Dr. Rene Laennec invents the stethoscope
See Heritage, Page 63
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7 COMMENTARY
Cyberbullying: Harassment at your fingertips
ELIZABETH JANOPAUL-NAYLOR, MD ’14
EDWARD FELLER, MD, FACP, FACG

Keeping the Fentanyl Narrative Accurate
SETH A. CLARK, MD, MPH
JASON B. HACK, MDS

14 RIMJ AROUND THE WORLD
Marin, California

51 RIMS NEWS
Are you reading RIMS Notes?
Working for You
Eleventh Hour Educational Event

63 HERITAGE
Dr. Rene Laennec: ‘From a Child’s Toy to a Stethoscope’
MARY KORR
IN THE NEWS

BIODN
seeking FDA review for Aducanumab to treat AD; Investigational drug studied at Butler Hospital’s Memory and Aging Program

ERIKA WERNER, MD
and Women & Infants Ob/Gyn Department receive $2.5M grant

LINDA J. RESNIK, PhD
awarded $1.5M grant for prostheses research project

Bystander CPR
‘Off-Duty’ Kent Hospital staff members save local child’s life

PEOPLE/PLACES

MARTHA B. MAINIERO, MD
elected to Lifespan Board of Directors

JAMIE B. PATTERSON, MD
named medical director of The Breast Health Center at Kent

BENJAMIN R. ADLER, MD
MARY BETH SUTTER, MD
join CNE primary care

NEWPORT HOSPITAL
to present health workshop, expert speaker on Internet addiction

KENT HOSPITAL
Spaulding Outpatient Center opens new Providence location

UNIVERSITY ORTHOPEDICS
launches dedicated Hip Institute

OBITUARY
Leroy Donald Aaronson, MD
CONTRIBUTION

15 Underlying Causes and Distribution of Infant Mortality in a Statewide Assessment from 2005 to 2016 by Infant, Maternal, and Neighborhood Characteristics

ERIN CLEMENTS, BS, RN, MPH; LAUREN E. SCHLICHTING, PhD; AILIS CLYNE, MD, MPH; PATRICK M. VIVIER, MD, PhD

23 Pulmonary Hypertension Post Liver-Kidney Transplant

HAFIZ IMRAN, MD; MATTHEW JANKOWICH, MD; GAURAV CHOUDHARY, MD

27 Implications of Accurate Interpretation of Carcinoma in Prostate Biopsy

ALI AMIN, MD

29 A Retrospective Analysis of Nursing Home to ED Transfer Correspondence Length and ED Length of Stay

SARA E. LONG, MPH; SARAH J. MARKS, MS; CAMERON J. GETTEL, MD; ELIZABETH M. GOLDBERG, MD, ScM

33 Efficacy of Computed Tomography Utilization in the Assessment of Acute Traumatic Brain Injury in Adult and Pediatric Emergency Department Patients

TANEISHA T. WILSON, MD, ScM; LISA H. MERCK, MD, MPH, FACEP; MARK R. ZONFRILLO, MD, MSCE; JONATHAN S. MOVSON, MD; DEREK MERCK, PhD

36 Cost-Effectiveness of a Statewide Pre-Exposure Prophylaxis Program for Gay, Bisexual, and Other Men Who Have Sex with Men

WILLIAM C. GOEDEL, BA; PHILIP A. CHAN, MD, MS; MAXIMILIAN R.F. KING, ScM; MATTIA C.F. PROSPERI, PhD; BRANDON D.L. MARSHALL, PhD; OMAR GALÁRRAGA, PhD

CASE REPORT

40 Secondary Megacystic Megaureter and Giant Hydronephrosis Presenting as Hematemesis

VINCENT LABARBERA, MD; DELANEY CONWAY GOULET, MD

IMAGES IN MEDICINE

43 A Full-Thickness Burn in a Teenager Resulting from Prolonged Contact with a Mobile Phone Charging Cube: A Case Report

DINA BURSTEIN, MD, MPH; CASSANDRA O’ROURKE, OTR/L, BCP; DAVID T. HARRINGTON, MD, FACS

PUBLIC HEALTH

46 HEALTH BY NUMBERS

Food Insecurity among Rhode Island Adults

MARTHA DUFFY, MD, MPH; TRACY L. JACKSON, PhD, MPH; TARA COOPER, MPH

49 Vital Statistics

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Cyberbullying: Harassment at your fingertips

ELIZABETH JANOPAUL-NAYLOR, MD’14; EDWARD FELLER, MD, FACP, FACG

Introduction
The Internet fuses technology with social interaction, making it a prime medium to extend bullying beyond direct, face-to-face aggression. Cyberbullies use digital or electronic media to transmit threats, sexual harassment, demeaning messages or malicious rumors to harm or shame victims. Online harassment is ubiquitous and has become a public health epidemic. As many as one-third of middle and high school students report being targets. About one-third admit to cyberbullying others. The most common media for cyberbullying are email and social media including Facebook, Twitter, YouTube, Snapchat, Instagram and chat rooms.

Typically a problem of children and adolescents, cyberbullying also affects adults, including students, teachers or workers at any level. A 2017 national Pew Research Center survey reported that 40% of adult Americans have been harassed online. Even teachers are victims. As many as one-third of college and post-graduate professors report cyberbullying by students. In addition to email and social media sites, students can post inappropriate, anonymous evaluations of their teachers on websites such as www.ratemyteachers.com.

Dramatic, high-profile harassment, such as a victim suicide, receives the most attention from media. The dangers of pervasive minor, daily microaggressions get less notice. Yet, inappropriate criticism, hurtful name-calling or taunts have a cumulative, corrosive impact on victims.

What are the consequences for victims?
Victims of bullying are at risk for poor life outcomes. They are more likely to be substance abusers, receive poor grades in school or drop out. Self-esteem may be decreased; they may experience isolation and social phobia, impaired-self-identity, chronic depression, burnout and anxiety. Sexually-related cyberaggression, most commonly directed toward females, is especially harmful. Victims are more likely to report the perception of loss of control over their lives. Data indicate that cyberbully victims have much higher rates of suicide ideation and attempts. Social media, including online forums, have been used to develop suicide pacts between both friends and strangers. Harassment is associated with school violence. As many as half of fatal school shootings may be associated with having been bullied at school.

Why is cyber aggression difficult to detect?
Unlike direct bullying, online bullying can be anonymous, occur in private, unmonitored settings and is easy to accomplish. Bullies hide behind an impersonal computer or cell phone. Power differentials, frequent in face-to-face attacks, may be absent. Co-occurrence with direct bullying is frequent, but aggressors may exclusively cyberbully due to perceptions of limited consequences. Disinhibition can be enhanced by using a fake name, stealing someone else’s on-screen identity or attacking unknown victims.

Who is more likely to be a cyberbully?
Aggressors are commonly both victims and perpetrators of prior direct bullying. Other risks include male gender, substance abuse, exposure to antisocial media, feeling unsafe at home, work or school. Behavioral traits linked to online aggression include limited empathy, moral disengagement, sadism, narcissism, disorganized attachment style and frequent absences and poor performance at work or school.

Who is more likely to be a victim?
Anyone can be a target. Girls and women are more commonly victims of all forms of online aggression, including...
sexually-related attacks. Those at greater risk are victims of face-to-face bullying, those perceived to be different due to a physical or mental disability, race or ethnicity, socioeconomic class, gender expression or sexual preference. Targets are more prone to exhibit emotional or peer problems, social anxiety and come from troubled families. Online behavior can encourage bullying by uploading inappropriate or controversial material, including sexually explicit photos.

**Doctors as cybervictims**

Now, even the public can taunt, deride, demean or vilify healthcare professionals. Physicians’ online presence is ubiquitous — published work, recorded lectures, blogs, social media sites and forwarded emails. Online ratings of doctors are everywhere. Many professionals and healthcare communities have their own webpages, blurring privacy boundaries. Anyone with a computer — students, patients, colleagues, former friends or a stranger with anti-social traits — can unearth your CV, cost and photo of your home, marital status and legal judgments against you.

Inappropriate, scathing content can spread virally, including exposure to licensing boards, residency selection committees and prospective employers. Some trainees hide behind the anonymity of social media or anonymous teacher evaluations to post unethical, biased and false criticism of faculty. The pervasiveness of damaging web-based posts has spawned websites such as https://removeonlineinformation.com/ where doctors and others can pay to expunge or hide negative, defaming online content. Cyber aggression is more likely when public opinions involve hot-button issues such as gun safety, abortion or national health insurance.

**Why Facebook won’t remove ads that lie**

Current societal trends facilitate population-based, online bullying. [Table 1] In October 2019, Facebook refused, when challenged, to delete political ads against specific rivals even though the material was proven to be outright lies, stating, “We are not in the business of censoring ads from political campaigns.” Facebook noted that “even false statements and misleading content in ads are important in the conversation.” Other media giants – YouTube and Twitter – also opined that these ads complied with company policies.

Thus, we have a dangerous new world of fake news, alternative facts and fabrication. “Twitter trolling” is a form of malicious online content, where governments, political parties or their supporters disseminate disinformation and fabrications disguised as credible to attack rivals, entire communities or countries. Lies can remain unchallenged or uncensored, seen by millions – living forever on the Internet.

**What can be done?**

Adults should search for specific clues that loved ones are suffering from bullying. Warning signs can include poor school performance or frequent absences, avoidance of computers, cell phones and other devices; stress when receiving email, instant messages or text. Parents should assess interactive video games, some of which glorify violence toward women and male dominance.

Parents must communicate with children about online safety and danger and create online-use plans, assess children’s privacy settings, monitor online activities and understand the limitations of software detection of worrisome Internet use. Additionally, they need to discuss safe and unsafe aspects of social media, reduce time online or on social media sites as needed. However, restricting Internet access or confiscating cell phones has not been shown to decrease cyberbullying.

Physicians should screen for cyberbullying in appropriate settings. Traditional teaching of trainees to explore whether their patients have been hit, kicked or punched should expand to include if they have been otherwise harmed, including verbal abuse and online bullying. Medical school curriculum committees, residency training programs, hospital, university and faculty administrations should assess the adequacy of guidelines and training related to direct and online bullying.

Which victims need a behavioral health referral? Patients presenting with suicidal or homicidal thoughts, severe anxiety or depression should be referred for psychiatric care. Police involvement is necessary for sexual assault or rape, online sexual solicitation of minors, threats of violence, stalking or hate crimes. Many states, including Rhode Island, have enacted anti-cyberbullying provisions. A federal government website, www.stopbullying.gov, offers practical help.

Social media, smart phones, bullies and the Internet will not disappear. The message is simple — any bullying is dangerous, unacceptable and non-negotiable.
References


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Extensive media coverage of the United States opioid epidemic has increased attention on substance use and its inherent risks. Important conversations and resources have been brought to bear on this issue. While this focus has advantages, there are aspects that are ripe for controversy and misunderstanding. One area of factual ambiguity are reports that first responders [e.g. emergency medicine service providers and police] are being occupationally exposed to white powder – presumed to be fentanyl – and having life threatening “opioid overdoses.”

Fentanyl is a fully synthetic opioid 50–100 times stronger than morphine. This highly potent opioid analgesic was developed for the medical treatment of severe pain. The majority of illicit fentanyl is manufactured in Mexico with precursor chemicals from China and trafficked north into the US and Canada. Experts refer to the intentional fentanyl adulteration of the heroin supply and resulting increased mortality as the opioid epidemic’s “third wave,” with the first wave being increased prescription opioid misuse followed by transition to illicit heroin use as the second wave.

Fentanyl, and even more potent analogs, have become synonymous with “heroin” in Rhode Island [RI] and are making up an increasingly greater proportion of overdose deaths. While overdose deaths in RI have begun a modest decline [peak at 336 in 2016, down to 314 in 2018], the proportion of OD deaths determined to be caused by fentanyl continues to increase. Fentanyl caused 4 deaths [3% of OD deaths] in 2012, which increased to 224 deaths [71%] in 2018.

Because of the high potency and potential lethality of illicit fentanyl in uncontrolled dosage, there has been, understandably, an increase in exposure concerns among health care providers involved in their care. From Vermont to Michigan there have been news stories of “opioid overdoses” from occupational exposure to powder thought to be fentanyl. These reports describe variable symptoms ranging from “anxiety” to “unresponsiveness” that occurred seconds to hours after exposure. Symptoms have been reported after nominal exposures [brushing off a small amount of white powder from a sleeve] and sometimes without any clear physical contact. Additionally, what makes these news items less clear has been the variable responses to naloxone with many exposures not responding to the antidote at all. One case described an officer who reported a resolution of his symptoms (“feeling sick”) following self-administration of naloxone. To date, none of these reports has included conformational body fluid testing from the victim which would confirm a true fentanyl exposure.

While these news stories are intended to inform the public of potential risks, they may be based on inaccurate information. A lay person reading these media reports might not recognize that the diverse symptomatology, incongruous time course, and variable responses to naloxone are not consistent with opioid overdoses and become unduly concerned. The risk of significant incidental exposure is extremely low, as fentanyl is not easily absorbed through intact skin. The American College of Medical Toxicology [ACMT] and American Academy of Clinical Toxicology [AACT] released a position statement in late 2017 that stated “the risk of clinically significant exposure to emergency responders is extremely low. To date, there have not been reports of emergency responders developing signs or symptoms consistent with opioid toxicity from incidental contact with opioids. Incidental dermal absorption is unlikely to cause opioid...
toxicity. For routine handling of most drugs, nitrile gloves provide sufficient dermal protection. They further reported: “if bilateral palmar surfaces were covered with fentanyl patches, it would take approximately 14 min to receive 100 mcg of fentanyl [using a body surface area of 17,000 cm², palm surface area of 0.5%, and fentanyl absorption of 2.5 mcg/cm²/h]. This extreme example illustrates that even a high dose of fentanyl prepared for transdermal administration cannot rapidly deliver a high dose...Therefore, based on our current understanding of the absorption of fentanyl and its analogs, it is very unlikely that small, unintentional skin exposures to tablets or powder would cause significant opioid toxicity, and if toxicity were to occur it would not develop rapidly, allowing time for removal.”

In regards to breathing in aerosolized fentanyl, the ACMT and AACT report states, “at the highest airborne concentration encountered by [industrial fentanyl producers], an unprotected individual would require nearly 200 min of exposure to reach a dose of 100 mcg of fentanyl.” The Office of National Drug Control Policy and the Centers for Disease Control and Prevention have similar positions regarding skin exposure and aerosolization.

The ACMT and AACT position statements, coupled with the inconsistent constellation of symptoms of reported exposures, suggest that people are likely not becoming intoxicated by fentanyl with incidental exposure – but are undergoing the “nocebo effect.” This is where negative expectations result in physical and psychological effects; this is in contrast to the positive expectations associate with the placebo effect. Thus, people think they are experiencing deleterious symptoms they understand to be associated with exposure to a substance they believe to be fentanyl. With national and international information sources reporting these cases as overdoses, it may serve to further entrench the public’s misunderstanding and fuel nocebo effects. A careful read of many described cases have symptoms more consistent with panic attack after presumed exposure than opioid overdose.

The potential consequences of inaccurate information are numerous. Regardless of the etiology, first responders have become incapacitated and unable to optimally perform their life-saving duties. Additionally, healthcare professionals and the general population are less likely to render aid if they believe it will put them at risk. This is a particular concern because of the need to administer naloxone to an opioid overdose victim in a timely manner to save their life.

While the ACMT and AACT statements explicitly describe the extremely low risk of OD with incidental fentanyl exposure, distributed information often contains inconsistent and mixed messages that have been repeated in conferences and training videos. Establishing clear case definitions, including clinical examination and confirmatory laboratory results, would be crucial to disseminating accurate and evidence-based information. The American Medical Association stated they will “work with appropriate stakeholders to develop and disseminate educational materials aimed at dispelling the fear of bystander overdose via inhalation or dermal contact with fentanyl or other synthetic derivatives.” Making certain the information being disseminated is accurate will help avoid potentially dangerous false narratives – within the lay public, first responders, and the community of people at risk for opioid overdose.

References

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10. Japan

MARIN, CALIFORNIA

During the massive power outages this week in California, resource centers, power stations and shelters were filled to capacity. RIMJ Associate Editor, Dr. Kenneth Korr, checked the draft of this month’s issue at a PG&E charging center near the Hamilton Coast Guard base in Marin County, blacked out for several days. Water, snacks, flashlights and small solar lamps were given out at check-in. Hundreds of thousands in the state were affected and schools, clinics and businesses closed for the duration. To the north of Marin, the Sonoma fires forced massive evacuations.

Wherever you may be, or wherever your travels may take you, check the Journal on your mobile device, and send us a photo: mkorr@rimed.org.
Underlying Causes and Distribution of Infant Mortality in a Statewide Assessment from 2005 to 2016 by Infant, Maternal, and Neighborhood Characteristics

ERIN CLEMENTS, BS, RN, MPH; LAUREN E. SCHLICHTING, PhD; AILIS CLYNE, MD, MPH; PATRICK M. VIVIER, MD, PhD

ABSTRACT

BACKGROUND: We aimed to explore the leading causes and risk factors for infant mortality in a statewide study of infant deaths from 2005 to 2016.

METHODS: Rhode Island Vital Statistics was linked with KIDSNET, a statewide-integrated child health information system. Descriptive analyses examined infant mortality rates as well as risk factors of infant, neonatal, and postneonatal death. A multivariable logistic regression model of the risk of infant mortality adjusting for risk factors was computed.

RESULTS: The majority (74%) of infant deaths occurred during the neonatal period. The top cause of infant mortality was prematurity (20.4%). After adjustment, infants born <28 weeks had 38.1 higher odds of mortality compared to term infants (p<0.01). Low 5-minute Apgar score, birth defects, less than 10 prenatal visits, and low maternal weight gain were associated with higher odds of infant mortality (p<0.01).

DISCUSSION: Substantial reductions in the infant mortality rate will require improving strategies to prevent preterm births as well as using factors identifiable at birth to focus prevention efforts on those at higher risk.

Infant mortality (IM), defined as death during the first year of life, is regarded as a marker of a nation’s overall health and reductions are a priority at both the local and national level. Infant mortality in the United States has declined approximately 15% from 2005 to 2014. However, in 2010, the United States was ranked 26th in IM, much higher than other industrialized nations, demonstrating substantial room for improvement.

As of 2016, the United States infant mortality rate (IMR) was 4.87 while the IMR of non-Hispanic black infants was more than double, 11.21. RI has reported similar racial disparities, with non-Hispanic black infants having an IMR of 9.5 while non-Hispanic white infants had an IMR of 4.4. States report the distribution of infant deaths by race/ethnicity, maternal age, prematurity, and birth defect. However, to our knowledge, multivariable analyses including important risk factors for infant, neonatal and postneonatal deaths have not been studied collectively in past RI analyses. Furthermore, it is important to examine and compare the leading causes of death for the neonatal and postneonatal time periods to inform prevention efforts.

We conducted a retrospective analysis of infant, neonatal, and postneonatal deaths among RI residents born between 2005 and 2016. We aimed to understand the distribution of IM by infant, maternal, and neighborhood risk factors, ascertain the significance of risk factors, identify disparities by demographic characteristics, and identify the top underlying causes of death by time frame of infant death.

METHODS

Data Sources
Data from the Rhode Island Department of Health’s [RIDOH] Vital Statistics and KIDSNET, Rhode Island’s integrated child health information system, were linked. Vital Statistics data was used to identify infants born to RI residents between 2005 and 2016. Births with a gestational age <20 weeks were excluded to reduce the possibility of misclassification of fetal deaths as infant deaths.
Measures
Infant death, a live birth that resulted in death within the first year (<365 days), was subcategorized as neonatal (<28 days after birth) or postneonatal (28 to 364 days after birth). The cause of death was classified based on International Classification of Diseases, Tenth Revision codes (ICD-10) according to the classification system from the National Center for Health Statistics. IM rates were calculated for each type of mortality and are expressed as deaths per 1,000 live births. The same denominator was used for infant and neonatal analyses, while the denominator for postneonatal analysis was smaller as neonatal deaths were excluded.

The analyses examined a number of characteristics that were postulated or known to be associated with IM in previous studies on other populations.

Infant
Infant characteristics examined included: gender, prematurity, birth weight, Apgar score, birth defect, and plurality. Gestational age, recorded on the birth certificate, was categorized using the World Health Organization (WHO) standard classification of preterm birth: extremely preterm (<28 weeks), very preterm (28 to <32 weeks), and moderate to late preterm (32 to <37 weeks). Birth weight was categorized “missing” if deemed improbable. A 5-minute Apgar score of less than 7 was used to indicate poorer infant health at time of delivery.

Maternal
Maternal characteristics examined included age, race/ethnicity, language, education, marital status, health insurance at the time of delivery, prenatal care received, and gestational weight gain. Maternal age was set to “missing” if deemed improbable (>54 years). First trimester prenatal care and 10 or more total prenatal visits were assessed. Gestational weight gain was categorized consistent with the Institute of Medicine guidelines.

Neighborhood
Infant address at the time of birth was geocoded using ArcGIS (Esri, Redlands, CA) and the corresponding Census block group was identified. We computed a block group-level measure of neighborhood risk, comprised of eight highly-correlated socioeconomic measures from the 2010–2014 American Community Survey and the 2010 Census, with higher scores indicating increased risk. We categorized neighborhoods into high risk (≥75th percentile) and low risk (<75th percentile).

Statistical Analysis
Descriptive and bivariate analyses were conducted to examine IMRs overall and by listed risk factors of infant, neonatal, and postneonatal death. Multivariable logistic regression was conducted to examine the association between IM and infant, maternal, and neighborhood risk factors. Birth weight, maternal language, and first trimester prenatal care were excluded from multivariable analyses as they were highly correlated with other variables. Stata 15.1 was used for all statistical analysis and statistical significance was assigned based on a p-value of <0.05.

RESULTS
After excluding births <20 weeks (N=460, 0.34%), there were 136,753 births to RI residents from 2005 to 2016. Infant, neonatal, and postneonatal mortality rates by characteristics are displayed in Table 1. There were 717 infant deaths, an overall IMR of 5.2, with 74% occurring in the neonatal period. The neonatal mortality rate was notably higher than the postneonatal mortality rate, 3.9 versus 1.4.

Study Population
The distribution of births is displayed in Table 1. Among RI resident births, 9.5% of infants were born premature. Most mothers (87.8%) were between the ages of 19-37 and over half were non-Hispanic white (61.7%). Almost half of mothers had public insurance (48.1%), and few had no insurance at the time of delivery (1.1%).

Infant Mortality Rates by Characteristic
Prematurity was the leading driver of IM (Table 1). As prematurity increased, IMRs increased. Premature infants born between 20 to <28 weeks had a significantly higher IMR than term infants, 421.9 versus 1.5. Infants with low birth weight (222.7), a 5-minute Apgar score <7 (194.0), a birth defect (31.1), or less than 10 prenatal visits (14.5) exhibited higher rates of mortality.

Racial and socioeconomic disparities were observed. Non-Hispanic black infants had a significantly higher IMR compared to non-Hispanic white infants, 7.4 versus 2.7. Higher IMRs were observed in infants born to mothers who were uninsured (18.9), unmarried (6.8), and living in a neighborhood with a higher risk score (7.3) [p<0.01].

Multivariable Analyses
The adjusted multivariable models examining risk factors for IM and for neonatal and postneonatal mortality are reported in Tables 2 and 3, respectively. Any level of prematurity exhibited higher adjusted odds of IM compared to term infants, with infants born between 20 to <28 weeks gestation exhibiting 8.11 (95% Confidence Interval [CI]: 24.84, 58.46) higher odds of mortality. Infants with a 5-minute Apgar score <7 had 14.58 (95% CI: 10.51, 20.24) higher adjusted odds compared to infants with a score of 7 or greater. Additionally, infants with a birth defect demonstrated 3.67 (95% CI: 2.50, 5.39) higher adjusted odds of IM compared to infants with no birth defect. Infants of mothers who had <10 prenatal visits and mothers who gained <25 pounds had significantly higher odds of IM compared to their counterparts. Maternal race/ethnicity was not significantly associated with increased risk of IM in the multivariable model [p=0.76].
**associations between each mortality type with infant, maternal, and neighborhood characteristics were tested using chi-square tests.**

Postneonatal rates calculated after excluding neonatal deaths: (N=136,226).

**Table 1. Infant Mortality Rates per 1,000 live births by Infant, Maternal, and Neighborhood Characteristics Among Infants Born to Rhode Island Residents, 2005–2016**

<table>
<thead>
<tr>
<th>Distribution of Births</th>
<th>Infant Mortality (Death in First Year of Life)</th>
<th></th>
<th>Neonatal Mortality (Death in First 0-27 Days of Life)</th>
<th></th>
<th>Postneonatal Mortality (Death in First 28-364 Days of Life)*</th>
</tr>
</thead>
<tbody>
<tr>
<td>% (N)</td>
<td>Rate Per 1,000 Live Births (N)</td>
<td>P Value</td>
<td>Rate Per 1,000 Live Births (N)</td>
<td>P Value</td>
<td>Rate Per 1,000 Live Births (N)</td>
</tr>
<tr>
<td>Overall</td>
<td>n=136,753</td>
<td></td>
<td></td>
<td></td>
<td></td>
</tr>
<tr>
<td>Infant Gender</td>
<td></td>
<td></td>
<td></td>
<td></td>
<td></td>
</tr>
<tr>
<td>Male</td>
<td>51.2 (70,013)</td>
<td>5.5 (383)</td>
<td>0.21</td>
<td>4.1 (285)</td>
<td>0.19</td>
</tr>
<tr>
<td>Female</td>
<td>48.8 (66,740)</td>
<td>5.0 (333)</td>
<td></td>
<td>3.6 (242)</td>
<td></td>
</tr>
<tr>
<td>Gestational Age at Birth, weeks</td>
<td></td>
<td></td>
<td></td>
<td></td>
<td></td>
</tr>
<tr>
<td>&lt;20 to &lt;28</td>
<td>0.7 (967)</td>
<td>421.9 (408)</td>
<td>&lt;0.01</td>
<td>388.8 (376)</td>
<td>&lt;0.01</td>
</tr>
<tr>
<td>28 to &lt;32</td>
<td>0.9 (1,273)</td>
<td>35.4 (45)</td>
<td></td>
<td>26.7 (34)</td>
<td></td>
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<tr>
<td>32 to &lt;37</td>
<td>2.9 (10,843)</td>
<td>7.3 (79)</td>
<td></td>
<td>4.3 (47)</td>
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<tr>
<td>≥37</td>
<td>30.4 (123,670)</td>
<td>1.5 (185)</td>
<td></td>
<td>0.6 (70)</td>
<td></td>
</tr>
<tr>
<td>Birthweight, grams</td>
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<td>English</td>
<td>89.9 (112,962)</td>
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<td>4.0 (41)</td>
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<tr>
<td>&lt;12 years</td>
<td>15.2 (18,890)</td>
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<td>≥12 years</td>
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<td>Unmarried</td>
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<td>3.2 (247)</td>
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<td>Private</td>
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<td>Total Prenatal Visits ≥10</td>
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<td>81.0 (96,913)</td>
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<td>3.2 (124)</td>
<td>&lt;0.01</td>
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<td>11.9 (271)</td>
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<td>Gestational Weight Gain, pounds</td>
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<td></td>
<td></td>
<td></td>
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<tr>
<td>&lt;25</td>
<td>24.9 (29,349)</td>
<td>10.7 (313)</td>
<td>&lt;0.01</td>
<td>8.6 (251)</td>
<td>&lt;0.01</td>
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<td>25 to 35</td>
<td>38.3 (45,174)</td>
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<td>&gt;35</td>
<td>36.9 (43,512)</td>
<td>2.0 (88)</td>
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<td>Neighborhood Risk Index</td>
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</tr>
<tr>
<td>≥75th percentile</td>
<td>25.3 (33,942)</td>
<td>7.3 (247)</td>
<td>&lt;0.01</td>
<td>5.3 (180)</td>
<td>&lt;0.01</td>
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<tr>
<td>&lt;75th percentile</td>
<td>74.7 (100,246)</td>
<td>4.6 (464)</td>
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<td>3.4 (342)</td>
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</tr>
</tbody>
</table>

* Postneonatal rates calculated after excluding neonatal deaths: (N=136,226).

**Associations between each mortality type with infant, maternal, and neighborhood characteristics were tested using chi-square tests.**
Table 2. Unadjusted and Adjusted Odds Ratios of Infant Mortality, Rhode Island, 2005-2016

<table>
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<tr>
<th></th>
<th>Unadjusted OR (95% CI)</th>
<th>Adjusted OR (95% CI)</th>
</tr>
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<tbody>
<tr>
<td>Infant Gender</td>
<td></td>
<td></td>
</tr>
<tr>
<td>Male</td>
<td>1.10 (0.95,1.27)</td>
<td>1.06 (0.83,1.37)</td>
</tr>
<tr>
<td>Female</td>
<td>1.00</td>
<td>1.00</td>
</tr>
<tr>
<td>Gestational Age at Birth, weeks</td>
<td></td>
<td></td>
</tr>
<tr>
<td>20 to &lt;28</td>
<td>487.18 (401.85,590.64)**</td>
<td>38.11 (24.84,58.46)**</td>
</tr>
<tr>
<td>28 to &lt;32</td>
<td>24.46 (17.57,34.04)**</td>
<td>5.47 (3.18,9.42)**</td>
</tr>
<tr>
<td>32 to &lt;37</td>
<td>4.90 (3.76,6.38)**</td>
<td>2.50 (1.67,3.73)**</td>
</tr>
<tr>
<td>≥37</td>
<td>1.00</td>
<td>1.00</td>
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<tr>
<td>5-minute Apgar Score</td>
<td></td>
<td></td>
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<tr>
<td>&lt;7</td>
<td>135.15 (114.81,159.09)**</td>
<td>14.58 (10.51,20.24)**</td>
</tr>
<tr>
<td>≥7</td>
<td>1.00</td>
<td>1.00</td>
</tr>
<tr>
<td>Birth Defect Present</td>
<td></td>
<td></td>
</tr>
<tr>
<td>Yes</td>
<td>6.94 (5.62,8.58)**</td>
<td>3.67 (2.50,9.42)**</td>
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<td>1.00</td>
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<tr>
<td>Plurality</td>
<td></td>
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<tr>
<td>Singleton</td>
<td>5.74 (4.73,6.96)**</td>
<td>1.17 (0.80,1.69)</td>
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<tr>
<td>Multiple Birth</td>
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<td>1.00</td>
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<tr>
<td>Maternal Age, years</td>
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<td></td>
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<tr>
<td>&lt;19</td>
<td>1.77 (1.34,2.35)**</td>
<td>1.36 (0.79,2.34)</td>
</tr>
<tr>
<td>19 to 37</td>
<td>1.00</td>
<td>1.00</td>
</tr>
<tr>
<td>38 to 54</td>
<td>1.20 (0.92,1.55)</td>
<td>1.37 (0.88,2.13)</td>
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<tr>
<td>Maternal Race/Ethnicity</td>
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<tr>
<td>Hispanic</td>
<td>1.57 (1.29,1.90)**</td>
<td>1.12 (0.78,1.62)</td>
</tr>
<tr>
<td>Non-Hispanic White</td>
<td>1.00</td>
<td>1.00</td>
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<tr>
<td>Non-Hispanic Black</td>
<td>2.55 (2.01,3.22)**</td>
<td>0.93 (0.59,1.47)</td>
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<tr>
<td>Non-Hispanic Other</td>
<td>1.40 (1.10,1.79)**</td>
<td>0.91 (0.60,1.38)</td>
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<tr>
<td>Maternal Education</td>
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<tr>
<td>&lt;12 years</td>
<td>1.35 (1.10,1.69)**</td>
<td>0.82 (0.55,1.22)</td>
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<td>≥12 years</td>
<td>1.00</td>
<td>1.00</td>
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<tr>
<td>Unmarried</td>
<td>1.67 (1.44,1.94)**</td>
<td>1.22 (0.91,1.66)</td>
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<tr>
<td>Maternal Insurance at Time of Delivery</td>
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<td></td>
</tr>
<tr>
<td>None</td>
<td>4.40 (2.95,6.54)**</td>
<td>0.99 (0.72,1.36)</td>
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<tr>
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<td>1.29 (1.11,1.51)**</td>
<td>1.53 (0.58,4.05)</td>
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<tr>
<td>Private</td>
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<td>1.00</td>
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<tr>
<td>Total Prenatal Visits ≥10</td>
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<tr>
<td>Yes</td>
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<td>1.00</td>
</tr>
<tr>
<td>No</td>
<td>6.17 (5.21,7.31)**</td>
<td>1.74 (1.31,2.31)**</td>
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<tr>
<td>Gestational Weight Gain, pounds</td>
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<tr>
<td>&lt;25</td>
<td>4.50 (3.61,5.60)**</td>
<td>1.83 (1.33,3.25)**</td>
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<td>25 to 35</td>
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<tr>
<td>&gt;35</td>
<td>0.85 (0.64,1.12)</td>
<td>1.20 (0.83,1.72)</td>
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<tr>
<td>Neighborhood Risk Index</td>
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<tr>
<td>≥75th percentile</td>
<td>1.58 (1.35,1.84)**</td>
<td>1.27 (0.92,1.76)</td>
</tr>
<tr>
<td>&lt;75th percentile</td>
<td>1.00</td>
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* P-value <0.05.
** P-value <0.01.

Similar associations were observed in the adjusted multivariable model for neonatal mortality. However, in the neonatal multivariable model, mothers with public insurance had 0.63 (95% CI: 0.41,0.97) lower adjusted odds of IM compared to those with private insurance, in contrast to the postneonatal model where public insurance holders had 1.70 (95% CI: 1.07,2.72) higher adjusted odds of IM compared to those with private insurance. Furthermore, in the postneonatal multivariable model, less than 10 total prenatal visits and gestational weight gain did not show significant associations.

Cause of Death

Prematurity (20.4%), congenital malformations (14.5%), complications of the placenta (12.0%), SIDS (9.2%), and pregnancy complications affecting the newborn (5.4%) were the top causes of infant death (Table 4). The top cause of neonatal mortality was prematurity (27.6%), while the top cause of postneonatal mortality was SIDS (29.8%).

DISCUSSION

In the United States, prematurity was the second leading cause of infant death; however, in RI, it was the leading cause and the factor with the highest IMR. Almost 75% of deceased RI infants were born premature, compared to 66% nationally. Furthermore, prematurity was the leading underlying cause of death in RI and accounted for 20.4% of infant deaths, also higher than the national average, 17.4%. The preterm birth rate in RI has been trending downward; however, racial disparities exist. From 2012 to 2014, 10.9% of non-Hispanic black births were preterm compared to 8.0% of non-Hispanic white births. Reducing racial disparities in preterm birth would likely also reduce racial disparities in IM.

There are known disparities in IM in the United States by race/ethnicity, geography, and other factors. Similarly, disparities in IM exist in RI with IMRs for non-Hispanic blacks being higher than non-Hispanic whites and higher IMRs among infants in the core cities. The present analysis also found higher IMRs among infants born to non-Hispanic black women and those living in higher risk neighborhoods. Several factors, including race/ethnicity, were found to be significantly associated with higher IMRs, but were not found to be significantly associated with IM when analyzed in the multivariable model. Additional research of these factors may be beneficial to further examine their interaction and possible confounding.

Unexpectedly, the adjusted multivariable analysis of neonatal mortality showed public insurance having
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<td><strong>Postneonatal Mortality</strong></td>
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<td><strong>Adjusted OR (95% CI)</strong></td>
<td><strong>Unadjusted OR (95% CI)</strong></td>
<td><strong>Adjusted OR (95% CI)</strong></td>
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<td>Infant Gender</td>
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<td>Male</td>
<td>1.12 (0.95,1.33)</td>
<td>1.03 (0.74,1.44)</td>
<td>1.04 (0.78,1.38)</td>
<td>1.04 (0.73,1.49)</td>
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<td>1.00</td>
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<td>Gestational Age at Birth, weeks</td>
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<td></td>
<td></td>
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<tr>
<td>20 to &lt;28</td>
<td>1123.37 (859.59,1468.08)**</td>
<td>32.92 (18.16,59.67)**</td>
<td>61.47 (41.19,91.74)**</td>
<td>34.57 (17.30,69.07)**</td>
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<td>48.45 (32.04,73.27)**</td>
<td>5.32 (2.56,10.66)**</td>
<td>9.62 (5.17,17.90)**</td>
<td>6.85 (2.96,15.86)**</td>
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<td>32 to &lt;37</td>
<td>7.69 (5.31,11.13)**</td>
<td>2.53 (1.34,4.78)**</td>
<td>3.19 (2.16,4.73)**</td>
<td>2.84 (1.69,4.75)**</td>
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<tr>
<td>&lt;7</td>
<td>381.93 (298.82,488.17)**</td>
<td>52.06 (31.83,85.16)**</td>
<td>12.32 (8.22,18.45)**</td>
<td>5.26 (3.22,8.60)**</td>
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<td>6.07 (4.70,7.85)**</td>
<td>2.21 (1.32,3.73)**</td>
<td>9.35 (6.47,13.51)**</td>
<td>5.26 (3.22,8.60)**</td>
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<tr>
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<td>1.00</td>
<td>2.11 (1.22,3.64)**</td>
<td>0.81 (0.40,1.65)**</td>
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<td>1.37 (0.88,2.11)**</td>
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<td>&lt;19</td>
<td>1.55 (1.09,2.19)**</td>
<td>0.93 (0.43,2.04)**</td>
<td>2.40 (1.49,3.87)**</td>
<td>1.85 (0.97,3.52)**</td>
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<td>19 to 37</td>
<td>1.00</td>
<td>1.00</td>
<td>0.85 (0.47,1.52)**</td>
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<td>38 to 54</td>
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<td>1.48 (0.77,2.83)**</td>
<td>1.48 (0.77,2.83)**</td>
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<tr>
<td>Hispanic</td>
<td>1.66 (1.33,2.08)**</td>
<td>1.42 (0.87,2.32)**</td>
<td>1.33 (0.92,1.94)**</td>
<td>0.82 (0.48,1.40)**</td>
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<td>0.76 (0.42,1.36)**</td>
<td>2.12 (1.33,3.37)**</td>
<td>1.18 (0.63,2.20)**</td>
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<tr>
<td>Non-Hispanic Other</td>
<td>1.27 (0.94,1.71)**</td>
<td>0.73 (0.42,1.29)**</td>
<td>1.72 (1.14,2.60)**</td>
<td>1.07 (0.61,1.87)**</td>
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<td>&lt;12 years</td>
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<td>0.69 (0.40,1.20)**</td>
<td>1.98 (1.41,2.78)**</td>
<td>0.98 (0.59,1.63)**</td>
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<td>Maternal Marital Status</td>
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<td>1.14 (0.76,1.69)**</td>
<td>2.40 (1.78,2.34)**</td>
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<td>Maternal Insurance at Time of Delivery</td>
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<td>2.77 (0.86,8.89)**</td>
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<td>Public</td>
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<td>0.63 (0.41,0.97)**</td>
<td>2.65 (1.92,3.66)**</td>
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<tr>
<td>Total Prenatal Visits ≥10</td>
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<tr>
<td>Yes</td>
<td>9.42 (7.61,11.65)**</td>
<td>2.29 (1.56,3.35)**</td>
<td>2.36 (1.71,3.25)**</td>
<td>1.22 (0.81,1.86)**</td>
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<tr>
<td>&lt;25</td>
<td>6.28 (4.75,8.29)**</td>
<td>2.39 (1.54,3.69)**</td>
<td>2.09 (1.43,3.06)**</td>
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<td>&gt;35</td>
<td>0.67 (0.45,0.99)**</td>
<td>1.37 (0.79,2.38)**</td>
<td>1.08 (0.72,1.62)**</td>
<td>1.07 (0.68,1.71)**</td>
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<td>≥75th percentile</td>
<td>1.56 (1.30,1.87)**</td>
<td>1.29 (0.83,2.00)**</td>
<td>1.63 (1.21,2.19)**</td>
<td>1.26 (0.81,1.97)**</td>
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<tr>
<td>&lt;75th percentile</td>
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* P-value <0.05.

** P-value <0.01
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<tr>
<th>Infant Mortality (n=710)</th>
<th>ICD-10 Codes</th>
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<td>Rank</td>
<td>Cause of Death Category</td>
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<tr>
<td>1</td>
<td>Disorders related to length of gestation and fetal malnutrition (e.g. low birth weight)</td>
<td>P07</td>
<td>145</td>
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<tr>
<td>2</td>
<td>Congenital malformations, deformations, and chromosomal abnormalities</td>
<td>Q00-Q99</td>
<td>103</td>
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<tr>
<td>3</td>
<td>Complications of placenta (cord and membranes)</td>
<td>P02</td>
<td>85</td>
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<tr>
<td>4</td>
<td>Sudden infant death syndrome</td>
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<td>65</td>
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<tr>
<td>5</td>
<td>Newborn affected by maternal complications of pregnancy</td>
<td>P01</td>
<td>38</td>
</tr>
<tr>
<td>6</td>
<td>Symptoms, signs, and abnormal clinical and laboratory findings, not elsewhere classified</td>
<td>R00-R99</td>
<td>33</td>
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<tr>
<td>7</td>
<td>Infections specific to the perinatal period</td>
<td>P35-P39</td>
<td>33</td>
</tr>
<tr>
<td>8</td>
<td>Other conditions originating in the perinatal period</td>
<td>P96</td>
<td>25</td>
</tr>
<tr>
<td>9</td>
<td>Cardiovascular disorders originating in the perinatal period</td>
<td>P29</td>
<td>21</td>
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<tr>
<td>10</td>
<td>Other respiratory conditions originating in the perinatal period</td>
<td>P29</td>
<td>21</td>
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<td>Other</td>
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<table>
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<th>Neonatal Mortality (n=522)</th>
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<td>Disorders related to length of gestation and fetal malnutrition (e.g. low birth weight)</td>
<td>P07</td>
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</tr>
<tr>
<td>2</td>
<td>Complications of placenta (cord and membranes)</td>
<td>P02</td>
<td>85</td>
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<tr>
<td>3</td>
<td>Congenital malformations, deformations, and chromosomal abnormalities</td>
<td>Q00-Q99</td>
<td>72</td>
</tr>
<tr>
<td>4</td>
<td>Newborn affected by maternal complications of pregnancy</td>
<td>P01</td>
<td>37</td>
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<td>5</td>
<td>Infections specific to the perinatal period</td>
<td>P35-P39</td>
<td>32</td>
</tr>
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<tr>
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<td>Cardiovascular disorders originating in the perinatal period</td>
<td>P29</td>
<td>21</td>
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<td>9</td>
<td>Other respiratory conditions originating in the perinatal period</td>
<td>P28</td>
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<tr>
<td>10</td>
<td>Hemorrhagic and hematological disorders of newborn</td>
<td>P50-P61</td>
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<table>
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<tr>
<th>Postneonatal Mortality (n=188)</th>
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<td>Rank</td>
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<tr>
<td>1</td>
<td>Sudden infant death syndrome</td>
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<td>56</td>
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<td>Congenital malformations, deformations, and chromosomal abnormalities</td>
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<td>31</td>
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<tr>
<td>3</td>
<td>External cause of mortality</td>
<td>U01-U03, V01-Y89</td>
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<tr>
<td>4</td>
<td>Certain infections and parasitic disease</td>
<td>A00-B99</td>
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<td>5</td>
<td>Diseases of the respiratory system</td>
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<tr>
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<td>Symptoms, signs, and abnormal clinical and laboratory findings, not elsewhere classified</td>
<td>R00-R99</td>
<td>11</td>
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<tr>
<td>7</td>
<td>Diseases of the nervous system</td>
<td>G00-G99</td>
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<tr>
<td>8</td>
<td>Diseases of the circulatory system</td>
<td>I00-I99</td>
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<tr>
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<td>Diseases of the digestive system</td>
<td>K00-K95</td>
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<td>Other</td>
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<td></td>
<td>19</td>
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</table>

Category notes:
1. Complications of the placenta: placenta previa, placental separation and hemorrhage, prolapsed cord, etc.
2. Newborn affected by maternal complications of pregnancy: incompetent cervix, premature rupture of membranes (PROM), etc.
3. Symptoms, signs and abnormal clinical and laboratory findings: symptoms and signs involving the circulatory and respiratory systems, the digestive system and abdomen, etc.
4. Infections specific to the perinatal period: neonatal infective mastitis, intra-amniotic infection, urinary tract infection, etc.
5. Other conditions originating in the perinatal period: congenital renal failure, neonatal withdrawal symptoms from maternal use of drugs of addiction, therapeutic use of drugs, etc.
6. Hemorrhagic and hematological disorders of the newborn: newborn affected by intrapertum blood loss, umbilical hemorrhage of newborn, etc.
7. Certain infections and parasitic diseases: intentional infectious diseases, tuberculosis, viral hepatitis, etc.
a protective effect. Possibly, access to prenatal health care without any cost to the patient reduces other risk factors, such as prematurity and maternal pregnancy complications, and indirectly reduces the risk of neonatal mortality, which is driven by those risk factors. Conversely, public insurance appears to confer increased risk for postneonatal mortality. As public insurance reflects socioeconomic status, it may be a proxy for familial financial stress and possible challenges in accessing infant safe sleep products, exposure to second-hand smoke, and other risk factors for the top causes of postneonatal death. Further research to better understand this finding is important for improving programs and services aimed at reducing IM and tailoring IM prevention activities to specific populations at higher risk.

Understanding the leading causes of infant death for the two time periods is important for designing interventions in RI. Leading causes of death in the neonatal period indicate the need for increased interventions aimed at ensuring maternal access to prenatal care and optimizing maternal health during pregnancy. The leading causes of death in the postneonatal period suggest additional efforts aimed at reducing risks for infant sleep-related deaths, injuries, and illnesses are warranted.

LIMITATIONS
Our study had several limitations. First, although we used twelve years of data, RI has a relatively small population and our study had only 717 infant deaths. This may account for some differences in statistical significance compared to studies in other populations with larger numbers of infant deaths. Also, while we attempted to reduce the chance of misclassification of infant death, it is possible that some of the neonatal deaths may have been fetal deaths. Lastly, while this study shows a strong association between preterm birth and infant mortality, specific causes for preterm birth cannot be determined by the available data. The causes of preterm birth are multifactorial and in many cases a precise cause or risk factor is unknown.

CONCLUSIONS
Our study provides RI specific information about the risk factors for IM and leading causes of death, updating and expanding upon past analyses. Furthermore, our study identified differences in risk factors for neonatal and postneonatal IM in RI as well as areas for further study to better understand risk factor associations. Prematurity was found to be the primary driver of IM in RI. Public health and healthcare personnel in RI should continue to focus on prenatal health and reducing known risk factors and disparities in prematurity to reduce IM.

References
Acknowledgments

We would like to offer a special thanks to the Brown University School of Public Health, the Rhode Island Department of Health (RIDOH), and the Hassenfeld Child Health Innovation Institute for their support for this project.

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Pulmonary Hypertension Post Liver-Kidney Transplant

HAFIZ IMRAN, MD; MATTHEW JANKOWICH, MD; GAURAV CHOUDHARY, MD

ABSTRACT

Porto-pulmonary hypertension has been recently recognized in patients post-liver transplantation with or without pre-transplant hepatopulmonary syndrome. We present a unique case of pulmonary hypertension in a 65-year-old patient after simultaneous liver-kidney transplantation for cirrhosis secondary to chronic hepatitis C infection and alcohol use disorder and end-stage renal disease secondary to diabetic nephropathy. He presented to pulmonary hypertension clinic with progressive shortness of breath and elevated right-sided pulmonary pressures on echocardiogram. He did not have pre-transplant hepatopulmonary syndrome and his post-transplant liver and kidney functions were normal. His right heart catheterization showed normal capillary wedge pressure, elevated mean pulmonary artery pressure and high pulmonary vascular resistance with normal cardiac index. His symptoms and pulmonary pressures improved with ligation of AV fistula.

KEYWORDS: pulmonary hypertension, liver transplant, renal transplant, simultaneous liver-kidney transplant, post-transplant pulmonary hypertension

INTRODUCTION

Portopulmonary hypertension (PoPH) de novo after liver transplantation has been recognized recently either with or without pre-transplant hepatopulmonary syndrome (HPS). There are no reports of pulmonary hypertension occurrence following simultaneous liver-kidney transplants, which is becoming a more common procedure. We present a unique case of heart failure and pulmonary hypertension (PH) after simultaneous liver-kidney transplants in a patient, whose pulmonary artery pressures improved during post-transplant course without use of pulmonary arterial hypertension (PAH) specific therapy, but with arteriovenous (AV) fistula closure.

CASE PRESENTATION

A 65-year-old male was referred to pulmonary hypertension clinic for evaluation of exertional dyspnea and elevated pulmonary pressures on echocardiogram 9 months after simultaneous liver-kidney transplants. The patient received deceased donor simultaneous liver-kidney transplants for liver cirrhosis (secondary to chronic hepatitis C infection and alcohol use) and end-stage renal disease (secondary to diabetic nephropathy). The patient’s medical history was significant for systemic hypertension, diabetes mellitus with diabetic nephropathy and neuropathy and permanent atrial fibrillation. The patient had quit drinking and smoking 8 years ago after 50-pack years and had denied any illicit substance use since then. His pre-transplant course was complicated by portal hypertension, ascites and variceal bleeding requiring band ligation and hepatocellular carcinoma treated with radiofrequency ablation. His pre-transplant echocardiogram showed normal left ventricular systolic function (Ejection Fraction- 65–70%) with severe left atrial dilatation, moderately dilated right ventricle with normal systolic function (tricuspid annular plane systolic excursion 2.1 cm). A pre-transplant right heart catheterization had demonstrated borderline pulmonary hypertension with a normal pulmonary vascular resistance (PVR), but an elevated cardiac index (Table).

Table. Summary of Right Heart Catheterization Results

<table>
<thead>
<tr>
<th></th>
<th>Pre-Transplant</th>
<th>Post-Transplant</th>
<th>Post AVF closure</th>
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</thead>
<tbody>
<tr>
<td>Right Atrial Pressure (mm Hg)</td>
<td>10</td>
<td>11</td>
<td>4</td>
</tr>
<tr>
<td>Right Ventricular Pressure (mm Hg)</td>
<td>38/10</td>
<td>47/11</td>
<td>27/5</td>
</tr>
<tr>
<td>Pulmonary Artery Pressure (mm Hg)</td>
<td>38/14 (22)</td>
<td>49/21 (31)</td>
<td>29/11 (19)</td>
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<tr>
<td>Pulmonary Capillary Wedge Pressure (mm Hg)</td>
<td>14</td>
<td>15</td>
<td>12</td>
</tr>
<tr>
<td>Cardiac Output (L/minute)</td>
<td>8.0 (TD)</td>
<td>4.55 (TD)</td>
<td>3.4 (F)</td>
</tr>
<tr>
<td>Cardiac Index (L/minute/m2)</td>
<td>4.17 (TD)</td>
<td>2.25 (TD)</td>
<td>1.73 (F)</td>
</tr>
<tr>
<td>Pulmonary Vascular Resistance (Woods Unit)</td>
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<td>3.67</td>
<td>2.1</td>
</tr>
<tr>
<td>Systemic Vascular Resistance (Woods Unit)</td>
<td>7.75</td>
<td>12.45</td>
<td>25.31</td>
</tr>
</tbody>
</table>

Abbreviations: AVF; arteriovenous fistula, F; Fick’s method, TD; Thermodilution
Two months after uncomplicated liver-kidney transplant, the patient reported shortness of breath after walking about 20 feet, abdominal distension and leg swelling. He had experienced a weight gain of as much as 30 pounds above his pre-transplant weight and he was also noted to have pleural effusion. Laboratory values for his liver (Total bilirubin 1.2 mg/dl, Aspartate aminotransaminase 15 Units/L, Alanine aminotransaminase 12 Units/L, Alkaline phosphatase 101 Uni/L) and kidney functions were normal. He was started on oral furosemide with some improvement in his symptoms along with a decrease in body weight. His transthoracic echocardiogram showed normal left ventricular systolic function with Ej (Ejection Fraction 65–70%), mild concentric left ventricular hypertrophy, severe bi-atrial enlargement, normal right ventricular size and function (tricuspid annular plane systolic excursion 2.4 cm), moderate to severe tricuspid regurgitation with estimated right ventricular systolic pressure 50–60 mm of Hg, an increase from pre-transplant estimates. He underwent a right heart catheterization at this time which showed pulmonary hypertension with a cardiac index 2.35 L/minute/m², mean pulmonary artery pressure 31 mm Hg, pulmonary capillary occlusion pressure of 15 mm Hg and pulmonary vascular resistance of 3.67 Woods units consistent with pulmonary hypertension with a pre-capillary component (Table). Post-right heart catheterization, while on twice daily furosemide, he reported that he could walk one mile on alternate days without any dyspnea, and reported improved orthopnea and leg swelling, though his weight remained about 20 pounds above his pre-transplant weight. His medications at this time included aspirin 81 mg, cholecalciferol 2000 units, ferrous sulfate 325 mg, furosemide 60/40 mg, gabapentin 600mg three times daily, Insulin glargine 15 units bedtime and aspart 4 units three times daily, omeprazole 20 mg, quetiapine 25 mg bedtime, co-trimethoprim-sulfamethoxazole 400/800 mg and tacrolimus 2/1 mg daily. Physical examination showed jugular venous distension of ~9 cm of water, a palpable thrill over right supraclavicular region with dilated veins around a right arm AV fistula, an irregularly irregular pulse, mildly decreased air entry in right lower lung and 1+ pitting edema. His arterial blood gases prior to [pH-7.52, pCO₂-25 mmHg, pO₂-92 mmHg, SaO₂-98% and HCO₃-20.4 mEq on room air] and after [pH-7.44, pCO₂-44 mmHg, pO₂-81 mmHg, SaO₂-96% and HCO₃-29.9 mEq on room air] transplantation did not show any evidence of hypoxia. His liver enzymes post-transplantation were normal work up for pulmonary hypertension including serologic tests for connective tissue diseases, chest imaging, pulmonary function tests (forced expiratory volume-84% of predicted and forced vital capacity-92% of predicted without any bronchodilator response) and ventilation-perfusion scan was unremarkable. Given his abnormal examination findings and history suggesting possible high output failure, he was referred for closure of his AV fistula. After closure of his AV fistula, the patient’s shortness of breath improved over the course of several months without further intervention. A repeat right heart catheterization showed a decrease in cardiac index to 1.73 L/minute/m², mean pulmonary artery pressure to 19 mm Hg, pulmonary capillary occlusion pressure 12 mm Hg and PVR to 2.1 Woods units (Table). The patient is now able to walk 2 miles every day without any difficulty and his furosemide has been titrated down to 20 mg/day.

**DISCUSSION**

Our patient developed symptomatic pulmonary hypertension and heart failure following simultaneous liver-kidney transplants, in the absence of pre-existing HPS, and despite some improvement in hyperdynamic circulation after transplant. He then improved symptomatically and hemodynamically over the course of several months following AV fistula closure.

Development of de novo PH has been reported in 14 patients post-orthotopic liver transplant (OLT).1,2 It can occur in 3 settings, 1) presence of pre-OLT HPS, 2) recurrent cirrhosis with PoPH and 3) isolated PoPH without any prior HPS.3 Development of PoPH after liver transplant varies in different patients. Patients with prior HPS may develop PoPH usually within 1 year of OLT, whereas it may take years to develop in patients with recurrent acquired liver disease. Auceto et al. proposed 2 mechanisms to explain PoPH in patients with HPS, 1) resolution of HPS and hence decrease in intrapulmonary vasodilation, and 2) hyperdynamic pulmonary circulation with arteriolar remodeling leading to increased PVR.3 Both these processes make diagnosis of PoPH difficult, until post operatively. Acquired recurrent liver disease leads to portal hypertension and subsequent PoPH years after OLT. There is no clear etiology behind development of PoPH in patients without antecedent HPS or recurrent liver disease. It is not clear either if PoPH in these patients was idiopathic or as result of organ transplant. Unique to mechanisms discussed above, our patient developed PH within months after OLT in absence of pre-OLT HPS and post-OLT liver disease and does not clearly fall in the category of PoPH.

Prognosis of new PH post-liver transplant is poor regardless of predisposing etiology.4 Patients with delayed onset have relatively better prognosis than patients who have earlier recognition of PH. Prostacyclin, prostacyclin analogues, phosphodiestrase inhibitors and endothelin receptor antagonists have been used in treatment of pre-transplant PH with improvement in 6-minute walk distance, New York Heart Association (NYHA) functional class and survival rates.5,9 Liver transplant improves or completely normalizes pulmonary pressures in certain patients.10,11 Post-OLT de novo PH poses a different challenge for treatment of disease with poor prognosis. Endothelin receptor antagonists have been shown to have better outcomes in pre-transplant
PH patients, but there may be a concern to starting these agents in liver-transplant patients due to potential hepatotoxicity.7,8,12 Experimental studies have shown that tacrolimus reverses endothelial dysfunction in PAH patients by activating bone morphogenic protein receptor 2 (BMPR 2) by signaling pathway.13 Safety of low dose (target trough levels 2-5 ng/mL) tacrolimus (FK506) has been tested in a Phase IIa trial of PAH patients increase in levels of BMPR 2 [low in PAH].13 Spiekerkoetter et al. in a case series of 3 end-stage PAH patients showed that treatment with low dose Tacrolimus increased circulating BMPR2 levels with improvement in 6-minute walk test, NYHA class and freedom from hospitalization from right ventricular failure.15 Dose-dependent increase in BMPR2 was noticed in a proof-of-concept study to establish safety of Tacrolimus use in PAH patients.14 However, the role of immunosuppressive dose of tacrolimus in mitigating post-transplant PAH remains unknown.

Pulmonary hypertension has also been identified in patients with end-stage renal disease undergoing hemodialysis.16-18 Increased pulmonary vasoconstriction leading to increased vascular resistance and high output failure associated with AV fistula have been reported as possible explanations for pulmonary hypertension in these patients.19-22 Hyperdynamic circulation causes increased shear stress and high pressure in pulmonary arteries with normal pulmonary vascular resistance initially. Increased endothelin-1 (ET-1) and endothelin receptor-A have been reported in lung tissue with high blood flow in animal studies.23,24 Endothelin-1 is a potent vasoconstrictor and causes vascular smooth muscle cell hyperplasia. Significant correlation was reported between elevated ET-1 levels, pulmonary arterial pressures and pulmonary blood flow in newborns with systemic-to-pulmonary shunts. Correction of high blood flow has led to reversal of pulmonary vascular remodeling in animal models.25 Renal transplant has been associated with improvement in pulmonary hypertension.26 Our patient did not have any evidence of PoPH or HPS prior to liver-kidney transplants. He developed PH with elevated PVR within months post-OLT which is unique to previously reported cases of PoPH which has been reported in following settings 1) pre-transplant PoPH or HPS, 2) recurrent cirrhosis with PoPH or 3) isolated PoPH without any prior HPS. It is possible that in our patient, a persistent hyperdynamic circulation from a patent AV fistula led to pulmonary vascular remodeling with improvement after closure of AV fistula. Unfortunately, our patient did not undergo mean shunt flow measurement prior to or during ligation of AV fistula to evaluate if it was reason for high output state. But his cardiac output decreased from 4.9 L/minute to 4.5 L/minute with occluding local pressure on right heart catheterization prior to AV fistula ligation suggesting minimal flow through fistula. Additionally, patient did not have hemodynamics performed with exercise or with fluid challenge, which leaves heart failure with preserved ejection fraction as unaddressed differential diagnosis. Nonetheless, he does not have reported abnormal LV diastolic function on echocardiogram at rest and his filling pressures are normal as well. The number of simultaneous liver-kidney transplants has grown over the years and simultaneous liver-kidney transplant occurred in 8.2% of all liver transplants in 2014. Recognition of PH and addressing all factors potentially responsible for PH in this special patient population is important.

References


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Implications of Accurate Interpretation of Carcinoma in Prostate Biopsy

ALI AMIN, MD

Prostate carcinoma is the second leading cause of cancer in men in the United States (US). Despite controversies on the efficacy of prostate cancer screening, it has become more common in the US since the early 1990s. Among the screening methods, needle biopsy is the most powerful and reliable means of diagnosis of prostate adenocarcinoma (PCa) that dictates the management protocol and follow-up regimen.

A review of the Surveillance, Epidemiology and End Result Program (SEER) 2019 data shows that PCa survival depends on the extent [stage] of tumor at the time of diagnosis, with 100% survival for localized PCa. The excellent survival rate is regardless of the management protocol (surgery, radiation or observation).

Less aggressive observation management of PCa has become more popular nowadays due to the slow growth of this tumor. Based on the definition by the National Cancer Institute (https://www.cancer.gov/), observation management is divided into two categories:

**Active Surveillance (AS):** is used to avoid or delay the need for more aggressive treatments such as radiation therapy or surgery, which can cause side effects or other problems. During AC, certain exams and tests are done in a regular schedule.

**Watchful Waiting (WW):** is referred to closely watching patients with documented low to intermediate risk PCa by tests and examinations but not giving definite treatment unless symptoms appear or change. In addition to slow growing conditions, WW is sometimes used in conditions when the risks of treatment are greater than the possible benefits.

Based on the successful experience with AS, it is currently recommended in management of low risk PCa. The morphological criteria defining low risk PCa include: grade group 1 [Gleason score ≤6], low volume disease (<2-3 cores involved by adenocarcinoma, involving <50% of each core), PSA ≤10 ng/ml and clinical stage ≤T2a. Studies have revealed that despite a potential risk of delaying treatment and missing the window of curability, AS and [in certain cases] WW are the preferred option for management of patients’ quality of life. This mandates an accurate interpretation of the Gleason score.

There are controversies in the interpretation of prostate biopsies between general and genitourinary pathologists, including overgrading of Gleason pattern 4 and undergrading Gleason pattern 5 in needle biopsy. Among these, overgrading of pattern 4 appears to be of significant implication, especially because it can deprive the patient of AS and result in overtreatment.

Several morphological subtypes of Gleason pattern 4 PCa have been introduced, including [in decreasing order of frequency] poorly formed glands, cribriform, glomeruloid and hypernephromatoid subtypes. These subtypes are usually identified admixed with each other. Studies have revealed a worse outcome associated with cribriform and glomeruloid subtypes, but there is not enough data to support the behavior of other subtypes, especially the poorly formed glands. It appears that the most discrepancy in diagnosis of Gleason pattern 4 stems from detection and quantity of poorly formed Gleason pattern 4.

Some studies recommend radical treatment procedure for PCa containing a significant amount of Gleason pattern 4 with cribriform morphology; however, others report that AS is an acceptable management method when confronting limited Gleason pattern 4 in grade group 2 PCa (<50% Gleason pattern 4 limited to a single area). This mandates a systematic and careful grading of PCa by the pathologists with quantitating the higher grade component. Epstein et al have advised practicing caution in overcalling Gleason pattern 4 in suspected poorly formed glands. Other experts have provided more objective criteria to facilitate diagnosis of poorly formed pattern 4, including practicing caution in calling limited (<50%) poorly formed glands immediately adjacent to well-formed glands.

In our practice, we have confronted discrepancies in the interpretation of Gleason score where our review altered the management in up to 8% of the cases. Some of the most common discrepancies we identified included overcalling adenocarcinoma in foci with high grade prostatic intraepithelial neoplasia (HGPIN) and outpouching of atypical small acinar proliferation (ASAP) next to HGPIN, overcalling limited poorly formed glands admixed with well-formed glands as pattern 4, overcalling branching glands as Gleason pattern 4 and overcalling pattern 5 in intraductal spread of acinar PCa. Similarly, it is unnecessary to provide confusing information like numerical Gleason grade to mimickers of PCa [i.e. ASAP].

In order to provide a standard format of reporting PCa
in needle biopsy, the College of American Pathologists [https://www.cap.org/], Genitourinary Pathology Society [https://www.gupathsociety.org/] and International Society of Urological Pathologists [https://isupweb.org/isup/] provide up-to-date standard protocol templates and guidelines that can reduce discrepancies in interpretation. It is essential that pathologists and men’s health caregivers follow the guidelines in diagnosis and grading of PCa to facilitate proper management and prevent potential liability.

References

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A Retrospective Analysis of Nursing Home to ED Transfer Correspondence Length and ED Length of Stay

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ABSTRACT
OBJECTIVES: To describe a) the length of nursing home (NH) to emergency department (ED) transfer correspondences and b) determine the relationship between NH-ED transfer correspondence length and ED length of stay (LOS).

METHODS: This is a secondary analysis of a retrospective cohort study that examined the health records of NH patients who visited one of three Rhode Island EDs included in the study. We used descriptive statistics to examine correspondence length and ED LOS and median quantile regression to evaluate the association between correspondence length and ED LOS.

RESULTS: Of the 456 ED visits, the median correspondence length was 12 pages (25th, 75th percentile: 8.5, 17 pages). For every one-page increase in correspondence length, the median ED LOS was not significantly changed (Coefficient: 0.82 minutes, 95% CI: -0.56, 2.19).

CONCLUSIONS: While correspondence length was not associated with ED LOS, this study suggests that stakeholders should work to decrease documentation burden.

KEYWORDS: nursing home, emergency department, length of stay, transfer documentation, transitions of care

INTRODUCTION
Patients from nursing homes (NH) account for 2.2 million emergency department (ED) visits annually.1 These patients often present with nonspecific medical concerns, have multiple comorbidities, and frequently a component of cognitive impairment. Only 28% of NH patients are able to provide a history of present illness, showcasing the importance of accurate written communication between NHs and EDs.2 The state of Rhode Island (RI) requires the completion of a standardized NH-ED transfer correspondence, the Continuity of Care (COC) form, for each patient transferred from a NH to the hospital. This one-page form displays essential information about the NH resident including patient name, emergency contacts, advanced directives, comorbidities, medications, and reason for transfer. However, NHs often supplement the COC form with additional medically-relevant information beyond the one-page document.

The effects of longer NH-ED transfer correspondence on patient care, particularly ED length of stay (LOS), is unknown. The medical implications of increased ED LOS include increased risk of delirium and pneumonia for patients.3,4 In addition, the detriments of increased ED LOS to physicians include decreased usage of evidence-based guidelines, information overload, and decision fatigue.5 The purpose of this study is to [a] describe the NH-ED transfer correspondence length in a cohort of NH patients presenting to three EDs in RI and to [b] determine the relationship between NH-ED transfer correspondence length and ED LOS. Due to the time required by clinicians to review extensive NH-ED transfer documentation, we hypothesize that an increasing length of NH-ED transfer correspondence will result in an increased ED LOS.

METHODS
2.1 Study Design, Setting, and Population
In this secondary analysis of a retrospective cohort study we examined ED visits from September 2015 to September 2016 between RI NHs and the three EDs of RI’s largest health system, which include an academic level I trauma center, an academic community hospital, and a community hospital (Table 1).1 To obtain an accurate representation of the population’s ED visits, we randomly sampled charts stratified by hospital with proportional allocation. For patients transferred multiple times within the study timeframe, only the index ED visit was included in the analysis to avoid undue influence from the prior ED visit’s transfer correspondence or disposition decision. Visits by patients 18 years or older who were directly transferred from a NH to an ED were eligible for inclusion in the study. Visits of patients transferred from assisted or independent living facilities, under

<table>
<thead>
<tr>
<th>Hospital</th>
<th>Median ED LOS (Minutes)</th>
<th>Annual Census (Visits)</th>
</tr>
</thead>
<tbody>
<tr>
<td>Academic, level I trauma ED</td>
<td>290</td>
<td>107,092</td>
</tr>
<tr>
<td>Academic community ED</td>
<td>264</td>
<td>68,353</td>
</tr>
<tr>
<td>Community ED</td>
<td>163</td>
<td>32,608</td>
</tr>
</tbody>
</table>

Table 1. 2016 Characteristics of Included Hospitals
CONTRIBUTION

Psychiatric observation in the ED, and those without any NH-ED transfer correspondence were excluded. The Institutional Review Board of the hospital approved the study.

2.2 Data Collection
All data was collected from the electronic health records (EHRs) of patients according to best practices for chart review, which included scanned copies of the transfer correspondences. Transfer correspondences included both typed and handwritten communication.

2.3 Measures
The outcome measure, ED LOS, was abstracted from the EHR. ED LOS was measured in minutes as the time from the patient’s earliest contact with the ED (triage, registration) until the patient was discharged from or admitted to the hospital. We measured correspondence length as the number of pages included in the NH-ED transfer correspondence. Documentation by Emergency Medical Services was not included in the correspondence page determination. Age, gender, race, Emergency Severity Index (ESI), comorbidities, and disposition (admission or discharge) were abstracted from the EHR. Age was categorized into less than 65, 65 to 74, 75 to 84, and 85 years and older. Triage acuity was based on the ESI, a 1 to 5 scale, with 1 representing patients in need of immediate resuscitation and 5 representing non-urgent patient presentations. An ESI of 1 or 2 was categorized as “high acuity” while 3, 4, and 5 was considered “low acuity”. We determined the Charlson Comorbidity Index score for each patient by referencing the medical conditions documented for each patient in the EHR. The Charlson Comorbidity Index predicts one-year mortality rates for patients based on the number and severity of a patient’s comorbidities.7 Lastly, the day of the week was dichotomized into either weekday (Monday through Friday) or weekend (Saturday and Sunday).

2.4 Data Analysis
First, we performed descriptive analysis. We determined the median LOS, correspondence length, and the distribution of characteristics within the study sample. Second, a median quantile regression was used to determine the unadjusted and adjusted coefficients between correspondence length and ED LOS. Outliers were determined by visual inspection of ED LOS and NH-ED correspondence length box plots. We conducted sensitivity analyses with and without potential outliers. We made the assumption that correspondence length and ED LOS had a linear relationship. This may not be true, but we conducted sensitivity analyses using differing categorizations of correspondence length and the results remained the same. Statistical analysis was completed using Stata version 15.1 (StataCorp, College Station, TX).

RESULTS
Of 1,926 eligible NH-ED transfers, 474 were sampled and 456 visits met inclusion criteria. The sample population was primarily white, female, 85 or older, and had an ESI of 1 or 2 (Table 2). The majority of patients presented to the academic, level 1 trauma ED and were admitted to the hospital (Table 2).

The median correspondence length was 12 pages with a 25th and 75th percentile of 8.5 and 17 pages (Table 2), while the range was from 1 to 112 pages. The median ED LOS for the study population was 348 minutes (IQR 178.5 minutes,

Table 2. Patient, Visit, and Correspondence Characteristics of Included ED Visits (n=456)

<table>
<thead>
<tr>
<th>Characteristics</th>
<th>(n)</th>
</tr>
</thead>
<tbody>
<tr>
<td><strong>Age</strong></td>
<td></td>
</tr>
<tr>
<td>Less than 65</td>
<td>21.5%   (98)</td>
</tr>
<tr>
<td>65 to 74</td>
<td>19.7%   (90)</td>
</tr>
<tr>
<td>75 to 85</td>
<td>21.1%   (96)</td>
</tr>
<tr>
<td>85 and older</td>
<td>37.7%   (172)</td>
</tr>
<tr>
<td><strong>Race</strong></td>
<td></td>
</tr>
<tr>
<td>White</td>
<td>86.0%   (392)</td>
</tr>
<tr>
<td>Other</td>
<td>14.0%   (64)</td>
</tr>
<tr>
<td><strong>Gender</strong></td>
<td></td>
</tr>
<tr>
<td>Female</td>
<td>57.2%   (261)</td>
</tr>
<tr>
<td>Male</td>
<td>42.8%   (195)</td>
</tr>
<tr>
<td><strong>Charlson Comorbidity Score (Median (IQR))</strong></td>
<td>2 (3)</td>
</tr>
<tr>
<td><strong>ESI</strong></td>
<td></td>
</tr>
<tr>
<td>1 and 2</td>
<td>60.4%   (274)</td>
</tr>
<tr>
<td>3, 4, and 5</td>
<td>39.7%   (180)</td>
</tr>
<tr>
<td><strong>Hospital</strong></td>
<td></td>
</tr>
<tr>
<td>Academic, level 1 trauma ED</td>
<td>55.7%   (254)</td>
</tr>
<tr>
<td>Academic community ED</td>
<td>38.6%   (176)</td>
</tr>
<tr>
<td>Community ED</td>
<td>5.7%    (26)</td>
</tr>
<tr>
<td><strong>Day of the Week</strong></td>
<td></td>
</tr>
<tr>
<td>Weekday</td>
<td>74.1%   (338)</td>
</tr>
<tr>
<td>Weekend</td>
<td>25.9%   (118)</td>
</tr>
<tr>
<td><strong>Disposition</strong></td>
<td></td>
</tr>
<tr>
<td>Admitted</td>
<td>70.4%   (321)</td>
</tr>
<tr>
<td>Discharged</td>
<td>29.6%   (135)</td>
</tr>
<tr>
<td><strong>LOS (Median (IQR))</strong></td>
<td>349 (178.5)</td>
</tr>
<tr>
<td>Academic, level 1 trauma ED LOS</td>
<td>389 (197)</td>
</tr>
<tr>
<td>Academic community ED LOS</td>
<td>318 (152.5)</td>
</tr>
<tr>
<td>Community ED LOS</td>
<td>300 (208)</td>
</tr>
<tr>
<td><strong>Correspondence Length (Median (25th, 75th percentile))</strong></td>
<td>12 (8.5, 17)</td>
</tr>
</tbody>
</table>

* Variables have less than 1% of data missing
Note: Not all percentages add to 100% due to rounding
The median LOS increased by 0.54 minutes [95% CI -0.81, 1.90] for every one-page increase in correspondence length. When accounting for the characteristics in Table 2, every one-page increase in correspondence length increased the median ED LOS by 0.82 minutes [95% CI -0.56, 2.19]. Two outliers were identified and included one extreme correspondence observation and one extreme ED LOS observation. The significance of the relationship between length of NH-ED transfer correspondence and ED LOS did not change when potential outliers were removed.

DISCUSSION
In this retrospective cohort study of NH patients visiting three academic and community EDs in RI, the median page length of NH-ED transfer correspondence was 12 pages. While NH-ED transfer correspondence length was not significantly associated with prolonged ED LOS in this study, there is an urgent need for solutions that decrease the documentation burden on NH staff and ED clinicians. “Information overload” can lead to ineffectual use of time, delayed decision-making, and decision paralysis.

In a recent qualitative study, ED clinicians perceived NH-ED transfer correspondences to be ineffective at communicating necessary information and were perceived as overly detailed often hindering the providers from reviewing the patient’s NH records. Among other industries, poor information quality, organization, and excessive quantity of information were also found to reduce work performance and organizational productivity among workers. It is widely accepted that the adoption of the EHR has led to clinicians spending more time with record review and documentation and less time at the bedside with patients. This has important implications on physician wellness and yet little research has been performed on how to improve the performance and organizational productivity among workers. It is widely accepted that the adoption of the EHR has led to clinicians spending more time with record review and documentation and less time at the bedside with patients. This has important implications on physician wellness and yet little research has been performed on how to improve the current status quo. In a study of almost 350 primary care physicians, time pressures relating to EHR adoption lead to decreased job satisfaction, increased stress, and intent to leave the practice. Patients, particularly older adults, also report being less satisfied with their care when they spend less time with physicians.

The adoption of a standardized care transition form for NH-ED transfers may improve the content, quality, and quantity of written communication received from NHs. As a result of this study and subsequent meetings of NH and ED stakeholders in RI, a new statewide NH-ED transfer correspondence form was adopted by the Department of Health for NH-ED transfers to improve the relevance of information provided during this care transition. This form was designed to succinctly communicate what is relevant to hospital staff [including ED providers] about the patient’s chief complaint and their medical history. Patients, clinicians, and NH staff stand to benefit from solutions that address information overload.

The limitations of this study include possible unmeasured factors and misclassification of NH-ED correspondence length. While we used a well validated comorbidity index and visit acuity level to control for the factors that contribute to ED LOS, we were unable to control for all factors associated with both ED LOS and NH-ED correspondence length such as reason for ED visit. Additionally, we were unable to quantify the volume of NH-ED correspondence allocated to each specific category of information (e.g. medication lists, past medical history, reason for transfer).

CONCLUSIONS
In this study, half of all NH-ED transfer correspondences were more than twelve pages. While lengthy NH-ED transfer correspondences did not prolong ED LOS, this research suggests that NH-ED transfer correspondence forms should be a target of efforts to reduce documentation burden on clinical staff.

References


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Efficacy of Computed Tomography Utilization in the Assessment of Acute Traumatic Brain Injury in Adult and Pediatric Emergency Department Patients

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ABSTRACT

BACKGROUND: Computed tomography (CT) is commonly used to assess traumatic brain injury (TBI) in the emergency department (ED). Radiologists at a Level 1 trauma center implemented a novel tool, the RADiology CATegorization (RADCAT) system, to communicate injuries to clinicians in real time. Using this categorization system, we aimed to determine the rates of positive head CTs among pediatric and adult ED patients evaluated for TBI.

METHODS: We performed a retrospective analysis of all patients who received a head CT to assess for TBI. We classified head CTs using the RADCAT tool. On a 5-point scale, scores of 3 or less are considered normal or routine. Scores of 4–5 are considered high priority, representing findings such as intracranial bleeding.

RESULTS: Of the 5,341 head CT’s obtained during the study period, 992 (18.5%) had high priority results (scores 4–5). A large number of pediatric studies, 30.8%, were positive for high priority results. Among the adult population, 18.0% contained high priority results.

CONCLUSION: The pediatric population had a higher rate of high priority reads among those undergoing non-contrast head CT for TBI compared to adult patients.

INTRODUCTION

Background

The appropriate use of imaging studies, especially those associated with radiation exposure, is an important consideration for both physicians and patients. It is particularly salient in the pediatric and young adult populations (age < 26 years). There is a reported increased cancer incidence, as high as 24%, among those with early radiation exposure compared to those of the same age without radiation exposure from imaging. When using imaging modalities associated with ionizing radiation, physicians must weigh the theoretical risk of oncogenesis, with the risk of missing a clinically significant injury.

Importance

Radiologists mitigate the risk of radiation exposure by decreasing radiation doses based on age and weight, but the risk is still non-zero. Initiatives such as the Image Gently campaign, and the American College of Emergency Physicians “Choosing Wisely” campaign emphasize the use of judicious imaging. Emergency physicians often use clinical support aids to guide imaging use. These guidelines include validated support tools, such as the Canadian CT Head Rule, NEXUS head CT, and PECARN clinical decision support aids. However, evidence suggests that head CT use continues to increase without a change in the overall positive predictive value of the study. In some physician groups, the use of head CT imaging may be unchanged or increased despite the use of validated clinical support aids, while some groups report a decrease in imaging use with these tools. Some of this increase in imaging use may be attributed to physicians who are unaware of recommended guidelines. Approximately 70% of physicians overuse imaging studies even when institutional practices encourage the use of clinical decision support aids.

In our study, a Level 1 trauma center implemented a new system of communication between radiologists and clinicians, the RADiology CATegorization (RADCAT) system. In real time, high priority findings such as subdural hemorrhage or skull fractures are given scores of “four” or “five”, while normal or incidental findings are scored as “one”, “two”, or “three”. This novel reporting tool enables clinicians to rapidly identify priority radiological findings.

Goals of this Investigation

Assigning the RADCAT designation to studies helps to improve the quality of care provided, by flagging patient findings as urgent or non-urgent on ED head CT imaging. This finding can inform local applicability and efficacy of validated decision support tools. The first step in this process is to identify the prevalence of high priority findings in patients who receive ED head CT imaging. In this study, we assessed the number of high priority head CT findings after the implementation of the RADCAT system.

METHODS

Study Design and Setting

This study was a retrospective quality improvement analysis, where we sought to evaluate the number of positive CT studies in patients presenting to the Emergency Department...
acutely for the assessment of TBI. We identified all adult and pediatric patients presenting to the adult and pediatric emergency departments affiliated with a Level 1 trauma center between November 1, 2017, and February 22, 2018, who received a non-contrast head CT to assess head injury. Adult ED visits, those >=18 years old, total approximately 110,000 visits per year while pediatric ED visits, those <18, total approximately 60,000 annual visits. All CT’s were initial studies ordered by the emergency medicine provider. We excluded all head injury patients who did not receive a non-contrast CT of the head, as well as patients who received other imaging of the body including the chest, spine, abdomen, and extremities (i.e. “trauma pan-scan”). We collected data on patient age, gender, and RADCAT classification.

Data Analysis
We computed the ratios of the number of positive (RADCAT > 3) vs. negative (RADCAT <= 3) CTs for all patients presenting with head injury. Positive findings include findings such as hemorrhage (epidural, subdural, subarachnoid, intracerebral), diffuse axonal injury, or skull fracture. We stratified the prevalence of positive injury by age and report the counts and percentages.

RESULTS
We found that of the 5,341 head CTs obtained during this period, n=992 (18.5%) had high priority results. Two hundred fifty (4.7%) of the head CTs were from the children’s ED, n=77 (30.8%) of these studies were coded with high priority results. Therefore, for every 3.25 completed non-contrast head CTs in the pediatric population, 1 study yielded high priority findings. Among the 5,091 adult non-contrast head CTs, n=915 (18.0%) yielded high priority results. In this population, for every 5.56 head CTs performed, 1 study yielded a high priority result. Figure 1 shows the age specific distribution of positive findings as clustered in 9-year intervals.

DISCUSSION
This analysis found a higher proportion of high priority results in the pediatric population than in the adult population. In children, approximately 1 in 3 head CT's were associated with a RADCAT 4/5 designation or high priority result compared to approximately 1 in 5 head CTs in the adult population. Patients aged 18-45 had the lowest rates of positive findings: less than 1 in 7. This finding suggests that clinicians may be more selective about ordering head CT’s for pediatric patients than they are for adult patients at our institution. Notably, the percentage of positive findings in the pediatric cohort is higher, 30.8%, compared to prior studies reporting a positive CT rate of 1-9% in this age group. This discrepancy may be attributed to recent efforts within our pediatric trauma center to reduce CT utilization and perform ancillary imaging studies, or observation in patients of young age.

Clinical decision aids can decrease CT imaging particularly in pediatric patients. Based on the findings presented in this study, support tools may be more frequently applied in pediatric patients with mild traumatic brain injury accounting for the high detection rates using. Previous studies have illustrated that implementing clinical support aids for patients with mild traumatic brain injury can decrease the use of CT imaging as much as 13.4%, when comparing pre-intervention and post-intervention populations. Communication among emergency physicians and radiologists is essential if we are to mitigate the use of unnecessary CT scanning. The novel reporting tool presented in this study will improve communication between radiologists and clinicians. Improved communication has implications for both clinical practice and research and may lead to improved ease of validation for radiology specific clinical support tools.

LIMITATIONS
Our study has several limitations restricting the generalizability of our findings. This report was a retrospective

Figure 1. Number of positive (RADCAT 4/5) CTs for head injury compared to negative

(RADCAT 1/2/3) as distributed across patient age. The red curve is the ratio of all studies to positive, or the “number needed to CT” for each positive study.

CT = computed tomography
RADCAT = RADiation CATegorization
analysis and was not designed to assess patient outcomes associated with reported high priority results. For example, of the high priority results noted in this cohort, it is unknown which of those resulted in neurosurgical intervention or prolonged hospitalization. It is also unclear if clinical decision support tools were applied to the patients imaged in this study population. Additionally, though the radiologists defined high priority results a priori, there was no verification of the consistency or interrater reliability of the interpretation of these results among radiologists. The study duration was also only five months in the immediate period after the universal implementation of the RADCAT protocol.

CONCLUSIONS

CT scan utilization was more refined in our pediatric trauma population, when assessing for TBI. The pediatric population had a higher rate of positive findings per head CT completed, when compared to the adult patients which may be secondary to higher use of clinical decision tools. Future research should include a prospective analysis of CT imaging and clinical decisions support use among the adult and pediatric patient populations presenting traumatic brain injury at our institution and will include outcome assessment for these patients using the novel radiology tool.

References


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Pre-exposure prophylaxis (PrEP) is an effective tool for preventing HIV infection among men who have sex with men (MSM), but its cost-effectiveness has varied across settings. Using an agent-based model, we projected the cost-effectiveness of a statewide PrEP program for MSM in Rhode Island over the next decade. In the absence of PrEP, the model predicted an average of 830 new HIV infections over ten years. Scaling up the existing PrEP program to cover 15% of MSM with ten or more partners each year could reduce the number of new HIV infections by 33.1% at a cost of $184,234 per quality-adjusted life-year (QALY) gained. Expanded PrEP use among MSM at high risk for HIV infection has the potential to prevent a large number of new HIV infections but the high drug-related costs may limit the cost-effectiveness of this intervention.

**KEYWORDS:** HIV pre-exposure prophylaxis, agent-based modeling, cost-effectiveness, men who have sex with men

**BACKGROUND**

Similar to national trends, men who have sex with men (MSM) represent the majority of people newly diagnosed and living with HIV infection in Rhode Island. Once-daily pre-exposure prophylaxis (PrEP) represents an effective prevention tool that has the potential to decrease the number of new HIV infections occurring among MSM.

Recent mathematical models have demonstrated that the expansion of PrEP use among MSM may have benefits at the population level in terms of reducing HIV incidence. However, many studies have produced mixed results in terms of the cost-effectiveness of scaling up this intervention. A recent analysis found that PrEP initiation among 20% of MSM in the United States would result in a 13% reduction in new HIV infections over 20 years but would not be considered cost-effective unless those most vulnerable to HIV infection were prioritized for PrEP initiation.

As many jurisdictions make important decisions about supporting scale-up of PrEP use among MSM, the clinical and economic benefits in local settings must be understood. To date, few studies have expanded the cost-effectiveness of real-world PrEP implementation in specific settings with models parameterized to represent local epidemiologic and behavioral contexts. In the current study, we simulated HIV transmission using an agent-based model representing all MSM in Rhode Island and considered the cost-effectiveness of various PrEP implementation scenarios.

**METHODS**

All model parameters and processes have been described previously. In brief, the agent-based model simulated HIV transmission from 2013 to 2022 among a population of individuals referred to as agents representing all MSM in Rhode Island ($n = 25,000$). The agents in the model were assigned specific demographic, behavioral, and clinical characteristics with distributions informed by data on MSM in Rhode Island, with estimates from the literature used as needed (Table 1).

The model progressed in a series of discrete time-steps, each representing one calendar month. During each time-step, agents were able to form and dissolve sexual partnerships. In the context of serodiscordant partnerships, agents could...
acquire HIV infection by engaging in condomless anal intercourse. Following infection, an agent could be tested and diagnosed, initiate antiretroviral treatment, or achieve viral suppression. Agents without HIV infection were eligible to initiate PrEP use based on the specific allocation scenario. Those who initiated PrEP could achieve an optimal level of adherence and discontinue PrEP use at any time (Table 1).

Model Scenarios
The model predicted the total number of new HIV infections over ten years under three PrEP allocation scenarios with varying levels of intervention coverage (5% to 25%, in 5% increments). The first set of scenario allocated PrEP to individuals similar to those currently receiving PrEP from the Rhode Island STD Clinic, while the two other sets of scenarios allocated PrEP to MSM with at least five or ten sexual partners each year, respectively. Each scenario is simulated for 1,000 iterations. Each scenario summarized as the mean number of HIV infections averted relative to a ‘status quo’ scenario where PrEP implementation does not occur.

Cost and Utility Assumptions
The annual operating cost of providing PrEP to one patient was estimated using a health system perspective (Table 1). Costs were derived from an analysis of the PrEP program at the Rhode Island STD Clinic. For each scenario, we calculated the cost per quality-adjusted life-year (QALY) gained relative to the ‘status quo’ scenario. Based on current guidelines, a scenario was considered cost-effective if this value was under a threshold under $100,000 QALY gained. Because drug-related costs represent the primary driver of program costs, we conducted sensitivity analyses where these costs were reduced (10% to 90%, in 10% increments).

RESULTS
In the absence of PrEP use, the model estimated an average of 830 new HIV infections over ten years, corresponding to an incidence rate of 3.5 infections per 1,000 person-years. With all strategies, increasing PrEP use resulted in proportionate reductions in HIV incidence (Figure 1).

If the current patient population served by the PrEP program were to be scaled up to cover 15% of MSM for ten years, the cumulative number of new HIV infections could be reduced by 26.1%. This scenario generated an increment $305 billion in healthcare-related costs and $73 billion in savings on HIV care, corresponding to $260,050 per QALY gained. Although increasing coverage to 25% would reduce the number of new HIV infections by 41.1%, the total cost and incremental cost-effectiveness increased because of the diminished benefits of additional PrEP use (Table 2).

Should 15% of MSM with five or more sexual partners each year use PrEP over the next ten years, the cumulative number of new HIV infections could be reduced by 33.1% and further reduce the cost per QALY gained to $184,234. Despite

Figure 1. Cumulative number of HIV infections among MSM in Rhode Island from 2013 to 2022 with varying PrEP coverage (a) with scale-up among the current patient population of the RI STD Clinic; (b) targeted scale-up to individuals with greater than 5 partners per year; and (c) targeted scale-up to individuals with greater than 10 partners per year, relative to a scenario where PrEP is not available.
in line with current guidelines,13 individuals may use PrEP. Patients at the Rhode Island STD Clinic are prescribed PrEP. The costs associated with PrEP use in this setting. Although efficiency of PrEP use in averting HIV infections or reducing research should investigate strategies to improve the effectiveness among MSM in the United States may be cost-saving in drug-related costs ($87,416 per QALY gained). 

**DISCUSSION**

This analysis demonstrates that the use of PrEP in MSM could have a substantial impact on the HIV epidemic in Rhode Island. If the current PrEP program at the Rhode Island STD Clinic were to be scaled up to cover 15% of MSM in the state over ten years, one-quarter of new infections could be prevented. However, PrEP is a costly intervention, largely due to the high costs of the drugs used in PrEP. If the annual cost of PrEP decreased by 40%, PrEP could be considered broadly cost-effective in this setting.

Several other analyses have also found that PrEP implementation among MSM in the United States may be cost-effective when targeted to individuals at highest risk for HIV infection, and that the cost-effectiveness of PrEP use is dependent on the associated drug costs. As such, future research should investigate strategies to improve the efficiency of PrEP use in averting HIV infections or reducing the costs associated with PrEP use in this setting. Although patients at the Rhode Island STD Clinic are prescribed PrEP in line with current guidelines,13 individuals may use PrEP even if they report fewer risk behaviors, decreasing its impact on HIV transmission while increasing costs. PrEP may be made more efficient in averting HIV infections if its uptake is targeted to those located centrally in sexual networks at high-risk for HIV infection.14

These analyses are not without limitation. The model does not account for the possibility that PrEP use may facilitate the emergence of drug resistance among those who initiate PrEP during acute HIV infection or those who acquire HIV infection with sub-therapeutic drug concentrations.15,16 A previous study found that the emergence of drug resistance due to the PrEP largely does not affect cost-effectiveness.10 In addition, the model does not account for co-circulating STIs. As such, an individual's probability of HIV transmission or acquisition may be underestimated, as these probabilities may be higher for individuals with a bacterial STI.17 In addition, previous modeling studies have suggested that the regular screening of individuals using PrEP for STIs has benefits at the population level.18 As such, we may underestimate the true health care costs saved due to PrEP use and the associated testing and treatment of other STIs.

**CONCLUSION**

We found that PrEP use among MSM in Rhode Island has the potential to prevent a considerable number of new HIV infections over a decade. However, expanded PrEP use is expensive. PrEP use among MSM at high risk of HIV acquisition provides substantial benefits at a lower cost, although its budgetary impact is still sizable. The high drug-related costs of PrEP are a significant barrier to cost-effective scale-up of PrEP implementation in this context. Drug costs must be reduced for PrEP to become an affordable HIV prevention option.

**Acknowledgments**

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Secondary Megacystic Megaureter and Giant Hydronephrosis Presenting as Hematemesis

VINCENT LABARBERA, MD; DELANEY CONWAY GOULET, MD

KEYWORDS: urinary retention, hematemesis, urethral stricture, giant hydronephrosis

A 60-year-old man with a past medical history of idiopathic urethral stricture status post-dilatation 15 years earlier and gastroesophageal reflux presented to the emergency department with syncope after vomiting blood. He reported two months of progressive abdominal distension with nausea and two days of vomiting and retching, culminating in a bout of hematemesis. He reported “normal” urination (including on day of presentation) as well as regular bowel movements over the past two months; however, his last bowel movement was four days prior to presentation. He also noted intermittent pink urine, but had no other urinary or bowel complaints. He denied previous hematemesis, hematochezia or melena.

Physical examination in the emergency department revealed tachycardia to 130, temperature of 98.6 degrees Fahrenheit, and blood pressure of 142/73. A general examination was notable for cachexia, pallor, and a significantly distended and tympanic abdomen and suprapubis, without significant tenderness on palpation. Bladder ultrasound indicated retention of at least 1000 milliliters. A Coude catheter placement was unsuccessful, and urology was consulted and placed a suprapubic catheter, yielding greater than nine liters of urine.

Laboratory evaluation revealed hemoglobin 8.9 g/dl, BUN 175 mg/dl, and Creatinine 14.9 mg/dl (baseline 0.8). Nephrology recommended frequent electrolyte monitoring and replacement and replacement of renal fluid losses. Esophagogastroduodenoscopy (EGD) revealed chronic Grade D esophagitis, using the Los Angeles Classification System (one or more mucosal breaks involving at least 75% of esophageal circumference), and pathology demonstrated severe inflammation and ulceration without metaplasia.

His 18-day hospitalization consisted of fluid replacement for post-obstructive diuresis of five to six liters daily, electrolyte repletion, and cardiopulmonary monitoring via telemetry. His course was complicated by Serratia marcescens cystitis, as well as colonic obstipation requiring manual disimpaction. By time of discharge, urine output fell to two liters daily and creatinine decreased to 4.65. After six months the patient’s new creatinine baseline was 3.5 mg/dl. He remains off hemodialysis with suprapubic catheter. Two years after this event, he continues to struggle with recurrent urinary tract infection, but has had no recurrent hematemesis and his hemoglobin has remained stable near 14 g/dl.

DISCUSSION
This article reports on a remarkable case of chronic urinary retention of 9 liters of urine, attributed to prior urethral stricture disease, resulting in massive urinary bladder distension.

Figures 1–4 reveal the extensive nature of this patient’s secondary megacystic megaureter and giant hydronephrosis.
primary bladder neck obstruction, 9 have been reported to stone disease, trauma, renal ectopy, ureteral tumor, and mechanical causes of ureteropelvic junction obstruction, causing giant hydronephrosis and giant bladder. Other presentations reported are lower abdominal pain, distension, and constipation, of which our patient also complained. Rectal bleeding without urinary symptoms has also been reported as a complication of urinary retention. Rectal bleeding without urinary symptoms.14-17

This patient’s giant distended bladder likely caused colonic pseudoobstruction via mass effect on the colon, resulting in a subsequent exacerbation of chronic esophagitis (the presumed etiology of the chronic esophagitis being severe gastroesophageal reflux disease), acutely presenting as hematemesis.

Urinary retention, which can be acute or chronic, is defined as a palpable or percussable bladder. It can be painful, especially in the setting of inability to pass urine (as is the case in acute urinary retention) versus non-painful, in the setting of retaining the ability to pass urine (as is the case in chronic urinary retention). Chronic urinary retention is also defined as post-void residual of more than 300 milliliters in men who are able to void, or more than 1000 milliliters in men who are unable to void. Although the nine liters of urine removed upon presentation in this case is quite impressive and dwarfs the consensus definition of chronic urinary retention as described previously, it is not the only report of giant hydronephrosis (defined as greater than one liter held within the renal collecting system) or massive urinary retention,5,12

This case report is novel and unique in two important ways. A literature review reveals that this is the first report of giant hydronephrosis and secondary megacystic megaueter presenting as hematemesis. More common presentations reported are lower abdominal pain, distension, and constipation, of which our patient also complained. Rectal bleeding without urinary symptoms has also been described,11 and complete mechanical bowel obstruction has also been reported as a complication of urinary retention.14-17

In addition, this is the only account of urethral stricture causing giant hydronephrosis and giant bladder. Other mechanical causes of ureteropelvic junction obstruction, stone disease, trauma, renal ectopy, ureteral tumor, and primary bladder neck obstruction, have been reported to cause giant hydronephrosis.10 Neurologic causes of urinary retention are well documented and include idiopathic atonic bladder,11 neurogenic bladder from various causes (multiple sclerosis, parkinsonism, stroke, spinal cord injury), and autonomic neuropathy from diabetes mellitus.12,18

This case also highlights the importance of recognition of this condition in patients presenting with progressive abdominal distension, and reiterates the management of massive urinary output, including fluid and electrolyte resuscitation, cardiopulmonary monitoring, and interdisciplinary care amongst emergency physicians, urologists, nephrologists, and internists.

References


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A Full-Thickness Burn in a Teenager Resulting from Prolonged Contact with a Mobile Phone Charging Cube: A Case Report

DINA BURSTEIN, MD, MPH; CASSANDRA O’ROURKE, OTR/L, BCP; DAVID T. HARRINGTON, MD, FACS

ABSTRACT
We present a case of a teenager who suffered a full-thickness burn following prolonged contact with a mobile phone charging cube. The patient required primary surgical excision and closure of the wound resulting in a good clinical outcome. There have been multiple reports in the literature of burns resulting from lithium batteries; however, this appears to be the first case report of a full thickness burn resulting from a mobile phone charging cube. Given the ubiquity of mobile phone use among teenagers, primary care providers should warn patients about the risks of sleeping with an electronic device while it is connected to a charger.

KEYWORDS: mobile phone charging cube, full-thickness burn, teenager

INTRODUCTION
Mobile telephone use is virtually ubiquitous among American teenagers with 88% either having, or having access to, a mobile phone and 73% possessing a smartphone. This demographic reports spending on average nine hours per day on their mobile device with 72% claiming that the first thing they do upon awakening is check for messages on their phone. To date there have been a handful of cases of cell phone-associated burns reported in the medical literature, all of which were caused by the phone’s lithium battery. As reported by Palmeri, et al, lithium batteries have allowed the battery size to decrease while capacity increases, further expanding their use in portable devices. With the increased use we have also seen increased reports of injuries associated with these batteries. To date, there have not been any reports in the medical literature of burns resulting from prolonged contact with a mobile telephone charging cube versus the battery itself. We present a case of a teen who sustained a full-thickness burn as a result of prolonged contact with the charging cube of a mobile telephone.

CASE PRESENTATION
A 17-year-old white female presented to the pediatric burn clinic for evaluation of a lesion on her left wrist. The patient reported going to bed with her phone charger plugged into an extension cord and the phone and charging cube pulled up into the bed. In the morning, she noted a red area above her wrist where the charging cube had been in contact with her skin throughout the night while she slept. As the day progressed, she noticed it began to form a blister which proceeded to worsen with time. She was evaluated by her pediatrician the following day and subsequently referred to the pediatric burn clinic.

The patient presented with a circular wound two centimeters in diameter on the dorsal aspect of her forearm, approximately three centimeters proximal to her left wrist crease, which was notable for significant step-off (level of healthy tissue was higher than the wound) and eschar, consistent with a third-degree burn. The burn was initially managed conservatively with daily dressing changes. At follow-up two weeks later the patient requested surgical intervention to speed healing and expedite return to her activities. The patient subsequently underwent primary excision and

Figure 1. Appearance of burn at initial presentation to pediatrician.

Figure 2. Appearance of burn at presentation to burn clinic.
There are few reports in the medical literature documenting burns associated with mobile telephones. A 2015 literature review identified six cases of burns associated with cell phone use, all as a result of malfunction of the lithium battery. Two cases of electrical injuries associated with cell phone chargers were reported by Kato et al. in 2013. Both cases involved individuals who fell asleep on the electrodes of the charging device leading to low-voltage cutaneous injuries. Here we report a case of a patient who sustained a full-thickness burn that resulted from prolonged contact with a cell phone charging cube.

A search of regulatory reports of cell phone-associated burns did not reveal any cases of burns sustained as a result of prolonged contact with the charging cube. In May of 2018, Bluefin voluntarily recalled their wireless charging device due to multiple reports of the device overheating; however, no burn injuries were reported. The United States Consumer Products Safety Commission also documents recalls of cell phone batteries due to fire and burn hazards. There have been multiple reports in the medical literature of burns caused by the lithium batteries associated with e-cigarette devices. These reports describe both electric and chemical burns to the lower extremities and face resulting from explosion of the lithium battery.

This case illustrates a mechanism of action of a full-thickness burn not previously reported in either the medical or lay literature. Given the ubiquity of cell phone use among youth in the United States, it is important to warn about this danger and recommend never sleeping with an electronic device while it is connected to a charger.

References

Disclaimer
The views expressed herein are those of the authors and do not necessarily reflect the views of the Alpert Medical School, the Department of Emergency Medicine, the Department of Surgery or the Rhode Island Burn Center.

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Food insecurity encompasses a variety of etiologies but is defined as an uncertainty or limitation in nutritionally adequate and safe foods, or if achieving nutritionally adequate and safe foods would require behavior that is socially unacceptable. In 2017, approximately 15 million households (11.8%), lacked year-round food security.

Food insecurity has been associated with numerous significant health conditions including obesity, heart disease, mental health conditions, and other chronic diseases. Research has demonstrated that food insecurity and obesity are linked in a dynamic that has become known as the “hunger-obesity paradox” where those that are food insecure are more likely to be overweight. Additionally, food insecurity has been associated both with the development of diabetes and with poor control of diabetes and with hypertension, even after adjusting for socioeconomic and demographic factors that we may traditionally think of as the major drivers of hypertension. Furthermore, food insecurity has been linked to higher healthcare expenditures, underlining the myriad effects that it has on individuals, communities, and our society at large. Due to these assorted health effects, it is important to assess the burden of food insecurity. The purpose of this analysis was to measure the prevalence of this often-hidden dimension of health across the state of Rhode Island and among those with specific health conditions.

METHODS

Data were from the 2017 Rhode Island Behavioral Risk Factor Surveillance System (RIBRFSS). The RIBRFSS is a telephone survey of non-institutionalized adults ≥18 years that is administered by the Rhode Island Department of Health (RIDOH) with support from the Centers for Disease Control and Prevention (CDC) and is used to measure risk behaviors and health. The survey was completed by 5,632 adults in 2017. Data obtained from the survey sample are weighted to obtain statewide population estimates.

Food insecurity was measured with the question: “How often in the past 12 months would you say you were worried or stressed about having enough money to buy nutritious meals? (“always”, “usually”, “sometimes”, “rarely”, or “never”). In the current analyses those who reported with “always”, “usually”, or “sometimes” were considered food insecure.

Descriptive analyses were conducted to measure the prevalence of food insecurity and chi square tests were used to test for significant differences between demographic groups. Additionally, we measured the prevalence of food insecurity among those with a number of health conditions. Health conditions assessed included fair/poor overall health (measured from the question “Would you say that in general your health is excellent, very good, good, fair, poor?”), frequent mental distress (FMD, ≥14 days in last 30 where mental health was not good), obesity (Body Mass Index ≥30, calculated from self-reported height and weight), disability (related to hearing, vision, cognition, mobility, self-care, or independent living), and history of depressive disorder, myocardial infarction, angina/coronary heart disease, stroke, arthritis, kidney disease, COPD, cancer, diabetes, high blood pressure, or high cholesterol.

RESULTS

Approximately 24.5% (95% CI 22.6–26.4%) of Rhode Island adults were at least sometimes food insecure in 2017. More specifically, 6.2% reported they were “always” food insecure, 4.0% reported “usually,” 14.3% “sometimes”, 13.0% reported “rarely,” and 62.5% reported they were “never” food insecure. Food insecurity was reported more often for Hispanics adults, non-Hispanic Black adults, women, and adults with a child in the home (Table 1). Prevalence of food insecurity was high among those with chronic medical conditions. Rates were highest among those with fair/poor overall health, frequent mental distress and depressive disorders, disability, COPD, and stroke (Table 2). About half (50.8%) of those reporting fair or poor health also reported food insecurity. Additionally, 28.1% of those reporting any chronic disease, specifically any diagnosis related to cardiovascular disease, COPD, cancer, diabetes, arthritis, asthma, or kidney disease, also reported food insecurity. More than half (57.6%) of respondents with frequent mental distress, and 45.3% of those ever diagnosed with a depressive disorder reported food insecurity.
Mounting evidence has associated food insecurity with the development of chronic conditions, especially diabetes, COPD and hypertension.6 Food insecurity has been linked to higher health expenditures on the order of billions of USD expended each year.7 These chronic diseases and preventable health expenses continue to stress our healthcare system. The burden of food insecurity is a major barrier to health that greatly impacts patients across the United States. Rhode Island is no exception to this phenomenon. The current study found nearly a quarter of adults are facing food insecurity and the problem is particularly prevalent among those with certain chronic health conditions.

Before food insecurity can be addressed, it must be identified. The American Academy of Family Physicians and the American Academy of Pediatrics recognize the utility of

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<td>30-44 years</td>
</tr>
<tr>
<td>45-64 years</td>
</tr>
<tr>
<td>65+ years</td>
</tr>
<tr>
<td><strong>Race/ethnicity</strong></td>
</tr>
<tr>
<td>White, non-Hispanic</td>
</tr>
<tr>
<td>Black, non-Hispanic</td>
</tr>
<tr>
<td>Multiracial, non-Hispanic</td>
</tr>
<tr>
<td>Hispanic</td>
</tr>
<tr>
<td><strong>Education level</strong></td>
</tr>
<tr>
<td>High school or less</td>
</tr>
<tr>
<td>Attended college</td>
</tr>
<tr>
<td>Graduated college</td>
</tr>
<tr>
<td><strong>Insurance type</strong></td>
</tr>
<tr>
<td>Private</td>
</tr>
<tr>
<td>Medicare</td>
</tr>
<tr>
<td>Medicaid</td>
</tr>
<tr>
<td>Other</td>
</tr>
<tr>
<td>None</td>
</tr>
<tr>
<td><strong>Veteran status</strong></td>
</tr>
<tr>
<td>Yes</td>
</tr>
<tr>
<td>No</td>
</tr>
<tr>
<td><strong>Children in household</strong></td>
</tr>
<tr>
<td>Yes</td>
</tr>
<tr>
<td>No</td>
</tr>
</tbody>
</table>

Source: 2017 Rhode Island BRFSS
Notes:
1 food insecurity defined as always/usually/sometimes worried or stressed about having enough money to buy nutritious meals
2 14 days in last 30 where mental health was not good;
3 disability related to hearing, vision, cognition, mobility, self-care, or independent living;
4 includes myocardial infarction, angina, coronary heart disease, or stroke;
5 cardiovascular disease, COPD, cancer, diabetes, arthritis, asthma, or kidney disease

<table>
<thead>
<tr>
<th>Table 2. Prevalence of Rhode Island adults reporting food insecurity, by selected health indicators, 2017</th>
</tr>
</thead>
<tbody>
<tr>
<td><strong>% Food Insecure</strong></td>
</tr>
<tr>
<td><strong>Overall state prevalence</strong></td>
</tr>
<tr>
<td><strong>Fair/Poor health</strong></td>
</tr>
<tr>
<td><strong>Depressive disorder</strong></td>
</tr>
<tr>
<td><strong>Frequent mental distress</strong></td>
</tr>
<tr>
<td><strong>Obesity</strong></td>
</tr>
<tr>
<td><strong>Disability</strong></td>
</tr>
<tr>
<td><strong>Myocardial infarction/Heart attack</strong></td>
</tr>
<tr>
<td><strong>Angina or Coronary Heart Disease</strong></td>
</tr>
<tr>
<td><strong>History of stroke</strong></td>
</tr>
<tr>
<td><strong>Any cardiovascular disease</strong></td>
</tr>
<tr>
<td><strong>Arthritis</strong></td>
</tr>
<tr>
<td><strong>Kidney disease</strong></td>
</tr>
<tr>
<td><strong>Ever had high blood pressure</strong></td>
</tr>
<tr>
<td><strong>Ever had high cholesterol</strong></td>
</tr>
<tr>
<td><strong>COPD</strong></td>
</tr>
<tr>
<td><strong>Cancer</strong></td>
</tr>
<tr>
<td><strong>Diabetes</strong></td>
</tr>
<tr>
<td><strong>Chronic disease</strong></td>
</tr>
</tbody>
</table>

Source: 2017 Rhode Island BRFSS
Notes:
1 food insecurity defined as always/usually/sometimes worried or stressed about having enough money to buy nutritious meals
2 ≥14 days in last 30 where mental health was not good;
3 disability related to hearing, vision, cognition, mobility, self-care, or independent living;
4 includes myocardial infarction, angina, coronary heart disease, or stroke;
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DISCUSSION
Mounting evidence has associated food insecurity with the development of chronic conditions, especially diabetes, COPD and hypertension.6 Food insecurity has been linked to higher health expenditures on the order of billions of USD expended each year.7 These chronic diseases and preventable health expenses continue to stress our healthcare system. The burden of food insecurity is a major barrier to health that greatly impacts patients across the United States. Rhode Island is no exception to this phenomenon. The current study found nearly a quarter of adults are facing food insecurity and the problem is particularly prevalent among those with certain chronic health conditions.

Before food insecurity can be addressed, it must be identified. The American Academy of Family Physicians and the American Academy of Pediatrics recognize the utility of
using a brief, two-question screen for all patients: [1] Within the past 12 months we worried whether our food would run out before we got money to buy more, and [2] Within the past 12 months the food we bought just didn’t last, and we didn’t have money to get more.8 Any affirmative response, including “sometimes true,” and “often true,” can predict food insecurity with a 97% sensitivity and 83% specificity.8 While the focus of this report is food insecurity, it is recommended that clinicians implement screening for a broad array of social determinants of health (e.g., housing instability, transportation barriers) rather than focusing on one domain. Other examples of screening tools include the Health Leads screener, the Medicaid Accountable Health Communities screening instrument and the PRAPARE screening tool. The Rhode Island Department of Health [RIDOH] recognizes food insecurity as a critical actionable social determinant of health. To improve surveillance of the socioeconomic and environmental factors that drive health inequities, RIDOH collaborated with community partners to form the Community Health Assessment Group. They developed Rhode Island’s first set of statewide health equity indicators and includes a measure of food insecurity.9

Addressing food insecurity requires a multi-disciplinary approach that involves clinicians, community health workers, social workers and case managers. Strong relationships with community-based organizations and programs such as local food banks, SNAP, Meals on Wheels is key for being able to connect patients to resources to address their social needs. As we move toward alternative payment models, it will become more apparent that addressing the low-hanging fruit of food insecurity will benefit our patients, our communities, and our entire healthcare system resulting in improved health outcomes and reduced healthcare costs.10

The findings from the BRFSS are subject to some limitations. Data are self-reported and prone to recall or reporting bias. Additionally, the study is cross-sectional and therefore we cannot ascertain the temporality of food insecurity and the development of chronic disease. Lastly, a single-item food stress question was used as a proxy for food insecurity; a true food insecurity assessment would be more complex and may result in a different prevalence estimate. Prevalence estimates in our study were higher than that from other studies, likely due to the difference in measurement. However, this food stress measure still provides valuable insight about challenges Rhode Island adults may face while trying to maintain their health. Further research should explore this topic.

References

Acknowledgments
We thank Dora Dumont, PhD, MPH, and Ada Amobei, MD, MPH, for their review and suggestions. This brief was supported by the Centers for Disease Control and Prevention (CDC), National Center for Chronic Disease Prevention and Health Promotion, National Center for Environmental Health for the RI BRFSS [1U58DP006067-03].

Authors
Martha Duffy, MD, MPH, is a family medicine physician in Worcester, Massachusetts and is affiliated with UMass Memorial Medical Center. She is a former public health scholar at RIDOH.
Tracy L. Jackson, PhD, MPH, is a Senior Public Health Epidemiologist in the Center for Health Data and Analysis (CHDA) at RIDOH.
Tara Cooper, MPH, is a Health Program Administrator who leads the Behavioral Risk Factor Surveillance System within CHDA.
Rhode Island Monthly Vital Statistics Report
Provisional Occurrence Data from the Division of Vital Records

<table>
<thead>
<tr>
<th>VITAL EVENTS</th>
<th>REPORTING PERIOD</th>
</tr>
</thead>
<tbody>
<tr>
<td></td>
<td>MAY 2019</td>
</tr>
<tr>
<td>Number</td>
<td>Number</td>
</tr>
<tr>
<td>Live Births</td>
<td>969</td>
</tr>
<tr>
<td>Deaths</td>
<td>870</td>
</tr>
<tr>
<td>Infant Deaths</td>
<td>3</td>
</tr>
<tr>
<td>Neonatal Deaths</td>
<td>1</td>
</tr>
<tr>
<td>Marriages</td>
<td>549</td>
</tr>
<tr>
<td>Divorces</td>
<td>241</td>
</tr>
</tbody>
</table>

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

<table>
<thead>
<tr>
<th>Underlying Cause of Death Category</th>
<th>REPORTING PERIOD</th>
</tr>
</thead>
<tbody>
<tr>
<td></td>
<td>NOVEMBER 2018</td>
</tr>
<tr>
<td>Number (a)</td>
<td>Number (a)</td>
</tr>
<tr>
<td>Diseases of the Heart</td>
<td>211</td>
</tr>
<tr>
<td>Malignant Neoplasms</td>
<td>162</td>
</tr>
<tr>
<td>Cerebrovascular Disease</td>
<td>44</td>
</tr>
<tr>
<td>Injuries (Accident/Suicide/Homicide)</td>
<td>77</td>
</tr>
<tr>
<td>COPD</td>
<td>43</td>
</tr>
</tbody>
</table>

(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 1,056,298 (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.
It’s a new day.

The Rhode Island Medical Society now endorses Coverys.

Coverys, the leading medical liability insurer in Rhode Island, has joined forces with RIMS to target new levels of patient safety and physician security while maintaining competitive rates. Call to learn how our alliance means a bright new day for your practice.

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Contact Sarah if you’ve missed an issue, sstevens@rimed.org.
Working for You: RIMS advocacy activities

October 1, Tuesday
RIMS Physician Health Committee: Herbert Rakatansky, MD, Chair
Conference call with EMS students regarding Basic Emergency and Response Skills (BEARS) legislation

October 2, Wednesday
Meeting with Hospital Association of RI (HARI) and DAY ONE regarding Sexual Assault Nurse Examiners (SANE)

October 4, Friday
RIMS Notes issue production
Meeting with the Department of the Attorney General regarding Medicaid fraud education initiative

October 7, Monday
RIMS Council: Christine Brousseau, MD, President

October 8, Tuesday
AMA conference call on federal legislation
Governor’s Overdose Prevention and Intervention Task Force Harm Reduction Work Group

October 9, Wednesday
Board of Medical Licensure and Discipline
Governor’s Overdose Prevention and Intervention Task Force
Meeting with American Nurses Association-RI and Alzheimer’s Association regarding Alzheimer’s legislation and CME
Meeting of the New England Charter Medicine Academy Board: Bradley Collins, MD, Chair

October 11, Friday
Conference call with Office of the Health Insurance Commissioner (OHIC) regarding prior authorization
World Diabetes Day Executive Committee conference call

October 14, Monday
RIMS closed in observance of Columbus Day

October 16, Wednesday
Primary Care Physician Advisory Committee

October 21, Monday
Rhode Island Mental Health Parity Initiative
Meeting with Blue Cross Blue Shield of RI: Christine Brousseau, MD, President

October 22, Tuesday
RIMS Notes issue production

October 23, Wednesday
Department of Health/Executive Office of Health and Human Services (EOHHS) meeting on continuity of care documentation

October 24, Thursday
Meeting with UnitedHealthcare-New England Commercial Market Chief Medical Officer
Meeting with Chair of Super PAC regarding RIMS Opioid Harm Reduction Initiative work group

October 25, Friday
Project Weber Renew Initiative
October 26, Saturday
Recognition of lay leaders of the Maine Medical Association since 1954, Portland, ME

October 28, Monday
RI Community Health Centers Association Annual Meeting

October 30, Wednesday
Department of Health Diabetes Prevention Program
Meeting with Health Insurance Commissioner Ganim regarding prior authorization: Peter A. Hollmann, MD, Chair, Board of Directors

October 31, Thursday
Meeting with Hospital Association of RI (HARI), DAY ONE, and RI ACEP regarding SANE Nurses

The Rhode Island Medical Society’s Eleventh Hour CME Event

On a biennial basis, Rhode Island physicians are required to document to the Board of Medical Licensure and Discipline that they have earned a minimum of forty (40) hours of American Medical Association, Physician Recognition Award or American Osteopathic Association (AOA Category 1a) continuing medical education credits. At least four (4) hours of continuing medical education shall be earned on topics of current concern as determined by the director of the RI Department of Health.

2020 topics will be announced soon. Prior years’ topics have included:
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- End of Life and Palliative Care
- Antimicrobial Stewardship

Watch your email for more information regarding the date, topics, and registration deadlines for the 2020 event.

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RIMS members will receive a reduced registration fee.
The Rhode Island Medical Society continues to drive forward into the future with the implementation of various new programs. As such, RIMS is expanded its Affinity Program to allow for more of our colleagues in healthcare and related business to work with our membership. RIMS thanks these participants for their support of our membership. Contact Marc Bialek for more information: 401-331-3207 or mbialek@rimed.org

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

RIPCPC is an independent practice association (IPA) of primary care physicians located throughout the state of Rhode Island. The IPA, originally formed in 1994, represent 150 physicians from Family Practice, Internal Medicine and Pediatrics. RIPCPC also has an affiliation with over 200 specialty-care member physicians. Our PCP’s act as primary care providers for over 340,000 patients throughout the state of Rhode Island. The IPA was formed to provide a venue for the smaller independent practices to work together with the ultimate goal of improving quality of care for our patients.
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Biogen seeking FDA review in early 2020 for Aducanumab to treat early AD

Investigational drug studied at Butler Hospital’s Memory and Aging Program may become first new treatment for Alzheimer’s disease in 16 years

Biogen, maker of the investigational drug Aducanumab, announced on Oct. 22nd that it will seek review of the drug by the US Food and Drug Administration (FDA) in early 2020. If approved, it will become the first drug to remove amyloid protein from the brain and slow the progression of Alzheimer’s disease (AD). The drug was studied in multiple clinical trials at sites across the country including at Butler Hospital’s Memory and Aging Program, a world leader in Alzheimer’s research.

STEPHEN SALLOWAY, MD, MS, Director of Neurology and the Memory and Aging Program at Butler Hospital and the Martin M. Zucker Professor of Psychiatry and Human Behavior and professor of neurology at the Warren Alpert Medical School of Brown University, says he is hopeful that the drug will be approved and optimistic about its potential to slow the progression of Alzheimer’s in those with the early stages of the disease.

“In March of this year, Biogen abruptly halted its ongoing studies of aducanumab when an analysis of the initial data showed it was unlikely to be successful in meeting the benchmarks necessary to be considered a viable therapy. It was a crushing blow to researchers and study participants around the nation, including the 60 trial participants here at the Memory and Aging Program. Many of our patients had seemed to be benefitting from the drug,” Dr. Salloway said.

“But as additional data came in, particularly from trial participants who had been administered a higher dose of the drug, it became apparent that aducanumab yielded clinically significant results for the successful treatment of early Alzheimer’s disease,” Dr. Salloway continued. “With this new information, Biogen is now moving forward with the process to make the drug available to the public, and I’m very happy that Biogen will start a new re-dosing study so that patients who participated in the initial trials will be able to restart treatment with the drug.”

“This is very exciting news for our patients. Rhode Islanders who participated in the original study made a huge contribution to the success of this trial and their courage and dedication is very inspiring,” said Dr. Salloway. “We are proud of our participants and the role our program at Butler Hospital has played in bringing this potential treatment for Alzheimer’s disease to fruition.”

Biogen plans regulatory filing based on new analysis of larger dataset from Phase 3 studies

CAMBRIDGE, MASS. AND TOKYO, OCT. 22, 2019 (GLOBE NEWSWIRE) – Biogen and Eisai, Co., Ltd. today announced that, after consulting with the U.S. Food and Drug Administration [FDA], Biogen plans to pursue regulatory approval for aducanumab, an investigational treatment for early Alzheimer’s disease [AD]. The Phase 3 EMERGE Study met its primary endpoint showing a significant reduction in clinical decline, and Biogen believes that results from a subset of patients in the Phase 3 ENGAGE Study who received sufficient exposure to high-dose aducanumab support the findings from EMERGE. Patients who received aducanumab experienced significant benefits on measures of cognition and function such as memory, orientation, and language. Patients also experienced benefits on activities of daily living including conducting personal finances, performing household chores such as cleaning, shopping, and doing laundry, and independently traveling out of the home. If approved, aducanumab would become the first therapy to reduce the clinical decline of Alzheimer’s disease and would also be the first therapy to demonstrate that removing amyloid beta resulted in better clinical outcomes.

The decision to file is based on a new analysis, conducted by Biogen in consultation with the FDA, of a larger dataset from the Phase 3 clinical studies that were discontinued in March 2019 following a futility analysis. This new analysis of a larger dataset that includes additional data that became available after the pre-specified futility analysis shows that aducanumab is pharmacologically and clinically active as determined by dose-dependent effects in reducing brain amyloid and in reducing clinical decline as assessed by the pre-specified primary endpoint Clinical Dementia Rating-Sum of Boxes [CDR-SB]. In both studies, the safety and tolerability profile of aducanumab was consistent with prior studies of aducanumab.

Based on discussions with the FDA, the Company plans to file a Biologics License Application [BLA] in early 2020...
and will continue dialogue with regulatory authorities in international markets including Europe and Japan. The BLA submission will include data from the Phase 1/1b studies as well as the complete set of data from the Phase 3 studies.

The Company aims to offer access to aducanumab to eligible patients previously enrolled in the Phase 3 studies, the long-term extension study for the Phase 1b PRIME study, and the EVOLVE safety study. Biogen will work towards this goal with regulatory authorities and principal investigators with a sense of urgency.

**Study Results**

EMERGE (1,638 patients) and ENGAGE (1,647 patients) were Phase 3 multicenter, randomized, double-blind, placebo-controlled, parallel-group studies designed to evaluate the efficacy and safety of two dosing regimens of aducanumab. These studies were discontinued on March 21, 2019, following the results of a pre-specified futility analysis which relied on an earlier and smaller dataset. The futility analysis was based on data available as of December 26, 2018, from 1,748 patients who had the opportunity to complete the 18-month study period and predicted that both studies were unlikely to meet their primary endpoint upon completion.

Following the discontinuation of EMERGE and ENGAGE, additional data from these studies became available resulting in a larger dataset, which included a total of 3,285 patients, 2,066 of whom had the opportunity to complete the full 18 months of treatment. A new extensive analysis of this larger dataset showed a different outcome than the outcome predicted by the futility analysis. Specifically, the new analysis of this larger dataset showed EMERGE to be statistically significant on the pre-specified primary endpoint (P=0.01). Biogen believes that data from a subset of ENGAGE support the findings of EMERGE, though ENGAGE did not meet its primary endpoint. Biogen consulted with external advisors and the FDA on these different results and their implications.

“This large dataset represents the first time a Phase 3 study has demonstrated that clearance of aggregated amyloid beta can reduce the clinical decline of Alzheimer’s disease, providing new hope for the medical community, the patients, and their families,” said Dr. Anton Porsteinsson, William B. and Sheila Konar Professor of Psychiatry, Neurology and Neuroscience, director of the University of Rochester Alzheimer’s Disease Care, Research and Education Program (AD-CARE), and principal investigator. “There is tremendous unmet medical need, and the Alzheimer’s disease community has been waiting for this moment. I commend Biogen, the FDA, the medical community, and the patients and their study partners for their persistence in working to make today’s announcement a reality.”

In EMERGE, which met its pre-specified primary endpoint in the new analysis, patients treated with high dose aducanumab showed a significant reduction of clinical decline from baseline in CDR-SB scores at 78 weeks [23% versus placebo, P=0.01]. In ENGAGE, patients treated with high-dose aducanumab also showed a consistent reduction of clinical decline as measured by the pre-specified secondary endpoints: the Mini-Mental State Examination (MMSE; 15% versus placebo, P=0.06), the AD Assessment Scale-Cognitive Subscale 13 Items (ADAS-Cog 13; 27% versus placebo, P=0.01), and the AD Cooperative Study-Activities of Daily Living Inventory Mild Cognitive Impairment Version (ADCS-ADL-MCI; 40% versus placebo, P=0.001). Imaging of amyloid plaque deposition in EMERGE demonstrated that amyloid plaque burden was reduced with low- and high-dose aducanumab compared to placebo at 26 and 78 weeks (P<0.001). Additional biomarker data of tau levels in the cerebrospinal fluid supported these clinical findings. Biogen believes that data from patients in ENGAGE who achieved sufficient exposure to high dose aducanumab supported the findings of EMERGE.

In both studies, the most commonly reported adverse events were amyloid-related imaging abnormalities-edema (ARIA-E) and headache. The majority of patients with ARIA-E did not experience symptoms during the ARIA-E episode, and ARIA-E episodes generally resolved within 4 to 16 weeks, typically without long-term clinical sequelae. Biogen plans to present further detail on the new analysis of the larger dataset from EMERGE and ENGAGE at the Clinical Trials on Alzheimer’s Disease (CTAD) meeting in December 2019.

After reviewing the data in consultation with the FDA, Biogen believes that the difference between the results of the new analysis of the larger dataset and the outcome predicted by the futility analysis was largely due to patients’ greater exposure to high dose aducanumab. Multiple factors contributed to the greater exposure to aducanumab in the new analysis of the larger dataset, including data on a greater number of patients, a longer average duration of exposure to high dose, the timing of protocol amendments that allowed a greater proportion of patients to receive high dose, and the timing and pre-specified criteria of the futility analysis.
Women & Infants’ Dr. Erika Werner and OB/GYN Dept. receive $2.5M grant

Dr. Werner also awarded a National Institute of Child Health and Human Development (NICHD) five-year, $7 million grant

ERIKA WERNER, MD, MS, division and fellowship director of the Division of Maternal Fetal Medicine, associate professor of obstetrics and gynecology at The Warren Alpert Medical School of Brown University, and associate professor of epidemiology at The Brown University School of Public Health, in connection with the Department of Obstetrics and Gynecology at Women & Infants Hospital, was recently awarded a grant from the National Institute of Diabetes, Digestive, and Kidney Diseases (NIDDK) last week.

The organization, whose mission is to conduct and support research on many of the most common, costly, and chronic conditions to improve health, awarded a five-year $2.5 million grant which will allow Dr. Werner and her team to work with four other centers focused on diabetes in pregnancy (MGH, Yale, Northwestern, and Kaiser) across the country, to identify better ways to diagnose glucose metabolism abnormalities in pregnancy, in an effort to optimize maternal and child health.

While the study began October 1, participant recruitment will likely begin next year at several Care New England prenatal clinics. Individuals involved in the study will be asked to wear small devices to monitor their glucose continuously for several days during their pregnancy.

In addition, Dr. Werner was also awarded a National Institute of Child Health and Human Development (NICHD) five-year, $7 million grant last month, to investigate health disparities.

This grant is in collaboration with RTI, Brown University’s DAVID SAVITZ, associate dean for research, and professor of epidemiology, obstetrics and gynecology, and pediatrics, as well as the Hassenfeld Child Health Innovation Institute, in a research effort to better understand the developmental origins of health disparities, or differences in developmental outcomes between socially advantaged and disadvantaged groups.

The study entitled, “The Prenatal and Childhood Mechanisms of Health Disparities”, is designed to recruit a diverse cohort of pregnant parents in the first trimester and follow them throughout pregnancy and during the first year of life.

“Specifically the study will recruit 2,000 pregnant women, 500 of whom are Black or African American, and 500 of whom are Hispanic or Latina, to better understand how socioeconomic and race/ethnic disparities during pregnancy and in the first year of life, affect health-related behaviors, maternal neuroendocrine-immune, and metabolic responses during pregnancy, and children’s health and development.”

Said Dr. Werner, “I would like to express my thanks to both agencies for their recognition and acknowledgment of this most important work and the clinical advancements that could result from these studies. I would also like to extend my sincere appreciation to all of my colleagues, research collaborators, Brown University, and especially the Hassenfeld Child Health Innovations Institute and Women & Infants Hospital for fostering an environment of academic and clinical excellence.”

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- Opioid Pain Management and Chronic Pain Management
- End of Life and Palliative Care
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RIMS members will receive a reduced registration fee.
Dr. Linda J. Resnik awarded $1.5M grant for prostheses research project

Providence — A career research scientist with the VA Rehabilitation Research and Development Service’s Center for Neurorestoration and Neurotechnology at the Providence VA Medical Center was awarded a three-year contract by the Department of Defense for a research study that will compare the effectiveness of different prostheses types.

“This study will be the largest, most comprehensive study comparing upper limb prostheses and components,” said DR. LINDA J. RESNIK, the principal investigator for the study, who is also a professor in the Department of Health Services, Policy and Practice at Brown University. “Providing prostheses that are optimally matched to the patient will improve satisfaction, reduce abandonment rates and improve overall quality of life for people with upper-limb amputations.”

The nearly $1.5 million contract, awarded by DOD’s Orthotics and Prosthetics Outcomes Research Program to Ocean State Research Institute Inc., the nonprofit associated with the Providence VAMC, will provide evidence to guide prosthesis prescription by comparing effectiveness of upper limb prostheses and whether specific groups of patients are more likely to benefit from different device types. It builds on an existing study and will allow comparisons of outcomes for approximately 300 upper limb prosthesis users.

Bystander CPR: ‘Off-Duty’ Kent Hospital staff save local child’s life

Earlier this summer, BRYDIE THOMASIAN, MSW, LICSW, director of behavioral health and clinical social work at Kent Hospital, was relaxing in her yard in Coventry, RI, with friends and their young children. She had recently completed recertification in basic life support and cardiopulmonary resuscitation (CPR), but had no idea her skills would be needed that afternoon.

Suddenly, her friend Paulina Oliveira’s 14-month-old daughter began choking on a piece of fruit and stopped breathing, quickly becoming unresponsive and presenting discoloration of the skin. Taking action quickly, Brydie initiated back blows followed by chest compressions to try and dislodge the food while others called 9-1-1. EMILY COLEYER, DO, emergency medicine physician at Kent Hospital, who lives nearby, ran over after hearing the calls for help.

Together, the two were able to open the child’s airway while waiting for the ambulance to arrive. The child was briefly hospitalized but made a quick and complete recovery greatly due to the training and teamwork demonstrated by these two Kent employees.

Paulina Oliveira, mother of the toddler, said, “I would never wish this experience upon any parent. We are so lucky to have had a positive outcome, due to Brydie’s quick reaction, knowledge, and composure. She saved my child’s life.”

Paulina continued, “This event drove home the importance of being certified in CPR. After this experience, both my husband and I went to take classes.”

According to the National Safety Council, choking is the fourth leading cause of unintentional injury or death. Choking is also a leading cause of death in children and infants, who require a different rescue procedure than adults.

Thomasian said, “I think that CPR training is easy to overlook because we all hope we will never find ourselves in a situation that calls for it. I certainly never thought I would have to use the training, but I’m extremely grateful for it now. I encourage everyone to consider taking a course. No one ever wants to witness a life-threatening crisis but we absolutely don’t want to be wishing we took a course if that crisis comes.”

Dr. Colyer added, “In this event, as well as many pediatric airway obstruction and respiratory arrest cases, time is of the essence. It was a blessing that Brydie was there, trained in CPR and basic life support, and was able to take action immediately. Had that not been the case, the outcome for Paulina’s daughter may not have been as bright.”

In the News

Dr. Linda J. Resnik, center right, career research scientist with the VA Rehabilitation Research and Development Service’s Center for Neurorestoration and Neurotechnology at the Providence VA Medical Center, with team members, from left to right, Matthew Borgia, Rachel Underwood, Josephine Airoldi, Eileen Small and Sarah Biester, at the Providence VAMC Sept. 24, 2019. Dr. Resnik was awarded a three-year, $1.5 million contract by the Department of Defense for a research study that will compare the effectiveness of different prostheses types.

[Providence VA Medical Center photo by Winfield Danielson]
Appointments

Martha B. Mainiero, MD, elected to Lifespan Board of Directors

PROVIDENCE – The Lifespan Board of Directors has elected a new member – MARTHA B. MAINIERO, MD, FACR, FSBI.

Dr. Mainiero is Medical Director of the Anne C. Pappas Center for Breast Imaging at Rhode Island Hospital and Vice Chair of Education for the Department of Diagnostic Imaging at Brown University’s Alpert Medical School. Throughout her career she has held numerous healthcare leadership roles, including President of the Medical Staff Association of Rhode Island and President of the Association of University Radiologists. She earned her medical degree from Tufts University and completed residency in Radiology and a fellowship in breast imaging at Yale University. She has been on Lifespan’s medical staff since 1995.

“I’m very pleased that Dr. Mainiero has accepted our invitation to join the board,” said Lawrence Aubin, Sr., chairman of the Lifespan Board of Directors “She is a highly respected leader in her field, and deeply committed to Lifespan’s mission. Her perspective and input at the board level will be of great value to the organization.”

Benjamin R. Adler, MD; Mary Beth Sutter, MD, join CNE primary care group

Care New England Medical Group’s Primary Care and Family Medicine program is expanding its clinical services with the addition of two physicians, BENJAMIN R. ADLER, MD, and MARY BETH SUTTER, MD.

Dr. Adler is board-certified in family medicine and specializes in family medicine and obstetrics. He earned his medical degree from University of Massachusetts Medical School and completed a residency at the Tufts University Family Medicine Residency program. As part of a compassionate team of health care professionals, Dr. Adler provides a full range of services for the whole family – including prenatal care and delivering babies, newborn and pediatric care, acute illnesses, mental health and addiction care, as well as LGBTQ health. Dr. Adler will see patients in his West Warwick office.

Dr. Sutter, director of maternal and child health, is board-certified in family medicine. She received her medical degree from the Warren Alpert Medical School of Brown University and completed a family medicine residency at Brown University/Memorial Hospital of Rhode Island. Dr. Sutter went on to complete a fellowship in maternal, child, and reproductive Health at University of New Mexico. In addition to her leadership role at CNE, Dr. Sutter serves as assistant professor of family medicine and is the maternal child health director for the Brown Family Medicine Residency program. Dr. Sutter has special interests in women’s health, maternity and newborn care, breastfeeding, and substance use disorder in pregnancy and parenting. Dr. Sutter will see patients in her Pawtucket office.

Jamie B. Patterson, MD, named medical director of The Breast Health Center at Kent

Care New England Medical Group welcomed JAMIE B. PATTERSON, MD, as medical director of The Breast Health Center at Kent Hospital.

Dr. Patterson earned her medical degree at the University of Nevada School of Medicine. She completed further training in breast surgical oncology through the University of Southern California/Hoag Breast Oncology Fellowship Program under Dr. Melvin Silverstein, who pioneered oncoplastic breast surgery in the United States.

She has extensive experience in breast conserving surgery, oncoplastic breast surgery, skin and nipple-sparing mastectomies, pregnancy-associated breast cancer, and hidden-scar surgeries.

With a strong background in women’s health, she provides a unique holistic approach to breast care. She focuses on breast disease, surgical management of breast cancer, inherited breast cancer syndromes, and sexual health and menopause in cancer survivorship.

In addition to her leadership role at Kent Hospital, Dr. Patterson also serves as an assistant clinical professor of surgery at The Warren Alpert Medical School of Brown University and assists in training residents and fellows in the Women & Infants Hospital Breast Fellowship Program. She is also an active member in several professional organizations including American Society of Breast Surgeons, Society of Surgical Oncology, and American College of Obstetrics and Gynecologists.

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Newport Hospital to present health workshop, expert speaker on Internet addiction

Newport Hospital, in collaboration with The Gruben Foundation and Salve Regina University, offers workshop to be led by international lecturer David Greenfield, PhD, MSCP

NEWPORT – A timely symposium on behavioral healthcare – “Innovations in Addiction Treatment: Epidemiology and Etiology of Internet Behavior” – will be held in Newport on November 18 and feature a leading authority on Internet addiction.

The workshop is being presented by Newport Hospital in collaboration with The Gruben Charitable Foundation and Salve Regina University. The event, to be held at Salve, is aimed at professionals seeking continuing education credits but is also appropriate for anyone with an interest in Internet addiction.

The workshop will feature DAVID GREENFIELD, PhD, MSCP, founder and medical director of the Center for Internet and Technology Addiction and assistant clinical professor of psychiatry at the University of Connecticut School of Medicine. He is an expert on behavioral addiction medicine who lectures internationally and has appeared frequently on television and in numerous publications.

Dr. Greenfield will discuss issues associated with Internet addiction and Internet-use disorder. He will explain how certain aspects of the Internet and smartphones promote mood-altering behaviors such as compulsive use and addictive patterns.

Professional credits have been applied for.

The workshop will be held from 5:30 to 7:30 p.m. on November 18 at Salve’s Bazzarsky Lecture Hall, O’Hare Academic Building, 36 Ochre Point Ave. To register, visit https://newport-bh-workshop.eventbrite.com or call 401-845-1502.

Spaulding Outpatient Center at Kent Hospital opens new Providence location

The Spaulding Outpatient Center at Kent Hospital opened its new location at 100 Butler Drive in Providence on Tuesday, October 1. The new facility is located in the same building, which formerly housed University Orthopedics.

The new location will be staffed with physical and occupational therapists who specialize in sports medicine and orthopedics including:
- Sports medicine; competitive and recreational injuries
- Orthopedic injuries
- Foot and ankle rehabilitation, surgical and non-surgical
- Musculoskeletal rehabilitation of the spine
- Joint replacement prehab and rehabilitation
- Hand and wrist rehabilitation, splinting
- Geriatric orthopedics
- Coordinated concussion management
- Shoulder and elbow rehabilitation for adolescent and adult
- Manual therapy
- Arthritis of the shoulder, spine, knee, foot and ankle

University Orthopedics launches dedicated Hip Institute

PROVIDENCE (OCT. 8, 2019) – University Orthopedics (UOI) recently laid down the foundation of the Hip Preservation Institute, an affiliate of University Orthopedics that specializes in hip and pelvic disorders.

“The Hip Preservation Institute is a state-of-the-art center dedicated to the diagnosis, treatment and management of simple and complex hip and pelvic-related disorders across the spectrum of life. Our multi-disciplinary team consists of highly skilled specialists dedicated to restoring patient’s function and improving quality of life,” said DR. RAMIN TABADDOR, an orthopedic surgeon at UOI and director of the institute.

With operative and non-operative options available, the Hip Preservation Institute offers patients access to advanced diagnostic tools such as ultrasound, high-resolution MRI and arthrograms as well as dynamic X-Ray testing and interventional therapies.

“This level of care has not been available to patients in this area until now. We have assembled the best hip specialists available and are thrilled provide a coordinated approach to care that will ensure the best outcomes possible,” Dr. Tabaddor added.
Obituaries

**LEROY DONALD AARONSON, MD,** passed away peacefully on October 14, 2019 at Saint Elizabeth Home in East Greenwich, with his daughter Pamela by his side. He was 91.

Beginning in 1959, Dr. Aaronson practiced Dermatology first from his home in the Edgewood section of Cranston and then, in 1963, from his office on Toll Gate Road in Warwick, across from Kent County Memorial Hospital, with which he was affiliated as a board-certified Dermatologist. He was appointed clinical assistant in Dermatology at Massachusetts General Hospital in 1961, and an assistant in Dermatology at Harvard Medical School in 1962, and received an honorary degree from Harvard Medical School for his work there. He retired in 1998, at the age of 70.

Dr. Aaronson is survived by his daughters Debra Aaronson Lawless and her husband John of Cranston, RI and Brewster, MA, Pamela Aaronson Hamilton and her husband John, and two grandchildren, Jack and Peter Hamilton of East Greenwich, RI and Weymouth, MA. He was predeceased by his wife of 51 years, Barbara [Norden] Aaronson, his parents, Gunnar and Ebba [Soderlund] Aaronson and his elder brother Richard.

The “Doc,” as he was affectionately called, will be dearly missed by many, including his family, who had the privilege to enjoy his big personality, original sense of humor, great intelligence and selfless kindness.

In his memory, donations may be made to Providence Animal Rescue League, 34 Elbow Street, Providence RI 02903.
Dr. Rene Laennec: ‘From a Child’s Toy to a Stethoscope’

MARY KORR
RIMJ MANAGING EDITOR

Vintage issues of the Rhode Island Medical Journal (RIMJ), now in its 102nd year of publication, are a treasure trove of case reports, clinical and scientific advances, as well as medical lore and miscellaneous items.

While perusing a 1920 issue recently, I came across an interesting story written by one of the editors on the invention of the stethoscope. Under the Miscellaneous section of the April 1920 issue of RIMJ, on page 82, one of the editors describes its origins in a column titled “From a Child’s Toy.” It recounts that more than a century earlier, Dr. Rene Theophile Hyacinthe Laennec, described as a pioneer in modern medicine, observed children in the Louvre gardens listening to the transmission of sounds along pieces of wood while scratching the other end with pins.

Dr. Laennec, who was also a musician who made his own flutes, realized he could use this method for listening to breath sounds while examining a patient’s lungs, rather than putting his ear on a patient’s chest, and constructed prototypes of the device using paper cones, and then wooden cylinders, over a three-year period.

According to the article, Dr. Laennec gave his invention the name by which the device is still known, deriving the word stethoscope from two Greek roots, one meaning the “chest” and the other “to observe” or “regard.” The first stethoscope was to be used by listening with one ear only.

In 1819, Dr. Laennec published a seminal treatise on the diagnosis of the diseases of the heart and lungs, titled Auscultation Médiate ou Traité du Diagnostic des Maladies des Poumons et du Cœur.

RIMJ’s editor then goes on to describe how the stethoscope should be used:

“The instrument should be placed on the bare chest wall. For this reason satisfactory examination of the lungs can only be made when the patient is stripped to the waist. Careless physicians sometimes attempt to examine patient’s chest through the clothing. Such an examination is worthless.”

A brief biography of Dr. Laennec ends the RIMJ piece, stating he was born in Quimper, Brittany, on February 17, 1781, studied medicine in Paris, and began the practice of medicine in 1804. He died in 1826 [from tuberculosis], “at the early age of 45, in the quaint old town in Brittany, in which he first saw the light.”

He bequeathed his medical papers and first stethoscope to his nephew, and described it as his greatest legacy.

The first drawing of the hollow wooden cylinder stethoscope, devised by Dr. Laennec in 1816, when he worked at Necker Hospital in Paris, shows the complete instrument, longitudinal sections, the detachable chest tool, and the earpiece.

IMAGES: NATIONAL LIBRARY OF MEDICINE