month, [b] 80% retention rate across the study period, including percent of participants who completed assessments, [c] 70% completion rate of Family Navigator protocol, and [d] 70% engagement with the text messages including participant reports of reading messages.

Acceptability was derived from [a] the perceived usability of the intervention reported during the Qualitative Exit Interview with mostly positive/few negative comments, [b] mostly positive/few negative comments from the feedback, and [c] average score of 24 on the Client Satisfaction Questionnaire (CSQ-8). Safety was evaluated via [a] no report of serious adverse events and [b] chart review of youth patient readmission to the ED for SSIB.

Qualitative Interviews
Research staff conducted semi-structured interviews (~30-minutes) with caregivers over the phone at the end of the intervention protocol for each wave of the study. The purpose of these interviews was to elicit feedback on perceived acceptability and usability of the intervention, as well as ways to improve/ refine intervention content and delivery for the subsequent phase of the study involving a randomized clinical trial.

Data Analysis
The iterative development and initial acceptability and feasibility results presented below are based on youth and caregiver dyads. Descriptive statistics (via SAS version 9.4, Cary, NC) were utilized to describe the study population and explore responses. Qualitative data analysis was conducted to learn and understand caregiver feedback about the intervention using the Framework Matrix approach.45 Interviews were independently coded by two research staff, who met to establish code concordance. The Principal Investigator resolved any discrepancies. Framework Matrix is a structured process to categorize qualitative data by topic/a priori (deductive) and data driven (inductive) codes.

Table 1. Study Measures

<table>
<thead>
<tr>
<th>Measure</th>
<th>Description</th>
</tr>
</thead>
<tbody>
<tr>
<td>Suicidal Ideation Questionnaire (SIQ-JR):</td>
<td>15-item measure covering youth distress and suicidal intent. Each item is on a 5-point Likert Scale and a sum score was obtained for all items. Greater scores correspond to higher levels of suicidal ideation; clinical cutoff score is 15.</td>
</tr>
<tr>
<td>Pediatric Symptom Checklist (PSC):</td>
<td>35-item measure that assesses youth psychological impairment via 5 subscales (Attention, Internalizing, Externalizing, School and Other), with 3-category responses (0=Never, 1=Sometimes, 2=Often). The total score is derived from the sum of the attention, internalizing, externalizing and school subscales. Clinical cut score is 28 or above.</td>
</tr>
<tr>
<td>McMaster Family Assessment Device (FAD):</td>
<td>60-item measure with seven subscales (problem solving, communication, roles, affective responsiveness, affective involvement, behavior control and general functioning). Subscales are scored by taking the average.</td>
</tr>
<tr>
<td>Motivation for Youth Treatment (MYTS):</td>
<td>8-item scale that assesses youth treatment motivation of youth and caregivers. MYTS has two subscales – recognition the youth has a problem; readiness to participate in treatment. MYTS has a total score and subscale scores. Higher scores correspond to higher motivation for treatment.</td>
</tr>
<tr>
<td>Mental Health Literacy Scale (MHLSC):</td>
<td>(adapted for this study) is used to explore the participant’s understanding of mental health. Caregivers received a 33-item measure: 13 items used a 4-point Likert Scale and 20 items on a 5-point Likert Scale (maximum score of 152). Youth received a 24-item measure: four items on a 4-point Likert Scale and 20 items on a 5-point Likert Scale (maximum score of 116). A composite score was derived from summing all the items; higher scores correspond to greater mental health literacy.</td>
</tr>
<tr>
<td>Child and Adolescent Services Assessment (CASA):</td>
<td>36-item measure adapted for study use and administered to caregivers regarding youth healthcare utilization. Response options include “Yes,” “No,” and “Don’t Know.” The CASA is scored as a sum score of the responses of “Yes.” Higher scores indicate greater utilization of healthcare services.</td>
</tr>
<tr>
<td>Life Stress scale:</td>
<td>18-item measure that assesses experienced stressors by the caregiver over the past month. Life stress items had response options including “Didn’t happen”, “No negative impact”, “Little negative impact”, “Negative impact”, and “Very negative impact.” Endorsed responses were scored as a sum score. Higher scores indicate higher stress impact.</td>
</tr>
<tr>
<td>Life Support scale:</td>
<td>12-item measure that assesses caregiver support received from others, outside of the family, over the past month. Life support response options included “Not at all,” “Once,” “Twice,” and “3 or more times”. Responses aside from “Not at all” were scored as a sum score. Higher scores indicate higher caregiver support impact.</td>
</tr>
<tr>
<td>Client Satisfaction Questionnaire (CSQ-8):</td>
<td>8-item measure assessing quality of service, relevance of service, satisfaction with service received and likelihood of referring others to the service. Utilizing a 5-point Likert Scale, a composite score was derived by summing all 8 items with higher scores corresponding to greater satisfaction with services received.</td>
</tr>
<tr>
<td>Barriers to Treatment:</td>
<td>44-item rating of how much caregivers agree with statements about their expectancies of barriers to treatment for their child, using a 5-point Likert scale (1=totaly disagree, 5=totaly agree). Higher scores indicate increased barriers to care. This measure was adapted for study use and contained 38 items.</td>
</tr>
<tr>
<td>Social Determinants of Health (SDoH):</td>
<td>14-item measure is used to help identify specific needs of an individual/family. It screens for five core health-related social needs, which include housing, food, transportation, utilities, and personal safety, as well as employment, education, childcare, and financial strain.</td>
</tr>
<tr>
<td>Navigator Session Feedback Survey:</td>
<td>3-item survey developed to assess caregiver satisfaction of the Navigator session including the overall session, pace, and Navigators’ knowledge, support, and engagement.</td>
</tr>
</tbody>
</table>
RESULTS

Sample Characteristics

Social Identities and Demographic Data

A diverse sample of youth (M_age=13.00, SD=0.73) identified as 31.25% Hispanic/Latinx, 25% as Black/African American, and 56.25% as White. While youth sex assigned at birth was reported as 93.73% female, gender identity represented a significant range: 50% identified as male, 18.75% as female, and 12.50% as non-binary. A proportion of youth identified their sexual orientation as pansexual/asexual (31.25%) and homosexual (25%).

Most caregivers (M_age=41.87, SD=6.37) identified both sex assigned at birth and gender identity as female (68.75%), as well as 81.25% identified as non-Hispanic, 25% as Black/African American, and 75% as White. Caregivers were biological (93.75%) or adoptive (6.25%) parents, with annual income varied across the sample, with the most frequently reported ranges being $26–49K (18.75%), $75–99K (18.75%), $100–149K (18.75%) and $150K+ (18.75%). See Table 2 for greater detail.

Youth MH Symptoms

Youth suicidal ideation on the Suicidal Ideation Questionnaire-Jr (SIQ-Jr, M=33.56, SD=14.88) was more than double the scale’s clinically significant cutoff score of 15. However, only 25% of youth and 12.5% of caregivers indicated on the Pediatric Symptom Checklist (PSC) that youth MH symptoms were in the psychologically impaired range. Youth and caregivers did, however, endorse youth clinically elevated Internalizing Sub-scales scores M=7.56 and M=6.75, respectively, on the PSC.

Family Communication and MH Literacy

When compared to their caregivers, youth indicated fewer problems with communication (M=2.38, SD=0.21 versus M=2.42, SD=0.15), affective involvement (M=2.5, SD=0.42 versus M=2.8, SD=0.37), and behavior control (M=2.59, SD=0.2 versus M=2.64, SD=0.23) on the McMaster Family Assessment Device (FAD). Youth demonstrated lower MH literacy on the Mental Health Literacy Scale (MHLS, M=89.13, SD=11.18 out of a maximum score of 116) than their caregivers (M=127.06, SD=12.78 out of a maximum score of 152).

### Table 2. Sample Characteristics

<table>
<thead>
<tr>
<th></th>
<th>Youth (n=16)</th>
<th>Caregivers (n=16)</th>
</tr>
</thead>
<tbody>
<tr>
<td><strong>Sex at Birth</strong></td>
<td></td>
<td></td>
</tr>
<tr>
<td>Male</td>
<td>0 (0%)</td>
<td>5 (31.25%)</td>
</tr>
<tr>
<td>Female</td>
<td>15 (93.75%)</td>
<td>11 (68.75%)</td>
</tr>
<tr>
<td>Do not want to answer</td>
<td>1 (6.25%)</td>
<td>0 (0%)</td>
</tr>
<tr>
<td><strong>Gender Identity (&gt; one can be selected)</strong></td>
<td></td>
<td></td>
</tr>
<tr>
<td>Male</td>
<td>8 (50%)</td>
<td>5 (31.25%)</td>
</tr>
<tr>
<td>Female</td>
<td>3 (18.75%)</td>
<td>11 (68.75%)</td>
</tr>
<tr>
<td>Non-binary</td>
<td>2 (12.5%)</td>
<td></td>
</tr>
<tr>
<td>Genderqueer</td>
<td>0 (0%)</td>
<td></td>
</tr>
<tr>
<td>Agender</td>
<td>1 (6.25%)</td>
<td></td>
</tr>
<tr>
<td>Gender non-confirming</td>
<td>1 (6.25%)</td>
<td></td>
</tr>
<tr>
<td>Not listed (Indicated: Gender-fluid)</td>
<td>2 (12.5%)</td>
<td></td>
</tr>
<tr>
<td>Do not want to answer</td>
<td>0 (0%)</td>
<td></td>
</tr>
<tr>
<td><strong>Ethnicity</strong></td>
<td></td>
<td></td>
</tr>
<tr>
<td>Hispanic or Latino</td>
<td>5 (31.25%)</td>
<td>3 (18.75%)</td>
</tr>
<tr>
<td>Non-Hispanic or Latino</td>
<td>10 (62.5%)</td>
<td>13 (81.25%)</td>
</tr>
<tr>
<td>Do not want to answer</td>
<td>1 (6.25%)</td>
<td>0 (0%)</td>
</tr>
<tr>
<td><strong>Race (more than one can be selected)</strong></td>
<td></td>
<td></td>
</tr>
<tr>
<td>American Indian/Alaskan Native</td>
<td>1 (6.25%)</td>
<td>0 (0%)</td>
</tr>
<tr>
<td>Asian</td>
<td>2 (12.5%)</td>
<td>1 (6.25%)</td>
</tr>
<tr>
<td>Black or African American</td>
<td>4 (25%)</td>
<td>4 (25%)</td>
</tr>
<tr>
<td>Native Hawaiian/Other Pacific Islander</td>
<td>1 (6.25%)</td>
<td>1 (6.25%)</td>
</tr>
<tr>
<td>White</td>
<td>9 (56.25%)</td>
<td>12 (75%)</td>
</tr>
<tr>
<td>Not listed</td>
<td>0 (0%)</td>
<td>1 (6.25%)</td>
</tr>
<tr>
<td>Prefer not to answer</td>
<td>1 (6.25%)</td>
<td>0 (0%)</td>
</tr>
<tr>
<td><strong>Sexual Orientation</strong></td>
<td></td>
<td></td>
</tr>
<tr>
<td>Heterosexual</td>
<td>3 (18.75%)</td>
<td></td>
</tr>
<tr>
<td>Homosexual</td>
<td>4 (25%)</td>
<td></td>
</tr>
<tr>
<td>Bisexual</td>
<td>1 (6.25%)</td>
<td></td>
</tr>
<tr>
<td>Undecided</td>
<td>1 (6.25%)</td>
<td></td>
</tr>
<tr>
<td>Other (Indicated: Pansexual &amp; Asexual)</td>
<td>5 (31.25%)</td>
<td></td>
</tr>
<tr>
<td>Do not want to answer</td>
<td>2 (12.5%)</td>
<td></td>
</tr>
<tr>
<td><strong>Caretaker Highest level of Education</strong></td>
<td></td>
<td></td>
</tr>
<tr>
<td>Some high school</td>
<td>2 (12.5%)</td>
<td></td>
</tr>
<tr>
<td>High school degree</td>
<td>1 (6.25%)</td>
<td></td>
</tr>
<tr>
<td>Some college</td>
<td>3 (18.75%)</td>
<td></td>
</tr>
<tr>
<td>2-year degree</td>
<td>3 (18.75%)</td>
<td></td>
</tr>
<tr>
<td>4-year degree</td>
<td>5 (31.25%)</td>
<td></td>
</tr>
<tr>
<td>Master’s level degree</td>
<td>2 (12.5%)</td>
<td></td>
</tr>
<tr>
<td><strong>Marital Status</strong></td>
<td></td>
<td></td>
</tr>
<tr>
<td>Single, never married</td>
<td>4 (25%)</td>
<td></td>
</tr>
<tr>
<td>Living with partner, unmarried</td>
<td>1 (6.25%)</td>
<td></td>
</tr>
<tr>
<td>Married</td>
<td>7 (43.75%)</td>
<td></td>
</tr>
<tr>
<td>Separated/divorced</td>
<td>4 (25%)</td>
<td></td>
</tr>
<tr>
<td><strong>Annual Income</strong></td>
<td></td>
<td></td>
</tr>
<tr>
<td>$5,000–$49,999</td>
<td>5 (31.25%)</td>
<td></td>
</tr>
<tr>
<td>$50,000–$74,999</td>
<td>1 (6.25%)</td>
<td></td>
</tr>
<tr>
<td>$75,000–$99,999</td>
<td>3 (18.75%)</td>
<td></td>
</tr>
<tr>
<td>$100,000–$149,000</td>
<td>3 (18.75%)</td>
<td></td>
</tr>
<tr>
<td>Greater than/equal to $150,000</td>
<td>3 (18.75%)</td>
<td></td>
</tr>
<tr>
<td>Prefer not to answer</td>
<td>1 (6.25%)</td>
<td></td>
</tr>
</tbody>
</table>
MH Treatment and Barriers to Care

Youths’ overall motivation for treatment total score indicated lower motivation for treatment than their caregivers (M=29.44, SD=4.11 versus M=32.94, SD=3.49) on the Motivation for Youth Treatment (MYTS). Interestingly, youth demonstrated higher scores than caregivers on the “recognition that the youth has a problem” subscale, [M=14.75, SD=3.45 versus M=9.69, SD=2.02] but slower “readiness to participate in treatment” subscale scores than their caregivers [M=14.69, SD=2.44 versus M=23.25, SD=2.41].

On the Barrier to Treatment scale, caregivers indicated several factors that might compromised their child’s MH care, namely, “scheduling appointment times…” [33%], “…too tired after work…” [33%], “treatment will be more work than I think” [33%], and “bad weather…” [42%], “…challenges with attending school” (50%), “…child education needs” (42%), and “…previous contact with DCYF” (58%).

Caregiver Stressors and Support

While most caregivers (81.25%) indicated a high level of challenges with life stressors on the Life Stress scale (four or more life stressors; M=12.31, SD=5.14; Min: 2; Max: 19). On the Barrier to Treatment scale, caregivers indicated several factors that might compromised their child's MH care, namely, “eating less than you felt you should…wasn't enough money for food” (42%), “…challenges with attending school” (50%), “…child education needs” (42%), and “…previous contact with DCYF” (58%).

Feasibility

Recruitment

Electronic health records were screened and 58 youth 10- to 14-years-old were identified in the ED as meeting study criteria. Out of those 58, 13 were discharged and left the hospital prior to being approached about the study; 45 dyads were approached, but 10 youth who initially met study criteria were discharged to inpatient psychiatric care and no longer met study criteria; 18 dyads declined study participation (reasons included: “too tired,” “too busy,” “too stressed,” “not interested,” “too much going on,” “too frustrated,” and “we just want to go home”); one dyad was approached and signed a ‘consent to contact’ form (to be contacted after their ED discharge) but later did not return study calls; and 16 dyads met full study criteria and enrolled into the study.

Table 3. Caregiver Report on the Two-component Navigator and Text Message Intervention

<table>
<thead>
<tr>
<th>Question</th>
<th>Response option</th>
<th>End of study</th>
</tr>
</thead>
<tbody>
<tr>
<td>How would you rate the quality of service you received?</td>
<td>Excellent</td>
<td>7 (88%)</td>
</tr>
<tr>
<td></td>
<td>Good</td>
<td>1 (12%)</td>
</tr>
<tr>
<td></td>
<td>Fair</td>
<td>0</td>
</tr>
<tr>
<td></td>
<td>Poor</td>
<td>0</td>
</tr>
<tr>
<td>Did you get the kind of service you wanted?</td>
<td>No, definitely</td>
<td>0</td>
</tr>
<tr>
<td></td>
<td>No, not really</td>
<td>0</td>
</tr>
<tr>
<td></td>
<td>Yes, generally</td>
<td>4 (50%)</td>
</tr>
<tr>
<td></td>
<td>Yes, definitely</td>
<td>4 (50%)</td>
</tr>
<tr>
<td>To what extent has our care met your needs?</td>
<td>Almost all of my needs have been met</td>
<td>4 (50%)</td>
</tr>
<tr>
<td></td>
<td>Most of my needs have been met</td>
<td>3 (38%)</td>
</tr>
<tr>
<td></td>
<td>Only a few of my needs have been met</td>
<td>1 (12%)</td>
</tr>
<tr>
<td></td>
<td>None of my needs have been met</td>
<td>0</td>
</tr>
<tr>
<td>If a friend were in need of similar help, would you recommend our services to them?</td>
<td>No, definitely no</td>
<td>0</td>
</tr>
<tr>
<td></td>
<td>No, I don’t think so</td>
<td>0</td>
</tr>
<tr>
<td></td>
<td>Yes, I think so</td>
<td>0</td>
</tr>
<tr>
<td></td>
<td>Yes, definitely</td>
<td>8 (100%)</td>
</tr>
<tr>
<td>How satisfied are you with the amount of help you received?</td>
<td>Quite dissatisfied</td>
<td>0</td>
</tr>
<tr>
<td></td>
<td>Indifferent or mildly dissatisfied</td>
<td>0</td>
</tr>
<tr>
<td></td>
<td>Mostly satisfied</td>
<td>3 (38%)</td>
</tr>
<tr>
<td></td>
<td>Very satisfied</td>
<td>5 (63%)</td>
</tr>
<tr>
<td>Have the services you received helped you to deal more effectively with your problems?</td>
<td>Yes, they helped a great deal</td>
<td>4 (50%)</td>
</tr>
<tr>
<td></td>
<td>Yes, they helped</td>
<td>4 (50%)</td>
</tr>
<tr>
<td></td>
<td>No, they really didn’t help</td>
<td>0</td>
</tr>
<tr>
<td></td>
<td>No, they seemed to make things worse</td>
<td>0</td>
</tr>
<tr>
<td>In an overall, general sense, how satisfied are you with the services you have received?</td>
<td>Very satisfied</td>
<td>5 (63%)</td>
</tr>
<tr>
<td></td>
<td>Mostly satisfied</td>
<td>3 (38%)</td>
</tr>
<tr>
<td></td>
<td>Indifferent or mildly dissatisfied</td>
<td>0</td>
</tr>
<tr>
<td></td>
<td>Quite dissatisfied</td>
<td>0</td>
</tr>
<tr>
<td>If you were to seek help again, would you come back to our services here?</td>
<td>Yes, they helped a great deal</td>
<td>5 (63%)</td>
</tr>
<tr>
<td></td>
<td>Yes, they helped</td>
<td>3 (38%)</td>
</tr>
<tr>
<td></td>
<td>No, they really didn’t help</td>
<td>0</td>
</tr>
<tr>
<td></td>
<td>No, they seemed to make things worse</td>
<td>0</td>
</tr>
<tr>
<td>Caregiver Satisfaction on Navigator Session (n = 10)</td>
<td></td>
<td></td>
</tr>
<tr>
<td>Please rate your satisfaction with this navigator session/ guidance provided by the family navigator.</td>
<td>Quite dissatisfied</td>
<td>0</td>
</tr>
<tr>
<td></td>
<td>Indifferent or mildly dissatisfied</td>
<td>0</td>
</tr>
<tr>
<td></td>
<td>Mostly satisfied</td>
<td>4 (40%)</td>
</tr>
<tr>
<td></td>
<td>Very satisfied</td>
<td>6 (60%)</td>
</tr>
<tr>
<td>Was the session at a comfortable pace?</td>
<td>Yes</td>
<td>10 (100%)</td>
</tr>
<tr>
<td></td>
<td>No</td>
<td>0</td>
</tr>
<tr>
<td>Was the navigator engaging, supportive, and knowledgeable?</td>
<td>Yes</td>
<td>10 (100%)</td>
</tr>
<tr>
<td></td>
<td>No</td>
<td>0</td>
</tr>
</tbody>
</table>
Family Navigator: Caregiver Attendance and Retention

Family Navigator initial appointments were scheduled while youth were still in the ED. A total of 12 out of 16 caregivers (75%) attended their first Navigator appointment. For Wave 1, five out of six (83.33%) caregivers attended their first appointment, for Wave 2, three out of five (60%) attended, and for Wave 3 four out of five (80%) attended.

Youth Attendance in Community-based MH Care

At the first Navigator call (within three to seven days from the ED admission), most caregivers (83%) reported that their youth had attended the ED recommended community-based MH care [i.e., partial program, treatment with new therapist, treatment with original therapist, home-based family therapy].

One caregiver (from Wave 1) continued to work with the Navigator for a second appointment, and then reported the youth had attended a new therapist session. Another caregiver (from Wave 1) worked with the Navigator for a total of five appointments to secure services. This caregiver was a single parent, attending college, while also working full-time. They reported that they had difficulty receiving and making phone calls during office hours to secure services. With support, coaching and assistance, this caregiver was able to secure a therapist for the youth for remote telehealth MH care.

Information via Text Message

Caregivers (100%) accepted [i.e., did not stop or refuse] each of the text messages throughout the duration of the study. During the end-of-study interviews, caregivers reported reading the text messages and finding them “actionable,” “relevant,” and “new” or “a good reminder.”

Acceptability

Satisfaction

Out of this two-component intervention, 75% of caregivers participated in the Navigator component and 100% completed the text message component. Caregiver satisfaction on Navigator sessions [n=10] revealed a high rate of satisfaction, with 60% Very Satisfied and 40% Mostly Satisfied. Caregivers expressed high support, satisfaction, and usability of the Navigator and text message intervention during the qualitative interviews. Among caregivers responding to the CSQ-8 [n=8], the average score was 31.75, suggesting a high level of satisfaction with the program. See Table 3 for Navigator session and intervention feedback.

Table 4. Intervention Feedback and Iterative Modifications

<table>
<thead>
<tr>
<th>Content</th>
<th>Caregivers Exit Interview Quotes</th>
</tr>
</thead>
<tbody>
<tr>
<td>1. Review Safety Plan</td>
<td>“It is great to have the safety plan, but it is also challenging because now that we are home and she is back to school, some of the coping skills she listed now do not work. What do we do?”</td>
</tr>
<tr>
<td>A Safety Plans is a brainstorm of ways for youth to stay safe and have a plan on what to do to reduce risk and self-harm when experiencing SSIB symptoms. It can include planning for a future crisis, considering your options, and making decisions about your next steps.</td>
<td>“We have used Safety Plans before and found what worked for them last month, is not working for them now.”</td>
</tr>
<tr>
<td>2. Review Lethal Means Restriction</td>
<td>“I don’t let it happen, but I can see how stigma and embarrassment can get in the way.”</td>
</tr>
<tr>
<td>An approach to suicide prevention that reduces access to a fatal method of suicide (e.g., firearms, medications, sharps)</td>
<td></td>
</tr>
<tr>
<td>3. Mental Health Literacy</td>
<td>“I have no idea how the mental health system works. We went to the ED, and the providers were speaking gibberish to us. We need more information about all of the different types of service.”</td>
</tr>
<tr>
<td>When a family utilizes the ED for youth acute SSIB, youth and caregivers alike are often acutely distressed and may have difficulty remembering the details of their youth’s ED encounter and disposition. This can often be explained as a function of their distress tolerance.</td>
<td>“It would be helpful if their PCP had more information and resource on MH, maybe it would not have gotten to this extreme”</td>
</tr>
<tr>
<td>4. Youth Adherence/Attendance to ED Recommended level of Community-based Care</td>
<td>“I don’t let it happen, but I can see how stigma and embarrassment can get in the way.”</td>
</tr>
<tr>
<td>“While we are on the waitlist, we are going to wait to see if my child really needs that level of care. It is a lot of time out of school.”</td>
<td></td>
</tr>
<tr>
<td>5. Review of MH Communication</td>
<td>“The text messages remind me how to approach him [youth] in a positive way.”</td>
</tr>
<tr>
<td>“We need to know we are not alone.”</td>
<td></td>
</tr>
<tr>
<td>“We are sitting in the dark and do not know what to do with our youth – they have a therapist and a psychiatrist – but what do we do to support them at home?”</td>
<td></td>
</tr>
<tr>
<td>6. Mental Health Engagement</td>
<td>“We need to be a unified group – caregiver(s) and youth.”</td>
</tr>
<tr>
<td>“We have used Safety Plans before and found what worked for them last</td>
<td></td>
</tr>
<tr>
<td>month, is not working for them now.”</td>
<td></td>
</tr>
<tr>
<td>7. Caregiver Anxiety and Support</td>
<td>“We [Caregivers] need to know how to help ourselves.”</td>
</tr>
<tr>
<td>“I need more info to manage my own anxiety.”</td>
<td></td>
</tr>
<tr>
<td>“I feel fully responsible for my youth’s problems.”</td>
<td></td>
</tr>
<tr>
<td>“I feel overwhelmed and completely stressed out.”</td>
<td></td>
</tr>
<tr>
<td>8. How to parent a child after an ED visit for SSIB.</td>
<td>“I need more information and support while I support my child.”</td>
</tr>
</tbody>
</table>


Exit Interviews’ Feedback

Exit Interviews’ feedback and intervention modifications are outlined in Table 4. Overall, caregivers reported feeling satisfied with the ED REaCH intervention. When asked what else they would like to have in the intervention, they reported wanting: 1) more information about the safety plan and “how to use it” once they were “home” in their own environment, 2) more “education and scaffolding” on youth distress tolerance, MH symptoms and symptom severity, 3) a “road map” of youth MH services and resource, 4) more caregiver “support” and ways to “manage [their] own anxiety” including the development of “peer support” platforms, and 5) more information and education about “how to parent [their] child after an ED admission for SSIB,” including “how to set limits.”

The External Advisory Board was satisfied with the iterative intervention development, study timeline, and preliminary outcomes reported in this open trial.

Safety

Throughout this open trial, there were no reports of serious adverse events. There were also no reports via the EHR documentation of youth participant ED re-admissions during this open trial’s time frame.

DISCUSSION

The present study was conducted to further develop and refine, ED REaCH, a two-component navigation and text messaging intervention for caregivers of a diverse sample of youth with SSIB discharged from the ED. ED REaCH is grounded in the literature, derived from key stakeholder feedback, and based on three putative mechanisms of change: MH literacy, MH communication, and MH engagement. Findings from this open pilot development trial suggest that this two-component intervention for ED discharged youth with SSIB is, in general, feasible to administer and acceptable to caregivers.

ED REaCH is an important treatment for diverse youth with SSIB linkage to care, as it (a) focuses on caregivers/legal guardians as a conduit for youth MH care, (b) employs an ecological model within a socio-cultural theoretic framework of MH service disparities and barriers to treatment, (c) is grounded in both the evidenced-based practice of pediatric navigation and text-based digital health, and (d) is delivered by a highly accessible digital health platform with support from a Family Navigator. This unique combination of intervention content and delivery methods offers caregivers of diverse youth with SSIB support, encouragement, and motivation for youth linkage to MH care, as well as increased MH literacy, MH communication, and MH engagement strategies. The ED REaCH intervention was not only feasible to administer, but also was conducted at a comfortable pace, where caregivers were “very” and “completely” satisfied with the timing and amount of Navigator phone calls and text messages. Twelve out of 16 (75%) participants were retained in the navigation portion of the study and 100% in the text messaging throughout the entire 3-waves. Additionally, 10 out of 12 caregivers who completed the Family Navigator survey (83%) indicated that the Navigator was engaging, supportive, and knowledgeable. All caregivers also said that they accepted, read, and found utility and actionability in the weekly text messages. This is important, as studies indicate that one-way communications are effective in facilitating behavior change.

While dyads reported a low level of overall youth MH symptomatology, they endorsed a high, clinical level of youth internalizing symptoms. These differences could be due to the lack of MH symptom identification and/or misunderstanding of symptom severity and is in line with stakeholder interviews which suggested the need for greater information on MH literacy, particularly symptom and severity recognition. This was also highlighted in the caregiver end-of-study interviews, where caregivers indicated wanting more of this same information.

Further, youth report indicated better family communication than their caregivers; however, youth reported lower MH literacy and motivation for treatment. While discrepancies in youth and caregiver report are widely documented, patterns of discrepancy may predict treatment outcomes and provide insight into which youth and families may need more intensive engagement and services. This information can then be utilized via the Navigator to provide greater education and individualize engagement strategies.

Most caregivers indicated four or more life stressors, multiple barriers to treatment, and endorsed many items on the Social Determinants of Health, as well as identified limited supports and resources. These preliminary results highlight the significant need for this two-component intervention that leverages digital health and navigation procedures while employing an ecological model within a socio-cultural theoretic framework of MH service disparities and barriers to treatment. Research that develops intervention without stakeholder feedback, addressing systemic barriers to care, or including Social Determinants of Health, will not be able to support and meet the needs of this diverse population of youth with SSIB and their caregivers who utilize the ED.

The feasibility of the current ED REaCH intervention was enhanced by its text messaging component. Text messaging-based interventions often have high digital literacy, are cost-effective, and are considered standard and easily accessible across all types of cellphones. Additionally, incorporating this intervention into the ED setting so that it is available to youth with SSIB in an acute situation provides an opportunity for human touch points, which then bolstered the Family Navigation intervention and retention.

Further, caregivers’ input and feedback about ED REaCH’s putative mechanisms and content: MH literacy (symptoms,
service, safety plans, lethal means restriction), MH communica
|
|tion, MH engagement, provided the iteratively modified
|and newly added content on: caregiver anxiety and support
|and how to parent a child after an ED visit for SSIB. Using
|stakeholder feedback via the process of gathering, process-
|ing, and responding provides actionable impact to inter-
|vention development, and thus enhanced this interventions’
|acceptability, useability, and caregiver satisfaction.

Limitations
There are several limitations to the current study. First, the current sample of youth was limited regarding age, sex assigned at birth, and ethnic diversity, as well as overall sample size. As such, the generalizability of study finds may be limited. Future trials, with larger sample sizes and adequate representation of youth characteristics, including a broader age range, are needed to determine whether this intervention is feasible and acceptable across families utilizing the ED. Second, given that this was an open development pilot trial, the present study did not employ a control group or follow-up assessments to examine outcomes. Thus, it is difficult to determine whether clinical improvements will be observed throughout the study period. However, considering that caregivers reported over 80% of youth attended MH care, the preliminary data is promising. To fully evaluate the effectiveness of this intervention, future research will employ a randomized controlled trial design. Thirdly, we were unable to assess baseline demographic differences among those who agreed to enroll in the study versus those that did not. These differences would be important to investigate in future studies so that improvements in the intervention could be made. Fourth, the study employed a convenient sample of youth that utilized the ED from 8 a.m. to about 8 p.m. Monday through Friday. The characteristics of youth who utilize the ED outside of this window of time may differ on youth and family characteristic, whereby limiting the generalizability of study findings. However, due to limited ED provider staffing in the evening hours and on weekends, many youth with SSIB who utilized the ED after hours or on weekends obtain their final disposition after weekends, many youth with SSIB who utilized the ED after evenings or on weekends obtain their final disposition after reevaluation during the daytime shift. Another limitation is that multiple study measures were evaluated via self-report and may include recall bias or halo effects. Finally, this was a single-site study, and navigation was inherently tied to the MH resources in the community. As such, it is unclear whether the success of this project is due to the navigation itself, or the community resources. Future studies will need to include a multisite design.

CONCLUSION
The findings from this open pilot development study suggest promising results on the feasibility, acceptability, and safety of this two-component navigation and text message-delivered intervention, ED REaCH. The intervention benefits from employing an ecological model within a socio-cultural theoretic framework of MH service disparities and barriers to treatment and addresses systemic barriers to care. While preliminary, our data suggests that this intervention may hold promise in improving MH treatment outcomes for youth with SSIB. Next steps include the evaluation of this intervention using a randomized controlled clinical trial design. Additionally, future directions need to focus on enhancing the reach, automation, and personalization of this caregiver intervention to augment its scalability, feasibility, and acceptability, and provide youth with SSIB discharged from the ED the MH support and care they need.

References


24. Cancilliere MK, Guthrie K, Spirito A, Donise K. The development of an ED intervention to increase youth adherence to referred outpatient mental health care. 2022, April, Poster presented at the Annual Conference for the American Psychological Association, Society of Pediatric Psychology (Div 54), Phoenix, AZ.


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Characteristics of Interpersonal Violence and Intimate Partner Violence Among Injured Adults Seeking Emergency Care in Nairobi, Kenya

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ABSTRACT

BACKGROUND: Interpersonal violence is a significant contributor to global morbidity, and affects young adults, particularly males. In Kenya, injuries, including those from interpersonal violence, are a leading cause of emergency department (ED) visits.

OBJECTIVE: This study aims to evaluate the frequency, demographics, and types of injuries caused by interpersonal and intimate partner violence among patients presenting to the Kenyatta National Hospital (KNH) ED in Nairobi, Kenya.

METHODS: This was a prospective cross-sectional study among injured adult patients presenting to the KNH ED.

RESULTS: Of 665 enrolled patients, 82% identified as male and the median age was 30 years. Among enrollees, 257 (39%) reported ever having experienced physical, sexual, and/or emotional violence. Seventy-one patients reported a history of intimate partner violence; more than half had experienced intimate partner violence within the past 12 months.

CONCLUSIONS: Research on interpersonal injuries in ED settings is lacking, but data from a single Kenyan ED reveals a significant portion of injured patients with a history of interpersonal and intimate partner violence.

KEYWORDS: Injury, Interpersonal Violence, Intimate Partner Violence, Emergency Medicine, Kenya

INTRODUCTION

Intentional injuries resulting from interpersonal violence is a leading cause of morbidity among all age groups, causing an estimated 1.1% of all disability adjusted life years (DALYs) lost in 2019, and is the fifth leading cause of DALYs lost among 10–24 year olds globally. Interpersonal violence is an injury inflicted by another individual, and “the nature or mode of violence may be physical, sexual, or psychological.” Intimate partner violence occurs when such interpersonal injury occurs between romantic partners. Prior work in Kenya has evaluated both interpersonal and intimate partner injuries, but little work has been done in emergency departments (EDs) where patients frequently seek unscheduled medical care for injuries.

Injuries are a leading cause of seeking unscheduled medical attention in Africa and in Kenya. Injury is also a leading cause of mortality in Nairobi, Kenya, accounting for 10.6% of all recorded deaths. Within Kenya, one in eight adults experiences an injury annually, and the nation’s largest hospital, Kenyatta National Hospital (KNH) is a tertiary care center, a quarter of all patients in the KNH ED are seen due to injuries. Among injured Kenyans, a number of studies have found a higher burden of injury morbidity and mortality among males. Limited work has been done previously in Kenya to evaluate the epidemiology and burden of injuries that are due to interpersonal and intimate partner violence among persons seeking emergency care.

This study aims to evaluate the frequency, demographics, and types of injuries caused by interpersonal violence and intimate partner violence from among a population of patients presenting to the KNH ED.

METHODS

Study design and Setting

Study data were collected from March 6 to June 23, 2023. This study was an a priori, cross sectional secondary analysis of prospective data from patients presenting with injuries to the KNH ED; the data were derived from a prospective study assessing HIV care delivery in the study setting. KNH is the largest hospital in Kenya, the main public hospital serving the nation’s capital, and it is also an important receiving center for referrals from across the country. The ED functions 24-hours a day and has continually available medical and nursing staff as well diagnostic and treatment resources. The KNH ED is the primary center for injuries in Nairobi; approximately 60 injured patients are seen daily in the ED, with around 30–40% of injured patients admitted to the hospital wards.

Selection of Participants

Patients with injuries were screened and recruited from among all persons seeking ED care at KNH. Physical injuries were defined based on the standard triage process that is currently used in the ED, which is a modified version of the South African Triage Scale (SATS) as well as the standard World Health Organization guideline references for the case definition of injury. Patients were included who are...
at least 18 years of age, seeking care in the KNH ED for an injury, and were willing and able to provide informed consent. The exclusion criteria included those: seeking care for non-injury medical or surgical needs, legal prisoners of the state, those known to be pregnant, and patients triaged as critically ill. Critical illness was used as an exclusion criteria due to high unlikelihood to provide informed consent; prior work in the KNH ED demonstrated <3% of patients were triaged as critical. For injured, non-critical patients, the mental status was assessed by study personnel and required the participant to be alert and oriented to time, place and self, as has been done previously in this setting.

All enrolled participants provided informed consent. Study information and consents were available in the two main languages used in the study setting (Kiswahili and English), and all research personnel enrolling patients were fluent in both languages. Participants were provided appropriate reimbursement for their time spent completing research assessments. The study was approved by both the KNH Ethics and Research Committee and the Institutional Review Board of Rhode Island Hospital.

Data Collection and Management

All participants enrolled in the study received standard care for injuries at the discretion of their treating providers in the ED, who were not members of the research team. Patient interactions with study personnel for screening and consent took place in a distinct space from where clinical care occurs or other patients are present to ensure confidentiality. Enrollment and patient data was captured as close to the post-triage period, after ED arrival, as possible. The enrollment data included demographic data, medical history, as well as information on injuries and interpersonal violence. The primary mechanism(s) of injury was recorded based on participant report. At the time of ED disposition, data was collected on the outcomes of their ED care. All data were maintained in electronic formats on password-protected computing devices and were only accessible by study staff. Collected data was stored and managed using REDCap.

Outcomes and Analysis

Data on patient demographics (age, gender, etc.), education experience, current employment, and chronic health history were recorded at enrollment. The primary descriptive aims around an individual’s primary injury (mechanism and intention), as well as secondary data regarding interpersonal violence and intimate partner violence from both the index visit as well as whether the individual had any historical exposure prior to the index visit (both ever occurring and occurring in the last 12 months) were all collected during the patient’s ED care. Types of interpersonal violence was defined as the following: emotional violence was defined as “being scared or intimidated or threatened with harm,” physical violence was defined as being “hit, slapped, kicked or otherwise physically hurt,” and sexual violence was determined to be performance of “sexual acts against your wishes.” Survey instruments utilized validated questions from the World Health Organization multi-country Study on Women’s Health and Domestic Violence against Women.

Data analysis was performed using Stata v.14.0. Descriptive analysis was performed for the population stratified based on those who had and had not experienced intimate partner violence. Comparisons were made using chi-squared, Fisher’s exact nonparametric testing or Wilcoxon rank sum as appropriate, based on observation frequency and conformity with normality of distribution.

RESULTS

From March 6 to June 23, 2023, 2596 patients presented to the KNH ED who were screened for participation. Among those, 1202 (46%) did not meet inclusion criteria and 729 (28%) declined participation. A total of 665 participants (26%) were enrolled (Figure 1).

Patient Characteristics

Of the 665 patients enrolled (Figure 1, Table 1), 545 (82%) identified as male and the median age was 30 years (IQR: 24–38 years). Of enrolled patients, 257 (39%) reported ever having experienced physical, sexual, and/or emotional violence. The rate of having one or more chronic medical conditions was not different between those with and without history of interpersonal violence (p=0.79). There was a statistically significant difference in employment and interpersonal violence (p=0.01), with higher rates of self-employment among injured patients who denied any history of interpersonal violence, and higher rates of unemployment among those reporting prior interpersonal violence. Education level and currently in school status were not statistically significantly different between the two groups (p=0.15). More often than not (n=416, 63%) enrolled patients were
transferred from another healthcare facility (no difference in referral rates between those with or without interpersonal violence, p=0.419). Among the subset of enrollees reporting ever having had alcohol before in their lifetime (n=356), 29% (n=102), reported having used alcohol at the time of injury.

**Female Participants**
Of the 115 enrolled injured females (17% of enrollees), 43 (37% of enrolled females) identified as ever having prior history of interpersonal violence. Of these 43 females, 19 reported a history of physical violence, 19 reported a history of emotional violence, and five reported a history of sexual violence.

**Injury Findings**
There were a total of 669 primary mechanisms of injuries reported among the 665 enrollees for their index ED visits. Blunt mechanisms of injury (Table 2), including road traffic injuries, falls, and “other blunt” mechanisms accounted for 465 of the 669 injuries (70%) across all enrollees. There were fairly high rates of “other” and “missing/unknown” injury mechanisms among all patients (n=65, 10%), and these were more prevalent in those reporting a history of interpersonal violence (p=0.001 and 0.029, for “other” and “missing” respectively).

**Intentional Injuries**
For the specific injuries that brought an enrolled patient to the KNH ED, 84% were unintentional injuries; this was significantly different between those without (90%) and those with (71%) a history of interpersonal violence (p=0.001). In the population there were a total of 94 intentional injuries that resulted in the patient seeking ED care; these were from either someone completely unknown to the patient (n=43, 46%) or a non-family member that is also not a sexual partner (n=40, 43%).

There were no statistically significant differences across the types of perpetrators (Table 3) of intentional injury among those with or without history of interpersonal violence (p=0.328). Of note, 30 patients who had reported no prior history of interpersonal violence reported an intentional injury as the cause of that ED visit. The frequency of intentional injury among those without a history of interpersonal violence, were more common caused by persons unknown to the patient (17 of 30, 57%).

**History of Interpersonal Violence**
Of the 257 patients with a history of prior exposure to interpersonal violence, physical violence was the most commonly experienced domain of violence, with comparatively higher rates of emotional violence (Table 4). Among those with experience of interpersonal violence in the past 12 months (n=162), there was a similar distribution of the domains of interpersonal violence exposure.
ever experienced Intimate partner violence, this was most frequently experienced as physical violence alone (n=17, 24%) or as a combination of physical, sexual, and emotional violence (n=15, 21%).

DISCUSSION
In this prospectively evaluated population of 665 injured patients treated in the KNH ED, 257 (39%) reported ever having experienced a form of interpersonal violence. A further 30 patients who had reported no prior history of interpersonal violence reported intentional injury as the cause for the injury that brought them to the ED. As noted in the methods, this is because one’s “history of interpersonal violence” would have occurred prior to the index visit. This finding highlights that these 30 patients “without a history of interpersonal violence” have indeed now experienced interpersonal violence. Of those with a history of interpersonal violence, 71 individuals reported a history of intimate partner violence.

Among participants, 82% identified as male and the median age was 30 years. A prior national survey in Kenya found that approximately 15% of respondents had injuries in the prior 12 months, and 60% of those injured were males. Work by Saidi et al in Nairobi found that among 237 trauma autopsies, the average age of the victims was 29.8 years and were predominantly males (90%). Another study of injury mortality similarly found males accounted for 85% of the injured/dead.

In this patient cohort, blunt injuries were the predominant mechanism (70%). Several different studies on injury leading to mortality have found similar patterns of injury mechanism. Gathecha et al found injuries from assault/blunt force (31%), blunt road traffic injuries (26%) and lower rates of firearm injury (15%). Saidi et al found injuries were from road traffic (35%), gunshot wounds (26%) and blunt assault (20%). Our present work found lower rates of gunshot injury (1%) but a bit higher rates of stabbing (11%) and other penetrating trauma (4%).

Of enrollees in the present work, 94 (14%) reported their injury was intentional; very few intentional injuries were perpetrated by a spouse, a non-spouse family member, or a non-spouse sexual partner. The preponderance of intentional injuries were from either someone completely unknown to the patient or a non-family member that is not a sexual partner. Ranney et al performed prior work in western Kenya and found that among a population of 562 injured patients at a health facility, the majority (71%) of violent injury was caused by an assailant known to the victim. In that study, “women were more likely to be injured by a spouse/partner, whereas men were more likely to be injured by an acquaintance.” These differences in reported perpetrators could be due differences in the populations studies as the population from western Kenya was less urban than the current cohort.

### Table 3. Perpetrator of Intentional Injury, Stratified By Interpersonal Violence (IPV) History

<table>
<thead>
<tr>
<th></th>
<th>All n (%)</th>
<th>No-IPV n (%)</th>
<th>Yes-IPV n (%)</th>
<th>p =</th>
</tr>
</thead>
<tbody>
<tr>
<td></td>
<td>n = 94</td>
<td>n = 30</td>
<td>n = 64</td>
<td></td>
</tr>
<tr>
<td>Spouse</td>
<td>4 (4.3)</td>
<td>0 (0.0)</td>
<td>4 (6.3)</td>
<td>0.328</td>
</tr>
<tr>
<td>Non-spouse family member</td>
<td>2 (2.1)</td>
<td>0 (0.0)</td>
<td>2 (3.1)</td>
<td></td>
</tr>
<tr>
<td>Known Person (non-sex, non-family)</td>
<td>40 (42.6)</td>
<td>11 (36.7)</td>
<td>29 (45.3)</td>
<td></td>
</tr>
<tr>
<td>Known Person (sex partner, non-spouse)</td>
<td>3 (3.2)</td>
<td>1 (3.3)</td>
<td>2 (3.1)</td>
<td></td>
</tr>
<tr>
<td>Unknown Person</td>
<td>43 (45.7)</td>
<td>17 (56.7)</td>
<td>26 (40.6)</td>
<td></td>
</tr>
<tr>
<td>Police Officer</td>
<td>1 (0.15)</td>
<td>0 (0.0)</td>
<td>1 (1.6)</td>
<td></td>
</tr>
<tr>
<td>Other/Missing/ Wish not to disclose</td>
<td>1 (0.15)</td>
<td>1 (3.3)</td>
<td>0 (0.0)</td>
<td></td>
</tr>
</tbody>
</table>

### Table 4. Interpersonal Violence Exposure Matrix, for Enrolled Patients Previously Exposed to Interpersonal Violence

<table>
<thead>
<tr>
<th></th>
<th>Ever Exposed n (%)</th>
<th>Last 12 months n (%)</th>
</tr>
</thead>
<tbody>
<tr>
<td></td>
<td>n = 257</td>
<td>n = 162</td>
</tr>
<tr>
<td>Physical</td>
<td>118 (45.9)</td>
<td>82 (50.6)</td>
</tr>
<tr>
<td>Physical &amp; Emotional</td>
<td>54 (21.0)</td>
<td>28 (17.3)</td>
</tr>
<tr>
<td>Emotional</td>
<td>32 (12.4)</td>
<td>28 (17.3)</td>
</tr>
<tr>
<td>Physical &amp; Sexual &amp; Emotional</td>
<td>17 (6.6)</td>
<td>7 (4.3)</td>
</tr>
<tr>
<td>Sexual</td>
<td>13 (5.1)</td>
<td>6 (3.7)</td>
</tr>
<tr>
<td>Physical &amp; Sexual</td>
<td>12 (4.7)</td>
<td>4 (2.5)</td>
</tr>
<tr>
<td>Sexual &amp; Emotional</td>
<td>11 (4.3)</td>
<td>7 (4.3)</td>
</tr>
</tbody>
</table>

### Table 5. Intimate Partner Violence Typology

<table>
<thead>
<tr>
<th></th>
<th>Ever Exposed n (%)</th>
<th>Last 12 months n (%)</th>
</tr>
</thead>
<tbody>
<tr>
<td></td>
<td>n = 71</td>
<td>n = 38</td>
</tr>
<tr>
<td>Physical</td>
<td>17 (23.9)</td>
<td>8 (21.1)</td>
</tr>
<tr>
<td>Physical &amp; Sexual &amp; Emotional</td>
<td>15 (21.1)</td>
<td>6 (15.8)</td>
</tr>
<tr>
<td>Sexual &amp; Emotional</td>
<td>10 (14.1)</td>
<td>6 (15.8)</td>
</tr>
<tr>
<td>Sexual</td>
<td>10 (14.1)</td>
<td>5 (13.2)</td>
</tr>
<tr>
<td>Physical &amp; Sexual</td>
<td>9 (12.7)</td>
<td>4 (10.5)</td>
</tr>
<tr>
<td>Physical &amp; Emotional</td>
<td>5 (7.0)</td>
<td>5 (13.2)</td>
</tr>
<tr>
<td>Emotional</td>
<td>5 (7.0)</td>
<td>4 (10.5)</td>
</tr>
</tbody>
</table>

**Intimate Partner Violence**

Seventy-one patients (28% of those with a history of interpersonal violence, and 11% of all enrollees) reported a history of intimate partner violence (Table 5); more than half of these (n=38, 54%) reported experiencing intimate partner violence within the past 12 months. For those who ever experienced intimate partner violence, this was most frequently experienced as physical violence alone (n=17, 24%) or as a combination of physical, sexual, and emotional violence (n=15, 21%).
Of patients enrolled in this study, more than a third reported ever having experienced physical, sexual, and/or emotional interpersonal violence. Our cohort found violence from physical alone, physical and emotional, and emotional alone as the most likely reported experiences of prior interpersonal violence. A demographic survey across Kenya has shown 34% of women, and 27% of men, have experienced physical violence since the age of 15 years.44 Very little prior work has been done evaluating physical violence of both men and women, though work from Kenya did show that bidirectional violence may be present in many intimate partner relationships.35

In this population, 10% of participants were excluded due to being triaged as critical, while prior work in the same KNH ED showed a critical triage rate of 2.4% after a triage-related intervention.23 It is unclear why there was such a difference, though one hypothesis would be that the first study took place during the early phase of the COVID-19 pandemic which may have impacted the severity of cases, with a possible role for lower rates of transfer/referral given the high rates of patients transferred to KNH for injury care in this study.

More research is necessary to explore injuries and interpersonal violence within emergency department settings among injured individuals. Future work should aim to inform the development of standardized treatments and potential targeted interventions for application in Kenya and potentially other comparable contexts.

Limitations
Many injured patients in Kenya may not be seen or evaluated in the ED setting; in a household survey on injury in Kenya, “only one out of 25 injuries were brought to a health facility for attention.”36 While this may try to account for all injuries, we do recognize that our cohort of enrolled patients is in a large tertiary referral hospital and nearly two-thirds of enrollees were transferred from other health facilities for which one could infer that these patients are more complex or ill in some way. Patients with the most severe outcome of injury, death, were not included in this cohort while prior work in fatal injuries in Nairobi found about half of patients (51.4%) experienced out-of-hospital death.4. Additionally, the lack of data on anatomical regions of injuries precludes the ability to evaluate injury impacts and poly-trauma in the population.

One would also presume a level of both nonresponse [non-participation] and response [incompletely truthful response] bias, with a segment of eligible patients not wanting to discuss sensitive topics such as injury, HIV, and interpersonal/intimate partner violence.

Research on interpersonal violence and emotional, physical and sexual violence can re-traumatize survivors and may have led some participants to decline participation or provide inaccurate response. Such response bias would likely result in under estimations of the frequency and burden.

One must also consider that much interpersonal violence is experienced by women and children while our cohort of enrollees is overwhelmingly male and excluded children. Prior work in Kenya noted that the majority [56% in their study] of women did not seek help after experiencing interpersonal violence.37 Similarly, there is a large body of evidence that has been collected on the relationship between pregnancy and intimate partner violence, in our study all patients with known pregnancy were excluded. Much of the work on interpersonal violence in Kenya has focused on the experiences of women, and while our cohort of patients expands the body of evidence it does not fully represent the breadth of interpersonal violence and intimate partner violence.38-40

CONCLUSION
There is a gap in interpersonal injury research from high-risk emergency care settings in Africa such as Kenya. The current data demonstrate that there is a substantial segment of injured patients evaluated in the Kenyan ED setting with a history of interpersonal violence even among persons seeking care for non-interpersonal violence care. Further study is needed on injury and interpersonal violence in the ED setting among injured persons, in order to inform development and implementation of treatment and targeted interventions in Kenya and other similar settings.

References


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Quahogging in a Marine Habitat: An Extremely Rare Source of an Organism to Cause Endocarditis

JESSICA M. GONZALEZ, MD; ANSHUL PARULKAR, MD; GABRIEL LOWENHAAR, MD; TASNIM F. IMRAN, MD, MPH

ABSTRACT
A 66-year-old man with a history of apical variant hypertrophic cardiomyopathy, heart failure with preserved ejection fraction (HFpEF), severe pulmonary hypertension, and prior Group B streptococcal mitral valve endocarditis four months before, presented with generalized body shakes and urinary incontinence. Computed tomography angiography revealed an acute left M1 occlusion. The patient underwent mechanical thrombectomy. Within 24 hours of presentation, he developed hypotension, tachycardia, and fever. Infectious workup revealed a leukocytosis. One out of two sets of blood cultures revealed bacteremia with *Shewanella algae*. A transthoracic echocardiogram revealed a large mitral valve vegetation with multiple mobile components portending a high thromboembolic risk, as evidenced by his acute presentation with multiple embolic infarcts. He was diagnosed with infectious endocarditis caused by *Shewanella algae*, a rare marine environment pathogen. He was treated with ciprofloxacin 750 mg twice daily orally and meropenem 2 g every eight hours intravenously with an initial decrease in the mitral valve vegetation size. He was discharged on ceftriaxone 2g and ciprofloxacin 750mg every 12 hours for a total of six weeks from his first negative blood cultures. He was monitored through transthoracic echocardiography as he continued medical management with levofloxacin 750 mg daily. Six months after his discharge from the hospital he developed worsening heart failure and elected to pursue comfort measures only.

KEYWORDS: *Shewanella algae*; Infective Endocarditis, Marine plankton Endocarditis

INTRODUCTION
*Shewanella* spp. are hydrogen sulfide-producing, gram-negative, oxidase and catalase-positive, bacilli found in marine environments.1,2 *Shewanella* has been isolated in foods, sewage, fresh water, and salt water.1 The most common etiology is infection of skin or soft tissue following trauma that leads to a breach in the integrity of the skin.2 It has been found in body wounds, feces, conjunctiva, urine, cerebrospinal fluid, bile, ascitic fluid, pleural fluid, and stored blood.3 Major risk factor associated to these organisms are hepatobiliary disease, peripheral vascular disease with chronic leg ulcers, and poor hygiene.3

Infective endocarditis (IE) is an infection of the native valves, prosthetic valves, or endocardium.4 IE mortality estimates are as high as 25%.4 Common pathogens causing IE include *Staphylococci* and *Streptococci*.5 Only a few cases of *Shewanella* infective endocarditis have been reported with treatment options not clearly delineated.

CASE REPORT
A 66-year-old man suddenly developed generalized body shakes and urinary incontinence. He subsequently collapsed with sudden onset facial and body weakness that quickly progressed into seizure-like activity. This event was witnessed by the patient’s family who called emergency medical services. The patient’s past medical history included apical variant hypertrophic cardiomyopathy, heart failure with preserved ejection fraction, severe pulmonary hypertension, Group B streptococcal mitral valve endocarditis, hypertension, chronic obstructive pulmonary disease (COPD), and diabetes mellitus type 2. Notably, he had a recent admission to an outside hospital for Group B streptococcal mitral valve endocarditis four months before. Transthoracic echocardiogram (TTE) at that time showed a possible calcified vegetation on the posterior leaflet of the mitral valve with mild mitral regurgitation. At that time, he was treated with ceftriaxone 2 grams intravenously for a total of six weeks for presumed subacute endocarditis. He was discharged with outpatient follow-up and had a repeat TTE that showed no significant change. He also subsequently had an admission to an outside hospital six weeks prior to this presentation for left, lower extremity cellulitis after a clamming accident in which he sustained a puncture wound to his calf; he was initially treated with ceftriaxone 2 grams daily and vancomycin per infectious disease guidance and later transitioned to doxycycline 100mg and augmentin 875–125mg twice daily for seven days. Review of his outpatient wound care follow-up appointments showed improvement of his lower extremity injuries. On physical examination, vital signs revealed a heart rate of 73 beats/minute, blood pressure of 120/50, a temperature of 97.5°F and oxygen saturation of 99%. Cardiopulmonary examination revealed a regular rate and rhythm with a loud systolic murmur consistent with...
mitral regurgitation. On neurological examination, he was unable to follow commands, was globally mute, exhibited a right-sided facial droop, and had complete motor weakness of the right extremities. He had 1-plus pitting edema to his lower extremities, his left lower leg was dry with granulation tissue; compared to prior media images his left lower extremity had significantly improved. History was obtained through family as detailed information from him was limited by his complete aphasia. Laboratory evaluation was only remarkable for hs-troponin I of 1991 (3–57 ng/L). A complete blood count (CBC) showed white blood cells (WBCs) of 9.0 and a basic metabolic panel showed creatinine of 1.18mg/dL. Electrocardiogram revealed sinus rhythm with T-wave inversions in the lateral leads I, aVL, V5, and V6. Computed tomography angiography for emergent large vessel occlusions (CTA ELVO) revealed an acute left M1 occlusion. An electroencephalogram (EEG) was performed and did not reveal epileptiform activity. He was taken for thrombectomy and was subsequently managed for acute stroke in the neurology intensive care unit. Within 24 hours of presentation, he developed hypotension. A CBC revealed a leukocytosis to 18.7. Sepsis was suspected and blood cultures were obtained. He was initially treated with vancomycin and meropenem. One out of two sets of blood cultures revealed bacteremia with *Shewanella algae*, pan-susceptible. Transthoracic echocardiogram demonstrated a large vegetation (25mm x 23mm) on the posterior mitral leaflet with mobile components, mild mitral insufficiency, patent

**Figure 1.** Transthoracic Echocardiogram Parasternal Long Axis view showing large vegetation (25mm x 23mm) in the posterior leaflet of the mitral valve with mobile components and mild mitral insufficiency. [LA-Left Atrium, RA-Right Atrium, LV-Left Ventricle]

**Figure 2.** Transthoracic Echocardiogram Apical-4-Chamber View showing large vegetation (25mm x 23mm) in the posterior leaflet of the mitral valve with mobile components and mild mitral insufficiency. [LA-Left Atrium, RA-Right Atrium, LV-Left Ventricle]

**Figure 3.** Transthoracic Echocardiogram Parasternal Long Axis view comparison image showing a decrease in the vegetation size (14mm x 18mm) two weeks later. [LA-Left Atrium, RA-Right Atrium, LV-Left Ventricle]

**Figure 4.** Transthoracic Echocardiogram Apical-4-Chamber view comparison image showing a decrease in the vegetation size (14mm x 18mm) two weeks later. [LA-Left Atrium, RA-Right Atrium, LV-Left Ventricle]
DISCUSSION

Shewanella algae is an emerging pathogenic marine plankton that has rarely been found in the clinical setting. Only a few cases of Shewanella infections have been reported and Shewanella IE is extremely rare. In clinical cases, S. algae and Shewanella putrefaciens are the most commonly isolated Shewanella organisms. Shewanella algae accounts for approximately 80 percent of infections. In mice studies, it has been suggested that S. algae has the highest pathogenicity among Shewanella species. Shewanella algae's virulence factors potentially include its hemolytic activity. Shewanella spp can form biofilms. Most cases have been reported in countries with warm or temperate climates. Shewanella species are found in marine environments and exposure to bodies of water is a likely source for patients with Shewanella infections.

Prior literature suggests that 53–80% of patients had mucosal or skin portal of entry and 44% had been exposed to marine environments. As a clammer, the patient spent his time in marine environments. A breach in his skin integrity could have allowed Shewanella algae entry. We presume the injury our patient sustained with the clamping rake in a saltwater habitat prior to presentation was the origin of his infection, as Shewanella species are present in saltwater.

Given the rarity of this organism, treatment options for severe infections are not well elucidated. Early surgery is considered in patients with severe valvular pathology, heart block, annular abscess, signs of heart failure, fungal or highly resistant organisms, and in recurring emboli or enlarging vegetations, or a size of >10mm vegetations. The patient did meet these criteria, but his comorbidities and his acute stroke presentation made him a poor surgical candidate. Medical management was pursued based on prior literature on Shewanella and susceptibility profiles. Shewanella spp. are susceptible to cefotaxime, piperacillin and tazobactam, gentamicin, and ciprofloxacin. They are also typically susceptible to carbapenems, erythromycins, and quinolones. Shewanella spp can have resistance to imipenem due to their secretion of oxacillin. Ampicillin and cephalosporin susceptibility is variable; third- and fourth-generation cephalosporins have been used for treatment. For S. algae there is resistance to colistin. In one study, 87% of the patients recovered from a general infection of Shewanella species, 28% developed bacteremia, and 13% died.

Endocarditis associated with this organism is extremely rare with only a few cases of Shewanella species reported. In two reported cases of Shewanella putrefaciens endocarditis, one patient was treated with gentamicin and penicillin, resulting in an uncomplicated hospital course, and the other patient was treated with cefepime and gentamicin but required valve surgery. Only one case has previously been reported on Shewanella algae endocarditis. That patient was treated with high-dose ceftriaxone and oral ciprofloxacin. He improved medically by week two, but by week five of treatment he developed new-onset heart failure. He died within two weeks following discharge to a palliative care unit due to progression of his infection.

Similar to prior cases, this case of Shewanella endocarditis also affected the mitral valve. This case is unique as it is the only Shewanella algae endocarditis to affect a native valve and the second reported case worldwide of Shewanella algae endocarditis.
CONCLUSIONS

IE can have an insidious onset only to manifest suddenly with severe findings late in the disease course as shown through this case. This case also highlights the importance of a heightened clinical index of suspicion and detailed history are necessary to make the correct diagnosis.

References

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ABSTRACT

BACKGROUND: Parkinson’s disease (PD) progresses at highly variable rates in different individuals but, in general, has a fairly stable rate of progression in each patient. In cases where the decline in cognition and behavior suddenly accelerates, we usually think of co-existent Alzheimer pathology, as most demented PD patients also have Alzheimer disease (AD) changes, although not necessarily meeting criteria for a distinct pathological diagnosis of AD.

METHODS: Clinico-pathological case

RESULTS: A 75-year-old woman presented with a typical PD course including a good response to L-Dopa. Four years after diagnosis she developed a rapid decline in motor symptoms, severe cognitive fluctuations, and rapidly progressive dementia, dying within one year of the onset of the rapid progression.

CONCLUSIONS: While most cases of Parkinson’s disease dementia (PDD) show concomitant Alzheimer’s pathology, the sudden acceleration of the disease does not necessarily indicate the presence of concomitant Alzheimer’s disease.

KEYWORDS: Parkinson’s Disease, Rapidly Progressive Dementia, GBA Mutation, Cognitive Fluctuation

CASE REPORT

A 75-year-old woman was first seen in our movement disorders clinic in April 2021, having been diagnosed with PD in 2018 with a positive response to L-Dopa. The patient first noticed resting tremors and a change in her walking in 2017. She denied hallucinations or symptoms of REM sleep-behavior disorder. Her past medical history was significant for type 2 diabetes, hypothyroidism, renal calculi, gout, left knee replacement, and insomnia. Her mother had been diagnosed with late onset PD. The patient’s fraternal twin brother had amyotrophic lateral sclerosis (ALS).

She was fully oriented, with normal speech and affect, but struggled with the Luria 3 step task and spelled “earth” backwards as “HRAE”. Cranial nerves and muscle strength were normal. Deep tendon reflexes were normal. She had a 1+ rest tremor in the right hand, and a 3+ rest tremor in the left but no action or postural tremor. Left-sided rigidity and bradykinesia were noted. The patient had a 2+ stooped posture, walked unassisted, with a normal base but was slow, with a reduced stride length and no arm-swing, requiring eight steps to turn.

The clinical diagnosis of PD was confirmed. Carbidopa/Levodopa was increased and pramipexole added. No improvement was observed. Within several months, she experienced a significant and relatively sudden decline in her mobility, a new problem of multiple falls, worsening bradykinesia, cognitive decline, and confusion. Her medications were increased to: Carbidopa/Levodopa 25/100 mg 2 tablets four times daily and Pramipexol 0.75 mg three times daily, but the increased dose was not helpful so that pramipexol was reduced to 0.25 mg TID.

Ten months later, she developed new episodes of behavioral change, lasting 30–60 minutes, which increased in frequency and duration over the next several months. During a typical behavioral alteration, she was confused, slow to respond, dysarthric, and unable to move as at her baseline. She made a full recovery after each episode. She also developed frequent episodes during which she adopted peculiar postures, like being slumped over, or jerking, [not witnessed by us]. She had been seen at night standing alone, with purposeless movements of her fingers or hands. As part of her work-up, she underwent electroencephalography (EEG) which showed rhythmic theta runs, evolving into 3–4 Hz sharp waves without any clinical change, concerning for electrographic seizures arising from the bilateral temporo-occipital regions. MRI showed scattered white matter T2 and FLAIR hyper-intensities, and mild to moderate diffuse cerebral atrophy. Levetiracetam 250 mg bid was started. During the next month, anxiety and restlessness developed with a marked decline in language. A basic work-up including complete blood count and comprehensive metabolic panel for rapidly progressive dementia was unremarkable. Genetic studies revealed a single gene GBA pathogenic variant (c.1448T>C;p.Leu483Pro). Her EEG was repeated, and the initial EEG was re-interpreted as muscle artefact rather than epileptiform activity so that her levetiracetam was discontinued.

Two months later, on her last visit, while receiving hospice care, the patient was taking Carbidopa/Levodopa 25/100 mg q6h, lorazepam 0.5 mg q6h, and morphine 7.5 mg q6h. She was mute, unable to control her urine, severely akinetic and...
CASE REPORT

4+ rigid in all joints. She never smiled. She turned to the sound of her name and followed the examiner’s moving face. Carbidopa/Levodopa was tapered, and an LP was declined. The patient passed away three months later.

PATHOLOGICAL FINDING

Microscopic examination of her brain (which weighed 1148 g) revealed findings consistent with Parkinson’s disease Braak stage 5/6. Lewy bodies were identified in the dorsal motor nucleus of the Vagus nerve, locus coeruleus, substantia nigra, and olfactory bulb [Figure 1]. Occasional Lewy bodies were also detected within the cingulate cortex [Figure 2], medial temporal cortex, and posterior frontal cortex. No diagnostic features of Alzheimer’s disease were present on light microscopy or following application of immunohistochemical stains. [Figure 3]. Diffuse mild to moderate arteriosclerosis was also noted.

DISCUSSION

In this report, the patient presented with typical signs and symptoms of PD, which progressed at a typical rate for four years, at which point there was a sudden acceleration of the disease punctuated by episodes of greater confusion, slowness, and non-purposeful behaviors. The patient’s condition rapidly deteriorated, with progressive dementia and death within 15 months of the onset of deterioration.

PD can lead to cognitive impairment, with up to 50% of individuals developing mild cognitive impairment within six years of PD onset and over 80% of patients developing dementia within 20 years. Risk factors for Parkinson’s disease dementia (PDD) include advanced age, older age of disease onset, limited cognitive reserve, hallucinations, and predominant gait dysfunction. In general, Rapidly progressive dementia (RPD) refers to conditions in which the interval from first symptom to dementia onset is measured in weeks or months, with the majority of patients with RPD progressing from independence to complete (or near-complete) dependence within one to two years. During the initial evaluation at our clinic, our patient exhibited minor difficulty in cognition which progressed in an average fashion. Then, her cognition rapidly declined.

PDD shares the same clinical profile as Dementia with Lewy Bodies (DLB), being distinguished from DLB if the motor symptoms precede the dementia by 12 months or

Figure 1. Photomicrograph of substantia nigra at 40x magnification demonstrating intracytoplasmic inclusions (arrows) positive by alpha-synuclein immunostaining consistent with Lewy bodies.

Figure 2. Photomicrograph of right anterior cingulate cortex at 40x magnification demonstrating intracytoplasmic inclusions (arrows) positive by alpha-synuclein immunostaining consistent with Lewy bodies.

Figure 3. Photomicrograph of right hippocampus at 4x magnification demonstrating a lack of diagnostic features of Alzheimer’s disease by beta-amyloid immunostaining.
more. DLB is clinically defined by the presence of dementia together with its core clinical features: fluctuating cognition, well-formed recurrent visual hallucinations, rapid eye movement (REM) behavioral sleep disorders, and parkinsonism. Both PDD and DLB share the same pathology, characterized by the presence of neuronal inclusions of α-synuclein aggregates, often coupled with a varying degree of concomitant Alzheimer pathology. In both DLB and PDD, the coexistence of tau pathology with Aβ and α-synuclein contribute to the development of dementia. In general, tau aggregates in PD correlate with the severity of cognitive impairment. Autopsy studies have consistently revealed the presence of tau aggregates in the majority of both PDD and DLB, particularly in the later stages of the diseases. Notably, DLB has shown a higher burden of tau pathology compared to PDD tissue in general. This patient exhibited no concomitant Alzheimer pathology, so sudden acceleration of the disease does not reflect the effects of Alzheimer’s disease.

Fluctuating cognitive abilities with disturbances in cognition, attention, and arousal are frequently seen in dementia syndromes, including Alzheimer’s disease and vascular dementia, but are most characteristic of Lewy body dementia, including DLB and PDD. Studies have reported that approximately 29–90% of patients with Parkinson’s disease dementia demonstrate cognitive fluctuations. These fluctuations can range from reduced responsiveness, disturbances in arousal such as drowsiness and hypersomnolence, to global and dramatic changes in function affecting speech, memory or behavior. Some patients may experience episodes of staring spells that resemble absence seizures. Fluctuations may occur in short episodes lasting seconds, minutes, hours, or in longer periods over days or weeks. Our patient had fluctuating confusion, slowness, and speech disturbance.

Some genetic causes or risk factors for PD, such as α-synuclein duplication and triplications, GBA, and MAPT mutations have been linked to cognitive deficits and dementia. While only 5–15% of PD patients have GBA mutations, it is the most common genetic risk factor for the disease. Pathogenic GBA mutations lead to a decreased activity in the lysosomal enzyme glucocerebrosidase (GCase), which impairs alpha-synuclein metabolism and contributes to Lewy body formation. Individuals with GBA mutations may have a more diffuse pattern of Lewy body distribution throughout the brain compared to non-carriers.

Clinically, GBA-associated PD is identical to sporadic PD, except for an earlier age of onset, an earlier and higher frequency of cognitive impairment, and a more rapid progression. The risk of dementia in PD patients with GBA mutations is increased sixfold in carriers compared to non-carriers. Furthermore, GBA-associated PD patients have been found to have reduced survival compared to those without the mutation.

Our patient’s rapid cognitive decline and disease progression cannot with confidence be attributed to the GBA mutation. The onset of her PD was older than typical for GBA, and the GBA mutation is not known to cause a suddenly accelerated course. These observations suggest the likelihood that other genetic or environmental factors modified the expression of GBA-related neurodegeneration.

Two studies suggested a potential association between GBA mutations and Lewy body disorders characterized by a “purer” Lewy body pathology, with fewer concurrent Alzheimer’s pathological features. This finding corresponds to what we observed in our patient as well.

Given the family history of ALS in our patient’s twin brother, neurodegeneration in PD and ALS raises the question of shared mechanisms. A complex overlap between parkinsonian and motor neuron syndromes has long been recognized with parkinsonism and ALS co-occurring within families, as well as in individual patients, suggesting a possible genetic basis.

References
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Arm Injuries and Prevention Proficiency in High School Fastpitch Softball Players: A Survey of Players, Parents, and Coaches

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ABSTRACT
Arm injuries are common in youth fastpitch softball players. To characterize arm injuries and assess injury prevention knowledge, we administered a cross-sectional online survey and injury prevention quiz to high school fastpitch softball players, parents, and coaches. Associations between throwing habits and adverse arm outcomes were computed. Surveys were collected from 123 high school players, 59 parents, and 28 coaches, totaling 210 responses. Nearly half (48.8%) of players saw a doctor for arm pain. Riseball pitchers were less likely to undergo surgery than non-riseball pitchers ($P = .008$). Outfield/utility players trended toward more frequent arm pain compared to alternative position groups ($P = .086$). On injury prevention quizzes, players, parents, and coaches averaged scores of 56–65% correct, with players scoring below parents ($P = .011$) and coaches ($P = .006$). In conclusion, high school softball players frequently seek medical attention for arm pain, and injury prevention knowledge is consistently lacking.

KEYWORDS: Fastpitch softball; High school sports; Arm injury; Injury prevention; Psychological aspects of sport

INTRODUCTION
Fastpitch softball is a popular sport played each year by over 340,000 high school student-athletes. Although youth softball players are less likely to require surgery for arm injuries than youth baseball players, the incidence of softball injuries is increasing. Injury rates in youth softball players are now nearly as high as those in youth baseball players, although multiple studies have documented injury trends in baseball and reported deficient knowledge of and compliance with arm safety recommendations within the youth baseball community, there has not been a similar survey assessing these metrics in high school softball. The extensive body of literature surrounding injuries in amateur baseball attributes the meteoric rise in shoulder and elbow injuries primarily to overuse. Fast-pitch softball is unique in that pitchers do not throw overhead, and while elbow and shoulder joint loads are similar among windmill softball pitchers and overhead baseball pitchers, softball pitchers appear to incur fewer throwing arm injuries than their baseball counterparts. However, all softball position players throw overhead and injury rates from doing so are considerable, with overuse being a prominent mechanism of injury. Yet, while Major League Baseball produced a thoroughly researched and well-defined initiative entitled Pitch Smart to outline risk factors for arm injuries in youth baseball players, no such definitive guideline exists for youth softball players, and there is a general paucity of information regarding injury prevention in softball players. The American Orthopaedic Society for Sports Medicine (AOSSM) and National Council of Youth Sports jointly propose general tips to prevent overuse softball injuries as part of the STOP Sports Injuries campaign, which is likely the most comparable resource for youth softball players; however, this has not been fully codified, and there remains a lack of well-defined risk factors and prevention strategies in softball.

Ultimately, we aim to document arm injuries and assess knowledge of and satisfaction with injury prevention guidelines within a population of softball players, parents, and coaches. Results from this study could galvanize further research to better understand and ultimately prevent arm injuries in amateur softball players.

METHODS
This study was conducted following approval by the appropriate Institutional Review Board (IRB). The approval process included child assent with parental permission for participants ages 13–17 years old and consent for participants 18 years and older. The survey was created in Qualtrics and distributed and completed electronically. Qualifying respondents were either a) high school softball players (at least 13 years old and in Grades 9–12, including recent graduates in the Class of 2021), b) parents/guardians of high school softball player(s), or c) coaches of a high school softball team(s) in the United States. Participants qualifying under multiple categories were instructed to pick the one with which they most identify.

Participants were recruited via social media from August to December 2021. Under institutional IRB guidance, responses were incentivized with the chance to win one of two digital gift cards raffled off at random at the time of survey closure. The survey was advertised on Facebook pages...
dedicated to a community of fastpitch softball players, parents, and/or coaches in a state or region within the United States. Facebook has previously been shown to be an effective and financially conscious recruitment tool to reach diverse populations for scientific study.\textsuperscript{19-21} A total of 76 posts were made by an account created specifically for this study on 31 separate high school softball-related Facebook pages. There was an average of 3,488 members per Facebook page (range 550–11,546 members). In total, 266 participants with unique IP addresses accessed the study, and 260 participants answered at least one question, yielding a response rate of 97.7\% (260/266). Markedly incomplete survey responses (<75\% completion rate) were excluded from analysis to reduce bias and maintain consistency. A total of 210 responses were included in statistical analysis following the exclusion of 50 responses due to incompletion, for an inclusion rate of 80.8\% (210/260).

The survey assessed reported arm (including shoulder, elbow, wrist, and hand) symptoms, general rates of arm injury, throwing habits, sources for and knowledge of injury prevention recommendations, and other related impacts of arm pain in high school softball players. Participants were asked to report adverse arm outcomes including arm pain, fatigue, doctor’s visits due to softball-related arm injury, and surgery due to arm injury. Players, parents, and coaches were generally asked the same questions, although survey branching logic targeted only one or two groups in cases when a particular question did not apply to all three primary groups. All groups were asked to report satisfaction with and knowledge of current professional advice to prevent arm injuries. Knowledge of arm care recommendations was assessed via a nine-question quiz (Table 1). The quiz was constructed and graded based on the softball-specific guidelines outlined in the American Orthopaedic Society for Sports Medicine’s (AOSSM) STOP Sports Injuries campaign in partnership with the National Council of Youth Sports.\textsuperscript{2}

Players were asked to self-classify as either a pitcher or never-pitcher and then to indicate their primary and secondary (if applicable) position(s). Some analytical comparisons in this paper include only primary pitchers (n = 37), while others encompass all players who pitch (n = 62). Further, players who selected the ‘utility’ position – defined as those who have the expertise and opportunity to play more than one defensive position – as their primary position (n = 5) were grouped with outfielders (n = 25) since utility players are often substituted interchangeably for outfielders.

Graphs were made using Microsoft Word, Microsoft Excel, and GraphPad Prism version 9.2.0 (GraphPad Software, San Diego, CA). Data were analyzed with descriptive and inferential statistics including chi-square tests of independence and one-way analysis of variance (ANOVA). Statistical analyses were performed using IBM SPSS Statistics Version 27.0 (IBM Corp., Armonk, NY) and evaluated for significance using a P value of < .05.

### RESULTS

There were 210 total survey responses: 123 from active high school softball players (mean age ± SD, 16.4 ± 1.3 years), 59 from parents of active players, and 28 from softball coaches. The majority of parents and coaches were 41-50 years old. Among the 123 players, approximately half (n = 61) categorized themselves as non-pitchers while the other half (n = 62) categorized themselves as pitchers; 37 (59.7\%) of these players indicated pitcher as their primary position, while the remaining 25 (40.3\%) indicated pitcher as a secondary position. Similarly, 30/59 (50.8\%) parents classified themselves as parents of non-pitchers while the remaining 29 (49.2\%) were parents of pitchers. The majority of players were members of their high school varsity softball team. Among respondents from 26 total states, participants from Montana completed the most surveys (n = 55, 26.3\%), and respondents from Pennsylvania completed the second-most surveys (n = 23, 11.0\%). Comprehensive participant characteristics are summarized in Table 2.

Nearly 40\% (n = 46) of all players reported experiencing arm pain often or always, and 69 (56.1\%) players indicated

<table>
<thead>
<tr>
<th>Question</th>
<th>Answer choices</th>
</tr>
</thead>
<tbody>
<tr>
<td>1. True or false: playing on multiple teams at once will help maintain arm flexibility and strength and therefore reduce my chances for throwing-related arm injury.</td>
<td>a. True b. False</td>
</tr>
<tr>
<td>2. True or false: it is important to routinely assess my throwing velocity with a radar gun.</td>
<td>a. True b. False</td>
</tr>
<tr>
<td>3. True or false: to maximize your development as a softball player, you should only play one position.</td>
<td>a. True b. False</td>
</tr>
<tr>
<td>4. True or false: to maximize your development as a softball player, you should not play any sports other than softball.</td>
<td>a. True b. False</td>
</tr>
<tr>
<td>5. How many consecutive days of pitching are permitted for players 13 years and over? 1 meaning you should never pitch more than one day in a row</td>
<td>a. 1 b. 2 c. 3 d. 4 e. No limit</td>
</tr>
<tr>
<td>6. What is the recommended pitch count limit per game for softball players ages 13–14?</td>
<td>a. 30 pitches b. 55 pitches c. 80 pitches d. 100 pitches</td>
</tr>
<tr>
<td>7. What is the recommended pitch count limit per game for softball players ages 15 and older?</td>
<td>a. 30 pitches b. 55 pitches c. 80 pitches d. 100 pitches</td>
</tr>
<tr>
<td>8. During the softball season, is it more important to focus on arm flexibility or strength?</td>
<td>a. Flexibility b. Strength</td>
</tr>
<tr>
<td>9. After how long experiencing arm pain should you see a doctor?</td>
<td>a. 1 day b. 1 week c. 1 month d. 1 year</td>
</tr>
</tbody>
</table>

Table 1. Full questions presented in the injury prevention knowledge quiz. Correct answers are bolded.
Table 2. Characteristics of survey respondents

<table>
<thead>
<tr>
<th></th>
<th>Players</th>
<th>Parents</th>
<th>Coaches</th>
</tr>
</thead>
<tbody>
<tr>
<td>Total Responses</td>
<td>123</td>
<td>59</td>
<td>28</td>
</tr>
<tr>
<td>Age, y</td>
<td></td>
<td></td>
<td></td>
</tr>
<tr>
<td>13</td>
<td>0</td>
<td>–</td>
<td>–</td>
</tr>
<tr>
<td>14</td>
<td>8</td>
<td>–</td>
<td>–</td>
</tr>
<tr>
<td>15</td>
<td>28</td>
<td>–</td>
<td>–</td>
</tr>
<tr>
<td>16</td>
<td>23</td>
<td>–</td>
<td>–</td>
</tr>
<tr>
<td>17</td>
<td>40</td>
<td>–</td>
<td>–</td>
</tr>
<tr>
<td>18</td>
<td>17</td>
<td>–</td>
<td>–</td>
</tr>
<tr>
<td>&gt;18</td>
<td>7</td>
<td>–</td>
<td>–</td>
</tr>
<tr>
<td>20–30</td>
<td>–</td>
<td>0</td>
<td>3</td>
</tr>
<tr>
<td>31–40</td>
<td>–</td>
<td>5</td>
<td>2</td>
</tr>
<tr>
<td>41–50</td>
<td>–</td>
<td>32</td>
<td>13</td>
</tr>
<tr>
<td>51–60</td>
<td>–</td>
<td>13</td>
<td>1</td>
</tr>
<tr>
<td>&gt;60</td>
<td>–</td>
<td>1</td>
<td>4</td>
</tr>
<tr>
<td>No response</td>
<td>0</td>
<td>8</td>
<td>5</td>
</tr>
</tbody>
</table>

Table 3. Players and coaches reporting teammates/players that have undergone softball-related arm surgery.

<table>
<thead>
<tr>
<th></th>
<th>Players</th>
<th>Coaches</th>
</tr>
</thead>
<tbody>
<tr>
<td>Surgery for 1 teammate/player</td>
<td>27</td>
<td>7</td>
</tr>
<tr>
<td>Surgery for &gt;1 teammate/player</td>
<td>23</td>
<td>1</td>
</tr>
<tr>
<td>No known surgery</td>
<td>73</td>
<td>20</td>
</tr>
<tr>
<td>Total affirmative responses</td>
<td>50/123</td>
<td>8/28</td>
</tr>
</tbody>
</table>

Table 2.

Table 3.

Figure 1. Percent frequency of participant groups reporting arm pain never/rarely, sometimes, or often/always. Players were asked to self-classify as either a pitcher or a non-pitcher based on which position they play most often.

Figure 1.

Table 2. Characteristics of survey respondents

Table 3. Players and coaches reporting teammates/players that have undergone softball-related arm surgery.

that they play through arm pain often or always instead of resting. However, only eight (13.6%) parents and three (10.7%) coaches believed that their children/players experience arm pain with this frequency [Figure 1]. Despite the discrepancy, about half (n = 60, 48.8%) of the players say they have gone to the doctor for arm pain related to a softball injury. Of these 60 players who sought medical attention, 9 (15.0%) ultimately underwent surgery: 4 pitchers (10.8% of all respondents who are primarily pitchers), 2 first basemen (22.2%), 1 catcher (6.7%), 1 second baseman (9.1%), and 1 utility player (20.0%). Strikingly, 50 players (40.7%) knew of one or more teammates who had undergone surgery for a softball-related arm injury (Table 3).

Mean (± SD) frequency of arm pain on a scale of 1–5, with 5 equal to ‘always,’ by position was reported as follows: catcher, 3.33 (1.05); outfield/utility, 3.30 (0.79); shortstop/third base, 3.14 (1.20); first base/second base, 3.15 (0.88); pitcher, 3.11 (1.02). Seven (46.7% of position total) catchers reported frequent arm pain, the greatest among all positions for this metric. Overall, arm pain (P = .527) and fatigue (P = .590) were not significantly different between positions.

There was no difference between arm pain (P = .693) or fatigue (P = .102) between pitchers (primary or secondary position, n = 62) and never-pitchers (n = 61). Among all pitchers, the percentage reporting a particular pitch to be
in their repertoire was as follows: fastball [88.7%], changeup [82.3%], dropball [61.3%], curveball [59.7%], riseball [51.6%], and screwball [48.4%]. Pitchers who throw riseballs were significantly less likely to undergo surgery \( (P = .008, OR = 0.80, 95\% CI, 0.67-0.96) \) compared to non-riseball pitchers. We did not find other differences in frequency of adverse arm outcomes by pitch type.

Outfield (OF)/utility players trended toward more frequent arm pain \( (P = .086, OR = 2.96, 95\% CI, 0.82-10.66) \) compared to non-OF/utility players. There was no difference in frequency of arm fatigue \( (P = .125, OR = 2.08, 95\% CI, 0.81-5.33) \) and medical attention for arm injury \( (P = .269, OR = 0.63, 95\% CI, 0.27-1.44) \); surgery, \( (P = .335, OR = 0.63, 95\% CI, 0.27-1.44) \) during the study period.

Our survey assessed where players, parents, and coaches obtain their information for arm care. Players were more likely to obtain injury prevention information from other people compared to electronic sources \( (P < .001) \). Specifically, players were most likely to turn to coaches, followed by parents and then doctors for their information. Contrarily, parents \( (P = .030) \) and coaches \( (P < .001) \) both turned to electronic sources with greater overall frequency than human sources. Specifically, parents sought information equally from doctors and coaches, followed by Internet blogs. Coaches most often turned to doctors for their information, followed by medical/educational websites and finally websites of athletic organizations.

To assess knowledge of the current guidelines for softball arm injury prevention, a nine-question quiz was administered to all participants (Table 1). Mean quiz scores were significantly different by participant group \( (P = .002) \). Players had significantly lower mean quiz scores than parents \( (P = .011) \) and coaches \( (P = .006) \), but coaches and parents scored the same \( (P = .299) \). The mean (± SD) number of correct answers (± SD) on the 9-question quiz by group were as follows: players, 4.99 (1.59) or 55.4%; parents, 5.59 (1.25) or 62.1%; coaches, 5.89 (1.26) or 65.4%. The average number of correct responses by group is depicted in Figure 2.

Almost 70% of parents \( (n = 41) \) believe that the medical community does not do a sufficient job of communicating best safety practices for high school softball players. This percentage compares to 42.3% and 42.9% of softball players \( (n = 52) \) and coaches \( (n = 12) \), respectively. Taken together, 50.0% \( (n = 105) \) of all respondents maintain this belief.

The majority of responding players \( (n = 68, 55.3\%) \) indicated that they have less fun playing softball due to arm pain, and 27 \( (22.0\%) \) endorsed that, often or always, they are encouraged by coaches, trainers, parents, or teammates to keep playing despite experiencing arm pain.

**DISCUSSION**

To our knowledge, this study is the first to evaluate prevention proficiency in parents and coaches in addition to amateur softball players. We show that nearly 40% of high school softball players report arm pain often or always, while parents \( (13.6\%) \) and especially coaches \( (10.7\%) \) underestimate how often their children/players experience arm pain. The latter finding, in which coaches and parents fail to recognize the pervasiveness of arm pain in players, is especially worrisome since it may lead to encouraging athletes to continue throwing despite arm pain unbeknownst to them. Comparing the frequency of arm pain to values reported in the literature, Sauers et al reported that 60% \( (15/25) \) of high school and college softball pitchers experience mild to severe in-season shoulder pain,\(^{23}\) while Takagishi et al found 28–30% of baseball players to report ‘sometimes’ arm pain.\(^{24}\) Overall, the considerable rates of player-reported pain are arguably unsurprising given that softball is the fifth most common sporting source of injuries presenting to the Emergency Department in the United States, trailing only football, basketball, soccer, and baseball.\(^{24}\)

We found that 56.1% of softball athletes play through arm pain often or always, which is even greater than the 36.5% of players playing through pain as reported in Gooch’s study of 28 high school softball pitchers.\(^{25}\) Further, nearly half \( (n = 60, 48.8\%) \) of players in our sample went to the doctor for softball-related arm injuries, and nine \( (7.3\%) \) players went on to undergo surgery. Similarly, Krajnik et al reported that 5.0% \( (2/40) \) of high school softball players with shoulder injuries underwent surgery.\(^{4}\) However, Holtz and O’Connor’s study of 53 softball pitchers aged 12–18 did not reveal any athletes who had prior surgery.\(^{26}\) Despite the lower rates of surgery captured in some survey studies including Holtz’s, overuse-related surgery in youth athletes has been
increasing at concerning rates, which appears to align with the considerable surgical rate of 7.3% reported herein.17,28

Although we found the mean frequency of arm pain to be greatest for catchers, there were no significant differences in adverse arm outcomes by position. However, we identified non-significant trends in which pitchers demonstrated less frequent arm fatigue versus non-pitchers, and outfield/utility players reported more frequent arm pain compared to all other players. Current literature has presented contrasting data on which softball positions are at the greatest risk for arm injury. Pytiak et al reported elbow injuries to occur most frequently in outfielders and least frequently in catchers.14 Krainik et al reported shoulder injuries to also occur most frequently in outfielders but least frequently in shortstops/third basemen.8 Additionally, combined shoulder and elbow injury data from Oliver et al revealed infielders to be the most frequently injured and catchers the least frequently injured.13 Finally, Smith et al found that, while pitching injuries were less common overall, they were 50% more likely to result in injuries that lasted longer than two weeks compared to non-pitching injuries.29 This heterogeneity in the propensity for arm injury based on position, which differs across prior studies and as compared to this one, indicates that more research is needed to answer this important question.

Players were significantly more likely to obtain their injury prevention information from other people compared to electronic sources. This included information from coaches, parents, and doctors (in order of preferred frequency), underscoring how important it is for coaches to know the appropriate recommendations for arm care and injury prevention. However, we show that fewer than 30% and 50% of coaches know the recommended pitch count limit for 13–14 year old and 15-year-old players, respectively (Table 4). This suggests that the very people whom players consult for prevention advice may be providing information discordant with medical recommendations. Finally, parents and coaches both turned to electronic sources with greater overall frequency than human sources, but coaches relied most heavily on physicians when obtaining information from other people. It is therefore important for physicians to clearly counsel youth patients and their parents on appropriate injury prevention strategies for softball players.

Due to multiple prior studies surveying youth baseball players, parents, or coaches, which routinely reported a lack of both knowledge6,7,30 and compliance,6,7,31 we hypothesized that a similar lack of knowledge would be present in the softball community. True to our hypothesis and consistent with prior studies, quiz averages in our survey ranged between only 56–65% correct. Players scored significantly lower than both parents and coaches. This finding is alarming, as previous studies have shown that a lack of knowledge is a risk factor for arm injury in youth sports.6 But who is responsible for educating the softball community and ensuring that this information reaches the players? Based on the survey responses, nearly 70% [n = 41] of parents believe that the medical community does not sufficiently communicate best practices for arm safety in high school softball players. Considering there exists a lack of well-defined risk factors, prevention strategies, and even pitch count limits in softball, these parents’ intuition may be correct.32-34 Although some participants may disagree and wish for the medical community to leave instruction to coaches to avoid the over-medicalization of youth sports, given the convincing survey results with an apparent desire for additional injury prevention commentary from physicians – as well as the ethical responsibility of physicians to engage in public health efforts to prevent injuries when possible – we believe that physicians should play an increased role in the discussion of injury reduction in youth softball players.

Finally, our results affirm a distinct psychosocial component to experiences of arm pain. Regarding whether youth athletes have less fun playing softball due to arm pain, nearly 30% [36/122, 29.5%] indicated they sometimes do. Makhni et al surveyed 203 youth baseball players and similarly reported that 24% had less fun playing their sport due to arm pain. Makhni also reported that 8% of the responding baseball players had experienced external encouragement to play through arm pain often or always.9 A separate survey of youth baseball players, published five years after Makhni’s, stated that only 3% of responding players were encouraged to play through pain at this frequency.35,36 Therefore, our

<table>
<thead>
<tr>
<th>#</th>
<th>Question</th>
<th>Players correct</th>
<th>Parents correct</th>
<th>Coaches correct</th>
<th>Average correct</th>
</tr>
</thead>
<tbody>
<tr>
<td>1</td>
<td>Playing on multiple teams at once prevents injury</td>
<td>61.8%</td>
<td>78.0%</td>
<td>89.3%</td>
<td>76.4%</td>
</tr>
<tr>
<td>2</td>
<td>Radar guns should be used to assess velocity</td>
<td>60.2%</td>
<td>83.1%</td>
<td>82.1%</td>
<td>75.1%</td>
</tr>
<tr>
<td>3</td>
<td>Only play one position to maximize development</td>
<td>88.6%</td>
<td>89.8%</td>
<td>92.9%</td>
<td>90.4%</td>
</tr>
<tr>
<td>4</td>
<td>Only play one sport: softball</td>
<td>90.2%</td>
<td>94.9%</td>
<td>100.0%</td>
<td>95.0%</td>
</tr>
<tr>
<td>5</td>
<td>Consecutive pitching days permitted ages 13+</td>
<td>25.2%</td>
<td>6.8%</td>
<td>17.9%</td>
<td>16.6%</td>
</tr>
<tr>
<td>6</td>
<td>Pitch count per game ages 13–14</td>
<td>32.5%</td>
<td>42.4%</td>
<td>28.6%</td>
<td>34.5%</td>
</tr>
<tr>
<td>7</td>
<td>Pitch count per game ages 15+</td>
<td>30.9%</td>
<td>35.6%</td>
<td>42.9%</td>
<td>36.5%</td>
</tr>
<tr>
<td>8</td>
<td>Importance of arm flexibility versus strength</td>
<td>56.1%</td>
<td>66.1%</td>
<td>85.7%</td>
<td>69.3%</td>
</tr>
<tr>
<td>9</td>
<td>Time period before seeing doctor for arm pain</td>
<td>55.3%</td>
<td>67.8%</td>
<td>64.3%</td>
<td>62.5%</td>
</tr>
</tbody>
</table>

*Content is based on the softball-specific STOP Sports Injuries campaign by AOSSM and the National Council of Youth Sports. For each question, the percentage of correct responses by participant group is indicated. Full quiz questions with correct answers are detailed in Table 1.
finding that 22.0% (27/123) of participants are encouraged by those around them to play through arm pain often or always is not only concerning, but a reversal of a downward trend that may apply to some communities of youth baseball. Consistent with pervasive encouragement to play instead of rest when experiencing arm pain, 69 players (56.1%) in our survey confirmed that they do indeed play through arm pain. As a result, it is important that this considerable psychosocial component to arm pain in high school softball players not be overlooked and that parents and coaches appreciate how their recommendations may influence undesirable throwing behaviors.

This study shines light on an important issue in high school softball and the risk of overuse injury among its players. However, it has limitations. The relatively small sample size limits the generalizability of some of our findings. It is also possible that self-reported survey responses were impacted by non-random social media-based study recruitment and/or recall bias. Despite a response rate of 97.7%, with only 210 included responses from a non-random Facebook sample, there is the possibility of response bias. For example, it may be the case that only people impacted by the topic – via softball-related arm injury or experiencing feelings of uncertainty regarding preventative strategies – responded to the survey. Accordingly, the primary purpose of this paper is not to scrutinize risk factors for arm injury that have been previously outlined by investigators primarily in youth baseball and somewhat in softball; instead, we intend to characterize arm injuries within a cross-sectional population of high school softball players while contextualizing and describing the impact of those injuries. This limitation reminds us that this study, although the largest of its kind, is still an early step in understanding youth softball-specific arm injuries. We hope that our work will serve as a call to action to encourage larger and higher-powered investigations into youth softball arm injuries, perhaps facilitated by the involvement of national softball regulatory bodies.

CONCLUSION

From this study, we identified frequent and impactful arm symptoms in high school softball players and a clear lack of knowledge of injury prevention among players, parents, and coaches. Outfield/utility players trended toward more frequent arm pain compared to other positions, and the riseball was protective of surgery. Finally, we show an adverse psychosocial component in response to experiences of arm pain. Much like youth baseball has established Pitch Smart to make players, parents, and coaches aware of best practices for arm injury prevention, softball would undoubtedly benefit from a similar program.

Practical Implications

Further, larger scale epidemiological studies are necessary to generate a comprehensive list of risk factors for arm injury in softball.

American fastpitch softball would benefit from the establishment of explicit injury prevention guidelines.

Sports medicine providers should counsel patients, parents, and softball coaches on current understanding of injury prevention strategies.

References


Accidental Drug Overdose Deaths in Rhode Island: January 1, 2019–December 31, 2023
HEIDI R. WEIDELE, MPH; BENJAMIN D. HALLOWELL, PhD

INTRODUCTION
From 2019 to 2022, fatal overdoses in Rhode Island (RI) increased over 40% from 308 to 436 overdose deaths annually, with 2022 being the highest number of fatal overdoses ever recorded in RI.1 As part of RI’s comprehensive strategy to address the overdose epidemic, in August of 2023 the RI Overdose Task Force created a statewide goal to reduce the number of fatal overdoses by 30% by 2030, aligning with the national Healthy People 2030 goal.2 To inform prevention efforts, document progress towards this goal, and identify trends and populations disproportionally impacted, this work provides an overview of fatal overdoses in RI from 2019 to 2023.

METHODS
We obtained data from the RI Office of the State Medical Examiners (OSME) for accidental drug overdose deaths that occurred in RI between January 1, 2019, and December 31, 2023. Medical examiners determine the cause and manner of death based on numerous factors, including toxicology and autopsy findings, scene investigations, and decedent medical history when available.

We compared decedent demographics, substances contributing to cause of death, and location type by year of death. To create mutually exclusive race and ethnicity categories, all Hispanic or Latino decedents, regardless of race, were included in the Hispanic or Latino group, while non-Hispanic or Latino individuals were combined based on race into the Non-Hispanic White, Non-Hispanic Black, and Other categories. The Non-Hispanic Other category includes individuals belonging to other racial groups, as well as those with missing race and ethnicity information to comply with the Rhode Island Department of Health (RIDOH’s Small Numbers Policy.

Substances contributing to death were determined using a free text search of the cause of death, how injury occurred, and other significant conditions fields in the OSME database. Substance variables are not mutually exclusive, as more than one substance can contribute to the cause of death. We created an “Other” substance category for fatal overdoses where no opioids, cocaine, alcohol, benzodiazepines, or amphetamines contributed to cause of death. The RI State Health Laboratories (RISHL) began systematic testing for xylazine among opioid-involved overdoses in June 2023.

To describe racial disparities in rates of fatal overdoses, we restricted to fatal overdoses among RI residents and used population estimates from CDC Wonder.3 Chi squared tests were used to determine statistical significance. All analyses were performed in SAS [Version 9.4].

FINDINGS
From January 1, 2019, to December 31, 2023, 1,967 accidental drug overdose deaths occurred in RI. Overall, the greatest proportion of deaths occurred among individuals ages 25 to 54 (70.2%), males (71.2%), and Non-Hispanic White individuals (74.7%; Table 1). Deaths typically occurred in private locations (70.2%), while few took place in public (6.5%) or semi-private settings (6.0%; Table 1). Most overdoses (65.7%) involved only illicit drugs, or a combination of prescription and illicit substances (25.5%). Opioids, including fentanyl, were a cause of death in 84.2% of overdoses, while fentanyl specifically contributed to 74.6%. Overall, 52.7% of all overdoses involved cocaine, 25.2% involved alcohol, 13.5% involved benzodiazepines, and 9.8% involved any amphetamines (including methamphetamine; Table 2).

From 2022 to 2023, overdose fatalities decreased 7.3% from 436 to 404. The distribution of decedents by age, sex, race and ethnicity, location of overdose, and drug type were similar from 2022 to 2023 (Table 1 and 2). While the proportion of deaths involving each drug class were similar for opioids, fentanyl, benzodiazepines, and amphetamines from 2022 to 2023, the percentage of cocaine involved deaths increased (50 to 58%) while the proportion involving alcohol decreased (25% to 19%). Among 189 opioid-involved overdose deaths occurring between June 1, 2023 and December 31, 2023, 41 (21.7%) involved xylazine as contributing to cause of death. Fentanyl contributed to death in all (100%) of these xylazine-involved overdose deaths.

When adjusting for the underlying RI population, the rate of fatal overdose in 2023 was highest among Non-Hispanic Black individuals (47.9 per 100,000 residents), followed by Non-Hispanic White (35.6 per 100,000) and Hispanic or Latino individuals (31.8 per 100,000; Figure 1).
### Table 1. Demographic characteristics of individuals who died of an accidental overdose in Rhode Island: January 1, 2019–December 31, 2023

<table>
<thead>
<tr>
<th>Demographic Characteristics</th>
<th>Overall n=1,967 n (%)</th>
<th>2019 n=308 n (%)</th>
<th>2020 n=384 n (%)</th>
<th>2021 n=435 n (%)</th>
<th>2022 n=436 n (%)</th>
<th>2023 n=404 n (%)</th>
<th>p-value&lt;sup&gt;1&lt;/sup&gt;</th>
</tr>
</thead>
<tbody>
<tr>
<td><strong>Age</strong></td>
<td></td>
<td></td>
<td></td>
<td></td>
<td></td>
<td></td>
<td></td>
</tr>
<tr>
<td>0–18</td>
<td>9 (0.5)</td>
<td>&lt;5</td>
<td>&lt;5</td>
<td>&lt;5</td>
<td>&lt;5</td>
<td>&lt;5</td>
<td>0.1409</td>
</tr>
<tr>
<td>19–24</td>
<td>96 (4.9)</td>
<td>17 (5.5)</td>
<td>20 (5.2)</td>
<td>25 (5.8)</td>
<td>22 (5.1)</td>
<td>12 (3.0)</td>
<td></td>
</tr>
<tr>
<td>25–34</td>
<td>429 (21.8)</td>
<td>78 (25.3)</td>
<td>86 (22.4)</td>
<td>105 (24.1)</td>
<td>92 (21.1)</td>
<td>68 (16.8)</td>
<td></td>
</tr>
<tr>
<td>35–44</td>
<td>497 (25.3)</td>
<td>82 (26.6)</td>
<td>97 (25.3)</td>
<td>99 (22.8)</td>
<td>106 (24.3)</td>
<td>113 (28.0)</td>
<td></td>
</tr>
<tr>
<td>45–54</td>
<td>454 (23.1)</td>
<td>65 (21.1)</td>
<td>93 (24.2)</td>
<td>105 (24.1)</td>
<td>95 (21.8)</td>
<td>96 (23.8)</td>
<td></td>
</tr>
<tr>
<td>55–64</td>
<td>366 (18.6)</td>
<td>55 (17.9)</td>
<td>70 (18.2)</td>
<td>72 (16.6)</td>
<td>91 (20.9)</td>
<td>78 (19.3)</td>
<td></td>
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<tr>
<td>65+</td>
<td>116 (5.9)</td>
<td>10 (3.3)</td>
<td>16 (4.2)</td>
<td>28 (6.4)</td>
<td>29 (6.7)</td>
<td>33 (8.2)</td>
<td></td>
</tr>
<tr>
<td><strong>Sex</strong></td>
<td></td>
<td></td>
<td></td>
<td></td>
<td></td>
<td></td>
<td></td>
</tr>
<tr>
<td>Female&lt;sup&gt;2&lt;/sup&gt;</td>
<td>566 (28.8)</td>
<td>84 (27.3)</td>
<td>95 (24.7)</td>
<td>141 (32.4)</td>
<td>122 (28.0)</td>
<td>124 (30.7)</td>
<td>0.1328</td>
</tr>
<tr>
<td>Male</td>
<td>1,401 (71.2)</td>
<td>224 (72.7)</td>
<td>289 (75.3)</td>
<td>294 (67.6)</td>
<td>302 (69.3)</td>
<td>280 (69.3)</td>
<td></td>
</tr>
<tr>
<td><strong>Race/Ethnicity</strong></td>
<td></td>
<td></td>
<td></td>
<td></td>
<td></td>
<td></td>
<td></td>
</tr>
<tr>
<td>Non-Hispanic White</td>
<td>1,469 (74.7)</td>
<td>234 (76.0)</td>
<td>299 (77.9)</td>
<td>334 (76.8)</td>
<td>305 (70.0)</td>
<td>297 (73.5)</td>
<td>0.2260</td>
</tr>
<tr>
<td>Non-Hispanic Black</td>
<td>185 (9.4)</td>
<td>30 (9.7)</td>
<td>36 (9.4)</td>
<td>42 (9.7)</td>
<td>41 (9.4)</td>
<td>36 (8.9)</td>
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</tr>
<tr>
<td>Hispanic or Latino</td>
<td>283 (14.4)</td>
<td>40 (13.0)</td>
<td>45 (11.7)</td>
<td>53 (12.2)</td>
<td>79 (18.1)</td>
<td>66 (16.3)</td>
<td></td>
</tr>
<tr>
<td>Other</td>
<td>30 (1.5)</td>
<td>&lt;5</td>
<td>&lt;5</td>
<td>6 (1.4)</td>
<td>11 (2.5)</td>
<td>5 (1.2)</td>
<td></td>
</tr>
<tr>
<td><strong>Location of Overdose&lt;sup&gt;3&lt;/sup&gt;</strong></td>
<td></td>
<td></td>
<td></td>
<td></td>
<td></td>
<td></td>
<td></td>
</tr>
<tr>
<td>Private</td>
<td>1,381 (70.2)</td>
<td>213 (69.2)</td>
<td>272 (70.8)</td>
<td>310 (71.3)</td>
<td>302 (69.3)</td>
<td>284 (70.3)</td>
<td>0.0002</td>
</tr>
<tr>
<td>Public</td>
<td>127 (6.5)</td>
<td>12 (3.9)</td>
<td>20 (5.2)</td>
<td>28 (6.4)</td>
<td>37 (8.5)</td>
<td>30 (7.4)</td>
<td></td>
</tr>
<tr>
<td>Semi-Private</td>
<td>118 (6.0)</td>
<td>18 (5.8)</td>
<td>11 (2.9)</td>
<td>43 (9.9)</td>
<td>23 (5.3)</td>
<td>23 (5.7)</td>
<td></td>
</tr>
<tr>
<td>Unknown/Missing</td>
<td>341 (17.3)</td>
<td>65 (21.1)</td>
<td>81 (21.1)</td>
<td>54 (12.4)</td>
<td>74 (17.0)</td>
<td>67 (16.6)</td>
<td></td>
</tr>
</tbody>
</table>

Source: Office of the State Medical Examiners. Data current as of June 20, 2024. Note: Percentages may add to more than 100% due to rounding.

1 Chi-square test.

2 Includes individuals who are transgender female to comply with the Rhode Island Department of Health Small Numbers Policy.

3 Private included apartment or residence, semi-public included hotel, motel, shelter, nursing home, hospital, prison, group home, assisted living, or treatment facility, while public included theater, concert, show, office, park, school, bar/restaurant, roadway, or cemetery.

### Table 2. Substances that contributed to death for individuals who died of an accidental overdose in Rhode Island: January 1, 2019–December 31, 2023

<table>
<thead>
<tr>
<th>Drug Type</th>
<th>Overall n=1,967 n (%)</th>
<th>2019 n=308 n (%)</th>
<th>2020 n=384 n (%)</th>
<th>2021 n=435 n (%)</th>
<th>2022 n=436 n (%)</th>
<th>2023 n=404 n (%)</th>
<th>p-value&lt;sup&gt;1&lt;/sup&gt;</th>
</tr>
</thead>
<tbody>
<tr>
<td><strong>Drug Type</strong></td>
<td></td>
<td></td>
<td></td>
<td></td>
<td></td>
<td></td>
<td></td>
</tr>
<tr>
<td>Illicit</td>
<td>1,292 (65.7)</td>
<td>197 (64.0)</td>
<td>275 (71.6)</td>
<td>281 (64.6)</td>
<td>282 (64.7)</td>
<td>257 (63.6)</td>
<td>0.1961</td>
</tr>
<tr>
<td>Illicit and Prescription</td>
<td>501 (25.5)</td>
<td>85 (27.6)</td>
<td>76 (19.8)</td>
<td>119 (27.4)</td>
<td>109 (25.0)</td>
<td>112 (27.7)</td>
<td></td>
</tr>
<tr>
<td>Prescription</td>
<td>170 (8.6)</td>
<td>26 (8.4)</td>
<td>33 (8.6)</td>
<td>35 (8.1)</td>
<td>43 (9.9)</td>
<td>33 (8.2)</td>
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</tr>
<tr>
<td>Unknown/Missing</td>
<td>&lt;5</td>
<td>0</td>
<td>0</td>
<td>&lt;5</td>
<td>&lt;5</td>
<td></td>
<td></td>
</tr>
<tr>
<td><strong>Drug Class&lt;sup&gt;2&lt;/sup&gt;</strong></td>
<td></td>
<td></td>
<td></td>
<td></td>
<td></td>
<td></td>
<td></td>
</tr>
<tr>
<td>Opioid</td>
<td>1,657 (84.2)</td>
<td>256 (83.1)</td>
<td>323 (84.1)</td>
<td>375 (86.2)</td>
<td>358 (82.1)</td>
<td>345 (85.4)</td>
<td>0.4838</td>
</tr>
<tr>
<td>Fentanyl</td>
<td>1,467 (74.6)</td>
<td>214 (69.5)</td>
<td>282 (73.4)</td>
<td>334 (76.8)</td>
<td>323 (74.1)</td>
<td>314 (77.7)</td>
<td>0.1006</td>
</tr>
<tr>
<td>Cocaine</td>
<td>1,036 (52.7)</td>
<td>157 (51.0)</td>
<td>194 (50.5)</td>
<td>232 (53.3)</td>
<td>219 (50.2)</td>
<td>234 (57.9)</td>
<td>0.1554</td>
</tr>
<tr>
<td>Alcohol</td>
<td>495 (25.2)</td>
<td>91 (29.6)</td>
<td>109 (28.4)</td>
<td>108 (24.8)</td>
<td>110 (25.2)</td>
<td>77 (19.1)</td>
<td>0.0100</td>
</tr>
<tr>
<td>Benzodiazepine</td>
<td>265 (13.5)</td>
<td>41 (13.3)</td>
<td>55 (14.3)</td>
<td>73 (16.8)</td>
<td>47 (10.8)</td>
<td>49 (12.1)</td>
<td>0.1045</td>
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<tr>
<td>Amphetamines</td>
<td>193 (9.8)</td>
<td>21 (6.8)</td>
<td>29 (7.6)</td>
<td>54 (12.4)</td>
<td>42 (9.6)</td>
<td>47 (11.6)</td>
<td>0.0373</td>
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<tr>
<td>Other&lt;sup&gt;3&lt;/sup&gt;</td>
<td>31 (1.6)</td>
<td>&lt;5</td>
<td>&lt;5</td>
<td>8 (1.8)</td>
<td>12 (2.8)</td>
<td>7 (1.7)</td>
<td>0.0717</td>
</tr>
</tbody>
</table>

Source: Office of the State Medical Examiners. Data current as of June 20, 2024. Note: Percentages may add to more than 100% due to rounding.

1 Chi-square test.

2 Not mutually exclusive categories, as such percentages may add to more than 100%.

3 Individuals who had none of the pre-selected drug categories contributing to their cause of death were classified as other.
DISCUSSION

In 2023, RI experienced the first decrease in overdose fatalities since 2019. This decrease (7%) aligns with national trends (3% decrease) and those observed by neighboring states (Connecticut: 8.3% decrease) when comparing overdose fatalities in 2023 to the previous year.4,6

Though the greatest proportion of fatal overdoses in RI occur among Non-Hispanic White individuals, the rate of fatal overdoses continues to be highest among the Non-Hispanic Black population (Figure 1), similar to neighboring states.6 The rate of fatal overdose has declined among Hispanic or Latino individuals for the first time in recent years—a stark contrast to an almost 50% increase from 2021 to 2022. This is also the first notable decrease among the Non-Hispanic Black population since 2019.

The observed increase in cocaine- and amphetamine-involved deaths in 2023 aligns with national data which reflects an increase in stimulant-involved fatal overdoses.4 However, these data are based on toxicology findings and do not account for intentionality of use. Work recently published using RI drug seizure data highlights an increasing proportion of opioid pills contaminated with cocaine.7 As such, it is unclear from the present data if this increase is reflective of an increase in intentional stimulant and/or opioid use among overdose decedents, cocaine contamination of pressed opioid pills, or fentanyl contamination in crack and powder cocaine. Regardless, this finding highlights the importance of always practicing harm reduction techniques independent of the substance used.

Since the implementation of xylazine testing in June 2023, 22% of opioid overdose fatalities had xylazine as a contributing cause of death, which is high compared to trends in Massachusetts (9% of opioid overdoses) and Connecticut (21% of all overdoses).5,6 Due to the integration of xylazine in the opioid panel, we are unable to determine the prevalence of xylazine in non-opioid involved deaths. As the RISHL works to transition toxicology testing to the quadrupole time-of-flight (Q-TOF) mass spectrometer we will soon be able to analyze toxicology results for all substance types among all fatal overdoses.

While we are unable to show the specific cause for the decrease in overdoses fatalities in 2023, it is likely the result of years of effort by community organizations, healthcare professionals, and government agencies to provide treatment services, harm reduction supplies, education, and other supportive services to those at risk of experiencing an overdose.

References


Authors

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Substance Use Epidemiology Program
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Rhode Island Monthly Vital Statistics Report
Provisional Occurrence Data from the Division of Vital Records

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<th>VITAL EVENTS</th>
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* Rates per 1,000 estimated population
# Rates per 1,000 live births

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<tr>
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<td>Number (a)</td>
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<td>COPD</td>
<td>37</td>
<td>450</td>
<td>41.0</td>
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(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.
212TH ANNUAL MEETING and AWARDS DINNER
6:00 pm Reception, 7:00 pm Dinner
The Squantum Association, East Providence

WELCOME & REMARKS
HEATHER A. SMITH, MD, MPH President

AWARD PRESENTATIONS
The Charles L. Hill Award for Service
The Herbert Rakatansky Award for Professionalism
The Halifax Award for Volunteerism
The Award for Humanism in Medicine
4 under 40

INAUGURATION OF 2024–2025 PRESIDENT
KARA A. STAVROS, MD
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The WHO Pandemic Treaty: Indispensable if Uncertain

ELI Y. ADASHI MD, MS; DANIEL P. O’MAHONY, MLSL; I. GLENN COHEN, JD

On December 1, 2021, the World Health Assembly (WHA) of the 194 member states of the World Health Organization (WHO) met in a special session, the second ever since the founding of the WHO in 1948. Mindful of the recent emergence of the highly infectious Omicron variant in South Africa, the WHA, the governing and decision-making body of the WHO, resolved to craft a legally binding “historic global accord on pandemic prevention, preparedness and response.”1 Destined to be crafted under Article 19 of the WHO Constitution, the treaty was to see to it that the world is protected “from future infectious diseases crises.” The WHA plan (“The World Together”) empowered an Intergovernmental Negotiating Body (INB) to produce a draft of the treaty in question with a view towards its eventual adoption.1 According to Dr. Tedros Adhanom Ghebreyesus, WHO Director-General, the historic treaty “represented a once-in-a-generation opportunity to strengthen the global health architecture to protect and promote the well-being of all people.”1 At its first meeting on February 24, 2022, the INB affirmed its commitment to hold public hearings on the progress of its deliberations as well as to deliver a “Zero Draft” version of the pandemic treaty to the 76th WHA within a year.1 The INB further committed to submitting a revised final version of the anticipated treaty for consideration by the 77th WHA in May of 2024.1 In this Commentary we review the backdrop for the evolving WHO pandemic treaty as well as discuss the mixed reception thereof.

In the view of Dr. Tedros, the pandemic treaty was a must (“mission critical for humanity”) in that the “COVID-19 pandemic has shone a light on the many flaws in the global system to protect people from pandemics.”1 Note was also made of the untold human toll of the COVID-19 pandemic which was all but unprecedented.1 As reported by the Center for Systems Science and Engineering at Johns Hopkins University, a total of 676 million cases of COVID-19 were enumerated worldwide of whom over 6.9 million have died since the emergence of the virus in China in December of 2019.2 Given this unprecedented human toll, a responsive pandemic treaty would be expected to embrace foundational principles that emphasize equity as well as the sharing of data (e.g., genome sequences of emerging viruses) and of vaccines and drugs via a “WHO Global Pandemic Supply Chain and Logistics Network.”1 The Pandemic treaty would also do well to collaborate with the Global Fund, the 2023–2028 strategy of which is commensurate with the WHO plan.3

Concurrently, equal attention will have to be paid to gender-sensitive inclusion replete with provisions that “address a wider range of the gendered impacts of pandemics.”4 Issues around compliance and enforcement mechanisms, equity obligations, transparency, and technology transfer have led some nations to question the approach taken by the WHO.5

Although the Pandemic Treaty is meant to constitute a legally binding accord between states under international law, one guided by the principles of equity and solidarity, concerns as to its implications to national sovereignty have been decidedly mixed. Over 70 nations, most notably members of the United Kingdom, the European Union, and leading African nations, have come out in strong support of a legally binding international instrument. Other nations, in contrast, including India, Brazil, and Canada, proved reluctant to commit to a legally binding agreement for fear that it might undermine their sovereignty. The inability to resolve this tension and other key issues has led to a delay in the treaty’s proposed timetable. On June 1, 2024, recognizing that the INB had achieved progress and reached initial agreement on many provisions of the proposed WHO Pandemic Agreement, and that further work needed to be done on remaining elements, the Health Assembly decided to extend the INB’s mandate to finish its work as soon as possible, and submit its outcome for consideration by the Seventy-eighth World Health Assembly in May 2025, or earlier by a special session of the World Health Assembly if possible in 2024.6

The final legal status of the Pandemic Treaty in the United States (U.S.) remains equally uncertain. While treaties must be submitted to the Senate for advice and consent, the past decades have seen a rise in so-called “executive agreements” which do the work of treaties but do not require Senate approval. If the Pandemic Treaty must, in fact, be voted on by the Senate, its chances are hard to predict. In this regard one cannot lose sight of the reality that the U.S. has yet to ratify the only other international WHO treaty, that is, the WHO Framework Convention on Tobacco Control, which was adopted by the 56th WHA on May 21, 2003.

In keeping with standard protocol, the responsibility for interacting with the WHO is the domain of the U.S. Department of State. However, given the nature and the import of the special case in question, the U.S. delegation to the WHO also includes representatives of the Department of...
Health and Human Services, the Department of Commerce, the Department of the Treasury, and the U.S. Agency for International Development. Concurrently, a number of bills insistent on the Congressional ratification of the Pandemic Treaty were introduced by conservative members of the House as well as the Senate. As early as February 15, 2023, Sen. Ron H. Johnson [R-WI] introduced the No WHO Pandemic Preparedness Treaty Without Senate Approval Act [S.444]. A similarly minded resolution titled World Health Organization Pandemic Treaty Implementation Resolution [S.Res.81] was introduced shortly thereafter by Sen. James E. Risch [R-ID] with an eye towards assuring Senate ratification of any future WHO-negotiated Pandemic Treaty. By March of 2023, two similarly leaning House bills [H.R. 1425 and H.R. 1546] were introduced by Rep. Thomas P. Tiffany [R-WI-7] and Rep. Ronny L. Jackson [R-TX-13], respectively. As of this writing, none of these bills has been passed by either chamber of the Congress.

At the same time, President Biden also faces pressure from his political left. A March 19, 2024, letter to President Biden from Sen. Bernard Sanders and 11 like-minded members of the House of Representatives and the Senate urged the President to “push for strong, binding equitable access standards to ensure that tests, treatments, and vaccines for the next global public health threat are available to everyone who needs them as soon as possible.” The letter asks the President to extend “fair pricing” for drugs developed during public health emergencies to low- and middle-income countries through concrete obligations that attach to government funding for research, to pursue “pool[s]” (presumably patent pools) for pandemic technologies, among other pushes.7

Looking forward, one can only hope that the notion of international equity, otherwise absent during the COVID-19 pandemic, can be restored by the evolving pandemic treaty. That principle must not be squandered. In this context, much could be learned from the Pandemic Influenza Preparedness (PIP) Framework, which was adopted by the WHA in May of 2011. As crafted, the PIP Framework strives to improve the sharing of influenza viruses with pandemic potential and to increase the access of developing countries to vaccines and other life-saving products during a pandemic. Notably, at no point thereafter was the sovereignty of the U.S. diminished in any way. At this critical juncture, one would do well to recall the address made by President John F. Kennedy to the UN General assembly on September 25, 1961, wherein he made note of the truism that “Political sovereignty is but a mockery without the means of meeting poverty and literacy and disease. Self-determination is but a slogan if the future holds no hope.” In that the Pandemic Treaty is being crafted by independent nations with an eye towards its implementation in accordance with extant national laws, it would seem highly unlikely that any country will be signing its sovereignty away to the WHO. The world cannot afford to wait for the next pandemic to take action.

References

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Disclosures
Financial: Professors Adashi and Mr. O’Mahony declare no conflict of interest. Prof. Cohen is a member of the ethics advisory board for Illumina and the Bayer Bioethics Council and an advisor for World Class Health. He was also compensated for speaking at events organized by Philips with the Washington Post, attending the Transformational Therapeutics Leadership Forum organized by Galen Atlantis, and retained as an expert in health privacy, gender-affirming care, and reproductive technology lawsuits.
Funding/Support: None
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Mr. Potato Head, Healer

ELIZABETH TOLL, MD

KEYWORDS: Mr. Potato Head, healing arts, medical humanism

In 2000, around the time other tourist destinations were undertaking similar efforts, Rhode Island announced a campaign to advertise our fair state with six-foot high decorated statues inspired by none other than Mr. Potato Head. The Mr. Potato Head Funny Face Kit was first distributed by the Hasbro toy company in 1952, after acquiring the rights from its creator, George Lerner of Brooklyn, NY. Of note, Hasbro, whose world headquarters are in Rhode Island, generously funded our state’s Hasbro Children’s Hospital in the 1990s.

Mr. Potato Head is iconic in these parts, even appearing on a fund-raising license plate. All the same, when news of the statewide Potato Head initiative was announced, some local cynics, myself included, groaned with embarrassment. “New York has its stallions, Boston its cows, and Rhode Island will have…Mr. Potato Heads?” As so often happens in medicine and life, these snide first reactions were premature, and impaired by snap judgment.

Before long, the statues began to appear around the state. Predictably, a Potato Head sporting a chef’s hat and carrying a pizza popped up in Federal Hill, while a sand-encrusted one holding a beach umbrella and a child’s swim tire showed up at the airport, advertising our beautiful beaches. Nearby, Vino Di-“vine,” adorned with vines, grape clusters, and red wine spills, enticed tourists to visit our vineyards (yes, Rhode Island has vineyards). There was a spring green one with brightly-colored peas, a knight in shining armor, a surfer, and another covered in red polka dots. Even the cynics had to admit it was fun to run into them in unexpected places and try to decipher the meaning of their decorations. At the height of the campaign, about 47 Potato Heads “sprouted” around the state, each decorated by a local artist.

Healing power of the Potato Heads

Despite my initial snarky reaction, I had to admit they were adorable. My true opinion of the Potato Head campaign, however, emerged from two patient stories. The first came from a young mother in my practice whose abusive boyfriend had abandoned her weeks before the birth of their son, leaving her to raise the child as a single mother, which she was doing extremely well. Four years later, she was just finding the courage to begin spending time with a young man who had taken a shine to her and her son. One scheme he devised to court them both was driving around Rhode Island to visit the Potato Heads. On their outings they found playgrounds, and ice
cream cones, and other shared adventures. The boy loved the Potato Heads, and over the course of that year and all those outings, they became a permanent threesome. They documented their travels in a photo album that included pictures of them with every one of the figures.

Meanwhile, “wickit fah away,” on the other side of the state – a distance of about 28 minutes by car – a mother and father were raising their three-year-old daughter with autism spectrum disorder. Along with her teachers and counselors they were searching for ways to help the silent little girl access language. One day, the parents and child happened upon a Potato Head, and the girl lit up. “This is Mr. Potato Head,” they told her. For days after she continued to ask for “Mr. Potato Head.” Following this spark, they too began a pilgrimage around the state to find all the Potato Heads and create a scrapbook of the figures. The child became entranced, even obsessed by these photos, spending literally hours every day flipping through the pages of her collection. Gradually, she began to speak about the pictures. Words and stories emerged for the first time. The parents attributed her discovery of language to her connection with the Potato Heads in that scrapbook.

The tourism campaign lasted about a year. A few Potato Heads were vandalized or required repairs and touch-ups. Eventually, all were sold or auctioned off to permanent homes, sent to storage, or relegated to the scrap heap. I still pass by the spring green Potato Head on a regular basis, and I think I know where the polka dot one resides. I’ll admit to feeling a bit wistful about their departure, noting that my cynicism vanished with them. But in their wake, the Potato Heads left a reminder that judgmental first impressions can impair one’s ability to see possibility, not to mention that healing can occur in the most unlikely places.

Author
Elizabeth Toll, MD, Professor of Pediatrics and Medicine, Clinician Educator, The Warren Alpert Medical School of Brown University.

Disclosures
The author reports no financial conflicts or disclosures. She obtained written permission from the parent of the first child to tell their story. She was not able to find the parents of the child in the second story and has modified personal details to protect their privacy, while conveying the spirit of their experience.

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Dr. Fauci’s Memoir: From Brooklyn Boy, to Becoming a Physician, to Pandemics

MARY KORR
RIMJ MANAGING EDITOR

In his newly released memoir, *On Call: A Doctor’s Journey in Public Service*, Dr. Anthony S. Fauci traces his journey of almost 84 years, which began on Christmas Eve in 1940, when he was born at Brooklyn Hospital to Eugenia and Stephen Fauci.

In Chapter 1, “Brooklyn Boy,” he recalls his early years in Bensonhurst, where the population was mostly Italian-Americans and first-generation families like the Faucis. When Anthony was eight, his father, a pharmacist, bought a two-story building in nearby Dyker Heights, and opened the Fauci Pharmacy. The family lived upstairs.

His father opened the drugstore at 9 a.m. and closed it at 10 p.m. six days a week. Young Anthony helped at the store and delivered prescriptions on his Schwinn bicycle. “Dad was generous to a fault when customers could not afford to pay their bills,” he writes. “He kept a running account. ‘They can’t afford it; they are struggling. We will just put it on a tab.’”

The values of consideration and taking care of others his parents instilled in him and his sister were reinforced in later years at the Jesuit schools he attended, Regis High School in New York City and The College of the Holy Cross in Worcester, Mass.

BECOMING DR. FAUCI

In the chapter, “Becoming Dr. Fauci,” he recalls his time at Cornell University Medical College in 1962 as “one of the happiest, most fulfilling periods of my life, learning how to become, and ultimately becoming, a physician.” A second-year course in physical diagnosis taught by Dr. Elliot Hochstein on “the fine points of history-taking and physical examination, the essence of the hands-on doctor,” was foundational for him and confirmed he had made the right choice in going to medical school.

Following graduation in 1966, he did his internal medicine residency at New York Hospital-Cornell Medical Center, followed by a fellowship in infectious diseases at the National Institutes of Health (NIH). He joined the NIH in 1968 as a clinical associate in the National Institute of Allergy and Infectious Diseases (NIAID) and worked under Dr. Sheldon M. Wolff, chief of the Laboratory of Clinical Investigation, who became his mentor and close friend.

THE AIDS EPIDEMIC

Part Two of the memoir focuses on the AIDS era. Dr. Fauci’s career path took a turn in 1981 when he began to see patients, mostly gay young men, with the human immunodeficiency virus (HIV). He decided to transfer his research efforts in the laboratory on immune-mediated diseases to focus on “this mysterious new disease. I was trained for years as an immunologist and an infectious disease specialist. Here was a disease that certainly was infectious. It also was destroying the immune system and rendering the patients highly susceptible to opportunistic infections…I felt it was my destiny to get involved in this disease.”

Dr. Fauci’s memoir was published by the Viking division of Penguin Random House. The following is a link to the publisher’s website, where a sample can be read: https://www.penguinrandomhouse.com/books/743358/on-call-by-anthony-fauci-md/
Initially, there were no medications to block HIV, and the median survival rate of patients being admitted to the NIH Clinical Center was 9–10 months. The name, acquired immunodeficiency syndrome (AIDS), had not yet even been used, he writes, and was often referred to as gay-related immune deficiency or GRID. In 1982, the CDC used the term AIDS for the first time.

Over the next few years, the full scope of the epidemic “reared its ugly head,” including cases among heterosexual male and female injection-drug users, transfusion-associated cases, and in newborns. Similar cases were reported worldwide among men and women.

**Turning points**

The search was on by scientists for a retrovirus that was likely causing AIDS. In 1983, French scientists at the Institut Pasteur discovered the HIV virus, and in 1984 proved that it was the cause of the disease AIDS. In 1985, a blood test was developed to screen for AIDS.

The drug azidothymidine (AZT), a chemotheraphy agent, was a turning point for patients with AIDS, and, in 1986, a clinical trial showed its effectiveness as a potent inhibitor of HIV in a test tube. AZT was approved by the FDA in 1987 under the name zidovudine. But the virus mutated and it soon became apparent that a combination of drugs was necessary.

**AIDS ACTIVISM**

In the early 1980s, there was frustration in the gay community that the U.S. government was not doing enough to call attention to and act on the emerging AIDS epidemic. Activists, feeling that the government was failing them, targeted Fauci, the public face of AIDS, throughout the 1980s. Playwright and leader of the activist movement Larry Kramer, in a June 1988 article in the San Francisco Examiner, wrote a piece titled: “I Call You Idiot, Dr. Anthony Fauci.” He accused Fauci of facilitating the deaths of hundreds, if not thousands, of people with HIV.

“His rationale for the attack was that I had not demanded enough money for AIDS,” Fauci writes. “He ignored the fact that I had requested from Congress and the president the largest increase in resources given to an NIH institute since the famous ‘war on cancer’ in the 1970s.”

But when Dr. Fauci came out in support of a “parallel track” of drug testing that allowed patients with AIDS access to experimental treatments, the tide turned. In 1989, Dr. Fauci invited a cadre of activists who had descended on the NIH to a conference room. “They were shocked. This was the first time in anyone’s memory that a government official had invited them to sit down and talk on equal terms.”

When Dr. Fauci was appointed Director of NIAID in 1984, he expanded funding for AIDS research and established a program dedicated exclusively to the disease. Later, during the George W. Bush administration, he spearheaded the President’s Emergency Plan for AIDS Relief (PEPFAR), a program that has saved more than 25 million lives by distributing AIDS treatments around the globe.

**Personal life**

During this period, he married Christine Grady, RN, PhD, who is now chief of the Department of Bioethics at the NIH Clinical Center. The couple have three daughters, and a granddaughter. The memoir touches on the intersection of their personal and professional lives. “It has not always been easy...long hours, missing out on personal and family time, and enormous burdens of responsibility, and considerable anxiety and stress, and at times opposition and even hostility.”

**THE COVID-19 PANDEMIC**

The onset of the COVID-19 pandemic – and his role as “the de facto public face of the country’s battle with the disease” – further heightened media and public attention on him, for better and for worse. He describes President Trump’s interactions with him as unpredictable and mercurial, and sharpens his pen when reporting remarks President Trump made during White House briefings. “He shocked me on day one of his presidency with his disregard of facts. He seemed to conflate COVID with influenza.”

He also describes a meeting of the coronavirus task force, with the president “venting that we were seeing more cases only because we were doing more testing, and that ‘other countries looked good because they were not testing.’

“OK, Mr. President,” I said, looking straight at him. “We are now in the Oval Office so you need to hear it directly from us. Increased testing does not cause cases. When you increase testing, you will, of course, pick up asymptomatic whom you might not otherwise notice. However, when you have increased percent positives, increased hospitalizations, and increased deaths, that means there are truly more cases.”

While the rapid development of the COVID-19 vaccines during what was termed Operation Warp-Speed is a highlight of the Trump administration, criticism of lockdowns and school closures resulted in vitriolic attacks on Dr. Fauci by anti-vaxxers, the far-right politicians, and media/political strategists such as Steve Bannon, who called for “Fauci’s head to be put on a pike.” A security detail was put in place for Dr. Fauci and his family.

**REFLECTIONS**

As Dr. Fauci sums it up, the memoir focuses not on the dark days and the disinformation diatribes but on the “trials, tribulations, and mostly the rewards, experienced by someone who gave it his all. To this day, fifty years later, when I think of my identity, it is as Tony Fauci, physician.”

For his accomplishments as a physician-scientist, Dr. Fauci was awarded the Presidential Medal of Freedom and the National Medal of Science. Currently, he serves as Distinguished University Professor at Georgetown University School of Medicine and the McCourt School of Public Policy.

Far more than the classic “triple threat” in medicine – patient care, teaching, and research – Dr. Fauci’s career encompassed all of these, and his administrative and public policy skills establish him as the quintessential “quadruple” and even “quintuple threat.”
Panel appointed to explore potential URI medical school

STATE HOUSE – Senate President DOMINICK J. RUGGERIO recently announced appointments to a 21-member commission that will study and analyze the state’s health care workforce as it pertains to educating and retaining primary care physicians, including the potential of establishing a medical school at the University of Rhode Island.

“Few issues are as important as health care, and right now, our health care system is in critical condition,” said President Ruggerio (D-Dist. 4, North Providence, Providence).

The commission appointees include:

- Senator Pamela J. Lauria (D-Dist. 32, Barrington, Bristol, East Providence), who will co-chair the commission
- URI President Marc B. Parlange, PhD, PEng, who will co-chair the commission
- Senator V. Susan Sosnowski (D-Dist. 37, South Kingstown)
- Senator Alana M. DiMario (D-Dist. 36, Narragansett, North Kingstown, New Shoreham)
- Senator Thomas J. Paolino (R-Dist. 17, Lincoln, North Providence, North Smithfield)
- Representative Susan R. Donovan (D-Dist. 69, Bristol, Portsmouth)
- Representative Jacquelyn Baginski (D-Dist. 17, Cranston)
- Central Falls Mayor Maria Rivera
- Staci Fischer, MD, of the Rhode Island Department of Health
- Kerry LaPlante, PharmD, FCCP, FIDSA, FIDP, Dean of the URI College of Pharmacy
- Danny Willis, DNS, RN, FAAN, Dean of URI College of Nursing
- Patrick Vivier, MD, PhD, Dean of URI College of Health Services
- Barbara E. Wolfe, PhD, RN, FAAN, URI Provost and Executive Vice President for Academic Affairs
- Margo L. Cook, Chair, URI Board of Trustees
- Armand E. Sabitoni, Vice Chair, URI Board of Trustees
- Thomas M. Ryan, member, URI Board of Trustees
- M. Teresa Paiva Weed, President, Hospital Association of Rhode Island
- Stacy Paterno, Executive Vice President, Rhode Island Medical Society
- Christopher F. Koller
- Michael Fine, MD
- Marie Ganim, PhD

The commission is charged with developing and issuing its recommendations to the Senate by December 20, 2025.

BCBSRI to eliminate nearly 65% of prior authorization requirements for primary care providers

PROVIDENCE – As part of its continuing commitment to support healthcare practitioners and streamline patient access to care, Blue Cross & Blue Shield of Rhode Island (BCBSRI) will eliminate nearly 65% of prior authorization requirements for primary care providers (PCPs) by early 2025. This market-leading move is consistent with BCBSRI’s groundbreaking removal of all prior authorization for outpatient behavioral healthcare in 2018.

“We recognize that prior authorization can be a significant source of additional administrative burden and stress for primary care providers at a time when PCPs are struggling,” said MARTHA L. WOFFORD, president and CEO of BCBSRI. “We’re hopeful that reducing these authorizations, along with our significant investments in primary care practices, will help PCPs thrive and improve patient access to care as we continue to strive for balance between affordability for Rhode Islanders and stability for providers.”

BCBSRI took a data-driven approach to identify some of the most common orders that create additional work for PCPs. The review will result in the lifting of prior authorization requirements for numerous medical services, with radiology and cardiology leading the list. The reduction in prior authorization will benefit providers and patients in both commercial and Medicare plans.

BCBSRI’s initiative aligns with the work of the Rhode Island Office of the Health Insurance Commissioner (OHIC), which issued a report on primary care last December. Among its findings were that clinician burnout is a “key concern” for the workforce and that prior authorization can “exacerbate burnout.” The report called on insurers to “make significant reductions in the administrative burden” placed on PCPs.

BCBSRI is committed to improving access to high quality, affordable and equitable care for all Rhode Islanders and promoting a stable healthcare system in Rhode Island. Efforts to streamline prior authorization will continue in partnership with healthcare leaders across the state and details of the current initiative will be shared with BCBSRI’s network of PCPs and members in the coming months.
CVS Health Foundation awards W&I Hospital $1M

PROVIDENCE – CVS Health® (NYSE: CVS) and its Foundation recently announced a $1 million grant to support the Women & Infants Hospital’s ongoing work to reduce patients returning to the Emergency Department with hypertension-related complications.

“This grant from CVS Health allows the Women & Infants Hospital to continue successful programs like our Postpartum Hypertension Equity Program and build upon that progress to expand reach into the community,” said METHODIUS G. TUULI, MD, MPH, MBA, Chief of Obstetrics and Gynecology, Women & Infants Hospital. “This initial investment in WIH ECHO will benefit Rhode Islanders for years to come.”

Knowing 80% of the Rhode Island community delivers at the Women & Infants Hospital, the grant will also support their new mobile van, which will help remove transportation as a barrier to receiving postpartum care. The mobile van will offer various services, including hypertension management, contraceptive counseling, mental health screening and breastfeeding support.

New law clears barriers to HIV prevention prescriptions

WOONSOCKET – Legislation sponsored by Rep. REBECCA KISLAK and Sen. MELISSA A. MURRAY to prohibit prior authorization requirements and out-of-pocket costs for the HIV prevention medications PrEP and PEP was signed into law at Woonsocket’s Thundermist Health Center to highlight bills that affirm LGBTQ+ and reproductive rights.

The new law, which takes effect on health insurance policies issued or renewed in Rhode Island beginning January 1, is intended to remove barriers to patient access to pre-exposure prophylaxis [PrEP] and post-exposure prophylaxis [PEP], two extremely effective HIV prevention medications.

The law (2024-H 7625A, 2024-S 2255), which builds upon another PrEP/PEP access bill enacted last year, prohibits insurers from requiring patients to get prior authorization from the insurer before a PEP or PrEP prescription can be dispensed, or from requiring step therapy – a series of other therapies the patient must try before the prescription is approved. It also prohibits insurers from requiring copayments or subjecting the drugs to deductibles, or refusing to pay for prescriptions dispensed at an out-of-network pharmacy.

PHIL CHAN, MD, chief medical officer at Open Door Health in Providence, testified during the bill’s hearings that prior authorization requirements are often barriers to patient access, often resulting in delays lasting several days. Since PEP needs to be taken within 72 hours of exposure to be optimally effective, prior authorization requirements pose a particular danger for those in need of it. And some patients, when required to make a return trip to the pharmacy days later to pick up the prescription, abandon it altogether, leaving themselves at risk.

“Every hour and day when a prescription is held up by something like a prior authorization really has detrimental effects on HIV outcomes,” said Dr. Chan. “Out-of-pocket costs also contribute to prescription abandonment and increased infection, adding that co-pays of $10 or $20 can be a real barrier for the populations that are most affected by HIV.”

A study of more than 58,000 patients with new prescriptions for the drugs found that, after a year, HIV infection rates were two to three times higher among patients who abandoned the prescription because of the costs. Even costs as low as $10 were found to increase the abandonment rate.
South County Health awarded $1.1 million grant from Warren Alpert Foundation

WAKEFIELD – South County Health has been awarded a $1.1 million grant from the Warren Alpert Foundation for recruiting and retaining some of the most challenging RN vacancies at South County Hospital, supporting and enhancing nursing staff professional development.

“Receiving this generous grant from the Warren Alpert Foundation is a transformative moment for Nursing Services at South County Health. This funding will not only help us attract and retain top nursing talent, but in parallel invest in the professional growth and development of our current staff. We are committed to fostering a supportive and enriching professional environment that empowers our nurses to excel, and enhance the quality of care we provide to our patients,” said ANITRA GALMORE, DNP, MS, NEA-BC, Chief Operating Officer, Chief Nursing Officer.

Health Care Provider Shield Act signed into law

STATE HOUSE – Gov. DAN MCKEE signed legislation introduced by Rep. JOHN G. EDWARDS and Sen. DAWN EUER to protect medical providers who provide transgender and reproductive health care services in Rhode Island from civil or criminal suits from other states or their residents.

The Healthcare Provider Shield Act (2024-S 2262A, 2024-H 7577) provides broad protections for health care providers who are licensed and physically practicing in Rhode Island and complying with state regulations and standards of care when facing hostile litigation or criminal investigation from other states. These include protections from arrest and extradition, subpoena for testimony and documents, professional disciplinary action in Rhode Island on the basis of disciplinary action taken against them in other states and wiretapping and other surveillance.

The law also prevents all state public agencies, including law enforcement, from cooperating with out-of-state investigations of legally-protected health care in Rhode Island and protects personal medical information from being shared with law enforcement agencies in other states.

“Family doctors, OBGYNs and other practitioners want to be able to deliver high quality, essential care for our patients,” said HEATHER A. SMITH, MD, MPH, OBGYN and president of the Rhode Island Medical Society. “Here in Rhode Island, we are able to provide the care that Rhode Islanders need, including full-spectrum reproductive services and gender-affirming health care. We need the Healthcare Provider Shield Act to ensure Rhode Island remains a state where clinicians want to practice, and so that physicians can continue to provide our patients with quality, compassionate and essential care when they need it.”

New law to allow RNs to practice before taking national exam

STATE HOUSE – A new law sponsored by Senate Majority Whip VALARIE LAWSON and Rep. STEPHEN M. CASEY allows graduate nurses to begin practicing before taking and receiving results from the National Council Licensure Examination (NCLEX), the licensing examine developed by the National Council of State Boards of Nursing, provided that they are licensed within 90 days.

The legislation (2024-S 2083, 2024-H 7826), which was part of the Senate’s HEALTH Initiative of legislative priorities, was signed by the governor after passage by the General Assembly.

“This is an easy step we can take to help out with the nursing shortage in the short term and make life easier on new nurses and the hospitals that employ them,” said Representative Casey (D-Dist. 50, Woonsocket). “We did the same thing during the pandemic by executive order, so we know that it works.”

“Receiving this generous grant from the Warren Alpert Foundation represents a transformative moment for Nursing Services at South County Health. This funding will not only help us attract and retain top nursing talent, but in parallel invest in the professional growth and development of our current staff. We are committed to fostering a supportive and enriching professional environment that empowers our nurses to excel, and enhance the quality of care we provide to our patients,” said ANITRA GALMORE, DNP, MS, NEA-BC, Chief Operating Officer, Chief Nursing Officer.

Advocates for the law point out that graduating registered nurses undergo weeks of extensive training and supervision by experienced nurses when they begin their new jobs. Requiring them to have passed this exam before starting that training only delays new hires from making an impact in Rhode Island’s short-staffed medical system.

“The Hospital Association of Rhode Island extends its gratitude to Senator Lawson and Representative Casey for their leadership in championing this important legislation,” said M. TERESA PAIVA WEED, president of the Hospital Association of Rhode Island. “By allowing nursing graduates to practice pending the results of their NCLEX, this law provides a critical buffer that helps bridge the gap between academic preparation and full licensure. This change will not only bolster our health care workforce but also support new graduates as they transition into their professional roles, reducing administrative delays that currently hinder immediate employment and practice.”
Bradley first to study brain stimulation for OCD treatment

EAST PROVIDENCE – The Pediatric Anxiety Research Center (PARC) at Bradley Hospital has been funded by the National Institute of Mental Health to test a non-invasive type of brain stimulation called transcranial magnetic stimulation (TMS) for children and young adults with obsessive-compulsive disorder (OCD). This will be the first study to test TMS as a treatment for youth with OCD.

Two to three percent of children and adults are diagnosed with OCD, a disorder in which they experience obsessions (intrusive and distressing thoughts or images) that make them feel driven to complete compulsions (repetitive or unhelpful actions). These symptoms disrupt important areas of functioning and can negatively affect school, relationships, and daily activities. Untreated OCD in childhood can lead to problems later in life, including high rates of disability and increased likelihood of other disorders such as depression and substance use.

“Previous research has shown that specific brain networks operate differently in people with OCD. Unfortunately, Cognitive Behavioral Therapy (CBT) – the leading talk therapy treatment for OCD – relies on those brain networks to be effective,” said KRISTEN BENITO, PhD, research and quality improvement lead at Bradley Hospital. “Our goal is to learn whether we can improve the effectiveness of CBT by using TMS to optimize functioning in those brain networks. If we’re successful, this could lead to a new treatment option for kids and young adults with OCD.”

TMS has been FDA-approved for adults with OCD but research in this area has not yet been extended to children. The study will test how OCD symptoms and brain functioning might change following daily treatment for two weeks with TMS and CBT. Researchers are focusing on youth ages 12–21 years old with OCD, a time in life when OCD symptoms can be particularly disruptive.

Arches Medical Group brings 40 primary care providers and 9 locations into Integra, CNE provider network

PROVIDENCE – Arches Medical Group recently announced that it is joining Integra Community Care Network. Arches’ 40 Rhode Island Primary Care Providers will leave CharterCare Provider Group, a Prospect Medical Holding member, to partner with Integra Community Care Network, LLC, which is an affiliate of Care New England Health System.

“Arches was created with the goal of reinventing the way primary care is delivered,” said Arches founder CHRIS KRYDER, MD. “We want to increase access and quality for patients and remove barriers that lead to physician burnout and frustration. The Rhode Island healthcare market which we entered this year is fragile. Integra provides the stability we need to fulfill the promise of primary care for the communities we serve.”

Integra is nationally recognized as a leader in population health and value-based care. Integra has developed innovative programs that help physicians and primary care clinicians improve the health of their patients while also increasing patient and clinician satisfaction and lowering the cost of care.

“We are so pleased to welcome Arches Medical Group and its Primary Care Providers into the Integra network,” said ANA TUYA FULTON, MD, Integra President and COO. “Bringing more outstanding clinicians together, especially a group such as Arches that share our desire to create true primary care transformation, allows us to improve the services to and health of more Rhode Islanders. Equally important we can build a system where primary care teams feel joy in work again.”

“It was extremely important to us to be part of a network that values the voice of the physician and engages physicians to capture their ideas for improving primary care,” said SCOTT WILSON, MD, an Arches Medical Group physician in Cumberland. “We also wanted a proven and trusted name that was innovative and willing to think about healthcare in non-traditional terms. We found these qualities in the welcoming and physician-centric leadership of Integra.”

With more than 10 years in the Rhode Island market, Integra has deep experience working with health plans and social service organizations; it has been a leader in the successful implementation of new payment methods such as pay for performance and value-based/risk-based contracting. Nationally, Integra has been recognized for its commitment to care models that keep patients out of the hospital, including Integra at Home, partnerships with community paramedics, team-based care, patient-centered, goals-driven care management, behavioral health services in the physician’s office and social support services addressing food, housing, and other needs.
NIH findings shed light on risks and benefits of integrating AI into medical decision-making

BETHESDA, MD – Researchers at the National Institutes of Health (NIH) found that an artificial intelligence (AI) model solved medical quiz questions – designed to test health professionals’ ability to diagnose patients based on clinical images and a brief text summary – with high accuracy. However, physician-graders found the AI model made mistakes when describing images and explaining how its decision-making led to the correct answer. The findings, which shed light on AI’s potential in the clinical setting, were published in *npj Digital Medicine*. The study was led by researchers from NIH’s National Library of Medicine (NLM) and Weill Cornell Medicine, New York City.

“Integration of AI into health care holds great promise as a tool to help medical professionals diagnose patients faster, allowing them to start treatment sooner,” said NLM Acting Director, STEPHEN SHERRY, PhD. “However, as this study shows, AI is not advanced enough yet to replace human experience, which is crucial for accurate diagnosis.”

The AI model and human physicians answered questions from the *New England Journal of Medicine* (NEJM)’s Image Challenge. The challenge is an online quiz that provides real clinical images and a short text description that includes details about the patient’s symptoms and presentation, then asks users to choose the correct diagnosis from multiple-choice answers.

The researchers tasked the AI model to answer 207 image challenge questions and provide a written rationale to justify each answer. The prompt specified that the rationale should include a description of the image, a summary of relevant medical knowledge, and provide step-by-step reasoning for how the model chose the answer.

Nine physicians from various institutions were recruited, each with a different medical specialty, and answered their assigned questions first in a “closed-book” setting, without referring to any external materials such as online resources and then in an “open-book” setting using external resources. The researchers then provided the physicians with the correct answer, along with the AI model’s answer and corresponding rationale. Finally, the physicians were asked to score the AI model’s ability to describe the image, summarize relevant medical knowledge, and provide its step-by-step reasoning.

The researchers found that the AI model and physicians scored highly in selecting the correct diagnosis. Interestingly, the AI model selected the correct diagnosis more often than physicians in closed-book settings, while physicians with open-book tools performed better than the AI model, especially when answering the questions ranked most difficult.

Importantly, based on physician evaluations, the AI model often made mistakes when describing the medical image and explaining its reasoning behind the diagnosis – even in cases where it made the correct final choice. In one example, the AI model was provided with a photo of a patient’s arm with two lesions. A physician would easily recognize that both lesions were caused by the same condition. However, because the lesions were presented at different angles – causing the illusion of different colors and shapes – the AI model failed to recognize that both lesions could be related to the same diagnosis.

The researchers argue that these findings underpin the importance of evaluating multi-modal AI technology further before introducing it into the clinical setting.

“This technology has the potential to help clinicians augment their capabilities with data-driven insights that may lead to improved clinical decision-making,” said NLM Senior Investigator and corresponding author of the study, ZHIYONG LU, PhD. “Understanding the risks and limitations of this technology is essential to harnessing its potential in medicine.”

The study used an AI model known as GPT-4V (Generative Pre-trained Transformer 4 with Vision), which is a ‘multimodal AI model’ that can process combinations of multiple types of data, including text and images. The researchers note that while this is a small study, it sheds light on multi-modal AI’s potential to aid physicians’ medical decision-making. More research is needed to understand how such models compare to physicians’ ability to diagnose patients.

The study was co-authored by collaborators from NIH’s National Eye Institute and the NIH Clinical Center, the University of Pittsburgh, UT Southwestern Medical Center, Dallas; New York University Grossman School of Medicine, New York City; Harvard Medical School and Massachusetts General Hospital, Boston; Case Western Reserve University School of Medicine, Cleveland; University of California San Diego, La Jolla; and the University of Arkansas, Little Rock.
Valentin Antoci, MD; Brett Owens, MD, assume new leadership roles in total joint, sports medicine divisions

EAST PROVIDENCE – University Orthopedics announced in July that two of its orthopedic surgeons are taking on new leadership roles. DR. BRETT OWENS will now serve as division chief of sports medicine for the Department of Orthopedics at Lifespan and The Warren Alpert Medical School of Brown University, while DR. VALENTIN ANTOCI will take the reins as division chief of arthroplasty at the Department of Orthopedics at Lifespan and The Warren Alpert Medical School of Brown University.

Dr. Antoci and Dr. Owens will assume the roles previously held by Dr. John Froelich and Dr. Paul Fadale, respectively. While Drs. Fadale and Froehlich have chosen to step back from the leadership positions they have skillfully administered for many years, they remain at University Orthopedics and continue to see patients.

About Dr. Antoci
Dr. Antoci is an orthopedic surgeon specializing in adult reconstruction and hip and knee joint replacement surgery. He has a special interest in unicompartmental partial knee replacement, minimally invasive surgery, complex reconstructions, failed total joints, preservation techniques, and trauma.

In addition to his surgical duties at University Orthopedics, Dr. Antoci has served as director of outpatient adult reconstruction at the practice. Outside of UOI, he is the medical director of Newport Hospital’s Total Joint Replacement Program and an associate professor of orthopedic surgery at The Warren Alpert Medical School of Brown University.

About Dr. Owens
Dr. Owens, MD, is a board-certified pediatric and adult orthopedic sports medicine surgeon. He specializes in arthroscopic repair of sports-related injuries, as well as complex knee and shoulder reconstructions.

Dr. Owens serves as director of the Rhode Island Cartilage Repair Center, the director of Sports Medicine at The Miriam Hospital, and the director of Sports Medicine Research at Brown University, where he is also a professor of orthopedic surgery.

Stephen Marcaccio, MD, joins Sports Medicine Center at University Orthopedics

EAST PROVIDENCE – University Orthopedics recently announced the addition of Rhode Island-native STEPHEN MARCACCIO, MD, to The Sports Medicine Center.

Fellowship-trained in both orthopedic sports medicine and orthopedic trauma, Dr. Marcaccio treats a wide variety of injuries and ailments in athletes and active individuals – with a specific focus on the shoulders, hips, and knees. He is also experienced in treating fractures of the upper and lower extremities, including clavicle fractures, fractures of the humerus, elbow, and forearm, as well as those of the hip, femur, knee, tibia, and ankle.

“Dr. Marcaccio’s comprehensive knowledge of both sports medicine and orthopedic trauma makes him an outstanding addition to our practice. His experience – combined with a dedication to patient-centered care and positive outcomes – ensures our patients will receive tailored treatment that is of the highest standard,” said Dr. Edward Akelman, president of University Orthopedics. “We are truly excited to welcome a surgeon of his caliber to University Orthopedics.”

Before completing the orthopedic sports medicine fellowship at the University of Pittsburgh, Dr. Marcaccio received the majority of his medical education and training at The Warren Alpert Medical School of Brown University, earning his medical degree, and completing both his residency in orthopedic surgery and a fellowship in orthopedic trauma while there.

“During my orthopedic surgery residency and orthopedic trauma fellowship at Brown University, many University Orthopedics physicians were my teachers and mentors. I’m now incredibly honored and excited that these skilled surgeons and doctors, from whom I’ve learned so much, will now be my colleagues,” said Dr. Marcaccio, who grew up in East Greenwich.

“No only do I get to continue my career at one of the best orthopedic practices in the country, but I get to do so in my home state, helping my fellow Rhode Islanders. It doesn’t get much better than that.”

Dr. Marcaccio will see both adult and pediatric patients at the University Orthopedics locations in East Providence, East Greenwich, Providence, and Cranston.

Beyond his clinical practice, Dr. Marcaccio is the assistant team physician for Brown University Athletics and team physician for the school’s men’s and women’s hockey teams. He also serves as head team physician for East Greenwich High School Athletics.
Blue Cross & Blue Shield RI wins top honor for member retention

PROVIDENCE – Blue Cross & Blue Shield of Rhode Island (BCBSRI) has received a Brand Excellence Award for outstanding performance in member retention in 2023. BCBSRI garnered top honors for attaining a member retention rate of 96.4%. Brand Excellence awards are presented by the Blue Cross & Blue Shield Association to independent, community-based and locally operated Blue Cross and Blue Shield companies across the country.

“At BCBSRI, our top priority in everything we do is the health and well-being of our members. That’s why we are extremely honored to receive the Brand Excellence Award for member retention,” said Melissa Cummings, BCBSRI executive vice president and chief customer officer. “This award is a testament to our commitment to providing convenient and responsive customer service and ensuring the satisfaction of our members. Our retention rate of 96.4% is indicative of the trust and loyalty our members have in us and how we advocate on their behalf. We are proud to have received this top honor and will continue to strive for excellence in all aspects of our service.”

This marks the 29th year that Blue Cross Blue Shield Association has presented Brand Excellence Awards to recognize BCBS companies nationwide in categories that promote the BCBS brand, including attracting new customers, fostering loyalty among existing customers and brand innovation.

The winners were announced at the June Board of Directors meeting.

Recognition

Appointments

William Grobman, MD, MBA, joins CNE, Brown

PROVIDENCE – Nationally renowned maternal-fetal medicine expert, William Grobman, MD, MBA, joined Care New England and Brown University on July 1, 2024. He will serve as Chief Scientific Officer for Care New England, and the Associate Dean of Research, Care New England, at The Warren Alpert Medical School of Brown University. He will also serve as Executive Vice Chair for the Department of Obstetrics and Gynecology from December 1, 2024.

An elected member of the National Academy of Medicine, Dr. Grobman recently served as Professor and Vice Chair of Clinical Operations for the Department of Obstetrics and Gynecology at The Ohio State College of Medicine. He is nationally known for research work focused on predicting and preventing adverse obstetric outcomes and associated disparities. He has completed pivotal work leading to changes in the standard of care in obstetrics and maternal-fetal medicine, including the 2018 ARRIVE Trial, which showed that inducing labor at 39 weeks reduced the rate of cesarean deliveries and other complications. This publication was listed among the 12 most impactful and practice-changing papers since the year 2000 by the New England Journal of Medicine. He has over 650 peer-reviewed publications in high-impact journals, and his work is supported by the National Institutes of Health (NIH), Patient-Centered Outcomes Research Institute (PCORI), and the American Heart Association.

Dr. Grobman has held several national leadership roles including President of the Society for Maternal-Fetal Medicine from 2021-2022. He currently serves on the Board of Directors for the American Board of Obstetrics and Gynecology. He was elected to the National Academic Medicine in 2020 “for his paradigm-shifting research and organizational leadership that has been instrumental in defining modern obstetric practice and improving care and outcomes for women and children.”

In his roles at Care New England and Brown University, Dr. Grobman will help advance the academic and research goals of both institutions. He will continue his research, including work within the Maternal-Fetal Medicine Units (MFMU) Network, a research collaborative established by the National Institute of Child Health and Human Development. Women and Infants Hospital/Brown University is one of 14 centers within the MFMU Network.

Dr. Grobman received his medical degree from Harvard University, followed by residency training in Obstetrics & Gynecology and fellowship training in Maternal-Fetal Medicine at Northwestern University. He also earned a Master of Business Administration from the Kellogg School of Management at Northwestern University.

PEOPLE / PLACES
Recognition

Newsweek names Hasbro among best in country for pediatric endocrinology

PROVIDENCE – Hasbro Children’s Hospital has been recognized as one of America’s Best Children’s Hospitals 2024 for pediatric endocrinology. The designation is awarded by Newsweek and Statista Inc., a global statistics portal.

“The division of pediatric endocrinology at Hasbro Children’s Hospital is committed to providing the community with first-rate quality care, treating each child as an individual, and prioritizing research to learn more about the effects of diabetes and other endocrine disorders. Being identified as one of the country’s best children’s hospitals is confirmation of the comprehensive clinical care our team delivers to children and their families,” said PHYLLIS DENNERY, MD, pediatrician-in-chief and medical director, Hasbro Children’s Hospital.

The ranking is based on hospital quality metrics and the results of a nationwide survey of healthcare professionals and hospital managers with pediatric care knowledge, a patient experience survey and a patient reported outcome measures implementation survey.

“We have a passionate and dynamic multidisciplinary team of physicians, nurses, dietitians, mental health professionals, medical assistants, and administrative staff who work closely with patients’ families and the community at large to manage diabetes and other endocrine diagnoses. Our goal is to provide the best care possible, and this designation is terrific validation of our efforts,” said JOSE BERNARDO QUINTOS, MD, director of the Diabetes Outpatient Education Center and division chief of pediatric endocrinology and diabetes at Hasbro Children’s Hospital.

Hasbro recognized as Highest Level Center for Children’s Surgical Care by ACS

PROVIDENCE – Hasbro Children’s Hospital announced that it has been verified as a Level I Children’s Surgery Center by the American College of Surgeons (ACS). The designation, the highest ACS award available for quality of care, is given as part of The ACS’ Children’s Surgery Verification Improvement Program, or CSV program, which addresses the surgical care of infants and children. Hospitals that participate in ACS quality programs, such as the CVS program, earn the distinction of being an ACS Surgical Quality Partner (SQP). Hasbro Children’s Hospital, the only Level 1 verified children’s surgery center in RI, is among only 50 surgery programs nationwide to have attained level 1 verification.

The CSV Program, which recognizes institution-wide excellence in patient care, collaboration, and quality improvement processes, addresses gaps in surgical care to achieve better clinical outcomes, from relatively simple to high-risk and complex procedures, including:

- Trauma care
- Neonatal surgery
- Intussusception
- Pyloric stenosis; and
- Appendicitis

“Being recognized as a level 1 children’s surgery center recognizes our cohesive delivery of extraordinary surgical care for children throughout Rhode Island and southern New England,” said SARAH FROST, Chief of Hospital Operations, and President, Rhode Island Hospital and Hasbro Children’s Hospital. “This distinction acknowledges the expertise, efforts and dedication of our exceptional staff.”

Receiving a level 1 CSV designation demonstrates that a hospital has invested in systems directed toward pediatric surgical patients receiving high-quality, coordinated care and that its programs have made the effort to provide supportive services and resources addressing the full continuum of care in surrounding communities. A Level I children’s surgical center is a regional resource and tertiary- or quaternary-care facility central to the children’s health care system and must have the capability of providing leadership and comprehensive care for all aspects of children’s surgical needs. In this central role, the Level I center must have adequate depth of resources and personnel and is expected to manage large numbers of patients. The scope of care at a Level I center includes care for major congenital anomalies and complex diseases, requiring multidisciplinary teams.

“It really is about us having a whole system of specialists and subspecialists at Hasbro Children’s Hospital working collaboratively as a team and continually learning from each other that has enabled us to build a massive center of excellence and provide our patients with progressive, top-notch care year after year,” said FRANCOIS LUKS, MD, PhD, pediatric surgeon-in-chief and division chief of pediatric surgery, Hasbro Children’s Hospital.

Hasbro Children’s Hospital’s ACS verification as a Level 1 children’s surgery center extends through 2026.
Recognition

Lifespan makes U.S. News & World Report’s 2024–2025 Best Hospitals List

PROVIDENCE – U.S. News & World Report released its 2024–2025 Best Hospitals ratings on July 16 and both The Miriam Hospital and Rhode Island Hospital were recognized in the annual rankings, with The Miriam Hospital being named the top hospital in the state, and both hospitals receiving “high performing” scores in specialty care.

“These rankings are released with the intention of helping patients decide the best places to seek medical care,” said SARAH FROST, chief of hospital operations at Lifespan. “Lifespan hospitals take great pride in caring for our patients, it’s no coincidence we are identified in this year’s rankings. We plan to expand on these accomplishments in the following rating cycles.”

The Miriam Hospital has earned the honor of top hospital in Rhode Island for 13 straight years, starting with U.S. News & World Report’s first state rankings in 2012–2013.

U.S. News also ranked The Miriam Hospital the top hospital in the Providence metro area (which includes Providence, Pawtucket, Fall River, and New Bedford), and gave the hospital a “high performing” ranking or distinction for its care and treatment in 10 conditions and adult specialty areas, as follows:

• Hip replacements
• Knee replacements
• Colon cancer surgery
• Heart failure
• Heart attack
• Stroke
• Kidney failure
• Prostate Cancer
• Pneumonia
• Chronic Obstructive Pulmonary Disease (COPD)

Rhode Island Hospital received a “high performing” ranking for its excellence in Geriatric care and treatment. For the 2024–2025 rankings and ratings, U.S. News evaluated nearly 5,000 hospitals across 15 specialties and 20 procedures and conditions. Hospitals awarded a “Best” designation excelled at factors such as clinical outcomes, level of nursing care and patient experience.

Adult Reconstruction Fellowship among first in nation to earn American Association of Hip and Knee Surgeons recognition

PROVIDENCE – The Adult Reconstruction Fellowship at The Warren Alpert Medical School of Brown University recently announced it’s among the first 50 programs in the country to receive recognition from The American Association of Hip and Knee Surgeons (AAHKS).

The AAHKS earlier this month released a list of the first fellowship programs meeting the requirements and guidelines outlined as part of the new Adult Reconstruction Fellowship Recognition Program. Created in 2023, the recognition program aims to address the need for more oversight of adult reconstruction fellowship training programs and to ensure those programs – by meeting a defined set of standards – provide the highest quality educational and training experience.

“We are so honored for the Brown Adult Fellowship to earn the official AAHKS Fellowship Recognition designation,” said Fellowship Co-Director ERIC COHEN, MD. “We look forward to working with AAHKS to ensure a world-class hip and knee arthroplasty fellowship experience at Brown as we continue to train and mentor the next generation of arthroplasty surgeons and leaders.”

To receive AAHKS recognition, Brown’s Adult Reconstruction Fellowship program had to meet several rigorous requirements and guidelines, which include standards for program length and structure; faculty oversight; surgical volume; curriculum; research; and evaluations.

“The AAHKS recognition signifies the hard work that went into the initial foundation of this fellowship program and our continued efforts to improve fellow education and operative experience,” said Fellowship Co-Director THOMAS BARRETT, MD. “At the end of the day, it’s about the patients who put their trust and, more importantly, their lives in the hands of the fellows we train. It’s an incredible responsibility and one that we have and always will take seriously.”

Brown’s AAHKS recognition took effect July 1, 2024, and must be renewed every five years.

Over the next several years, participation in the AAHKS recognition program will become a requirement to participate in the AAHKS Adult Reconstruction Fellowship Match, as well as to receive AAHKS Fellowship Grants.
Recognition

AHA recognizes Lifespan hospitals for exceptional stroke treatment

PROVIDENCE – The American Heart Association [AHA] has once again recognized three Lifespan hospitals for their exceptional patient outcomes and commitment to providing quality patient care. For the third year in a row, Rhode Island Hospital, The Miriam Hospital, and Newport Hospital each received the prestigious Get With The Guidelines® - Stroke GOLD PLUS Quality Achievement Award. This award is given in recognition of programs who are successful in:

• Reducing barriers to prompt treatment for cardiovascular events,
• Providing coordinated patient care that results in shorter recovery times, and
• Reducing the need for hospital readmission.

All three hospitals also received AHA’s Target: Type 2 Diabetes Honor Roll designation. This recognition is given to hospitals that can demonstrate they met quality measures with over 90% compliance for one year. All three hospitals received this designation in 2022 and 2023 as well.

Rhode Island Hospital received the AHA’s Target: Stroke Advanced Therapy Honor Roll and Target: Stroke Honor Roll Elite Plus designations, in addition to, the Advanced Therapy award for diabetes. The Miriam Hospital received AHA’s Target: Stroke Honor Roll designation. These additional accolades highlight each hospitals’ commitment to providing advanced care and implementing innovative therapies.

“As the American Heart Association cardiovascular diseases, including heart attack, stroke, and heart failure, affect nearly half of all adults in the United States. For patients requiring hospitalization, time is of the essence,” said MELISSA HARMON, MSN, RN, ASC-BC, Manager, Comprehensive Stroke Program at Rhode Island Hospital. “Lifespan’s hospitals are dedicated to both prompt treatment and quality care. We understand this is crucial in improving patient outcomes and saving lives.”

“These awards underscore the dedication of our staff. We strive to provide exceptional care to our stroke patients each day. It is exciting that all our Lifespan stroke centers are again recognized by the AHA for the high-quality care that we provide to our patients,” said KAREN SCHAEFER, MSN, APRN, AGCNS-BC, ASC-BC, FCNS stroke program manager for The Miriam Hospital and Newport Hospital. “I want to express our continued gratitude for our staff and their accomplishments.”

Newport Hospital receives its 5th consecutive Magnet designation

NEWPORT – Newport Hospital was notified by the American Nurses Credentialing Center’s Magnet Recognition Program that is has attained Magnet recognition for the fifth consecutive time, joining only one percent of hospitals nationwide with five consecutive designations.

The honor, bestowed upon the hospital by the American Nurses Credentialing Center’s Magnet Recognition Program, is considered the gold standard for nursing excellence and provides consumers with the ultimate benchmark for measuring quality of care and patient satisfaction. Only hospitals that meet rigorous standards for high-quality nursing excellence can achieve Magnet recognition, the highest national honor for professional nursing practice.

Newport Hospital has continuously maintained Magnet recognition since 2004, one of only six hospitals in New England to accomplish two decades of nursing excellence.

“To receive a fifth consecutive Magnet recognition for nursing excellence is an amazing accomplishment and honor,” said CRISTA F. DURAND, MBA, FACHE, president of Newport Hospital. “Since 2004, nearly 20 years, Newport Hospital has held this designation, one that is awarded to only 604 hospitals in this country, fewer than 10-percent of all hospitals in the U.S. This recognition is affirmation of the hard work, dedication, and care that our team provides to our patients and this community under the outstanding leadership of our Chief Nursing Officer, ORLA BRANDOS, who emulates the Magnet philosophy every day. I offer the entire team my congratulations.”

To achieve Magnet recognition, organizations must pass a rigorous and lengthy process that demands widespread participation from leadership and staff. This process includes an electronic application, written patient care documentation, an on-site visit, and a review by the Commission on the Magnet Recognition Program. Health care organizations must reapply for Magnet recognition every four years based on adherence to Magnet concepts and demonstrated improvements in patient care and quality. This year, the hospital was further commended by receiving 12 exemplars for demonstrating exemplary nursing in nursing quality and patient satisfaction.

“It’s hard to express the pride and gratitude I feel toward our nursing staff who have once again received the highest honor in nursing excellence; validation of the care and commitment they provide daily in their work,” said Orla Brandos, vice president of patient care services and chief nursing officer. “We often receive grateful patient letters and comments about our nursing staff and the standard of care, but to demonstrate that through this rigorous process is challenging if it’s not part of your culture and already engrained in what you do every day. I am fortunate to work with this team and I thank them again for their dedication to our patients, our community, and one another.”
Call for art: Exhibit to showcase visual art created by medical professionals

BRISTOL – The Bristol Art Museum announces a call for art for an exhibit to be featured at the Museum, Prescribing Creativity. The exhibit will showcase a collection of visual art created by those working in the medical profession. The exhibit is open to all medical professionals who wish to submit artwork that reflects imagery related to medical experiences. The exhibit will be on display from Sunday, September 22 to Sunday, October 20. When the exhibit concludes, artists will be invited to have their works displayed at the Warren Alpert Medical School. “Those serving in the medical profession are not often thought of as artists. However, artistic creativity is common among those in this field of work,” said PHIL GRUPPUSO, MD, Professor of Pediatrics and Medical Science at Brown University’s Alpert Medical School. “After all, it’s hard to think of two more humanistic endeavors than caring for people as a medical professional or making art. In addition, art can play a role in the healing process, whether someone is dealing with physical or psychological issues. Finally, making art provides a creative outlet that can alleviate the stress experienced by so many medical professionals. I’m thrilled that the Museum chose to provide this opportunity for those in the medical fields to showcase their creativity. I encourage and invite doctors, nurses, EMTs, and others, including students, to participate in this show.”

Artists are encouraged to submit original artworks in various mediums, including drawing, painting, collage, printmaking, photography, mixed media, quilting, quilling, fine craft, and sculpture. Artists are invited to submit up to three pieces for the upcoming exhibit through the online registration process by Sunday, September 1, 11:59pm. The entry fees are $30 for the first entry, $40 for two entries, and $50 for three entries. All submitting artists must be able to hand-deliver their artwork on Sunday, September 15, or Monday, September 16, between 12:30 and 3:30pm.

For more information, visit http://www.bristolartmuseum.org/prescribing-creativity.html

Help your Patients Keep their Medicaid Coverage

Medicaid members will need to renew their eligibility with the State of Rhode Island to keep their health insurance. You can help now by reminding your Medicaid patients to update their account information with their current address and phone number. Medicaid members can update their information by:

- Logging into their HealthSource RI account: https://healthyrhode.ri.gov/
- Calling HealthSource RI at 1-855-840-4774 (TTY 771)

Thank you from all of us at Neighborhood for your commitment and partnership in ensuring Rhode Island families keep their health care coverage!
Obituary

NOOREDIN RAUFI, MD, of Barrington, passed away unexpectedly on July 17, 2024. He was born in Tehran, Iran. He earned his medical degree from Tehran University and immigrated to the United States where he dedicated over five decades of his life to medicine, practicing anesthesiology at Rhode Island and Butler Hospitals.

Nooredin “Noori” was the son of the late Kamal and Zibandehe Raufi. He was a brother to Shookoh, Parvin, Soori, and the late Mahin Raufi. He was the proud father of four children, Alexander, Ariana, Nikolas and Tatiana Raufi and the very proud grandfather of two granddaughters, Lucia and Sophia, whom he adored. He is also survived by his former wife, Angela Grenander Raufi.

Noori will always be remembered for his exceptional generosity, hospitality, sense of humor and devotion to family. He found tremendous joy in tending to his beautiful yard, cooking for his large extended family, and watching the sun set on his dock overlooking Hundred Acre Cove. He was the life of every party and the pillar of the Raufi family. He will be immensely missed, but his legacy will live on.

At this time, all services will be private. Donations in his memory can be made to Noori’s son’s research team: Dr. Raufi GI Cancer Research at https://giving.lifespan.org/The-Miriam/Give-Now