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Brain Treatments and Creativity

JOSEPH H. FRIEDMAN, MD
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A colleague wrote an article on brain disease and creativity which brought up an interesting point that I had never considered seriously, namely, the potential side effect of reducing creativity in patients who we put on brain-active drugs. The article focused on people who suffered from mental illness (Can J Psychiatry 2011;56;132) but there’s no reason the point doesn’t carry over to any brain disorder. While many of us are familiar with the eccentricities of friends or relatives with major mental illnesses, few of these people are very creative, simply because few people are very creative. Mental illness may be associated with creativity, particularly mania, when not out of control, but, as Sylvia Plath noted, “When you are insane, you are busy being insane – all the time...When I was crazy, that’s all I was.” While I am not a psychiatrist, I have seen a large number of people with major psychiatric illnesses, and her personal observation rings true.

My patients form a highly select group. They all have movement disorders. This does not mean that the psychiatric patients with movement disorder side effects of their medications were poorly treated. Sometimes side effects are unavoidable. However, those patients I’ve seen haven’t seemed particularly creative. Neuroleptics, the antipsychotic drugs that cause movement disorders, tend to slow people down, both in their movements and in their thinking. In fact, in the “early” days of psychopharmacology, animal testing for anti-psychophrenic drugs focused on the drug’s ability to slow the animals and make them less inquisitive. Likewise the presumed benefit of frontal lobotomies was reduced agitation, often reduced movement in general, probably due largely to apathy. Dopamine receptor blockade, the cardinal neurotransmitter effect shared by all anti-psychotic drugs, probably produces apathy or at least some degree of indifference, in the patients I see. This is why they were used on political prisoners in the Soviet Union. In Parkinson’s disease (PD), a dopamine depleting disorder, we think we see a reduction in “risk seeking behavior,” that some have opined is related to the reduced dopamine. I doubt that apathy and creativity can coexist.

In her article, my friend cites medical conditions thought to be linked to creativity: hypomania and temporal lobe epilepsy. The link may be anecdotal (Dostoyevsky) or by clinical research (see articles by Norman Geschwind, MD), and those linked by popular opinion, particularly certain recreational drugs. [Think of Coleridge and his opium haze-induced Xanadu, or Timothy Leary and his LSD “trips.”] It seems unlikely to me, on the face of it, that drugs induce creativity, although I do admit it is plausible. More likely, drugs suppress anxiety, or increase activity by combating depression, leading to increased and more considered expression of already-present thoughts, but this is certainly not an evidence-based opinion, and the bottom line is the bottom line. If drug X helps someone to write a great poem, create a dance, or solve some problem, then who can argue?

The interesting question that arises in the article is whether certain medications might squelch creativity. There was a famous British comedian who was well known to be at his creative peak as he became hypomanic. But his hypomania preceded severe mania which would require hospitalization. What if the only way to control his need for hospitalization was to use medication that suppressed these bouts of creativity? Of course, the patient is the one who would determine whether to be treated or not, but a case like that is extraordinary. In most cases one can only wonder if there may be a link between a “mental illness,” either frank illness or a premonitory state, and creativity. The author of the article opines that, based on theories about creativity and the modes of action of certain medications, some patients, “creative types” [my quotes, not hers] should be treated with certain drugs, less likely to reduce creativity.
to inhibit the creative impulse, than others approved for a similar indication. I am skeptical. I am not persuaded that we have such knowledge to guide us. If these drugs have predictable effects on creativity I would wonder if there may be different drugs for mathematicians, painters, writers or musicians. Some creative artists are creative in several realms, but so far as I know, Mozart and Einstein were known for single field creativity, implying that there is not a single “creativity circuit” in the brain.

One of the problems that we have in studying the brain is our tendency to oversimplify. This has become a problem because oversimplification sometimes does, in fact, produce heuristically helpful models that translate into actually useful outcomes. It’s not always wrong. The insulin deficit in diabetes, or the dopamine deficiency problem in Parkinson’s disease are good examples. But giving insulin through contemporaneous blood sugar samples only helps glucose control, not the other problems associated with diabetes. Increasing dopamine in the brain improves some movements in people with PD, but not all, and does nothing for any of the non-motor problems in that disorder. In addition, none of the ways we have of supplementing dopamine activity are helpful for the many disorders of dopamine deficiency that are not idiopathic PD. Furthermore, as I learned from a prominent neuropharmacologist, there are few, if any, neurological disorders that don’t, at some point, involve dopamine. In the brain, as most people know, everything is connected to everything else. There are no isolated physiological circuits and there are no isolated neurotransmitter circuits. Any perturbation is counterbalanced by some response somewhere. Blocking dopamine, increasing serotonin, reducing nicotine activity create imbalances in one (or more) place, counterbalanced by changes in other neurotransmitters somewhere else. I fully believe that in one hundred years our current most sophisticated analyses of brain circuitry will seem closer to the four humors of the Greeks than 22nd century brain science. I am skeptical of theories that are not empiric when it comes to the brain because we know what we observe, but rarely why it occurs. We have too often been wrong, misled by our oversimplifications. Since there are usually several options for choosing psychiatric drugs, most of which work equally well, there is no harm in this theorizing, so long as we don’t take it too seriously.
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January 1920: The Beginning of Nationwide Sobriety

STANLEY M. ARONSON, MD
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A sobering event was enacted on January 16, 1920; for on this date the use, manufacture, sale and distribution of alcoholic beverages, except for those employed in religious ritual, were henceforth forbidden in the United States. And thus, for the first time in American history, the Constitution was employed to regulate certain allegedly aberrant human behaviors.

The 18th Amendment prohibiting alcoholic beverages was the culmination of a lengthy temperance drive that began almost a century before, led by a generation of determined women who had witnessed the corrupting effects of liquor upon the integrity of their family; and they took to the streets to protest. The newspapers characterized these courageous women as remorseless extremists determined to destroy the saloons which provided transient tranquility to working men. Rarely, though, did these same newspapers tell of the wife-beatings, the unpaid rents and the domestic discord contributed to by alcohol. The Amendment was ratified on January 16, 1919 but was not enacted into law until January of 1920. Only two states failed to ratify the Amendment (Connecticut and Rhode Island – but, of course, it was Rhode Island that also failed to ratify the first draft of the Constitution).

For the next thirteen years the 18th Amendment stumbled along, spawning an immense new industry of illegally shipped alcoholic beverages, a vast network of illicit saloons called speakeasies, a major force augmenting police corruption and a new incentive for crime.

Prohibition has been caricatured as a wasted effort to vainly legislate human weakness. Yet, from a medical point of view, prohibition had its modest successes. Where prohibition was strictly enforced, the frequency of auto accidents was reduced. And more significantly, death due to the late sequel of chronic alcoholism – namely cirrhosis of the liver – dropped significantly during the 1920s and rose again in 1933 and beyond when the purchase of liquor resumed.

Prohibition was a mixed success, reflecting the human ambivalence toward alcohol. The Rubaiyat taught us: “Drink, for you know not whence you came nor why.” But Shakespeare’s Cassio responds: “O God! that men should put an enemy in their mouths to steal away their brains.”

Author
Stanley M. Aronson, MD, is Editor emeritus of the Rhode Island Medical Journal and dean emeritus of the Warren Alpert Medical School of Brown University.

Disclosures
The author has no financial interests to disclose.

This cartoon by Friedrich Graetz appeared in a New York publication during the Prohibition era with the caption: The drug store of the future. The interior view shows people in a line to the side of a consultation-free, doctor’s office booth; men are sitting at a drug store counter; a graphic insert is the outside of the building with the window sign saloon crossed out and drug store written underneath.
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Marijuana Use in Athletics

DAVID B. STOLL, MD, FACP

This month’s PHP Perspectives is in reference to RIMJ’s November “Sports Medicine” issue. While professional athletes are susceptible to a whole host of sports-related pathology with various organ involvements, they are also susceptible to developing dependence on substances used to relieve pain and stress, recover from injuries or to enhance performance.¹ Dr. David Stoll, a member of RIMS Physician Health Committee since 2005, reflects on the controversial issue of prohibiting use of cannabis by athletes and its inclusion as a banned substance under the World Anti-Doping Agency (WADA); along with his perspective on the effect of using cannabis as a means of coping with the stress and anxiety of competitive sports.

Let me begin by stating that, unfortunately, any discussion of marijuana use becomes mired in social and political issues, which leads us away from discussing it in terms of evidence-based medicine. The use of marijuana by athletes is a somewhat contentious issue for these reasons. Considering the adverse effects of marijuana, there appears to be good evidence that addiction can range from 9% to 50%, depending on the age of first consumption and the frequency of consumption. Known side effects of marijuana use include impaired short-term memory, impaired motor coordination, or altered judgment. It has also been documented that marijuana consumed in high doses can result in paranoia and psychosis. As the dose increases, the user may experience hallucinations, an alteration of the perception of reality, and the marked reduction in concentration. Effects include tachycardia, increased appetite, vasodilatation, broncho dilatation, increased sleep, and/or analgesia. It is difficult to classify marijuana as a stimulant, tranquilizer, or hallucinogen.²,³ It is also difficult to quantitate the dose because marijuana is consumed in a variety of ways and produced under non-regulated conditions. Health risks, as stated above, are very well defined.

Why should marijuana be considered a banned substance under the World Anti-Doping Prohibited List? The World Anti-Doping Agency’s [WADA] Prohibited List is the comprehensive document serving as the international standard for identifying substances and methods prohibited in sport. Mandated by, and serving as a key component of the WADA Code, the Prohibited List is one of the most important parts of harmonization globally across the anti-doping movement.⁵ Three criteria are used to consider if a drug, class of drug, or method should be included on the prohibited list. At least two of these criteria should be fulfilled. A drug should be included on the prohibited list if it poses a potential health risk. A substance shall be considered performance enhancing when the substance alone, or in combination with other substances, has the potential to enhance sport performance.

When so much needs to be learned about marijuana, it would make sense to keep it as a banned substance until medical research points to some possible positive effect. At the present time, there does not seem to be one. □

References
5. http://www.usada.org/substances/prohibited-list
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TEHRAN, IRAN
Misha Pless, MD, (above) a neurologist/neuro-ophthalmology from Zurich, Switzerland, and Michael E. Migliori, MD, (left) Ophthalmologist-in-Chief at Rhode Island Hospital, catch up on the latest edition of the RI Medical Journal at the 24th Annual Congress of the Iranian Society of Ophthalmology on December 3.

ISFAHAN, IRAN
Michael E. Migliori, MD, at the Sheikh Lotfollah Mosque in Naghsh-e Jahan Square. Built to be a private mosque of the royal court, construction began in 1603 and was finished in 1619. It is registered, along with the Naghsh-i Jahan Square, as a UNESCO World Heritage Site.
University Orthopedics proudly announces the appointment of Derek Jenkins, M.D.

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Dr. Jenkins was an adult reconstruction fellow at the Mayo Clinic in Rochester, MN, following his orthopedic surgery residency at Lenox Hill Hospital, NY, NY. He is a graduate of Dartmouth College as well as Dartmouth Medical School, where he also completed a student fellowship in Bone and Soft Tissue Pathology.

Dr. Jenkins, selected after a national search, will be an Assistant Professor at the Warren Alpert Medical School of Brown University. He will perform surgery at the Miriam Hospital, Rhode Island Hospital, Newport Hospital, and will see patients at University Orthopedics’ Butler Campus and Middletown offices.

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Public-private Partnerships, Programs Target Infectious Diseases in RI

BRIAN T. MONTAGUE, DO, MPH
GUEST EDITOR

Though morbidity and mortality from infectious diseases continues to decline in the United States, the recent epidemic of Ebola in West Africa highlights the ongoing importance of maintaining strong public health programs to address infectious diseases in the United States. Though epidemics may be infrequent, they consume considerable amounts of public resources and maintaining a strong public health approach to respond to these outbreaks is critical. In times of declining funding for public health programs, alternative strategies are needed to maintain the readiness of our health systems to respond to these crises. Dedicated public health treatment programs are increasingly transitioning into public-private partnership models in which community providers become the key care providers guided by public health programs. Targeted financial support addresses those aspects of control efforts not fundable through the existing public and private insurance systems. Both the increasing complexity of the system of care and the increasing emphasis on accountability in medical under the provisions of the Affordable Care Act, create a clear need to examine and monitor outcomes across the system of care. This issue highlights a number of programs in Rhode Island that address important issues in infectious diseases with implications for public health, including this public-private partnership model.

CONTRIBUTIONS

The article by Montague et al. highlights the opportunities and risks of public-private partnerships as an approach to sustaining tuberculosis (TB) control efforts in the context of declining incidence in Rhode Island and concomitant reductions in state and federal funding. The RI Department of Health has promoted a community-based testing and treatment model for latent tuberculosis infection focusing on the community health centers given their role as key sites for targeted testing for tuberculosis infection. The case study presented by Chow et al. highlights the need to consider tuberculosis as part of the differential diagnosis for persons from high-risk communities, even where specific exposure to persons with tuberculosis cannot be established.

Increasing attention is being given to a public health approach to HIV prevention using a treatment-as-prevention model, supported by the recent publication of the HPTN052 study, which showed near complete elimination of transmission within HIV serodiscordant couples when the infected partner is on suppressive antiretroviral therapy. In multiple settings strong inverse correlations are seen between the uptake to antiretroviral therapy and reductions in incident HIV in the community. Community viral load, assessed as the sum of detectable viral counts in the community, has been proposed as a potentially valuable index for risk of HIV transmission in the community. Touzard Romo et al. present clinic-based viral load data for the Miriam Hospital program, which may provide a useful baseline and framework for monitoring infection risk in the community going forward.

Recent epidemics of sexually transmitted diseases (STDs), particularly among men who have sex with men, have been described in many areas of the country. Chan et al. describe the recent observed increases in sexually transmitted diseases in RI as well as the working model of public-private STD testing and treatment clinic established at the Miriam Hospital. This clinic links STD testing with provision of pre-exposure and post-exposure prophylaxis for HIV and provides a unique source for this integrated care in RI.

Tick-borne illness is both a significant cause of morbidity in Rhode Island and an area of significant controversy. Reece et al. outline the current recommendations for diagnosis and treatment of tick-borne illnesses, particularly Lyme disease. They also discuss the important distinction between acute infection requiring antibiotic therapy and the post-Lyme inflammatory syndrome that likely accounts for a significant portion of persistent symptoms following treatment of the initial infection.

Increasing attention is being given to the management of persons receiving extended duration outpatient parenteral antibiotic therapy (OPAT). Touzard Romo et al. review the current guidelines for monitoring patients on these therapies and outline a program for monitoring these patients through an outpatient OPAT program.

BRIAN T. MONTAGUE, DO, MPH, is an Assistant Professor of Medicine in the Division of Infectious Diseases, the Warren Alpert Medical School of Brown University. He is a clinical provider of HIV and viral hepatitis care at the Miriam Hospital and other community sites and manages Ryan White funded HIV care programs at the Miriam and Rhode Island Hospitals and medical director of the RISE TB Clinic.
Tuberculosis Control in RI: Maintaining Control Efforts in the Context of Declining Incidence and Funding for Tuberculosis Programs

BRIAN T. MONTAGUE, DO, MPH; NICOLE E. ALEXANDER-SCOTT, MD, MPH; UTPALA BANDY, MD, MPH; JAIME COMELLA, MPH; AWEWURA KWARA, MB.CHB, MPH

INTRODUCTION

Tuberculosis (TB) infection is one of the most common infections in the world, affecting an estimated one-third of the world’s population and accounting for 1.3 million deaths annually.\(^1\) Incidence in the United States (US) peaked most recently in 1992 at 26,673 cases (10.4 cases per 100,000 persons), which was associated with the emergence of the HIV epidemic together with declines in funding for TB control in the 1980s.\(^2\) Tuberculosis incidence has since declined, with only 9,945 cases reported in 2012 (3.2 per 100,000). Sixty-three percent of TB cases in 2012 occurred among foreign-born populations.\(^3\) In Rhode Island (RI), highest rates are seen among persons from Guatemala (23%), Dominican Republic (15%), and Cambodia (15%). Multi-drug resistant tuberculosis, defined as resistance to isoniazid and rifampin, has been reported in 1% of US TB cases consistently. Though pulmonary TB is most common, disease can occur throughout the body with diverse manifestations.

Tuberculosis is spread by persons with pulmonary disease. Following initial infection within the lungs, the infection is usually contained and the mycobacteria remain quiescent within granulomas, a state termed latent tuberculosis infection (LTBI).\(^4\) Ten percent of infected persons subsequently develop TB over the course of their life, with half of that risk occurring within the first 2 years after infection. For persons with HIV, the risk of reactivation is higher and may reach 10% per year. Though eradication of infection may be possible, this cannot be confirmed with current testing and the assumption is made that all those infected are at risk for reactivation disease. Predictive models have been developed to estimate the risk of TB and of treatment complications with risk calculators available online.\(^5,6\)

Tuberculosis control involves the combination of active case finding for TB disease, assurance of adequate treatment for active disease with directly observed therapy (DOT), screening and treatment of TB infection among contacts to infectious cases, and targeted testing and treatment of LTBI among higher risk populations. This combined strategy has contributed to the substantial declines in reported TB.

Support for TB control has varied historically with increased support following times of higher incidence and declines when incidence diminishes. In 2000, the Institute of Medicine (IOM) report Ending Neglect highlighted the impact of declines in US categorical funding for TB on disease control and outlined key recommendations for improvements with the goal of TB elimination. It was estimated that 4 times the current funding of $528 million annually would be required to fully implement the IOM recommendations.\(^7\) Despite this, federal funding for TB control has been level or declining when adjusted for inflation since 1994, with greater reductions in funding for lower-incidence states.

Given ongoing funding gaps, partnerships with other programs and primary care providers are needed to maintain TB control efforts. With increases in federal support for community health centers (CHC), these centers may be model partners in this work. In 2012, a framework was established in RI under the direction of the RI Department of Health (HEALTH) to promote community-based testing and LTBI treatment by starting with CHC primary care providers. In this article we review the elements of screening and treatment for LTBI, discuss challenges implementing these in a community-based setting, and provide recommendations for providers to support integration of LTBI treatment into community care programs.

Diagnosis of Latent TB Infection

The Centers for Disease Control (CDC) recommends targeted testing for persons at high risk for TB with the framework that a decision to test is a decision to treat.\(^8\) Testing is recommended for persons who are at increased risk of exposure [e.g. persons from high-burden countries, contacts to persons with pulmonary TB] or persons at increased risk for reactivation disease [e.g. persons with HIV or on immunosuppressive medications]. Given the role of the CHCs in serving immigrants, these sites and similar primary care practices are important for targeted testing.

Historically, the cornerstone of screening for TB infection has been the tuberculin skin test (TST). This test has been validated in large cohorts with long-term follow-up such that evidence-based recommendations for interpretation of results for most individuals can be provided. A key limitation of the TST has been the potential for false positives due to exposure to either BCG vaccine or non-tuberculous mycobacteria. This potential is highest among young persons with recent BCG administration.

Interferon Gamma Release Assays (IGRAs) were developed as more specific alternatives to TST, without cross-reactivity with BCG or common non-tuberculous mycobacteria.\(^9,11\) Two forms of IGRA have been approved for use, the
Quantiferon®-TB Gold, which is used most commonly, and the T-Spot®-TB test. These assays have been validated with short-term follow-up of populations at high risk for disease with performances comparable to TST. False negatives and false positives, however, can occur. For persons tested with both TST and an IGRA, the interpretation of discordant results may not be clear.12-14 CDC guidelines discourage the use of dual testing except in limited circumstances, principally:

1) When increased sensitivity for detection of TB infection is desired and treatment would be recommended based on positivity of either test.

2) When a confirmatory test is necessary to persuade a patient to take treatment due to skepticism regarding the interpretation of the TST.8

Given the potential for false positive TSTs for persons with a history of BCG, the recommendation is that IGRA be used as the sole test.

Uncertainty exists with regard to the management of persons with a history of BCG or no clear exposures to TB who test positive by TST. The core recommendation is that testing be restricted to persons of sufficiently high risk that a positive test would be accepted as indication to treat. Though not endorsed by the guidelines, in practice IGRA testing has been used as a second test in low-risk individuals for whom false positive TST is likely. Because the sensitivity of the IGRA is not 100%, individuals with TB infection may be misclassified based on a negative IGRA and not offered treatment. IGRA should not, therefore, be used as a second test in those at high risk for development of tuberculosis disease.

Diagnosis of LTBI requires exclusion of TB disease. Historically, about one-third of patients with active TB identified at the RISE TB Clinic were identified as part of initial evaluation for LTBI. Standard protocols include conducting a symptom screen and obtaining a chest x-ray. Symptom screens focus on the most common symptoms including fever, cough, unintentional weight loss, and drenching night sweats. These screens may miss extrapolmonary TB and so the initial evaluation needs to include review of other unexplained symptoms the patient may have that may be attributable to TB.

### Table 1. Treatment Regimens for Latent Tuberculosis Infection

<table>
<thead>
<tr>
<th>Treatment</th>
<th>Dose</th>
<th>Duration</th>
<th>Minimum Doses</th>
</tr>
</thead>
<tbody>
<tr>
<td>Isoniazid</td>
<td>10 mg/kg children, 5 mg/kg</td>
<td>9 months</td>
<td>Daily: 270 within 12 months Twice Weekly DOT: 76 within 12 months</td>
</tr>
<tr>
<td></td>
<td>adults. Max dose 300 mg/day</td>
<td></td>
<td></td>
</tr>
<tr>
<td>Rifampin</td>
<td>10 mg/kg. Max dose 600 mg/day</td>
<td>4 months</td>
<td>Daily: 120 within 6 months</td>
</tr>
<tr>
<td>Isoniazid + rifampentine</td>
<td>INH: 15mg/kg round up to</td>
<td>3 months</td>
<td>Weekly DOT: 11 or 12</td>
</tr>
<tr>
<td></td>
<td>nearest 50 or 100mg. Max dose:</td>
<td></td>
<td>within 16 weeks</td>
</tr>
<tr>
<td></td>
<td>900mg. RPT:</td>
<td></td>
<td></td>
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<tr>
<td></td>
<td>10.0-14.0 kg 300 mg</td>
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<td></td>
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<tr>
<td></td>
<td>14.1-25.0 kg 450 mg</td>
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<tr>
<td></td>
<td>25.1-32.0 kg 600 mg</td>
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<tr>
<td></td>
<td>32.1-49.9 kg 750 mg</td>
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<tr>
<td></td>
<td>≥ 50.0 kg 900 mg</td>
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</table>

### Latent Tuberculosis Infection in Rhode Island

RI is a low-incidence state for TB with 23 cases reported in 2012.21 On average, more than 60% of cases occur among foreign populations. A National Health and Nutrition Examination Survey (NHANES) survey from 1999-2000 estimated the prevalence of LTBI at 4.2% nationwide with 18.7% prevalence among the foreign born.21 The 4.2% overall prevalence would suggest that approximately 44,000 people in RI tolerate at doses greater than 50mg. Isoniazid has the advantage that it has few drug interactions and serious toxicities are relatively rare.15 The common side effects include inflammation of the liver, with the incidence of serious toxicity estimated to be as low as 0.1 to 0.6% of cases. Drug-induced neuropathic pains of the extremities can occur and are often preventable with vitamin B6 supplementation.

Shorter course treatment with rifampin has been both validated independently and tested compared to isoniazid.16-18 Completion rates were better with rifampin and tolerance was higher. Hepatotoxicity can occur, though it is thought to be less frequent than with isoniazid. The relative risk of grade 3 or 4 hepatotoxicity was 0.12 for rifampin.16 Hypersensitivity reactions and hematologic changes, principally thrombocytopenia and leukopenia can occur but are rare.

The third regimen is the combination of isoniazid and rifapentine dosed weekly as DOT for 12 weeks.19,20 This regimen was validated for use in contacts to persons with pulmonary TB. Dosing for both agents is weight-based. This regimen is recommended for patients of age 12 or higher with high risk of disease based on recent exposure, documented conversion of TST or IGRA.

Whichever regimen is used, treatment monitoring and documentation of treatment outcome is a key component of therapy. Adherence assessment is necessary and where possible documentation of the number of doses received and the time period should be made. Persons who subsequently require immunosuppressive therapy may require retreatment if sufficient documentation of treatment adequacy is not available.

### Treatment of Latent TB Infection

There are several approved regimens for the treatment of LTBI (see table 1). The oldest and best studied is therapy with isoniazid. The treatment course is 9 months and, if gaps occur, a total of 270 doses must be received within a period of 12 months. Liquid formulations are available but the sorbitol base limits
are living with LTBI. Though LTBI has been reportable since 2010, it remains underreported and LTBI targeted testing expansion is needed to reach more high-risk individuals.

Funding for TB control in RI has decreased overall in the last 10 years, reaching its current nadir in 2012. Given these declines, the TB control program has prioritized:

1) Identification and medical treatment of active cases
2) Contact investigations and treatment of LTBI among contacts to actives
3) Evaluation and treatment of TB infection among persons at high risk of reactivation
4) Evaluation and treatment of TB infection among persons with no other access to services

The tuberculosis control program at HEALTH works in partnership with the Miriam Hospital RISE Clinic, which provides consultation and treatment services, and with Hasbro Children’s Hospital for treatment of LTBI among children in RI. In 2013, there were 27 confirmed active TB cases in RI and the program identified 1,183 contacts to active cases and performed 5,056 DOT visits. During the same period, 413 LTBI cases were identified and managed at the Hasbro Children’s Hospital and RISE TB Clinics. The overall completion rate for persons starting on LTBI treatment at RISE in 2013 was 67%.

The proposed framework to collaborate with CHCs for treatment of LTBI included CHCs consulting the RISE Clinic to conduct an initial evaluation to exclude active TB and set an LTBI treatment plan. Given the high risk of reactivation disease among persons with HIV, all persons without prior documented HIV testing and those with risk factors for recent HIV exposure would be screened as part of the initial RISE clinic evaluation. Low-risk LTBI patients who are able to receive treatment through the CHC would be referred back for the treatment and monitoring. In addition to contacts to persons with active TB, high risk or complex LTBI patients, particularly young children, persons with HIV, and those who are on or who are candidates for immunosuppressive therapy, would complete their treatment course at the RISE Clinic.

Several barriers were noted with the initial roll-out of this program. Medication costs and costs of associated monitoring for patients without insurance historically have been borne by the state and the Miriam Hospital. Patients referred back to CHCs without medication coverage were unlikely to receive the full treatment course in the absence of financial supports. Access to insurance under the Affordable Care Act has improved access to medications and diagnostics for some, though immigrants may be excluded and cost-share requirements continue to pose barriers. Without specific funding and mechanisms to support the costs of treatment for the uninsured, referral to the CHC would result in failure to treat.

Provider comfort with both medication management and clinical monitoring is equally a challenge. Many providers have rarely, if ever, prescribed TB medications and may be uncomfortable managing the side effects and toxicities. Though targeted education can address these concerns, a high level of commitment from CHCs is needed to maintain investment in the program over time.

The referral step before treatment creates the potential for loss to follow-up. This may be particularly a concern if there is inadequate tracking of referrals. If new symptoms develop during the period prior to follow-up for treatment, health center providers may be uncomfortable treating or providing the needed clinical reassessment. If treatment complications occur, explicit planning is needed to determine when referral to RISE Clinic is appropriate. Further solidification of this model is needed with the eventual goal of expanding to additional pediatric and adult primary care providers.

RECOMMENDATIONS

In order for a community-based treatment for LTBI to succeed there are several key areas that need to be addressed:

- Increased targeted testing is needed among high-risk groups.
- Use of IGRA per recommendations to minimize referrals due to false positive TSTs.
- Ongoing education of community providers is needed to improve knowledge of tuberculosis and the treatment of LTBI.
- Partnering primary care providers, starting with CHCs, need to develop internal processes for tracking prescriptions/adherence.
- Continued support for LTBI treatment at the Rise and Hasbro clinics is needed both for high-risk patients and to serve those without adequate coverage for treatment in the community.
- Treatment completion rates and complications need to be reviewed focusing on gaps or adverse outcomes resulting from the referral process.

References


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Disclosures

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ABSTRACT
This is a case of a child born in the US to immigrant parents from a tuberculosis (TB)-endemic area of Liberia who was diagnosed with TB meningitis after a greater than 1-month history of unremitting fever. This report aims to highlight the importance of early identification of TB in the pediatric population with risk factors for TB and considering TB as a diagnosis among US born children to immigrants from TB-endemic countries.

KEYWORDS: Tuberculous meningitis, refugee, pediatric, immigrant

INTRODUCTION
Tuberculosis (TB) continues to be the second most common infectious killer in the world among patients of all ages with approximately 1.3 million deaths worldwide attributable to the disease in 2012.1 While many developing countries continue to struggle with TB control, widespread surveillance and appropriate treatment has allowed the US to maintain a low incidence of the disease. The Centers for Disease Control’s (CDC) 2012 annual report noted a total of 9,945 new cases of TB, the lowest number ever of new TB cases in the US in a single year.2 While the majority of these cases of TB occurred in foreign-born individuals, a significant percentage (37%) occurred in US-born persons.3 Reaching the appropriate populations to test for TB continues to be key to controlling the transmission of TB.

Among refugee immigrant communities in the US, the risk of TB exposure is higher than the general population. Greater than 85% of refugees worldwide come from countries with a high prevalence of TB and many live in resource poor, crowded conditions prior to immigrating to their final destination.4 In 2012, more than 58,000 refugees arrived in the US through the US Refugee Admissions Program (USRAP).5 The state of Rhode Island (RI) has been an important site for refugee resettlement. From 1990–2008, a total of almost 4,800 refugees emigrated to the state of RI with 96% from Africa or Iraq.6 Prior to relocation, refugees undergo screening by the US Department of State in countries of emigration. CDC screening standards since 2009 require immigrants older than 15 years of age in countries with WHO-estimated TB incidence rate ≥ 20 cases per 100,000 population to be screened by medical history, physical examination and chest radiograph. Only when individuals have symptoms or evidence suggestive of TB or HIV infection are sputum smears and cultures sent for TB.7 Individuals with possible TB disease with negative smear and culture findings are not generally treated unless findings are highly suggestive of TB disease.7 These screening exams are often completed months before departure, affording time for new exposure or reactivation. Although refugees are expected to be screened and receive treatment for active TB prior to arrival in the US, studies of refugee populations have found that when rescreened on arrival in the US, a significant percentage of refugees have active TB. A retrospective review of CDC data on refugees and immigrants arriving in the US from 1999-2005 found that 7.0% of those diagnosed with smear-negative tuberculosis and 1.6% of those with an overseas diagnosis of inactive TB (Liu et al described inactive TB as a chest radiograph with evidence of TB that was not clinically active including fibrosis, scarring, pleural thickening, diaphragmatic tenting or blunting of the costophrenic angles) were rediagnosed with active pulmonary TB.8 This diagnosis was made on the results of chest radiography and sputum smears for those presenting for their follow-up evaluation upon arrival in the US. In the northeast, one study in Connecticut found that 4% of refugees with prior history of disease and presented for TB evaluation on arrival had active disease when reexamined in the US.9 While the country of origin or emigration for refugees differ in each state, these data suggest that despite screening requirements, a significant number of individuals arrive in the US with active TB disease. Consequently, people who have regular close contact with the refugee community are at higher risk for TB exposure, including US-born children of refugees.

Here we describe a case of TB meningitis in a US-born child of refugee parents after a delay in diagnosis. We will highlight the importance of having a higher index of suspicion for TB in US-born children with TB symptoms and with immigrant parents from TB-endemic areas, especially in families with ongoing exposure to individuals from the immigrant community. Furthermore, we will demonstrate how a delay in diagnosis can increase the morbidity (and potentially mortality) of the disease in the pediatric population.
CASE REPORT
A 2-year-old girl initially presented to her outpatient primary care physician (PCP) after developing a fever to 102.3°F, ear pain and intermittent nonproductive cough. She was the US-born child of Liberian immigrant parents who had arrived in the US 20 years prior to her birth. Both parents were known to have positive PPDs (purified protein derivative) but negative chest x-rays (CXR), and the child had no history of travel outside of the US. Caregivers initially made a diagnosis of pneumonia and sent her home with a 5-day course of azithromycin. When symptoms did not improve, she was brought to the local emergency department (ED) where a further work-up for pneumonia was started. On CXR, she was noted to have a left pleural effusion. She was hospitalized for 7 days during which she underwent a video-assisted thorascopic surgery (VATS) with a left-sided chest tube and a course of ceftriaxone. Bacterial cultures, including acid-fast bacilli (AFB) used to detect TB, were performed and results returned as negative. Adenosine deaminase (ADA) levels and pleural biopsies that can be helpful in detecting TB pulmonary infections were not performed. After completing her course of antibiotics, the patient’s fever persisted, and she was brought back to the PCP and ED for further evaluation. A subsequent CXR showed a resolution of the previous pleural effusion, and additional testing including a complete blood count, viral titers for infectious mononucleosis, lead levels and urinalysis were normal. Erythema was noted around the former chest tube site, and the patient was given cefdinir to treat cellulitis.

After an additional 3 weeks of fever, the patient’s mother noted signs consistent with new left-sided neurological deficits, including left upper and lower extremity weakness. When the patient returned to the ED for work-up, she was afebrile and all vital signs were stable. On physical exam, she had an abnormal gait with repeated falling to her left side. She had no meningismus, and her lung, cardiovascular and abdominal exams were normal. Other than her gait, the neurological exam was documented to be normal, including no evidence of diminished strength in the upper or lower extremities. Labs showed that the patient had an elevated white blood count with no bandemia. The respiratory viral panel which included testing for respiratory syncytial virus, influenza A and B, metapneumovirus, rhinovirus, enterovirus, adenovirus, parainfluenza and coronavirus was negative. She had a computed tomography (CT) scan of the chest, abdomen and pelvis. Scans of the chest revealed multiple calcified lymph nodes consistent with a prior TB infection [Figure 1]. The images were otherwise normal, and there was no evidence of active lung infection.

She was admitted for further work-up and evaluation. Overnight, she became increasingly lethargic and less responsive and was transferred to the pediatric intensive care unit (PICU). A CT scan of the head showed ventriculomegaly involving the lateral, third and fourth ventricles [Figure 2]. A magnetic resonance image [MRI] of the brain revealed basilar meningeal enhancement as well as acute infarcts involving the corpus callosum and bilateral basal ganglia [Figure 3]. Later that same day, her PPD was read as positive with a 15 mm induration. In the context of these findings, her imaging was highly suggestive of TB meningitis. Lumbar puncture and cerebrospinal fluid (CSF) analysis showed an increased white cell count of 233 with a lymphocytic predominance, elevated protein to 103 mg/100mL (normal between 15-60 mg/100mL) and a decrease of glucose to 20 mg /100mL (normal between 50-80 mg/100mL). CSF polymerase chain reaction (PCR) was additionally performed for enterovirus and herpes simplex 1 and 2 that were all subsequently negative. Quantiferon gold blood test was
sent as an additional test to support the diagnosis of TB and ultimately yielded a positive result. AFB cultures for blood, urine and CSF did not grow any bacteria.

Initially, the patient’s diagnosis remained elusive because tuberculosis was not high on the care team’s differential. Her fevers persisted through several trials of antibiotics prior to initiating her TB treatment. She had an extensive work-up for a broad range of viral and bacterial causes of her infection; all were negative except for mildly elevated Mycoplasma titer, thought to be an incidental finding. Given her pleural effusions, brain imaging findings, CSF analysis, PPD positivity and QuantiFERON-TB Gold test results, the patient’s symptoms were attributed to TB meningitis. Her excellent response to treatment further supported the presumed diagnosis of TB meningitis.

She was started on a four-drug regimen of isoniazid, rifampin, ethambutol and pyrazinamide for a 12-month course of directly observed therapy (DOT). One year after discharge from the hospital, her symptoms have resolved and she has no neurological deficits. She has completed her treatment and has returned to her usual state of health. She was assessed to be a clinical case of tuberculosis based on evidence of exposure, a consistent clinical syndrome, and response to antituberculous therapy. To this day, the source case has not been identified.

**DISCUSSION**

This case of TB meningitis demonstrates the importance of increased suspicion for TB in patients living in immigrant and refugee communities in RI, regardless of whether the patient is US- or foreign-born. Delayed diagnosis can result in significant morbidity (and potentially mortality), including further spread of TB. A recent study of US children younger than 5 with symptomatic TB infection found that it took a median of 52 days to initiate TB therapy. Clearly, a higher degree of suspicion is needed. RI continues to welcome refugees who often live with multiple family members and have contact with close-knit communities from their countries of origin, allowing for the possibility of transmission despite efforts to screen and treat new immigrants.

The large majority of cases of active TB among pediatric patients in the US occur in children who are either foreign-born or in close contact with individuals from a TB-endemic country. In a study by Winston et al. evaluating the demographics of pediatric TB cases in the US between 2008–2010, the authors found that 69% of cases occurred in US-born children, but that 66% of these US-born children with active TB had at least one foreign-born parent. Children younger than 5 represent a particularly vulnerable population because they are more likely to progress to active disease and are more likely to develop severe manifestations of TB disease, such as TB meningitis. In an observational study by the Tuberculosis Epidemiologic Studies Consortium from 2005–2007, the majority (53%) of cases of active TB in young children younger than 5 in the US were reported among US-born children with at least one foreign-born parent. In contrast, foreign-born children represented only 17% of cases. This study also examined the reasons for seeking healthcare that led to the diagnosis of active TB. Among US-born children younger than 5 with active TB, only 40% were evaluated and diagnosed due to contact investigations or known TB exposures. The remainder of the children were diagnosed either by routine screening (14%) or because they were symptomatic (46%). While young children should be prioritized during contact investigations of active TB cases, these data suggest that tracing of contacts alone is likely not sufficient to catch all active TB disease in young children in the US.

A child’s parents’ status as refugees or immigrants from TB-endemic countries should be added as additional risk factors when considering testing for TB in pediatric patients with TB-related symptoms. Despite TB screening policies in place before and upon entering the US, not all individuals with TB are appropriately identified or completely treated. A constant influx of new immigrants as well as contact with family members visiting from TB-endemic countries may also increase a patient’s TB risk. Clinicians should have a higher index of suspicion for TB in US-born children living in refugee and immigrant communities from TB endemic countries.
References


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Conflicts of Interest
None of the authors have any conflicts of interest or financial disclosures to report.

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Monitored Viral Load: A Measure of HIV Treatment Outcomes in an Outpatient Setting in Rhode Island

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ABSTRACT
Community viral load measurements have been postulated to be a population-based biomarker of HIV disease. We propose the use of the monitored community viral load (mCVL) as an aggregate measure of viral load among persons receiving HIV care with available HIV-1 plasma viral loads and applied it to our clinic population from 2003–2010. We demonstrated a reduction in mCVL from 16,589 copies/ml to 11,992 copies/ml that correlated with a rising rate of antiretroviral use and HIV viral suppression; however, differences among risk populations were observed. The mCVL is a useful measure of HIV burden among patients in-care; it may reflect the HIV transmission risk in the community and help target preventive interventions.

KEYWORDS: Community viral load, HIV, Rhode Island, Antiretroviral therapy

INTRODUCTION
Antiretroviral therapy (ART) effectively suppresses HIV-1 RNA concentrations in blood and other body fluids, hence decreasing the risk of HIV infectivity. Based on this principle, universal HIV testing and early antiretroviral therapy has been advocated as a strategy to lower HIV incidence. Clinical evidence and mathematical models support the use of ART to control HIV transmission risk at an individual and population level.

The concept of community viral load (CVL), defined as the mean or total HIV-1 plasma viral load (PVL) of infected individuals in a given geographic area or population, has been postulated as a useful population-based measure of the effect of treatment on HIV transmission and supported by ecological evidence. As a result, the Division of HIV/AIDS Prevention at the Centers for Disease Control and Prevention (CDC) has proposed the use of CVL as a tool to monitor the progress of the National HIV/AIDS Strategy goals and released guidelines to standardize definitions and calculations in 2011. Nonetheless, CVL measurements must include PVLs from all HIV-infected persons, including those who are not engaged in care, in order to accurately assess the population’s aggregate viremia. We propose the use of the “monitored community viral load” (mCVL) instead, an estimate that includes patients in care with available PVLs, to examine HIV transmission drivers and quality of HIV care in a community-based outpatient practice.

METHODS
This is a retrospective analysis of clinical and demographic data collected from a longitudinal electronic database of all HIV-infected individuals receiving care at the Miriam Hospital Immunology Center, the largest HIV care provider in RI, with approximately 1,500 active patients in 2012. We determined the proportion of patients on ART with undetectable HIV-1 plasma viral load (PVL), with CD4 cell counts below 200 and ≥ 350 cells/μL (based on the last available CD4 cell count each year), and the proportion retained in care between January 1, 2003 and December 31, 2010. ART use was defined as documentation of prescribed ART in at least one clinic visit in any given year. Given variability in the level of detection among viral load assays used over time, an undetectable PVL was defined as < 75 copies/ml. Patients who attended at least 1 clinic visit with a medical provider within each 6-month period in a given year separated by ≥ 60 days were considered retained in care.

Based on the CDC guidance, mean and median mCVLs were calculated using detectable and undetectable PVL values among patients in-care. To be included in this analysis, patients must have had at least one PVL value recorded in a given year during the study period. Calculations were compared using three different PVL summary measures: 1) the mean of all available individual PVLs for each calendar year; 2) the aggregate mean of the annual mean PVL for each individual; and 3) the mean of the last available PVL for each individual per calendar year. The latter was used to assess changes in mCVL among patients stratified by HIV risk factor and to assess trends over time.

We summarized the demographics and clinical characteristics such as gender, age, race/ethnicity, HIV risk factor, proportion on ART, CD4 counts ≥ 350 cells/μL, retention in-care rates, and mCVL for the total sample from 2003 to 2010 using means (standard deviation) for continuous data and absolute numbers (percentages) for categorical variables. Ordinary Least Square linear regression models were used to assess time trends treating years as an independent variable. A regression coefficient estimated the changes over time; each series was analyzed independently. All data analysis was
conducted using Statistical Analysis Software (SAS) version 9.1 (Cary, NC), double sided p-values and a threshold for statistical significance set at < 0.05.

**RESULTS**

A total of 1959 unique HIV-infected patients received care at our center during the study period. As shown in Table 1, the number of active patients in-care increased from 922 in 2003 to 1,383 in 2010, particularly men who have sex with men (MSM) as reflected by the regression coefficient (p < 0.01). Over the time period, the clinic population was predominantly Caucasian, non-Hispanic males, between 25-64 years of age. MSM and heterosexual contact were the most common HIV risk factors recorded. Eighty-five to 95% of patients had at least one PVL in a given year from 2003 to 2010. The proportion of patients receiving ART increased from 67% to 86% by the end of the study [p < 0.01]. This finding correlates with a 22% increase in the proportion of patients with undetectable viral loads [p < 0.01] and a 12% rise in the proportion with CD4 counts ≥ 350 cells/μL [p < 0.01] over the 8-year period [Figure 1]. The clinic population retention in-care rate remained stable, ranging from 61% to 68%, with similar trends observed across risk groups (Table 1).

We calculated the mCVL using the three calculation methods described and found there was a decrease in mCVL.

**Table 1. Demographic and Clinical Characteristics of Clinic Patients Over Time.**

<table>
<thead>
<tr>
<th>Year</th>
<th>2003</th>
<th>2004</th>
<th>2005</th>
<th>2006</th>
<th>2007</th>
<th>2008</th>
<th>2009</th>
<th>2010</th>
<th>R Coefficient (SD, P value)*</th>
</tr>
</thead>
<tbody>
<tr>
<td><strong>Total Active Patients, n</strong></td>
<td>922</td>
<td>951</td>
<td>985</td>
<td>1064</td>
<td>1135</td>
<td>1204</td>
<td>1315</td>
<td>1383</td>
<td></td>
</tr>
<tr>
<td><strong>Patients entering care</strong>, n (%)</td>
<td>118 (12.7)</td>
<td>187 (19.6)</td>
<td>124 (12.5)</td>
<td>166 (15.6)</td>
<td>128 (11.2)</td>
<td>154 (12.7)</td>
<td>165 (14)</td>
<td>166 (12)</td>
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<tr>
<td><strong>New HIV diagnosis</strong>, n (%)</td>
<td>47 (5)</td>
<td>110 (11.5)</td>
<td>64 (6.5)</td>
<td>84 (7.9)</td>
<td>76 (6.7)</td>
<td>87 (7.2)</td>
<td>98 (7.4)</td>
<td>70 (5)</td>
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<td><strong>Gender, n (%)</strong></td>
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<td></td>
<td></td>
</tr>
<tr>
<td>Male</td>
<td>594 (64.4)</td>
<td>602 (63.3)</td>
<td>624 (63.4)</td>
<td>694 (65.2)</td>
<td>759 (66.9)</td>
<td>806 (66.9)</td>
<td>884 (72.7)</td>
<td>952 (68.8)</td>
<td>54 (4.1, &lt; 0.01)</td>
</tr>
<tr>
<td>Female</td>
<td>325 (35.2)</td>
<td>348 (36.6)</td>
<td>360 (36.5)</td>
<td>370 (34.8)</td>
<td>376 (33.1)</td>
<td>398 (33.1)</td>
<td>431 (32.8)</td>
<td>430 (31.1)</td>
<td>15 (1.3, &lt; 0.01)</td>
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<tr>
<td>Transgender</td>
<td>3 (0.3)</td>
<td>1 (0.1)</td>
<td>1 (0.1)</td>
<td>0 (0)</td>
<td>0 (0)</td>
<td>0 (0)</td>
<td>0 (0)</td>
<td>0 (0)</td>
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<td><strong>Age, n (%)</strong></td>
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<tr>
<td>16–24 years</td>
<td>34 (3.7)</td>
<td>46 (4.8)</td>
<td>39 (3.9)</td>
<td>28 (2.6)</td>
<td>34 (3.0)</td>
<td>32 (2.7)</td>
<td>42 (3.2)</td>
<td>47 (3.4)</td>
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<td>25–44 years</td>
<td>539 (58.5)</td>
<td>567 (59.6)</td>
<td>503 (51.1)</td>
<td>526 (49.4)</td>
<td>536 (47.2)</td>
<td>549 (48.4)</td>
<td>601 (49.9)</td>
<td>683 (51.9)</td>
<td>741 (53.6)</td>
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<td>45–64 years</td>
<td>343 (37.2)</td>
<td>336 (35.3)</td>
<td>437 (44.4)</td>
<td>8 (0.8)</td>
<td>16 (1.4)</td>
<td>26 (2.2)</td>
<td>33 (2.5)</td>
<td>40 (2.9)</td>
<td></td>
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<tr>
<td>≥ 65 years</td>
<td>6 (0.7)</td>
<td>2 (0.2)</td>
<td>6 (0.6)</td>
<td>8 (0.8)</td>
<td>16 (1.4)</td>
<td>26 (2.2)</td>
<td>33 (2.5)</td>
<td>40 (2.9)</td>
<td></td>
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<td><strong>Race, n (%)</strong></td>
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<td></td>
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<td></td>
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<td></td>
<td></td>
</tr>
<tr>
<td>Caucasian</td>
<td>460 (49.9)</td>
<td>509 (53.5)</td>
<td>542 (55)</td>
<td>599 (56.3)</td>
<td>646 (56.9)</td>
<td>691 (57.4)</td>
<td>743 (56.5)</td>
<td>795 (57.5)</td>
<td></td>
</tr>
<tr>
<td>AA</td>
<td>297 (32.2)</td>
<td>308 (32.4)</td>
<td>324 (32.9)</td>
<td>347 (32.6)</td>
<td>369 (32.5)</td>
<td>383 (31.8)</td>
<td>432 (32.9)</td>
<td>451 (32.6)</td>
<td></td>
</tr>
<tr>
<td>Others</td>
<td>165 (17.9)</td>
<td>134 (14.1)</td>
<td>119 (12.1)</td>
<td>118 (11.1)</td>
<td>120 (10.6)</td>
<td>130 (10.8)</td>
<td>140 (10.6)</td>
<td>137 (9.9)</td>
<td></td>
</tr>
<tr>
<td><strong>Ethnicity, n (%)</strong></td>
<td></td>
<td></td>
<td></td>
<td></td>
<td></td>
<td></td>
<td></td>
<td></td>
<td></td>
</tr>
<tr>
<td>Hispanic</td>
<td>182 (19.8)</td>
<td>183 (19.2)</td>
<td>197 (20)</td>
<td>214 (20.1)</td>
<td>235 (20.7)</td>
<td>261 (21.7)</td>
<td>296 (22.5)</td>
<td>314 (22.7)</td>
<td>20 (1.8, &lt; 0.01)</td>
</tr>
<tr>
<td>Non-Hispanic</td>
<td>740 (80.2)</td>
<td>768 (80.8)</td>
<td>788 (80)</td>
<td>850 (79.9)</td>
<td>900 (79.3)</td>
<td>943 (78.3)</td>
<td>1019 (77.5)</td>
<td>1069 (77.3)</td>
<td>49 (2.8, &lt; 0.01)</td>
</tr>
<tr>
<td><strong>HIV Risk Factor, n (%)</strong></td>
<td></td>
<td></td>
<td></td>
<td></td>
<td></td>
<td></td>
<td></td>
<td></td>
<td></td>
</tr>
<tr>
<td>MSM</td>
<td>272 (29.5)</td>
<td>292 (30.7)</td>
<td>303 (30.8)</td>
<td>359 (33.7)</td>
<td>400 (35.2)</td>
<td>429 (35.6)</td>
<td>469 (35.7)</td>
<td>541 (39.1)</td>
<td>38 (2.7, &lt; 0.01)</td>
</tr>
<tr>
<td>Non-MSM</td>
<td>650 (70.5)</td>
<td>659 (69.3)</td>
<td>682 (69.2)</td>
<td>705 (66.3)</td>
<td>735 (64.8)</td>
<td>775 (64.4)</td>
<td>846 (64.3)</td>
<td>842 (60.9)</td>
<td>31 (2.9, &lt; 0.01)</td>
</tr>
<tr>
<td><strong>Retained in care</strong>, n (%)</td>
<td>575 (62)</td>
<td>580 (61)</td>
<td>663 (67)</td>
<td>731 (69)</td>
<td>767 (67)</td>
<td>809 (67)</td>
<td>867 (66)</td>
<td>937 (68)</td>
<td>53 (2.6, &lt; 0.01)</td>
</tr>
<tr>
<td>% on ART</td>
<td>67</td>
<td>74</td>
<td>77</td>
<td>79</td>
<td>80</td>
<td>81</td>
<td>82</td>
<td>86</td>
<td>2 (0.32, &lt; 0.01)</td>
</tr>
<tr>
<td>% Undetectable PVL</td>
<td>48</td>
<td>48</td>
<td>52</td>
<td>58</td>
<td>60</td>
<td>67</td>
<td>67</td>
<td>70</td>
<td>3.5 (0.3, &lt; 0.01)</td>
</tr>
<tr>
<td>% CD4 ≥ 350 cell/μL</td>
<td>61.7</td>
<td>57.9</td>
<td>60.5</td>
<td>65.8</td>
<td>62.2</td>
<td>68.7</td>
<td>69.7</td>
<td>73.5</td>
<td>1.9 (0.4, &lt; 0.01)</td>
</tr>
</tbody>
</table>

1 Includes all newly diagnosed registered to receive care in the clinic, patients transferring care from another provider, and patients who were reactivated into care.
2 Includes patients who registered to receive care in the clinic and were diagnosed with HIV within the previous 12 months.
3 Based on patients self-reports during their intake interviews.
4 Includes patients that attended to at least 2 medical visits with a medical provider separated by ≥ 60 days in a year.
5 Documented prescribed ART in at least one clinic visit in any given year.
6 < 75 copies/ml.
7 Based on the last available CD4 cell count in each year.
* Regression coefficient, P value by ordinary linear regression

Abbreviations: AA, African American; SD, standard deviation, ART, antiretroviral therapy; PVL, HIV-1 RNA viral load
over time using each calculation method (Table 2). Using the aggregate mean of the last available PVL for each calendar year per individual, we observed decline in the mCVL from 16,589 copies/ml in 2003 to 11,992 copies/ml in 2010 [p = 0.07] as shown in Table 3. When looking at the mCVL among risk groups over the time period, there was a significant reduction in mCVL over the time period among MSM (p = 0.035) but not among other risk groups (p = 0.14).

Figure 1. Percentage of clinic patients on ART, with undetectable PVL and CD4 cell count ≥ 350 cells/μL over study period (2003-2010).

Table 2. Comparison of Monitored Community Viral Load Calculation Methods.

<table>
<thead>
<tr>
<th>mCVL Calculation Methods</th>
<th>2003</th>
<th>2004</th>
<th>2005</th>
<th>2006</th>
<th>2007</th>
<th>2008</th>
<th>2009</th>
<th>2010</th>
<th>Mean (SD)*</th>
<th>R Coefficient (SD, P Value)**</th>
</tr>
</thead>
<tbody>
<tr>
<td>Method #1</td>
<td>24,244</td>
<td>27,195</td>
<td>22,483</td>
<td>24,166</td>
<td>20,986</td>
<td>18,031</td>
<td>15,510</td>
<td>16,012</td>
<td>21,078 (4,224)</td>
<td>-1578 (283.6, &lt;0.01)</td>
</tr>
<tr>
<td>Method #2</td>
<td>20,841</td>
<td>25,983</td>
<td>21,001</td>
<td>23,782</td>
<td>22,573</td>
<td>18,019</td>
<td>15,899</td>
<td>15,205</td>
<td>20,412 (3,795)</td>
<td>-1191 (404.6, 0.03)</td>
</tr>
<tr>
<td>Method #3</td>
<td>16,589</td>
<td>20,511</td>
<td>16,508</td>
<td>17,493</td>
<td>20,923</td>
<td>14,163</td>
<td>11,254</td>
<td>11,992</td>
<td>16,179 (3,568)</td>
<td>-977 (441.1, 0.07)</td>
</tr>
</tbody>
</table>

Table 3. Monitored Viral Load Over Time by HIV Risk Factor.

<table>
<thead>
<tr>
<th>Year</th>
<th>2003</th>
<th>2004</th>
<th>2005</th>
<th>2006</th>
<th>2007</th>
<th>2008</th>
<th>2009</th>
<th>2010</th>
<th>RCoefficient* (SD, P value)</th>
</tr>
</thead>
<tbody>
<tr>
<td>Mean mCVL</td>
<td>16,589</td>
<td>20,511</td>
<td>16,508</td>
<td>17,493</td>
<td>20,923</td>
<td>14,163</td>
<td>11,254</td>
<td>11,992</td>
<td>-977.0 (441.1, 0.07)</td>
</tr>
<tr>
<td>MSM (SD)</td>
<td>16,139 (51,766)</td>
<td>20,946 (61,058)</td>
<td>20,197 (63,342)</td>
<td>20,052 (70,941)</td>
<td>19,151 (73,021)</td>
<td>13,733 (53,485)</td>
<td>11,565 (40,001)</td>
<td>11,176 (67,742)</td>
<td>-1217 (450.6, 0.035)</td>
</tr>
<tr>
<td>Non-MSM (SD)</td>
<td>16,770 (55,658)</td>
<td>20,323 (60,806)</td>
<td>14,867 (54,846)</td>
<td>16,150 (59,687)</td>
<td>21,888 (182,023)</td>
<td>14,407 (59,016)</td>
<td>11,074 (51,844)</td>
<td>12,507 (94,389)</td>
<td>-848.9 (503.6, 0.14)</td>
</tr>
</tbody>
</table>

1 Mean of all available individual PVLs for each calendar year.
2 Aggregate mean of the annual mean PVL for each individual.
3 Mean of the last available PVL for each calendar year per individual.
* Across years.
** Regression coefficient, P value by ordinary linear regression.
Abbreviations: mCVL, Monitored community viral load; SD, standard deviation.

1 Using the last available PVL for each calendar year per individual.
2 MSM – Non-MSM.
* Regression Coefficient, P value by ordinary linear regression.
Abbreviations: mCVL monitored community viral load; MSM, men who have sex with men; Non-MSM, all other risk factors.
DISCUSSION

The demographics and risk factor characteristics of our HIV population is comparable to the surveillance profile of RI’s HIV/AIDS epidemic; the majority of cases occurring among white MSM with a decreasing proportion of IDU.\textsuperscript{13}

We detected a significant increase in ART use that correlated with improvement in HIV viral suppression rates and immune status among patients receiving care at our center between 2003 and 2010. Similar results have been reported in other large urban clinic settings nationwide.\textsuperscript{14, 15} These findings likely reflect the effectiveness of widespread and earlier implementation of ART in response to national treatment guidelines.\textsuperscript{16}

The increased proportion of patients on ART and those who achieved a suppressed HIV-1 viral load resulted in a concurrent downtrend of the mCVL over time. The decline of mCVL provides additional insight into the quality of our HIV care and implies a decrease in the HIV transmission potential of the clinic population and possibly at a broader community level.\textsuperscript{17, 18} Several studies have shown an association between a decrease in the CVL and a reduction in new HIV infections in populations such as San Francisco and British Columbia.\textsuperscript{6, 8} Although our results are derived from a single center and are not necessarily generalizable to the entire state, there was a concurrent decline in the number of new HIV diagnoses reported to the RI Department of Health during this time period (178 new diagnoses in 2004 to 106 new diagnoses in 2010) raising the possibility that improved HIV viral control among our clinic population correlates with a reduction in new HIV diagnoses statewide.\textsuperscript{13}

CVL has been used as a public health monitoring tool of the HIV epidemic.\textsuperscript{5-9} We believe the mCVL is particularly useful as a research and surveillance tool of community-level interventions that can be easily implemented in HIV care centers. It is methodologically feasible, reproducible, and is less affected by incomplete data. Nonetheless, we recognize that interpretation of the mCVL has several limitations as it excludes persons with undiagnosed HIV, those who are not engaged in care, and those who are engaged in care but do not have available PVL test results. As an ecological measure, population level observations can be mistakenly interpreted to reflect outcomes of individuals in that population.\textsuperscript{18, 19} In addition, CVL calculations usually use one viral load value from each patient collected during a given calendar year but most patients in care will have several viral load measures and the selection of a single value could affect the accuracy of the result. For this reason, we compared three different mCVL calculation methods including multiple viral load values available for each patient per year and found a uniform decline of the mean mCVL over time using all three methods. It is evident that using the mean of the last available PVL for each calendar year per individual resulted in the lowest mCVL mean and standard deviation value and appears to be comparable to calculations used in other studies.\textsuperscript{7, 8, 17}

While the downward trend of our mCVL reflects the remarkable impact of increased ART implementation and uptake in this urban HIV-infected population, there is a concern for persistent high disease burden among certain risk populations such as IDU, heterosexuals, and among persons classified as having “other” risk factors. HIV treatment as a prevention strategy can only be successful if all of the sequential steps of the HIV treatment cascade (HIV diagnosis, linkage to care, retention in care, ART receipt, and viral suppression) are optimized.\textsuperscript{20, 21} Further research is needed to explore HIV treatment and retention in care among non-MSM persons in RI, given we did not observe a significant decline in mCVL over time among these risk groups. Despite MSM being the predominant risk factor among newly diagnosed HIV cases in RI, we observed a downtrend of the mCVL among MSM receiving care at our center.\textsuperscript{13} A possible explanation for this discrepancy is that there could be a substantial population of undiagnosed HIV positive MSM in the community, or MSM who are aware of their HIV infection yet who are not engaged in care, who are contributing to ongoing HIV transmission in RI.

In summary, increased use of ART and the subsequent HIV viral suppression correlated with a decrease in the mCVL in our patient population. The mCVL is a useful indicator of clinical HIV care within a population engaged in treatment and may be helpful in estimating the infectiousness of a population receiving HIV care.

References


Addressing the Increasing Burden of Sexually Transmitted Infections in Rhode Island

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ABSTRACT
The rates of sexually transmitted infections (STIs) including chlamydia, gonorrhea, and syphilis, are increasing across the United States, including in Rhode Island (RI). These STIs affect many otherwise healthy adolescents and young adults, and represent a significant source of morbidity. The Centers for Disease Control and Prevention encourages states to develop strategies for addressing increasing STI rates in the setting of diminishing public health resources. The RI Department of Health (DOH) works with providers and funded community-based organizations to promote STI screening, expedited partner therapy, and partner services to reduce STI rates. The Miriam Hospital Immunology Center opened a public HIV/STI Clinic, which offers free and confidential testing for HIV, viral hepatitis, chlamydia, gonorrhea, and syphilis, as well as post-exposure prophylaxis (PEP) and pre-exposure prophylaxis (PrEP) services to prevent HIV. In collaboration with the RI DOH, the Clinic serves as a referral source across the state for complicated STI cases.

KEYWORDS: HIV, PREP, PEP, STI

BACKGROUND
Sexually transmitted infections (STIs) are caused by a variety of pathogens that are acquired through sexual activity. Despite numerous public health interventions, the rates of STIs such as chlamydia, gonorrhea, and syphilis continue to increase across the United States [US]. The most commonly reported STI is chlamydia. In 2012, there were 1.4 million cases reported to the Centers for Disease Control (CDC) which is the largest number of cases reported for any disease.1 During the time period 2008-2012, there was a 25% and 11% increase in the chlamydia rate among men and women, respectively. Similarly, rates of gonorrhea have increased 9.6% since 2009. Gonorrhea and chlamydia are highest among individuals 15-24 years old. A resurgence in syphilis has also occurred in the last decade with an 11.1% increased rate from 2011 to 2012. These STIs account for $16 billion in medical costs in the US population.2 Chlamydia, gonorrhea, and syphilis infections have increased significantly in Rhode Island (RI) the past few years.3 The majority of individuals who test positive for STIs reside in Providence County (78% of chlamydia, 87% of gonorrhea, 81% of syphilis). These STIs affect individuals across all age groups, genders, sexual orientations, and socioeconomic levels. However, certain groups of people are disproportionately affected by STIs. The two most common reportable STIs in RI are chlamydia and gonorrhea, caused by Chlamydia trachomatis and Neisseria gonorrhoea, respectively. Both are transmitted through oral, vaginal, and anal sex with symptoms ranging from none to urethritis characterized by dysuria and penile/vaginal discharge. Serious complications include infertility, pelvic inflammatory disease, and ectopic pregnancy. Chlamydia is by far the most common STI in RI. In 2010, 3,840 cases of chlamydia were reported in RI. In 2012, there was a 12% increase with 4,313 new cases statewide. Just under three-fourths of new chlamydia cases were reported in females, likely due to higher STI screening rates in this group. Additionally, the majority of new chlamydia cases occur in younger individuals, aged 15-24 years old, highlighting the importance of early education and intervention during these years. The CDC recommends annual chlamydia screening for all females under the age of 26 years old. Similar to chlamydia, rates of gonorrhea have increased in RI over the last few years. In 2010 and 2012, 291 and 507 cases of gonorrhea were reported, respectively, representing a 57% increase. The majority of gonorrhea cases were in males (54%) and younger age groups 15-29 years old. In contrast to chlamydia, gonorrhea is more common among males and disproportionately impacts gay, bisexual, and men who have sex with men (MSM). In 2012, 32% of gonorrhea cases were diagnosed in MSM. In 2012, due to increasing resistance observed in Neisseria gonorrhoeae isolates,4 the CDC recommended injectable ceftriaxone in combination with either azithromycin or doxycycline5 to treat uncomplicated gonorrhea. Oral Cefixime or other single combination regimens are no longer recommended due to increasing resistance.

Syphilis is caused by the spirochete Treponema Pallidum and can lead to a diverse spectrum of symptoms including progressive neurological and cardiovascular disease. Treponema Pallidum remains highly sensitive to penicillin, the treatment of choice. In 2006, the CDC launched a highly ambitious national campaign to eliminate syphilis from the US. Unfortunately, rates of syphilis have risen drastically since that time. In 2012, the Rhode Island Department of Health (RIDOH) reported 68 cases of infectious syphilis, a
300% increase from 2006 (20 cases, Figure 1).8 This trend is observed across the country. In contrast to chlamydia and gonorrhea that affect both heterosexuals and MSM, syphilis tends to affect mainly MSM. Syphilis infection is classically divided into disease stages, including primary and secondary stages, considered “infectious,” and the latent and tertiary stages. In 2012, the majority of infectious syphilis cases in RI were among males (97%), of which 94% were MSM. Of MSM with infectious syphilis, 52% were also HIV-positive. The high rate of syphilis and HIV coinfection likely results from behavioral practices including unprotected oral sex and “serosorting,” or limiting sex to partners with the same HIV status. Due to the low risk of HIV transmission through oral sex, condoms are often not used for oral sex. Although the risk of HIV transmission from oral sex is low, transmission rates for syphilis may approach 30% per episode of oral sex.6 Furthermore, serosorting to have unprotected sex in the MSM population likely leads to increased syphilis and other STIs. Although the total number of new HIV diagnoses has slightly decreased over the past five years, MSM populations continue to experience a disproportionately high burden of new HIV infections.3

For all STIs including HIV, gonorrhea, chlamydia, and syphilis, race and ethnicity is a key demographic factor in determining risk. Across the board, racial and ethnic minorities present with a higher incidence of STIs than their white counterparts. Complex social and structural factors contribute to the racial and ethnic STI disparities in RI, including limited access to testing and treatment services and dense sexual networks. Perhaps most notably, the majority of new STIs are concentrated within a few select census tracts in Providence. These geographic and racial disparities suggest that greater efforts are needed to address heavily impacted communities in culturally competent ways.

PUBLIC HEALTH RESPONSE IN RHODE ISLAND

Federal and state funding for STI has decreased in RI and throughout the US due to diminishing public health resources while social media and geo-location apps promote more anonymous sexual encounters in high-risk populations such as MSM, adolescents, and young adults. Health departments are encouraged to implement strategies that focus on strengthening collaborative relationships in order to meet the increased STI demands stretching each jurisdiction’s capacity. Within the Division of Infectious Diseases and Epidemiology at the RIDOH, the STI and HIV program have joined forces to integrate public health activities as the new combined Office of HIV/AIDS, Viral Hepatitis, STIs, and TB. To reflect the CDC priority for Program Collaboration and Service Integration (PCSI), community agencies in RI receive funding to provide comprehensive STI, HIV, and viral hepatitis testing and linkage to care for all patients. Partner services are strengthened through collaboration with clinical providers such as The Miriam Hospital HIV/STI Clinic and Planned Parenthood who service the most at-risk patients. In addition, academic detailing visits to primary care providers are used to promote STI prevention and care-specific messages such as syphilis screening among MSM, expedited partner therapy, and multidrug resistant gonorrhea.

THE MIRIAM HOSPITAL IMMUNOLOGY CENTER

HIV/STI CLINIC

On June 30, 2011, Whitmarsh Clinic, the only public STI clinic in RI, closed due to state budget cuts. The clinic was located on the West side of Providence and had been offering accessible screening and treatment services for STIs. After Whitmarsh Clinic closed, there were no clinics in the state which provided safety net testing and treatment for STIs. To address this public health gap amid increasing rates of STIs, The Miriam Hospital Immunology Center opened a clinic in January 2012 offering free HIV and syphilis testing on a walk-in basis during Friday afternoons. The Clinic is under the direction of Dr. Philip A. Chan with support from the Division of Infectious Diseases. R. Bobby Ducharme, with over a decade of experience in HIV/STI prevention, manages the clinic.

The Clinic immediately became an important site for those in RI with undiagnosed and untreated syphilis. During the first year, the overall syphilis positivity rate was approximately 15%. With support from Dr. Kimberle Chapin (Department of Pathology), The Miriam Hospital agreed to provide financial coverage for STI testing at the Clinic, as a commitment to public health. As of January 1, 2013, the Clinic has expanded hours and is currently open Wednesday, Thursday, and Friday from 12:30-3:30 p.m. The Clinic currently works closely with the RIDOH as a referral center for partner notification and contact tracing services, and to provide education and support services to other clinics and medical providers in the state.
The Miriam Hospital Immunology Center HIV/STI Clinic provides free testing, treatment, and comprehensive counseling services for HIV, viral hepatitis, chlamydia, gonorrhea, and syphilis to patients with or without health insurance. Clinic staff evaluate STIs such as herpes simplex virus, trichomoniasis, and others on a case-by-case basis. HIV and hepatitis C virus (HCV) testing are performed using rapid or serum antibody tests. For those with suspected acute HIV infection, viral loads are performed. Syphilis testing is performed via the standard CDC algorithm which involves nontreponemal testing (Rapid Plasma Reagin) followed by a confirmatory treponemal test (FTA-Abs). Gonorrhea and chlamydia are assessed by urine nucleic acid amplification testing (NAAT). For higher-risk individuals, pharyngeal and rectal NAAT testing is performed. Treatment and follow-up is arranged and provided for all patients.

BIOMEDICAL HIV PREVENTION INTERVENTIONS

Antiretrovirals (ARVs) are the cornerstone of HIV treatment. HIV-infected individuals who are diagnosed and treated early have a similar life expectancy to those who are HIV negative. These medications have fewer side effects and are much simpler to take than previous regimens. Several single tablet regimens are now available. A landmark study demonstrated that HIV positive individuals who are on treatment and have an undetectable viral load are 96% less likely to transmit the virus to others. This has led to increased efforts to diagnose and treat all those who are HIV positive. The Miriam Hospital Immunology Center has led aggressive retention and treatment programs for all individuals who are HIV positive.

ARVs are also now being used in HIV negative individuals to prevent HIV infection. Post-exposure prophylaxis (PEP) has long been used in the medical field after an occupational exposure to HIV. Individuals with a non-occupational exposure (i.e. sex) can also take PEP within 72 hours of exposure to prevent HIV. The Clinic supports a PEP program to which individuals can be urgently referred to and seen same-day. The Clinic follows standard CDC guidelines for the administration and monitoring of PEP. The US Food and Drug Administration also recently approved as the drug combination tenofovir/emtricitabine (TDF/FTC) for pre-exposure prophylaxis (PrEP). PrEP is a single pill that HIV-negative individuals can take daily to prevent HIV infection. TDF/FTC is safe and very effective when taken every day. PrEP is an option for individuals who are at-risk of HIV. Given the higher numbers of HIV among gay, bisexual, and other MSM in RI, this population should consider PrEP depending on other sexual risk factors (i.e. unprotected sex, multiple partners). The Clinic has an ongoing PrEP program, among the first in the country, to which any patient may be referred for counseling and consideration of PrEP, and the RIDOH is using it as a model to build a network of providers throughout the state with the capacity to offer PrEP.

COMMUNITY PARTNERS

Contact tracing to offer testing and referral services to partners of STI patients is a crucial component of addressing STI rates and requires close collaborations with the RIDOH, The Miriam Hospital HIV/STI Clinic, and other key RI providers and organizations. HIV, viral hepatitis, syphilis, gonorrhea, and chlamydia require mandatory reporting to the RIDOH. Surveillance data collected through reporting helps guide ongoing outreach efforts and testing programs in the state, such as AIDS Care Ocean State (ACOS), Project Weber, and AIDS Project Rhode Island (APRI). Partnership and communication with DOH occur at various levels (i.e. patient-level, community-level, and policy/administration) in order to effectively coordinate STI prevention and treatment services with key stakeholders throughout the state.

The Rhode Island Public Health Institute (RIPHI), under the direction of Dr. Amy Nunn, also supports the Clinic and community health in general with efforts to eliminate health disparities in the state. The institute partners with Brown University and the RIDOH to develop innovative public health community initiatives, research health policy, and to train students as well as public health officials and practitioners. More specifically, RIPHI disseminates information about HIV and other STIs, and spreads awareness about free testing and treatment services (www.DoItRight.org).

CONCLUSION

STIs have significantly increased in RI over the last few years. The Miriam Hospital HIV/STI Clinic fills a critical need in the state to provide testing and treatment for STIs. Partnerships and collaborations across multiple sectors
are needed to effectively address the epidemic and reverse the increasing trends. More specifically, adolescents and younger adolescents who are most at-risk of gonorrhea and chlamydia need improved education and access to resources, especially in Providence where the majority of these cases are diagnosed. Increased education and awareness is also needed among gay, bisexual, and other MSM about HIV and syphilis, including newer strategies to prevent HIV such as PrEP. Only through ongoing and multifaceted efforts can STIs be effectively addressed in the state.

References


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Tick-Borne Illness In Rhode Island – How Big a Problem Is It?

ABSTRACT

Rhode Island is a state with a high incidence of tick-borne diseases, specifically Lyme disease. The *Ixodes* tick which serves as vector for the three most common tick infections is endemic in both the New England and mid-Atlantic regions. However, differences in the density of infections exist within Rhode Island (RI), with the highest densities in the southern counties. Tick-borne diseases can have varying presentations, as well as varied response to appropriate treatment leading to many questions and confusion for patients, clinicians, and the public itself.

KEYWORDS: tick-borne illness, Lyme disease, TBDs, anaplasmosis, babesiosis

INTRODUCTION

In the United States, tick-borne diseases (TBDs), including borrelioses (Lyme), anaplasmosis, and babesiosis, are on the rise. The three mentioned are significant causes of disease in the New England region including in RI. The reasons for this increase are multifactorial, including changes in the deer and mice population and the movements of humans into areas heavily populated by both host animals and the tick vectors. All three of these TBDs are transmitted by the same vector in our region, the hard bodied *Ixodes scapularis* tick, with infectivity concentrating in the summer months. Given the same vector for these infections, patients can be co-infected with more than one of these infections. Studies show an approximately 10% co-infection rate. The clinical presentations of either of these diseases can vary among patients with many nonspecific acute symptoms such as fever, arthralgias, headache, and fatigue, to later presentations with arthritis, neurologic and other symptoms. Because of this, the diagnosis can be missed early on if TBDs are not considered. Of the three, Lyme disease is the most difficult to diagnose and treat appropriately given the different stages of presentation.

Early Lyme disease presents within the first 30 days from the tick bite and can be localized or disseminated. Localized presentation with the characteristic erythema migrans rash is the classic presentation. This is diagnosed clinically with supportive epidemiologic history as Lyme serology can be negative in this acute stage of infection. Early disseminated infection presents with objective findings of either arthritis, neurologic (e.g., cranial nerve palsy or meningitis), or carditis with heart block. These presentations are diagnosed by clinical findings, epidemiologic history and positive Lyme serology with two-tier testing of EIA and Western blot. Late Lyme disease most often presents with arthritis, or less common neurologic findings with encephalitis or neuropathy. This presentation occurs months to years after the tick bite. Diagnosis in this stage is most dependent on positive serology with both EIA and Western blot IgG. In terms of late neuroborreliosis, CSF analysis should be abnormal with a positive Lyme CSF index. In addition to early and late Lyme stages, much debate has been around the post-Lyme disease syndrome or post-treatment Lyme disease syndrome (PTLDS). The clinical definition for post-Lyme disease syndrome is a clear objective history (i.e., positive serology) of prior Lyme infection and ongoing symptoms of joint pain, fatigue, or others after appropriate antibiotic treatment. This can mimic many illnesses given its myriad of manifestations. Careful evaluation of the history of the illness, tick exposure, and consideration of concurrent disease is needed.

With the varying times and types of presentations for TBDs, diagnostic tests, specifically serology, are needed to aid in decision-making. However, the limitations of these tests can lead to varying interpretations of results by clinicians and to different treatment plans that, for the most part, are not strongly supported by evidence-based medicine. Research in the treatment of TBDs that do not fit the classic presentation is lacking, specifically in the late Lyme presentations. (Table 1) Without significant evidence-based research in these areas, there are gaps in our understanding of TBDs and what treatments are most effective for patients. Further research is needed to fill these gaps.

Table 1. Priorities for research on tick-borne disease

- Evaluation of current diagnostic tests
- Development of new diagnostic tests with better performance characteristics
- Evaluation of current treatment regimens for the different tick-borne diseases
- Characterization, diagnosis, and treatment of late Lyme disease
- Evaluation and treatment of post-treatment Lyme disease syndrome (PTLDS)
- Characterization of post-infectious inflammatory syndromes associated with Lyme disease
- Prevalence of novel or recently discovered tick-borne diseases (e.g. *borrelia miyamotoi*)
results, the guidelines for management of TBDs, particularly Lyme, are varied across different medical groups. This continues to add to the public’s confusion of the management of Lyme disease and other TBDs and the frustration and suffering at the individual level of the patient. Adding to the many unknowns of TBDs and its higher prevalence in our region is the discovery of other infections being transmitted by these vectors. For example, in 2013 the first reported cases of Borrelia miyamotoi in the United States occurred in New England, including one case in RI, with presentation of relapsing fever and meningitis.\textsuperscript{7,8}

**Rhode Island and the Nation**

Lyme disease (*Borrelia burgdorferi*) is the most common tick-borne infection reported in the US, with around 30,000 cases reported to the CDC annually. However, this is thought to be a significant underestimation of actual cases with the CDC reporting in August 2013 that the number of Lyme infection cases is approximately 300,000 nationwide.\textsuperscript{9} This new estimation comes from the culmination of three ongoing studies that collects information from medical claims, clinical laboratories, and patient self-reporting, respectively. This ongoing effort to more accurately determine the burden of disease points to its importance among public health concerns.

Anaplasma (*Anaplasma phagocytophilum*) formerly known as *Ehrlichia phagocytophilum* is the second most common TBD reported in the US since its discovery in the 1990s. Over 10 years (2000 to 2010), the incidence rose from 1.4 cases per million to 6.1 cases per million. In 2010, a total of 1761 cases were reported.\textsuperscript{10} The same hard bodied tick (*Ixodes scapularis*) serves as the vector for anaplasma which explains the similar geographic distribution of anaplasma to Lyme. Babesia is less common with only 911 cases reported in 2012. Only 22 states conduct surveillance on babesia with the majority in the upper Midwest and the Northeast.\textsuperscript{11} However, the majority of infected individuals have a brief febrile illness or nonspecific symptoms for which they do not seek medical attention, thus the true incidence of disease is unknown.

**Regional Impact**

The majority of Lyme disease cases are limited to the northeast and east coast of the US. In 2013, cases from New England made up 39\% of the reported cases while the Mid-Atlantic comprised 34\%. Rhode Island and its neighboring states continue to carry a significant burden of Lyme disease in the country. (Table 2) Within New England, the states reporting the highest number of Lyme disease cases in 2013 included Massachusetts (1319), Connecticut (840) and New Hampshire (396).\textsuperscript{12} The incidence of Lyme disease in RI for 2012 was 12.1 (per 100,000), with higher incidence rates in nearby states: MA 51.1, CT 46.0, ME 66.6, and NH 75.9. There are 34 states that have an incidence of less than 2.0 for Lyme disease, highlighting the burden faced by this region of the country.\textsuperscript{13} Anaplasmosis and babesiosis contribute to a number of TBD cases in the New England area as well. Nationwide, there were 1761 cases of anaplasma and 911 cases of babesia in 2012. Of the anaplasma cases, 90\% occurred in six states: New York, Connecticut, New Jersey, Rhode Island, Minnesota, and Wisconsin. Similarly, babesia affected mostly New England states. The 911 cases reported in 2012 occurred in 14 states; however 96\% of them occurred in seven states: NY, CT, NJ, RI, MN, WI, and MA. Given that babesia only recently became a notifiable disease in 2011, the total number of cases may be underreported in the New England region as well as other parts of the country. Both historical and current data show that a large number of cases of Lyme disease, anaplasmosis, and babesiosis were reported in New England, especially in Rhode Island’s neighboring states. As such, Rhode Island has the potential for higher disease burden given its geographical location in the New England region.

**Within RI**

There is a high variation among the different counties in RI. (Table 2) So though overall, the state reports a higher incidence of Lyme, as well as other TBDs, certain counties have a higher density of infection that drives the statewide incidence above the national averages. Lyme infections are the most often reported TBD in RI, with 217 cases reported in 2012. This is an incidence of 20 per 100,000 people. The demographics of those infected show two age peaks among the population: ages 5 – 9 and ages 50+. There is a seasonality effect of overwhelming majority occurring in June and July, correlating with the summer months and increased activity of both tick vectors and people. The raw total number of cases shows Providence County to be most affected with 86 cases in 2012, followed by 75 cases in Washington, and 28 and 21 cases in Kent and Newport counties. However the incidence rates show a significantly higher density of Lyme disease in Washington County: 59.1 (per 100,000) compared to Providence County: 13.7. Newport and Kent counties also had higher incidence rates of 25.3 and 16.9 respectively.\textsuperscript{14}

### Table 2. Incidence of Lyme disease by state and county in 2012.

<table>
<thead>
<tr>
<th>State</th>
<th>Incidence (per 100,000)</th>
</tr>
</thead>
<tbody>
<tr>
<td>Connecticut</td>
<td>46.0</td>
</tr>
<tr>
<td>Maine</td>
<td>66.6</td>
</tr>
<tr>
<td>Massachusetts</td>
<td>51.1</td>
</tr>
<tr>
<td>New Hampshire</td>
<td>75.9</td>
</tr>
<tr>
<td>Rhode Island</td>
<td>12.1</td>
</tr>
<tr>
<td>Bristol County</td>
<td>14.0</td>
</tr>
<tr>
<td>Kent County</td>
<td>16.9</td>
</tr>
<tr>
<td>Newport County</td>
<td>25.3</td>
</tr>
<tr>
<td>Providence County</td>
<td>13.7</td>
</tr>
<tr>
<td>Washington County</td>
<td>59.1</td>
</tr>
</tbody>
</table>
The findings for both anaplasma (ehrlichia) and babesia are similar with higher density of infection in the southern counties of Washington and Kent. The statewide incidence of anaplasma is reported at 10.2 per 100,000 for 2012 with a raw total number of 107 cases. However, on the county level Washington has an incidence of 30.7 and Kent with a rate of 20.5, while Providence County had a much lower incidence at 4.6. Reported babesia cases per county follow the same trend, with a statewide incidence of 5.3 per 100,000 in 2012, and Providence County with a lower rate of 1.4. Washington, Kent, and Newport counties have incidence rates of 23.6, 6.0 and 6.0, respectively.

Review of the surveillance data available for the years 2010-2012 shows that overall there has been a rise in reported Lyme and anaplasma cases statewide, though much more heavily concentrated in the aforementioned counties. Contrary to this, reported cases of babesia have declined in this same time period. However, similar to the national CDC data, these are likely underestimations of true burden of disease given that it is only through passive surveillance that these numbers are collected. The trends that are seen in terms of increasing cases and higher density of infections in southern counties can help to inform the medical and lay community on the burden of TBDs here in RI, but the true weight of that burden is likely unknown at this time.

CONCLUSION

As described above, RI has a higher burden of tick-borne infections compared to the majority of the United States, though not as severe as its neighboring states. It is important to be aware of the magnitude of the burden of TBDs faced in this region which is compounded by the many questions unanswered with Lyme disease and other TBDs. The difficulty in diagnosis particularly in late-presentation cases, the varied response to appropriate treatment, as well as the ongoing symptoms in select patients despite treatment are just a few of the questions faced by clinicians and patients. TBDs are an important public health concern given the gaps in the knowledge of these diseases and their outcomes, and the high prevalence among our community.

References


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ABSTRACT

Outpatient parenteral antimicrobial therapy (OPAT) is an increasingly utilized treatment modality that has been proven to be safe and cost-effective for treating infections that require prolonged antimicrobial treatment. Adequate patient selection, a structured OPAT team with an effective communication system, and routine clinical monitoring are key elements to establish a successful OPAT program. The Miriam Hospital Infectious Diseases Clinic offers a multidisciplinary OPAT model coordinated by infectious diseases specialists and serves as a major referral center in Rhode Island.

KEYWORDS: OPAT, antibiotics, infection, Rhode Island

INTRODUCTION

Outpatient parenteral antimicrobial therapy (OPAT) refers to the administration of intravenous antimicrobials to patients who suffer from chronic infections that warrant parenteral therapy but these patients are otherwise stable enough to receive this therapy in an outpatient setting. Since its introduction in the 1970s, OPAT has been shown to be a safe, practical, and cost-effective treatment modality. In the United States, it is estimated that more than 250,000 Americans receive OPAT services every year. OPAT helps to reduce healthcare costs by reducing the length of inpatient hospitalizations, and the success of OPAT has been facilitated by the development of antimicrobials with convenient dosing schedules and the development and utilization of convenient and safe long-term IV catheters.

STRUCTURE OF THE OPAT PROGRAM

The Miriam Hospital Infectious Diseases Clinic, located at 1125 North Main Street in Providence, is the largest provider of outpatient infectious diseases treatment in Rhode Island. The clinic provides longitudinal OPAT for persons who have been discharged from the hospital with IV antimicrobials and serves as a specialty referral resource to community healthcare providers in New England. Every month, the clinic sees approximately 100 new patients, of whom 75% are patients who have been discharged from either Rhode Island Hospital or The Miriam Hospital on at least one IV antimicrobial treatment.

According to guidelines released by the Infectious Diseases Society of America, key elements of a successful OPAT program include: 1) A healthcare team comprised of infectious diseases specialists that work in collaboration with the primary care or referring physician, a nurse and pharmacist knowledgeable in antibiotic infusion therapy, and a case manager who can help coordinate care and manage reimbursements; 2) An accessible and rapid communication system between the patient and OPAT team members; 3) Established policies that outline the responsibilities of each team member, offer patient education materials, and help measure outcomes.

As outlined in Figure 1, the Miriam Hospital OPAT program starts with the patient being seen by the infectious diseases consultation team inside of the hospital, or the patient is referred to the clinic by a community provider for infectious diseases evaluation. The OPAT physicians are responsible for ensuring the patient’s suitability for OPAT, prescribing the intravenous antimicrobial regimen, formulating a treatment plan, and monitoring for adverse events or medical complications that may arise during the course of therapy.
Once OPAT is considered appropriate, insertion of a long-term intravenous catheter for antimicrobial administration is arranged with interventional radiology or at an ambulatory infusion suite. A peripherally-inserted central catheter (PICC) is the most common type of catheter used for OPAT administration. PICC lines are inserted into the basilic or brachial veins and extend into the superior vena cava; position is confirmed with a chest x-ray. PICC lines can remain in place for over 90 days and seldom need to be exchanged.

Midline peripheral intravenous catheters, tunneled venous catheters or ports inserted for other purposes (i.e. parenteral nutrition, hemodialysis or chemotherapy) can also be used for OPAT.

Antimicrobials are infused either at a skilled nursing facility or at home. For home administration, the OPAT program partners with a community-based infusion company which provides dedicated pharmacists, arranges for home delivery of the antimicrobial, and provides nursing and educational support. OPAT inside of the patient’s home often involves visiting nurses and the patient’s own family members who can assist with infusions. A patient can even be taught to self-administer the antimicrobial safely, thus increasing the patient’s independence and involvement with their own healthcare. Patients are typically seen by a visiting nurse at least once weekly to assess the IV catheter and to collect blood for routine laboratory testing as ordered by the prescribing physician. Constant communication and coordination between the patient and the OPAT team comprised of the pharmacist, visiting nurse, OPAT physician, and the referring physician has allowed us to successfully implement OPAT services to our patients. This process is greatly facilitated by a dedicated physician’s assistant based within the Miriam Hospital Infectious Diseases Clinic who acts as liaison between patients and OPAT physicians, evaluates patients for routine follow-up visits, and who is responsible for monitoring safety labs and adverse reactions to treatment. Patients discharged from the hospital are seen at the Clinic within 2-3 weeks, and then at regular intervals throughout the course of treatment.

**PATIENT SELECTION AND CLINICAL INDICATIONS**

Candidates for OPAT therapy include clinically stable patients who can understand the risks and benefits of therapy, have a safe environment to support care, and can assume the costs of therapy through their health insurance provider. OPAT should be avoided in patients for whom oral antibiotic therapy is equally effective, continued hospitalization is warranted, or if a safe environment for OPAT cannot be established. Patients with active injection drug use often require continued antimicrobial administration in a monitored setting and are not appropriate for OPAT. OPAT is typically used to treat bacterial infections; however certain severe fungal, viral or even protozoal infections might require prolonged intravenous antimicrobials. The most common conditions treated with OPAT include skin and soft tissue infections, bone and joint infections, endocarditis, bloodstream infections, complicated urinary tract infections, meningitis, and respiratory infections. In 2013, the Miriam Hospital Infectious Diseases Clinic treated a total of 712 patients with OPAT. As displayed in **Figure 2**, bone and joint infections including osteomyelitis, discitis, septic arthritis, and prosthetic joint infections were the most common indications followed by bacteremia/endovascular infections and skin/soft tissue infections. The majority of these infections require a prolonged course of intravenous treatment (at least 4-6 weeks). Some infections including those that involved retained foreign bodies such as orthopedic hardware may require a longer course of therapy (months) sometimes followed by suppressive oral antibiotic therapy.

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**Figure 2.** The Miriam Hospital Infectious Diseases Clinic: Infections treated with OPAT in 2013.
<table>
<thead>
<tr>
<th>Antimicrobial Class</th>
<th>Antimicrobial drug</th>
<th>Adult Dosing Schedule</th>
<th>Pathogens</th>
<th>Common diagnoses treated</th>
</tr>
</thead>
<tbody>
<tr>
<td><strong>Penicillins</strong></td>
<td></td>
<td></td>
<td></td>
<td></td>
</tr>
<tr>
<td>Penicillin G</td>
<td>3-4 MU every 4 hours or 18-24 MU via continuous infusion over 24 hours</td>
<td>Streptococci</td>
<td>Endocarditis</td>
<td></td>
</tr>
<tr>
<td>Ampicillin</td>
<td>2 gm every 4-6 hours</td>
<td>Enterococcus Listeria monocytogenes</td>
<td>Endocarditis/bacteremia Meningitis</td>
<td></td>
</tr>
<tr>
<td>Nafcillin</td>
<td>2 gm every 4 hours or 12 gm via continuous infusion over 24 hours</td>
<td>MSSA</td>
<td>Endocarditis/bacteremia Septic arthritis Osteomyelitis Skin/soft tissue infections CNS infections</td>
<td></td>
</tr>
<tr>
<td>Ampicillin-Sulbactam</td>
<td>1.5-3 gm every 6 hours</td>
<td>Streptococci MSSA Gram-negatives* Anaerobes</td>
<td>Diabetic foot infections Aspiration pneumonia Intra-abdominal infections</td>
<td></td>
</tr>
<tr>
<td>Piperacillin-Tazobactam</td>
<td>3.375-4.5 gm every 6 hours</td>
<td>Streptococci MSSA Gram-negatives Anaerobes</td>
<td>Intra-abdominal infections Pleuro-pulmonary infections</td>
<td></td>
</tr>
<tr>
<td><strong>Cephalosporins</strong></td>
<td></td>
<td></td>
<td></td>
<td></td>
</tr>
<tr>
<td>Cefazolin</td>
<td>1-2 gm every 8 hours</td>
<td>MSSA</td>
<td>Septic arthritis Osteomyelitis Skin/soft tissue infections</td>
<td></td>
</tr>
<tr>
<td>Ceftriaxone</td>
<td>1-2 gm every 24 hours (2gm every 12 hours for CNS dosing)</td>
<td>Streptococci MSSA Gram-negatives*</td>
<td>Endocarditis/bacteremia Septic arthritis Osteomyelitis Skin/soft tissue infections CNS infections</td>
<td></td>
</tr>
<tr>
<td>Cefepime</td>
<td>1-2 gm every 8 hours</td>
<td>Streptococci MSSA Gram-negatives</td>
<td>Intra-abdominal infections Pleuro-pulmonary infections Osteomyelitis CNS infections</td>
<td></td>
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<tr>
<td><strong>Monobactam</strong></td>
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<tr>
<td>Aztreonam</td>
<td>1-2 gm every 8 hours</td>
<td>Gram-negatives</td>
<td>Intra-abdominal infections Pleuro-pulmonary infections Genitourinary tract infections</td>
<td></td>
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<tr>
<td><strong>Glycopeptides</strong></td>
<td></td>
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<td></td>
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<tr>
<td>Vacronymycin</td>
<td>15mg/kg every 12 hours</td>
<td>Streptococci Enterococcus MSSA MRSA</td>
<td>Endocarditis/bacteremia Septic arthritis Osteomyelitis Skin/soft tissue infections CNS infections</td>
<td></td>
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<tr>
<td><strong>Aminoglycosides</strong></td>
<td></td>
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<tr>
<td>Gentamicin</td>
<td>1mg/kg every 8 hours for synergy in combination with a beta-lactam antibiotic</td>
<td>Streptococci Enterococcus MSSA MRSA</td>
<td>Endocarditis</td>
<td></td>
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<tr>
<td><strong>Lipopeptide</strong></td>
<td></td>
<td></td>
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<td></td>
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<tr>
<td>Daptomycin</td>
<td>6mg/kg every 24 hours</td>
<td>MSSA MRSA Enterococcus</td>
<td>Endocarditis/bacteremia Septic arthritis Osteomyelitis Skin/soft tissue infections</td>
<td></td>
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<tr>
<td><strong>Carbapenems</strong></td>
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<tr>
<td>Meropenem</td>
<td>1-2gm every 8 hours</td>
<td>Streptococci MSSA Gram-negatives Anaerobes</td>
<td>Intra-abdominal infections Skin/soft tissue infections CNS infections</td>
<td></td>
</tr>
<tr>
<td>Ertapenem</td>
<td>1 gm every 24 hours</td>
<td>Streptococci MSSA Gram-negatives* Anaerobes</td>
<td>Intra-abdominal infections Skin/soft tissue infections Osteomyelitis</td>
<td></td>
</tr>
<tr>
<td><strong>Antivirals</strong></td>
<td></td>
<td></td>
<td></td>
<td></td>
</tr>
<tr>
<td>Acyclovir</td>
<td>10 mg/kg every 8 hours</td>
<td>Herpes simplex virus Varicella zoster virus</td>
<td>CNS infections Disseminated infections</td>
<td></td>
</tr>
<tr>
<td><strong>Antifungals</strong></td>
<td></td>
<td></td>
<td></td>
<td></td>
</tr>
<tr>
<td>Amphotericin B (liposomal preparations)</td>
<td>5mg/kg every 24 hours</td>
<td>Aspergillosis Zygomycetes Candidiasis Cryptococcosis</td>
<td>Invasive fungal infections CNS infections</td>
<td></td>
</tr>
</tbody>
</table>
ANTIMICROBIAL SELECTION AND ADMINISTRATION

The antimicrobial agent for OPAT should be selected based on the susceptibility testing of the infecting organism, pharmacokinetic and pharmacodynamics properties, safety profiles of the possible antimicrobials to be used, and the patient’s drug allergy history. Ideally, the selected antimicrobial should be bactericidal, should reliably penetrate into the site of infection (including biofilms in the case of infections that involve retained foreign bodies), and can be administered at a convenient dosing schedule. The half-life of the drug determines the dosing, where as its temperature and pH stability defines mixture frequency and optimal storage. Antibiotics with time dependent-killing activity such as β-lactams require frequent dosing and may be best given through a continuous infusion, if preparation remains stable. Long half-life drugs that allow once daily dosing are preferred, such as ceftriaxone and ertapenem. Parenteral antibiotics commonly used in our practice include vancomycin, cephalosporins and daptomycin for gram-positive infections; ertapenem, third/fourth generation cephaplosporins and aztreonam for gram-negative infections. Aminoglycosides are used in combination therapy for enterococcal endocarditis.

LABORATORY MONITORING AND COMPLICATIONS OF THERAPY

Adverse events and response to therapy are monitored at scheduled intervals through routine lab work and clinic visits according to the Infectious Diseases Society of America (IDSA) OPAT guidelines. Most antimicrobials require weekly complete blood count and renal function tests; some antimicrobials also require weekly liver function tests. Serum drug concentrations help monitor the potential for toxicity as well as predicted efficacy for certain antimicrobials including the aminoglycosides and vancomycin. C-reactive protein (CRP) and erythrocyte sedimentation rate (ESR) can be useful surrogate markers of inflammation that can be helpful in monitoring response to therapy, particularly in hematogenous osteomyelitis.6,7

Adverse events encountered during OPAT therapy can be classified as either catheter-related or antimicrobial-related. Complications associated with indwelling intravascular devices include bloodstream infections, thrombosis, mechanical obstruction and chemical phlebitis.8 Regular flushing of the catheter to ensure patency, use of local anticoagulants, and sutureless vascular devices can reduce the rate of these complications.8 Most of our patients have routine catheter dressing changes by skilled nurses that help identify early catheter-related complications and arrange for a new vascular access if warranted. Possible complications associated with the antimicrobials themselves include: drug-related hypersensitivity reactions including rash or more severe cutaneous or systemic reactions [anaphylaxis]; antibiotic-associated diarrhea, bone marrow suppression that may include leukopenia or thrombocytopenia; and secondary infections such as mucosal candidiasis.9 Clostridium difficile infection (CDI) occurs in 15–25% of antibiotic-associated diarrhea cases and although fluoroquinolones, clindamycin, and broad-spectrum B-lactams are most frequently implicated, it can potentially occur with any antibiotic exposure.11,12 Co-administration of probiotics might reduce the risk of CDI, although evidence is inconclusive.13 Certain antimicrobials are associated with higher risk of nephrotoxicity [i.e. aminoglycosides, vancomycin and amphotericin B]. Patients who receive aminoglycosides are at risk of developing vestibular and oto-toxicity and routine clinical assessment is recommended to avoid permanent hearing loss and disequilibrium. The rate of hospital admissions due to OPAT related complications is approximately 9% in other academic institutions.14 Clinicians prescribing OPAT are responsible for educating their patients on possible side effects related to their therapy and to provide education regarding monitoring for adverse events.

CONCLUSIONS

OPAT has become increasingly utilized for the treatment of infections that require a prolonged course of treatment. OPAT enables patients to return home and regain their independence and also helps to decrease healthcare costs. The Miriam Hospital Infectious Diseases Clinic has successfully implemented a multidisciplinary OPAT program. Our goal is to continue to safely deliver OPAT services, optimize the delivery of these services, and improve patient outcomes in RI for those who require prolonged antimicrobial treatment.

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Pediatric Refugees in Rhode Island: Increases in BMI Percentile, Overweight, and Obesity following Resettlement

JESSICA H. HENRY, MD; CAMIA C. DIMOCK, MD; JENNIFER F. FRIEDMAN, MD, PhD; CAROL T. LEWIS, MD

ABSTRACT

OBJECTIVE: To evaluate BMI change among pediatric refugees resettling in Providence, RI.

METHODS: Retrospective chart review of pediatric refugees from the initial evaluation to year 3 post-resettlement at Hasbro Children's Hospital. Primary outcome of interest was within person change in BMI percentile at each time point.

RESULTS: From 2007–2012, 181 children visited the clinic. Initial prevalence of overweight and obesity was 14.1% and 3.2% versus 22.8% and 12.6% at year 3. From visit 1 and years 1–3, there was a positive mean within person change in BMI percentile of 12.9% (95% CI 6.3–19.6%), 16.6% (95% CI 11.2–21.9%), and 14.4% (95% CI 9.1–19.7%).

CONCLUSIONS: The prevalence of overweight and obesity increased from 17.3% at initial intake to 35.4% at 3 years post-resettlement to surpass that of American children (31.7–31.8% for 2007–2012). Refugee children have additional risk factors for obesity; multidisciplinary interventions must be designed to address nutrition at each visit.

KEYWORDS: refugee, pediatric, child, obesity, overweight, BMI, weight

BACKGROUND

Refugees arriving in the United States (US) present with health problems that differ drastically from those of the general population. Research from across the US shows high rates of positive purified protein derivative testing for latent TB, elevated lead levels, pathogenic gastrointestinal parasites, anemia, malnutrition, dental carries, and mental health problems in this at-risk population. However, little evidence is available regarding the changing medical needs of pediatric refugees over time and whether their needs ultimately mirror those of American-born children.

Pediatric obesity remains a problem of critical importance in the US, with rates having doubled to tripled over the last 25 years. Almost 17% of children and adolescents ages 2–19 currently meet criteria for obesity [body mass index (BMI) > 95th percentile for age and sex] and nearly one-third of American children are either overweight (BMI between 85th to <95th percentile) or obese. In Rhode Island (RI), 16.3% of children ages 2–5 and 16.7% of adolescents are overweight while 15.5% and 10.4% are obese, respectively. The health effects of obesity in childhood include both short-term effects (type II diabetes, hypertension, dyslipidemia, orthopedic problems, and even poor quality of life) as well as longer-term risks (obesity in adulthood, cardiovascular disease, diabetes, and some cancers).

While there are countless research efforts targeted at understanding obesity and its outcomes in both the pediatric and adult populations in the US, there is little research that specifically focuses on obesity amongst refugee populations and even less is available regarding pediatric refugees. Several research studies have shown that among different adult immigrant subgroups, the number of years of residence in the US is associated with higher BMI after 15 years. A smaller study of 69 Somali refugee children in 2009 noted that refugee children who were overweight or at risk for becoming overweight on arrival were more likely to be overweight on follow-up at 24 months than children who were not at risk or overweight on arrival, but more research is needed.

RI welcomed 1,010 refugees between 2007 and 2012, the majority of whom resettled from Burundi, Iraq, Eritrea, Liberia, Nepal, Bhutan, Myanmar, Somalia, and the Democratic Republic of Congo. Of these, 181 were children evaluated at the Pediatric Refugee Health Program (PRHP) at Hasbro Children’s Hospital in Providence between October 2007 and March 2012. Working under the Federal Refugee Act of 1980 and in collaboration with the Dorcas International Institute of RI (the state’s primary refugee resettlement agency), this program coordinates the care of newly-resettled pediatric refugees and provides ongoing primary care after the initial evaluation. The refugee intake process, including timing of initial appointments, screening labs, and immunization process has been described elsewhere. In conjunction with refugee interpreters working as community health workers, the pediatric clinic involves additional ancillary services including: intake dental assessment, mental health follow-up, and frequent contact with schools.

METHODS

We conducted a retrospective chart review of all refugee patients who underwent initial evaluation at the PRHP...
during the above-specified date range (n=181). The time frame and sample size were selected out of convenience given concomitant quality improvement initiatives at the clinic aimed to enhance the comprehensive care services offered to refugees. Inclusion criteria were: at least two annual well-child checks (WCC) and age between 2 and 18 years.

Data was collected from the initial intake appointment as well as all annual WCCs and included background information (i.e. age, sex, country of origin, country of exit, birthplace, language, etc), and physical exam and lab results (i.e. height, weight, body mass index (BMI), BMI percentile, blood pressure, results from screening labs, etc). BMI was determined by calculating weight in kilograms divided by height in meters squared. BMI percentile was calculated based on the Centers for Disease Control (CDC) BMI for age and sex growth algorithms. Overweight and obese were defined according to the CDC and as written above. Both BMI and BMI percentile were included in analysis only when calculated at WCC visits to reduce selection bias based on more frequent visits for obesity follow-up. A WCC visit was counted in a given follow-up “window” if it occurred within the first week following arrival as well as during subsequent intervals thereafter (i.e. 1–12 months for year post-resettlement, 13–24 months for year 2, and 25–36 months for year 3). This study was approved by the Lifespan Institutional Review Board.

The primary outcome of interest was within person change in BMI percentile from the time of initial visit to each subsequent year following. Using JUMP software version 8.0, ninety-five percent confidence intervals (95% CI) were derived for the mean within person change in BMI percentile from initial intake to 1, 2, and 3 years post-resettlement to assess whether there was a significant positive increase in BMI percentile over time. This was defined as having mean change in BMI over time with 95% confidence intervals that did not include zero. This is somewhat analogous to use of a P-value of P < 0.05 but is more informative as it provides the range of values around the mean to be expected. We further stratified these analyses based on the presence of overweight at time of arrival (BMI percentile for age and gender <3%) versus those who were not overweight, as these subjects might be expected to have a more significant increase in BMI which would represent a healthy process. Finally, we examined the overall prevalence of overweight and obesity in this population at arrival and each year following.

**RESULTS**

Of the 181 children who visited the PRHP for intake between 2007 and 2012, 103 (57%) were male and 78 (43%) were female. They emigrated from 17 different countries across the continents of Africa and Asia. Of the 181 children for whom data was available, 156 (86.2%) met the above inclusion criteria.

Demographic characteristics of the subjects at their initial visit and at each year of follow-up are displayed in Table 1. Data was available for 43 (27.5%), 76 (48.7%), and 79 (48.7%) children at years 1, 2, and 3. Across all years, the majority of participants were boys. While the age distribution of participants was approximately equal between ages 2-15 at the initial visit, subsequent visits demonstrate an increase in the number of participants aged 5-10. Approximately 5.7% of subjects were underweight at arrival. The majority of subjects were from the African continent, with Burundi and Eritrea most heavily represented, among those participants who emigrated from the Asian continent, Iraq and Nepal were most heavily represented. Though the individual breakdown between the 17 represented countries varied by year, the majority of participants who followed up remained those from African nations by year 3 post-resettlement.

Figure 1 demonstrates that the baseline prevalence of overweight and obese rose from 14.1% and 3.2% at initial intake to 22.8% and 12.7% at year 3, respectively. Overall, the prevalence of overweight and obesity at year 3 was 44.4% and 54.2%, respectively. Of note, 57.8% were male and 57.4% female.

### Table 1. Baseline and Follow-up Characteristics of Pediatric Refugees Attending the Pediatric Refugee Health Program at Hasbro Children's Hospital, 2007-2012

<table>
<thead>
<tr>
<th></th>
<th>Initial visit (n = 156)</th>
<th>Year 1 (n = 43)</th>
<th>Year 2 (n = 76)</th>
<th>Year 3 (n = 79)</th>
</tr>
</thead>
<tbody>
<tr>
<td><strong>Number of months post-resettlement at follow-up, mean (SD)</strong></td>
<td>N/A</td>
<td>11.1 (2.4)</td>
<td>17.2 (3.8)</td>
<td>30.1 (3.4)</td>
</tr>
<tr>
<td><strong>Male sex, n (%)</strong></td>
<td>103 (58.3)</td>
<td>25 (58.1)</td>
<td>44 (57.9)</td>
<td>49 (62.0)</td>
</tr>
<tr>
<td><strong>Age (years), n (%)</strong></td>
<td></td>
<td></td>
<td></td>
<td></td>
</tr>
<tr>
<td>2 to &lt;5</td>
<td>48 (30.8)</td>
<td>12 (27.9)</td>
<td>21 (27.6)</td>
<td>15 (19.0)</td>
</tr>
<tr>
<td>5 to &lt;10</td>
<td>39 (25.0)</td>
<td>16 (37.2)</td>
<td>27 (35.5)</td>
<td>28 (35.4)</td>
</tr>
<tr>
<td>10 to &lt;15</td>
<td>47 (30.1)</td>
<td>9 (20.9)</td>
<td>17 (22.4)</td>
<td>23 (29.1)</td>
</tr>
<tr>
<td>15+</td>
<td>22 (14.1)</td>
<td>6 (14.0)</td>
<td>11 (14.5)</td>
<td>13 (16.5)</td>
</tr>
<tr>
<td><strong>Percentage underweight (BMI% &lt;3)</strong></td>
<td>5.7</td>
<td>0</td>
<td>1.3</td>
<td>1.2</td>
</tr>
<tr>
<td><strong>Family continent of ethnic origin, n (%)</strong></td>
<td></td>
<td></td>
<td></td>
<td></td>
</tr>
<tr>
<td>Africa</td>
<td>90 (57.7)</td>
<td>26 (60.5)</td>
<td>39 (51.3)</td>
<td>45 (57.0)</td>
</tr>
<tr>
<td>Asia</td>
<td>64 (41.0)</td>
<td>17 (39.5)</td>
<td>37 (48.7)</td>
<td>34 (43.0)</td>
</tr>
<tr>
<td>Not listed</td>
<td>2 (1.3)</td>
<td>N/A</td>
<td>N/A</td>
<td>N/A</td>
</tr>
<tr>
<td><strong>BMI percentile, mean (95% CI)</strong></td>
<td>49.4 (44.4-54.2)</td>
<td>68.5 (60.7-76.3)</td>
<td>57.8 (50.9-64.8)</td>
<td>64.0 (57.4-70.6)</td>
</tr>
</tbody>
</table>

N/A, not applicable; SD, standard deviation; BMI, body mass index; CI, confidence interval
the total prevalence of overweight or obesity more than doubled from 17.3% initially to 35.4% by year 3, with the most substantial increase occurring by year 1 post-resettlement. Between the initial visit and the year 3 post-resettlement WCC, the mean BMI percentile rose from 49.4% to 64.0% among all participants. To put these results within the context of an individual subject and minimize bias in loss to follow-up, we calculated the mean within person change in BMI percentile between the initial visit and each subsequent year as shown in Table 2. Between the initial visit and year 1 post-resettlement, there was a positive mean within person BMI percentile change of 12.9% [95% CI 6.3–19.6%]. Similarly, between the initial visit and the years 2 and 3 WCCs, there were positive mean within person changes of 16.6% [95% CI 11.2–21.9%] and 14.4% [95% CI 9.1–19.7%], respectively. We then stratified the within person change analyses by presence of underweight initially and found that even among those who were not underweight at arrival, there remained a significant positive change in BMI percentile for age and gender, with means and CI as follows from arrival to years 1–3: 12.9% [95% CI 6.3, 19.6%], 14.8 [95% CI 9.4–20.2%] and 14.2 [95% CI 8.8, 19.7%].

**DISCUSSION**

Although refugee children resettling in the US do not initially have the same prevalence of overweight and obesity as do American-born children (17.3% in our study vs 31.7–31.8% based on National Health and Nutrition Examination Survey [NHANES] data for children aged 2–19 from 2007–2012)9, we observed a significant increase in prevalence to approximate that of American-born children within 1 year post-resettlement (32.5%) and to surpass that of American-born children within 3 years post-resettlement (35.4%). Results on our primary endpoint also confirm a significant positive mean within person increase in BMI percentile at years 1–3. This was true even after excluding children underweight at arrival. Our results, which confirm that length of stay in the US is associated with increased BMI percentile, mirror those published about adult immigrant populations17,18 and one small study involving refugee children.19

Many factors predispose refugees to gain weight upon moving from areas of relative food shortage to the US. Biochemically, prenatal nutrient restriction has been shown to predispose to obesity later in life during times of food abundance.24 Children born in resource-constrained settings who are at higher risk of low birth weight may be at increased risk of obesity once they move to the US. Cost, availability, transportation, and other barriers to procuring nutritious foods, as well as developing a taste preference for American foods, have also been theorized to lead to unhealthy eating habits.24 Aside from just changes in diet, refugee children may be more physically inactive once moving to the US, and other socioeconomic and cultural factors (including parents having less time to prepare meals, unsafe neighborhoods lending to sedentary lifestyles, trauma related to the migration process, and degradation in social position) are additional obstacles.24,25

This study has several potential limitations. First, we observed substantial loss-to-follow-up among this population, especially within the first year post-resettlement. This may reflect the fact that once in the US there is significant secondary migration for employment or to join family members in a more established anchor community. The increase in lost-to-follow-up at year 1 may also reflect the unfamiliarity of refugees to primary health care services in this country. Interventions must address the importance of keeping families within their patient-centered medical

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**Table 2. Mean Within Person Change in BMI Percentile at Years 1–3 Post-Resettlement**

<table>
<thead>
<tr>
<th>Years post-resettlement</th>
<th>Year 1</th>
<th>Year 2</th>
<th>Year 3</th>
</tr>
</thead>
<tbody>
<tr>
<td>BMI percentile (entire cohort)</td>
<td>12.9 (6.3–19.6)</td>
<td>16.6 (11.2–21.9)</td>
<td>14.4 (9.1–19.7)</td>
</tr>
<tr>
<td>BMI percentile (underweight excluded)</td>
<td>No change</td>
<td>14.8 (9.4–20.2)</td>
<td>14.2 (8.8–19.7)</td>
</tr>
</tbody>
</table>

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**Figure 1. Prevalence of Overweight and Obese Among Refugees Attending the Pediatric Refugee Health Program at Hasbro Children’s Hospital, 2007-2012**

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**Table 2.**
home [PCMH] during this transition utilizing trained community health workers.

Furthermore, our results were limited by the accuracy of the data we abstracted from the charts. Many refugees immigrating to the US do not have documented birth certificates or do not know their exact dates of birth; upon entering the US, many are automatically assigned a January 1st birthday of the year they are believed to have been born. Since our calculations were predicated on having accurate ages so that BMI percentile could be correctly calculated, it is possible that these results either over or underestimate the actual prevalence of overweight or obese within this population. The primary endpoint of mean within person change addresses this issue.

This study confirms that refugee children are at risk of becoming overweight and obese within the first year following resettlement and that their risk increases by the third year post-resettlement. Given these trends, in addition to the extensive workup done at intake to address infectious diseases and mental health conditions, focused interventions should be designed to counsel these at-risk families on nutrition at every visit. These interventions should firmly root resettling refugee families within their PCMH by integrating ethnically-, culturally-, and linguistically-appropriate counseling by nutritionists, nurse care managers, physicians and most importantly, community health workers, who can guide and educate providers as to the cultural context of food for a particular culture or individual families. Further research is still needed to better define the problem of pediatric obesity among refugee populations, including following a larger number of participants over a longer period of time as well as evaluating interventions designed to help this at-risk population.

Acknowledgments

We would like to thank all the providers at Hasbro Children’s Hospital Pediatric Refugee Health Program, with special thanks to the community health supporters who work tirelessly to ensure the health of the populations we serve.

References

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Treating Children at Urgent Care Centers: A Qualitative Study to Determine How Providers Perceive Managing Pediatric Patients

THERESE L. CANARES, MD; LINDA BROWN, MD, MSCE; REBECCA M. SLOTKIN; ARIS GARRO, MD, MPH

ABSTRACT
As Urgent Care Centers (UCCs) multiply, more children receive care in this setting. Little is known about UCC providers’ perspectives on the management of common pediatric conditions. The objectives of this study are to describe the perceptions of UCC providers and identify challenges they face regarding common pediatric conditions. This qualitative study used semi-structured interviews with a convenience sample of 12 UCC providers from 9 non-academic UCCs in Rhode Island. Content analysis identified themes that describe perceptions of UCC providers regarding pediatric patients. Interviews identified three common pediatric scenarios that challenged UCC providers: acutely ill young infants, minor traumatic brain injury (mTBI), and uncooperative children requiring minor procedures. UCCs should focus quality initiatives to educate their providers on evidence-based management of common pediatric clinical scenarios. Efforts may include dissemination of validated guidelines, education targeted to non-pediatric trained providers, and the integration of minimal sedation protocols for minor procedures.

KEYWORDS: RI, Urgent Care, Ambulatory Care, Pediatrics, Qualitative Research

INTRODUCTION
The urgent care industry grew 20% in the past four years, totaling more than 9,400 clinics, with 40% of sites planning to expand.1 Currently, Rhode Island (RI) contains 15 Urgent Care Centers (UCCs). As numbers of UCCs grow, more children receive acute care in this setting. A challenge for this emerging clinical setting is in delivering standardized quality of care.

Few organizations offer voluntary accreditation of UCCs; however, there remain no national or statewide accreditation requirements.2-4 The American Academy of Pediatrics (AAP) has developed recommendations on the care of children at UCCs, although suggestions on provider qualifications are non-specific, such as employing providers with experience treating children and providing meaningful oversight of non-physician providers.5 RI Department of Health (DOH) similarly has vague requirements for UCC staff whose duties should be consistent with their licensure, training and experiences. However, RI DOH makes no recommendations on pediatric-specific care, providers, or equipment for this clinical setting.6 Currently, no recommendations exist on the training background or board certification status of UCC providers, resulting in varied types of providers who treat children in this setting.

In addition to limited guidelines and accreditation requirements for UCCs, there is a paucity of literature assessing the pediatric care delivered in UCCs. While the majority of children are managed and discharged from UCCs, some patients are transferred to emergency departments (EDs). The circumstances and thought processes of providers who face challenges with children in the UCC setting are unknown. The objectives of this study are to describe the perceptions of UCC providers and identify challenges they face regarding common pediatric conditions.

MATERIALS AND METHODS
Study Design
This qualitative study used content analysis of semi-structured interviews with 12 UCC providers from 9 non-academic UCCs in RI from December 2012 to January 2014.

Study Setting and Population
Participants were medical providers who treat children in RI UCCs. Clinicians of varied years of experience, degree types, and training backgrounds were purposively recruited to obtain a broad representative viewpoint of the providers who treat children in UCCs. The UCCs in this study were privately owned, non-academic, and none were hospital-based. There were no exclusion criteria.

Data Collection and Analysis
The RI Hospital Institutional Review Board (IRB) approved this study with a waiver of written consent, and informed, verbal consent was obtained. A $50 gift card was provided as compensation for time spent during interviews.

The primary researcher (TC) conducted all semi-structured, one-on-one interviews. Interviews continued until data saturation was reached. An interview guide was pilot-tested using pediatricians and emergency medicine clinicians from the researchers’ primary institution. The interview guide included closed and open-ended questions.
with pre-specified probes. After an interval analysis the interview guide was modified to add additional questions and probes that were not fully explored in previous interviews (Appendices I & II). Data saturation was defined as the point at which interviews did not yield any new information. This occurred after 12 provider interviews.

Discussions were digitally recorded with two recording devices to safeguard against device failure. Digital files were transcribed by a professional transcription service. Thematic coding of transcribed interviews was performed by two independent raters [TC & RS or TC & AG]. The coding scheme was drafted by the principal investigator, and edited by consensus amongst the research team. Coding discrepancies were resolved by group consensus. NVivo software (QSR International Ltd, 2013) was used to organize the data. Content analysis was used to identify themes in the coded data.

RESULTS

Characteristics of UCC providers

Self-reported characteristics of the participants and their practices are noted in Table 1. Two UCC providers declined to participate in interviews. Of the 12 providers interviewed, 7 were physicians and 5 were midlevel providers [NP or PA]. Training backgrounds included providers from family medicine, internal medicine, obstetrics and gynecology, and occupational health. Median years employed at an UCC was 12.5. Median percentage of pediatric patients (< 18 years) treated at the UCCs was 25% (ranging 5–100%).

<table>
<thead>
<tr>
<th>Gender</th>
<th>Degree</th>
<th>Training</th>
<th>Years in Medical Practice</th>
<th>Years in Practice at an UCC</th>
<th>Estimated percentage of UCC Population &lt;18 years of age</th>
</tr>
</thead>
<tbody>
<tr>
<td>Female</td>
<td>MD</td>
<td>FP</td>
<td>21</td>
<td>23*</td>
<td>20%</td>
</tr>
<tr>
<td>Male</td>
<td>MD</td>
<td>OB</td>
<td>27</td>
<td>20</td>
<td>15%</td>
</tr>
<tr>
<td>Male</td>
<td>MD</td>
<td>Pedi</td>
<td>27</td>
<td>1</td>
<td>100%</td>
</tr>
<tr>
<td>Male</td>
<td>MD</td>
<td>FP</td>
<td>19</td>
<td>18</td>
<td>20%</td>
</tr>
<tr>
<td>Male</td>
<td>DO</td>
<td>FP</td>
<td>21</td>
<td>15</td>
<td>25%</td>
</tr>
<tr>
<td>Male</td>
<td>DO</td>
<td>IM</td>
<td>10</td>
<td>10</td>
<td>25%</td>
</tr>
<tr>
<td>Male</td>
<td>MD</td>
<td>IM</td>
<td>25</td>
<td>18</td>
<td>5%</td>
</tr>
<tr>
<td>Male</td>
<td>PA</td>
<td>None</td>
<td>6</td>
<td>2</td>
<td>30%</td>
</tr>
<tr>
<td>Male</td>
<td>NP</td>
<td>FP</td>
<td>3</td>
<td>3</td>
<td>30%</td>
</tr>
<tr>
<td>Male</td>
<td>PA</td>
<td>OH</td>
<td>33</td>
<td>4</td>
<td>25–30%</td>
</tr>
<tr>
<td>Female</td>
<td>NP</td>
<td>FP</td>
<td>22</td>
<td>22</td>
<td>20–30%</td>
</tr>
<tr>
<td>Female</td>
<td>NP</td>
<td>FP</td>
<td>16</td>
<td>5</td>
<td>20%</td>
</tr>
</tbody>
</table>

Nurse Practitioner (NP), Physicians Assistant (PA), Family Practice (FP), Obstetrics/Gynecology (OB/GYN), Internal Medicine (IM), Pediatrics (Pedi), Occupational Health (OH). *One provider had worked in UCCs for more years than she had been in practice, due to moonlighting in an UCC during residency.

Themes generated from UCC provider interviews

Three common pediatric clinical scenarios were identified that challenged UCC providers: acutely ill young infants, children with minor traumatic brain injury [mTBI], and uncooperative children requiring minor procedures.

Theme: UCC providers are often uncomfortable managing acutely ill young infants.

Infants were a challenging patient group for UCC providers [Illustrative quotes in Table 2]. A primary reason reported was because these patients are nonverbal. Providers reported that the inability to speak to a patient “makes me worry” and raises concerns for “missing something.” In contrast, speaking to the older, verbal child was a reassuring sign that providers relied on.

Training background influenced UCC providers’ comfort managing acutely ill infants. Providers that were uncomfortable with infants reported transferring pediatric patients to EDs for this reason. Providers lacking pediatric-specific training relied on clinical experience and whether “instinct tells me to send [a patient] to the ER.” In contrast, providers with post-graduate pediatric training were confident caring for young infants, believing the training provided them with the “judgment to see sick kids.” All providers, whether senior or junior in their career, correlated the volume of previous pediatric clinical experience to their confidence caring for children.

The presence of fever compounded concern for the infant’s well being due to the possibility of a serious bacterial illness [SBI]. For febrile infants who were perceived as “sick,” providers considered their primary job was to determine if the infant was “stable” and then transfer to an ED. In this scenario, most providers did not initiate a diagnostic workup for SBI, stating that this should occur in an ED. When children were not “sick,” a frequent alternative approach was contacting the patient’s PCP to help guide management and facilitate next-day follow-up. UCC providers often identified linking PCPs and their young patients during acute illness as an important priority.

Availability of laboratory tests was variable from site to site. Most UCC sites had access to urinalysis, rapid influenza or rapid streptococcal tests. Basic lab tests [e.g., complete blood count, electrolytes] and X-rays were available on-site at some locations. Providers reported frequent difficulty with infant phlebotomy, IV placement, and catheterized urine collection. They attributed this to either nursing discomfort or a lack of infant-sized equipment. Providers highly valued the select nurses and medical assistants that were comfortable with triaging and assessing children.

Theme: UCC providers are particularly concerned about mTBI in children.

Providers were apprehensive about mTBI because of concern for missing intracranial hemorrhage [ICH] or concussion [Illustrative quotes in Table 3]. They often described
that any sign of abnormal mental status [e.g., brief confusion or slowed speech] after mTBI [e.g., helmeted football collision] requires transfer to an ED for computed tomography (CT). Minimizing radiation in children was a goal identified by several UCC providers, but most said that any concern for intracranial injury outweighed the radiation exposure risk of CT. No UCC providers mentioned use of published mTBI decision tools to determine patients at low-risk for ICH [e.g., the PECARN algorithm for low risk TBI]. When asked about observation capabilities, providers uniformly stated that due to limited space and high volume, UCCs were not able to observe a patient for a sufficient length of time. In addition, the business model of UCCs leads providers to “want [the patients] in and out.”

Theme: Providers had difficulty with uncooperative children requiring minor procedures.
Providers’ approaches to laceration repair in children ranged from those with “no anxiety” to those stating, “I’m not comfortable with it” [illustrative quotes in Table 4]. Most clinicians had some degree of comfort suturing, depending on the laceration location and cooperativeness of the child and parent. UCC providers were more likely to transfer children to an ED or plastic surgeon because of patient or parental anxiety about a scar, cosmetically sensitive areas, or in one UCC provider’s opinion, female gender of the patient. Two UCC providers interviewed did not have requisite suturing skills and elected not to perform any suturing in children.

Overall, providers lacked familiarity or adequate staffing to apply immobilization and were not trained in minimal sedation techniques commonly used for minor procedures in children, including laceration repair, foreign body removal, and reduction of dislocations. No UCCs employed pediatric-restraint techniques [e.g., papoose board or wrapping with a bed sheet], anxiolytic, or minimal sedation papoose board or wrapping with a bed.

Table 2. Sub-themes on providers’ perceptions on managing acutely ill young infants.

<table>
<thead>
<tr>
<th>Sub-theme</th>
<th>Quotes</th>
</tr>
</thead>
<tbody>
<tr>
<td>Infants were described as challenging to examine because they are nonverbal.</td>
<td>“Sometimes people bring in month-olds to urgent care. I have to be real cautious with that; they have a fever, they’re not eating right, off to the ER for them. It makes me worry when I can’t get a history and talk to patients.”</td>
</tr>
<tr>
<td></td>
<td>“We’ve seen, I think that’s the youngest I’ve seen here. 2-week old babies with coughs or not feeding right or vomiting, and usually a very young mother. A lot of us feel that this is not the place for that young a child, that they should at least be in a pediatrician’s office.”</td>
</tr>
<tr>
<td></td>
<td>“Again, I just worry about it… I guess maybe it’d be the same issue if you had an adult who was nonverbal. What could you possibly be missing here?”</td>
</tr>
<tr>
<td>Many providers were concerned that an infant may be “sick” or septic and rapidly decompensate.</td>
<td>“I’m a little leery of the little kids… With little kids the question is are they stable, are they okay?”</td>
</tr>
<tr>
<td></td>
<td>“Infants when they’re sick, they’re really sick. Infants less than 12 months I really take extra caution with… If an infant has a fever and needs a febrile workup… I don’t take that with a grain of salt at all, ‘cause I’ve been around a lot of septic workups with an infant.”</td>
</tr>
<tr>
<td></td>
<td>“Well, because they are so—hemodynamically—they can go bad on you so quickly.”</td>
</tr>
<tr>
<td>The PCP relationship was described as important for follow-up of acute illnesses, especially for infants.</td>
<td>“A lot of what our visit often is, is having that education visit with the parent about how their child has a pediatrician. They should be seeing them regularly and these are the things that you should go to your pediatrician for, and while it’s bad for business, it’s good for kids.”</td>
</tr>
<tr>
<td></td>
<td>“I really try to get the vibes from the parents. How much they know. How educated they are. How are they gonna follow up. I call the pediatrician to see if they have any of these reliance issues. That kind of stuff. Never do it in a vacuum with a kid.”</td>
</tr>
<tr>
<td></td>
<td>“Quite often, we also call the pediatricians to talk about the infant if we have any concerns and we don’t know them well, or the parents… We try and keep good communication with their primary cares.”</td>
</tr>
<tr>
<td>Pedi or FP-trained providers expressed more comfort treating children due to their training.</td>
<td>“Most of it is having the pediatric experience, the know-how, the judgment to see sick kids rather than adults, because they’re not small adults” – MD, Pediatrics</td>
</tr>
<tr>
<td>Providers without pediatric-specific training drew confidence from their clinical experience, particularly with children and adolescents.</td>
<td>“Well, I guess I’m very conscious of the fact that I’m not a pediatrician. I don’t want to give anyone the impression that I consider myself equal to one in anyway. I’m just trying to be aware of my limitations, too. I’m an internist.” – DO, Internal Medicine</td>
</tr>
<tr>
<td></td>
<td>“I’ve quite a bit of experience treating an age group of say adolescent to older adult. As a provider, you develop an intellectual database. You’re able to distinguish and practice instinctively. I just don’t know that I’ve developed a deep enough database on children to trust my intuition as I would with the [adult] population” – PA, Occupational Health</td>
</tr>
<tr>
<td>Providers acknowledged that they knew their limitations and accepted that being uncomfortable with a pediatric patient justified transfer to higher level of care.</td>
<td>“Of all the kids that I’ve seen that are really, really young, under a year—if I have any doubt in my mind, me personally, I’m going to send them to the hospital if I’m not sure.”</td>
</tr>
<tr>
<td></td>
<td>“We don’t have a set rule of what you see and what you send out… Again, it’s if you’re uncomfortable, there’s nothing wrong with transferring them out… That’s just the limiting factor of what we take care of, but at the same time as long as [we] know their limits; at least [we’re] practicing in a safe manner.”</td>
</tr>
<tr>
<td></td>
<td>“If I get the—if my instinct tells me to send to the ER, there’s usually a reason for it. I usually know which ones have to go.”</td>
</tr>
<tr>
<td>Providers believed their facility was adequately equipped to care for children for the urgent care setting.</td>
<td>“We have the equipment we need, and I think it’s just, you know, I think the staff’s comfort level is even more important than the equipment. You can figure something out to use and it works.”</td>
</tr>
<tr>
<td>Capabilities to obtain infant labs, IV, and urine collection were often unavailable.</td>
<td>“We don’t really like to do infant hydration. We’re not really equipped to do little, tiny kids.”</td>
</tr>
<tr>
<td></td>
<td>“We actually don’t take a lot of the pediatric blood pressures below the age of ten. If we’re worried about a blood pressure the child doesn’t belong there.”</td>
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<tr>
<td></td>
<td>“We don’t start IV’s on kids very often. No, if somebody was that bad I’d probably send ‘em down to [the pediatric ED] if I thought they needed fluid for kid.”</td>
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</table>
medications. Difficulty restraining an uncooperative child for a minor procedure often prompted transfer to an ED for a procedure that was otherwise within the UCC providers' skill set.

**DISCUSSION**

We identified three common pediatric clinical scenarios that are challenging for UCC providers. Those clinical scenarios are: acutely ill young infants, children with mTBI, and uncooperative children requiring primary laceration repair or minor procedures.

A challenge that UCC providers described was the evaluation and diagnostic work-up of acutely ill young infants. It is unclear whether UCCs employ evidence-based guidelines on the approach to fever in infants,\(^9\) as this was not acknowledged by any providers interviewed. One provider suggested guidelines of vital signs by age to screen for sepsis would be helpful. Triage assessment tools that utilize vital signs to identify children with sepsis in the ED setting have been successful.\(^10,11\) Another aspect of infant management that leads to practice variability is the variety of training backgrounds in UCC providers. It is imperative that UCC providers lacking formal pediatrics training are equipped to provide basic pediatric urgent care, since children comprise a quarter of the population at many UCCs in this study. Review of evidence-based guidelines (e.g., fever in infants) through continuing medical education, or dissemination of pediatrics-based resources (e.g., vital signs triage tools) may enhance UCC providers' confidence and comfort level with this age group.

When unsure about management of an infant, many providers endorsed good communication with pediatricians, particularly when follow-up was indicated. This addresses expectations from the AAP, which has concerns that urgent care and retail clinics may undermine continuity of care and the medical home model.\(^3,12,13\) Next steps to encourage more UCC providers’

| **Table 3. Sub-themes on providers’ perceptions on managing head injuries.** |
|-----------------|----------------------------------|
| Sub-theme | Quotes |
| **Providers worried about intracranial hemorrhage or concussion.** | “A lot of the transfers [to the ED] may be for head trauma, and we know it’s a low likelihood of any type of bleed, but it’s a safety factor. So in those cases we’re not really expecting to be right, we’re expecting to be safe.”  
“I take these things quite seriously with a great concern for a concussion and long-term implications for a concussion. We simply do a good exam. … Not to say that I’m quick to order CT scans. There really are criteria for obtaining a CT.”  
“If his speech is off; he has light sensitivity; his coordination is off, he would be immediately shipped out for a CT. [If] anything at all that seems to be off. That type of thing would—I would be very concerned. Always. Helmet or no helmet.” |
| **Observation time and space was limited across most UCCs.** | “We try not to [keep patients for observation]. We only have six exam rooms. Seeing 50, 60, 70 patients in an 11-hour day is not unheard of… The volume has been pretty crazy.”  
“No, [observation of a patient with head injury] is really not an option… It’s not really a suitable place… the anxiety will be heightened just by being here. There’s a lot of noise here. There’s a lot of patients here. There’s a lot of coughing, sneezing, retching… What you really want for this individual is for him to start resting the injured part as quickly as possible. I just don’t feel this is the proper place…If I was that concerned, I’d probably refer him out.”  
“At Urgent Care they want [the patients] in and out, because they time us on that.” |

| **Table 4. Sub-themes on providers’ perceptions on suturing lacerations and minor procedures.** |
|-----------------|----------------------------------|
| Sub-theme | Quotes |
| **There were widely varied comfort levels on pediatric facial lacerations.** | “Suturing is one of the things that I have no anxiety about. I’ve sutured a vermilion border in a two-year-old in an urgent care setting.”  
“I personally do not suture faces… I’m not comfortable with it… If I can possibly get them just the best-trained person to do it, that’s what I would do.”  
“I guess we’re always sensitive to scarring but I’m particularly sensitive to a younger age group of scarring. I might consider the alternative of referral to a plastic surgeon. It might be better on my list of suggestions than it would be for an adult.”  
“Dog bites [to] the faces are awful. They’re just so ragged and torn and need irrigation. The things to faces I always err on the side of sending them somewhere… Anything that goes over the vermilion border… Eyebrows, eyelids, anything that’s gonna be really cosmetic.” |
| **Most providers endorsed some concern about scars in children, and were more likely to transfer to an ED for concerns on cosmetic outcome.** | “Some of them we’ll suture… in mom’s arms. Sometimes it goes very well… Obviously the kids can reach a point where they’re so big, if they’re still resistant, there’s no way that my staff can hold ‘em down and get ‘em sutured. That’s certainly a reason for a transfer.”  
“When a kid comes in say with a splinter that’s a particular challenge… The parental anxiety and then both having to do a procedure on a kid. I mean, trying to give Lidocaine to a kid or trying to have a kid hold still. It’s hard… We don’t have the ability to restrain a child who needs a procedure who needs suturing. We don’t have papoose. We have to have people draped over ‘em. I’m not at all comfortable with that.”  
“We only have three people in Urgent Care at a time so [restraining an uncooperative child] would tie up my entire staff.” |
| **Restrainting the uncooperative child was challenging, and would justify transfer to the ED.** | “When unsure about management of an infant, many providers endorsed good communication with pediatricians, particularly when follow-up was indicated. This addresses expectations from the AAP, which has concerns that urgent care and retail clinics may undermine continuity of care and the medical home model. Next steps to encourage more UCC providers’ |
communication with patients’ pediatricians may be development of quality improvement (QI) feedback after follow-up.

Head injury was concerning for many UCC providers, often leading to ED transfer. Established guidelines for mTBI in children identify those at low risk of ICH, however, these were not discussed by any UCC providers. For patients with mTBI that are low risk for clinically important injury, the practice of immediate ED transfer causes inconvenience to families, unnecessary ED resource utilization, and increases in costs. Reviewing evidence-based guidelines on mTBI, evaluating cases for QI, and discussing transfer protocols with local EDs may help UCC providers improve their triage of children who are transferred to the hospital.

UCC providers frequently reported difficulty managing uncooperative children requiring minor procedures. Providers suggested they would provide a better service to patients with the availability of a papoose board or some form of minimal sedation. UCC directors may consider implementing a minimal sedation program. Intranasal midazolam is well studied as anxiolysis for lacerations with a low side-effect profile that may be a safe and feasible adjunct to UCC providers’ armamentarium. Furthermore, staff training in the use of ancillary immobilization (e.g., bed sheet wraps) and distraction may facilitate minor procedures such as lacerations.

LIMITATIONS

This study is limited geographically to privately owned UCCs in RI and may not be characteristic of UCCs nationwide. It is possible that the providers sampled are not representative of other UCC providers; however, we purposively recruited a wide range of UCC providers to obtain viewpoints from UCC providers that cover the breadth of practitioners in this setting.

CONCLUSIONS

UCC providers’ perspectives allowed us to identify pediatric clinical scenarios frequently encountered in the UCC setting that are challenging to manage. Based on these findings we recommend that UCC providers utilize validated guidelines and decision tools on common diagnoses (e.g., fever in infants, mTBI), seek out education targeted to non-pediatric trained providers, and gain familiarity with minimal sedation or immobilization techniques for minor procedures. Given the relatively recent advent of UCCs, scarcity of research, and limited guidelines for children in this setting, there is opportunity to improve evidence-based care for children.

References

Previous Presentations
Abstract; Pediatric Academic Societies, 2014, Vancouver, BC
Abstract; Eastern Society for Pediatric Research, 2014, Philadelphia, PA
Platform; North East Regional Society for Academic Emergency Medicine, 2014, New Haven, CT

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A Broken Heart: A Woman with Chest Pain and an Abnormal ECG

COURTENEY MACKUEN, MD; WILLIAM BINDER, MD

From Case Records of the Alpert Medical School of Brown University Residency in Emergency Medicine

DR. COURTENEY MACKUEN: Today’s patient is a 56-year-old woman who presents with complaint of mid-sternal and left-sided chest discomfort beginning after several episodes of nausea and non-bloody emesis. She had been drinking alcohol the evening prior to presentation. She became concerned when she developed persistent, penetrating chest pain after vomiting. She did not describe a tearing sensation. She presented to the emergency department via ambulance 4 hours after the onset of pain. She received an aspirin and a sub-lingual nitroglycerin tablet without relief from the Emergency Service personnel.

Her history is significant for hypertension and an episode of chest pain two years ago with resultant hospitalization. She stated that she had an elevated troponin but minimal coronary artery disease (CAD) on catheterization. She was told she had a “broken heart.” She denied history of deep venous thrombosis (DVT) or pulmonary embolism (PE). She is a non-smoker. She reported a great deal of stress in her employment. Her only medication is venlafaxine hydrochloride.

DR. ANDREW NATHANSON: Can you describe her physical exam?

DR. MACKUEN: The patient appeared uncomfortable. Her brachial artery blood pressures were equal – 144/88 mm Hg. Her pulse was 96 and regular, respiratory rate was 16, and her room air oxygen saturation was 98%. Her neck was supple, with no bruits; her lungs were clear bilaterally, and her chest wall had no crepitus. She had a normal s1s2, no murmurs, a regular rhythm, and distal pulses were equal bilaterally. Her abdomen was soft, non-tender and without rebound or pulsatile masses. Her neurologic exam was normal.

DR. DAVID CURLEY: What were your initial concerns? How did you limit your differential?

DR. WILLIAM BINDER: Chest pain is the 2nd most common presentation to the emergency department, causing 6–8 million visits in the US annually.1 In our patient, the most concerning and life-threatening causes of chest pain were acute coronary syndrome, thoracic aortic dissection, pulmonary embolism, pneumothorax, and an esophageal rupture.

We obtained labs, including a cbc, chem 7, and troponin, all of which were normal. A chest radiograph was unremarkable and did not show mediastinal widening or air. A bedside echocardiogram performed by emergency physicians was negative for a pericardial effusion. An electrocardiogram demonstrated inverted and deep t waves in leads V2–V4 and a biphasic t wave in V5 (see figure 1).

In creating a differential diagnosis, esophageal rupture was certainly a possibility in this case. While about 75% of cases in the United States are iatrogenic or due to trauma, spontaneous rupture is seen in approximately 15% of cases.2,3 Pain is the most common finding in an esophageal perforation (90%). Subcutaneous emphysema can be palpated in 60% of
patients with a cervical esophageal rupture, whereas 30% of patients with a thoracic esophageal injury will have palpable crepitus.\(^4\) Mackler’s triad – emesis, chest pain, and subcutaneous emphysema – is seen in only 20–25% of cases.\(^2\) While initial radiography is normal in up to 33% of cases, within several hours an abnormal chest radiograph is noted in over 90%.\(^4,4\) Pneumothorax and pulmonary embolism seem less likely in this patient.

An acute aortic dissection was of significant concern. A type A dissection is highly lethal with mortality approaching 1–2% per hour within the first 48 hours of the event.\(^3\) Data from the International Registry for Acute Aortic Dissection (IRAD) revealed that approximately 66% of cases are seen in men (mean age is 63). Women have a higher mean age at presentation.\(^6\) Data from IRAD suggested that pain was not tearing or ripping but sudden and sharp in 90% of patients, while in 4.5% of patients there was no report of pain.\(^7\) Pulse deficits are intermittently seen (20%), and aortic insufficiency murmurs are noted in 40–50% of patients.\(^8\) Chest radiography is abnormal in up to 90% of cases of a proximal dissection, with mediastinal widening [63%] and pleural effusion [19%] the most common abnormalities.\(^9\) Our patient had a normal chest radiograph, no pulse deficits or abnormal blood pressures, and she did not have a murmur of aortic insufficiency. However, none of these findings completely excluded an aortic dissection or spontaneous esophageal rupture [Boerhaave’s syndrome].

Acute Coronary Syndrome (ACS) remains in the differential. The patient had been hospitalized previously and had a catheterization revealing minimal coronary artery disease but with a positive troponin, suggesting a non-thrombotic origin to her elevated cardiac biomarker. Additionally, her current ECG is abnormal.

**DR. CATHERINE PETTIT:** What are the causes of troponin elevation in patients without CAD?

**DR. MACKUEN:** There are numerous processes causing myocardial necrosis and troponinemia. ECG abnormalities are frequently seen in these cases but are not a direct result of thrombus within the coronary vessels. Acute aortic dissection, ischemic stroke, intracerebral hemorrhage all can lead to elevated troponin. Cardiac inflammatory states – endocarditis, myocarditis, and myopericarditis – as well as infiltrative states such as amyloid and sarcoid also result in troponin leaks.\(^10\) High cardiac demand states including SVT, atrial fibrillation with rapid ventricular response, pulmonary embolism, and sepsis can lead to a Type II non-ST elevation myocardial infarction (NSTEMI), or demand ischemia.\(^11,12\) Other causes of non-thrombotic acute coronary syndrome include coronary artery vasospasm and Takotsubo cardiomyopathy. Coronary artery vasospasm can cause transient symptoms of ischemia and can be provoked by stimulant drugs such as cocaine or other amphetamines. Takotsubo cardiomyopathy, the “broken heart” syndrome, is an important cause of non-thrombotic acute coronary syndrome. Given that our patient mentioned a “broken heart,” this is high on our differential today.

**DR. THOMAS HARONIAN:** What is the cause of Takotsubo cardiomyopathy and what are the complications?

**DR. MACKUEN:** Takotsubo cardiomyopathy is a reversible condition that can mimic acute coronary syndrome in the absence of coronary artery disease. This cardiomyopathy was named Takotsubo because on echocardiogram it resembled a Japanese octopus trap with a large bottom and narrow top.\(^13\) It classically presents as chest pain in a post-menopausal woman after an emotional or physical stressor. Between 80–90% of cases of Takotsubo cardiomyopathy occur in women (mean age 58–75). In 66% of patients the disorder is preceded by an emotional or physical stressor.\(^13\) Takotsubo appears to have a circadian predilection for the early hours of the day and summer months.\(^14\) Electrocardiographic changes such as ST elevation [68%], and T wave inversions [97%] are the most common findings.\(^15\) Troponin elevation is noted in 85% of patients, and are usually mild and rapidly normalize.\(^15,16\) Its prevalence in ACS is noted to be between 0.7%–2.5%, and in woman may be as high as 6%.\(^17,18\)

Etiology has not been elucidated. One hypothesis suggests that increasing circulating catecholamines cause transient epicardial spasm. Other theories speculate about microvascular dysfunction and cardiac fatty acid metabolism. Takotsubo is a diagnosis of exclusion and standard treatment for ACS is followed. Complications include heart failure, and ACE inhibitors have been used in the management of this disorder.\(^16\) Mortality is low (3%) and complete resolution occurs in 1–8 weeks. The 4-year recurrence rate is 5–10%.\(^15,19\)

**DR. JESSICA SMITH:** What was the clinical course for the patient?

**DR. MACKUEN:** In the ED the patient received sublingual nitrroglycerin and morphine without relief. She received hydromorphone and lorazepam and her pain abated. Interestingly, sedative use has been previously reported to be effective in Takotsubo cardiomyopathy.\(^18\) CT of the chest with intravenous contrast was negative for both dissection and esophageal rupture. The patient was admitted to the CCU. Her second troponin 6 hours later was elevated at 5.67 ng/ml. A subsequent troponin was 1.91 ng/ml. Cardiac catheterization revealed minimal luminal irregularities in her coronary arteries, mild hypokinesis in the apical portion of the heart, and an EF approximately 48%. She was discharged to home and has done well.

**FINAL DIAGNOSIS:** Takotsubo’s cardiomyopathy
References


Authors

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William Binder, MD, is Assistant Professor of Emergency Medicine at the Alpert Medical School of Brown University.

Correspondence

William_Binder@brown.edu
Rhode Island Monthly Vital Statistics Report
 Provisional Occurrence Data from the Division of Vital Records

<table>
<thead>
<tr>
<th>REPORTING PERIOD</th>
<th>JULY 2014</th>
<th>12 MONTHS ENDING WITH JULY 2014</th>
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</thead>
<tbody>
<tr>
<td>VITAL EVENTS</td>
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<td>Number</td>
</tr>
<tr>
<td>Live Births</td>
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<td>11,308</td>
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<tr>
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<td>9,874</td>
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<tr>
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<tr>
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<tr>
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<td>604</td>
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<tr>
<td>Under 20 weeks gestation</td>
<td>49</td>
<td>490</td>
</tr>
<tr>
<td>20+ weeks gestation</td>
<td>3</td>
<td>75</td>
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* Rates per 1,000 estimated population
# Rates per 1,000 live births

<table>
<thead>
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<th>REPORTING PERIOD</th>
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<th>12 MONTHS ENDING WITH JANUARY 2014</th>
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<tr>
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<td>Number (a)</td>
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<tr>
<td>Diseases of the Heart</td>
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<td>2,387</td>
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<tr>
<td>Malignant Neoplasms</td>
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<td>Cerebrovascular Disease</td>
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<tr>
<td>Injuries (Accident/Suicide/Homicide)</td>
<td>70</td>
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<tr>
<td>COPD</td>
<td>40</td>
<td>449</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 1,051,511 (www.census.gov)
(c) Years of Potential Life Lost (YPLL).

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

**December 1, Monday**
Meeting with Tobacco Free RI regarding 2015 legislative agenda
Meeting with Recovery Works Coalition – multiple organizations working on substance abuse issues
RIMS Council Meeting

**December 2, Tuesday**
RIMS Physician Health Committee [Herbert Rakatansky, MD, Chair]
Meeting with coalition partners regarding DOH proposed regulations on opioid prescribing, RIMS CME Chair Patrick Sweeney, MD, MPH
House Committee on Health, Education and Welfare regarding Ebola; Peter Karczmar, MD, President, testifying
CPT Seminar, Peter A. Hollmann, MD, presenting

**December 2–3, Tuesday and Wednesday**
Pfizer meeting with state medical societies, Boston, Massachusetts

**December 10, Wednesday**
American Heart Association, RI Kids Count, Voices for Healthy Kids coalition meeting regarding childhood obesity

**December 11, Thursday**
Meeting with Blue Cross Blue Shield, Peter Karczmar, MD, President, and RIMS staff

**December 12, Friday**
Meeting with Protect Families First coalition and others regarding 2015 Good Samaritan Legislation

**December 15, Monday**
Department of Health public hearing regarding proposed regulations for opioid prescribing

**December 16, Tuesday**
Meeting with Senator Whitehouse staff and AMA Federal Relations staff regarding electronic health records, Washington, DC
Meeting with Michael Fine, MD, Director of the Department of Health; Peter Karczmar, MD, Russell A. Settipane, MD, and staff

**December 17, Wednesday**
Department of Health Primary Care Physician Advisory Committee
OHIC Administrative Simplification Workgroup regarding co-pays and deductibles/patient responsibilities
Planning meeting for April 25 CME event, Elaine Jones, MD; Yul Ejnes, MD; Russell Settipane, MD; and RIMS staff
Public Laws Committee, Michael Migliori, MD, Chair, Elaine Jones, MD, Co-Chair, Michael Silver, MD, RIMPAC Chair

**December 18, Thursday**
Quarterly conference call with National Government Services [Medicare Contractor] and the six New England state medical societies

On December 2, RIMS sponsored the annual CPT Seminar, in cooperation with the MA/RI Medical Group Managers Association. The presenter was Peter A. Hollmann, MD, Chair of the CPT Editorial Panel (AMA) and one of RIMS’ AMA Delegates.
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Q & A with Carol T. Lewis, MD

Creating a Medical Home for Refugee Kids at Hasbro

MARY KORR
RIMJ MANAGING EDITOR

Whether her patients speak English or not, Dr. Carol T. Lewis’ passion for her work is not lost in translation. As the director of the Pediatric Refugee Health Program (PRHP) at Hasbro Children’s Hospital, she greets new patients with a smile, a hug, or a kiss on the forehead.

Within 30 days of their arrival, these newcomers, who are mostly from the Middle East and Africa, are seen in the monthly refugee clinic. They are referred by Dorcas International Institute of R.I., the state’s primary refugee resettlement agency, or by the Diocese of Rhode Island.

On this particular week, Dr. Lewis has been told to expect five children from Burundi in the next clinic. They are pre-screened on a Friday, so that by Monday morning at the clinic, designed as a patient-centered medical home (PCMH), Dr. Lewis and her team have all the lab results at hand, and an interpreter if necessary.

Partially because of the success of the PCMH model at the clinic, Hasbro has applied to PCMH-Kids, an initiative developed by the state, RI Medicaid and health insurers. Ten pilot programs will be selected this winter.

“I look at it as an opportunity to provide for all of the kids that we see here the type of PCMH we are offering for refugees,” Dr. Lewis said, during an interview with RIMJ when she spoke about her professional journey and the refugee program.

Q. How did you personally get interested in pediatrics and then caring for refugees?

A. Many years ago I realized I liked the little ones. You are not dealing with an isolated patient; you are always dealing with the family. But also it’s so incredibly dynamic – from taking care of a 6-month-old infant to a 16-year-old adolescent. You get to watch all those different stages of development. The fact that I’m here and not in private practice is because I love working with this population in general. When you are working with kids and families with limited resources, their access to healthcare is much more difficult. Here in the refugee clinic, we see the tip of the iceberg. Over time, you are allowed more into their story. I am very humbled by them and their incredible resilience.

Q. The pediatric refugee clinic opened in 2007. How did it start?

A. It had its roots following Liberian civil wars [1989–2003] when the influx of children to Rhode Island, between 2003–2006, was great and the slots available for them to be seen by hospital pediatricians was limited.

In 2006, we held a Saturday screening session at the International Institute; 30 kids came in and were seen by volunteer doctors and nurses. When we finished, we agreed it was so much better than trying to piecemeal it together. We then asked ourselves, ‘How can we do this better and create a patient-centered medical home (PCMH) for the refugee kids?’
Q. Are there many pediatric refugee clinics nationwide?
A. It is unusual to have a pediatric refugee clinic. In most states, the initial intake exams go through the Department of Health, which contracts out to providers.

Once they come here for the first visit, we don’t refer them out. The physician who sees them on their first visit becomes the primary care provider. Trust is huge with refugee populations. Healthcare is so different here. The concepts of prevention, the whole concept of primary care, is new to them.

Q. After a family is referred to the clinic, what happens?
A. The CDC guidelines are to see refugees within 30 days. Doreen Pelland is our refugee health nurse; she does a lot of the care coordination at the initial Friday pre-screening. I pop in for a visit, and then see these families the following Monday morning.

Comprehensive and culturally-sensitive care is part of the concept of the PCMH. We have Dr. Nicole Nugent available. She specializes in mental health care in diverse groups; she has time and funding set aside and can see a child within a week or two down here. In addition, St Joseph’s Hospital has a pediatric dental residency program. They send a dentist over on the very first intake day – oral health is a real problem with this population. And the interpreters – many are former refugees – and the community health workers, they are the real heroes.

Q. What advice do you give medical students and residents you work with?
A. Many students I come into contact with have some global health experiences and are interested in cultural differences. Probably the advice I give them is it’s the relationship piece that’s huge – not the one-time visit. If you are a medical student or resident and want to join me on that first visit, you’re going to commit to seeing these patients in that first year, and deal with their chronic issues and the preventive issues to keep them well – you are going to be the first line.

I tell them it’s the listening, making sure they use their resources, that they are knowledgeable about what’s culturally appropriate and what’s not – hugging may be okay for Burundians but not for Nepali families. As long as you are always respectful and always listening and learning how to interact with people, you will be fine.
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South Street Landing to House RI Nursing Education Center

PROVIDENCE – Governor Lincoln D. Chafee, Senator Jack Reed, Mayor Angel Taveras, Brown University President Christina Paxson, Rhode Island College President Nancy Carriuolo and University of Rhode Island President David M. Dooley joined developer Richard Galvin, Governor-elect Gina Raimondo, Mayor-elect Jorge Elorza and other officials on December 15, 2014 for a ceremonial groundbreaking of the South Street Landing Project.

The multi-million dollar project will house the Rhode Island Nursing Education Center, Brown University offices, graduate student housing and a parking garage. More than 200 guests joined the elected leaders in celebrating the project as it moves closer to actual construction, which is expected to start in early 2015.

“The Nursing Education Center will allow public and private institutions of higher learning to partner and forge a path to advance Rhode Island as a regional leader in nursing education,” Gov. Chafee said.

The Center used by RIC’s and URI’s nursing programs is expected to advance Rhode Island’s role as a regional leader in healthcare and nursing education. “This day is a testament to the dedication and commitment of RIC, Brown University and URI, state and city leaders, Dick Galvin and his team, and other members of the Rhode Island community,” said URI President Dooley.

Rhode Island College President Dr. Nancy Carriuolo said, “South Street Landing, and in particular the Rhode Island Nursing Education Center, will help our state grow the educated workforce it needs to meet the changing needs of its number-one industry sector: health care.”

“South Street Station represents a true public-private partnership, bringing together three universities, the state, the city of Providence, a private developer, and National Grid to transform an old power station into a critical asset for Providence’s growing meds and eds economy. Together with the Brown University’s medical school, Johnson & Wales University’s physician assistant school, and our surrounding hospitals this new joint nursing school will help to further solidify Providence as a center for health, education and research,” said outgoing Providence Mayor Angel Taveras.
IN THE NEWS

Southcoast Breaks Ground on Heart and Vascular Center at Charlton

FALL RIVER, MASS. – Southcoast Health recently held a groundbreaking ceremony for the Harold and Virginia Lash Heart and Vascular Center at Charlton Memorial Hospital. The new venue will house Southcoast Health’s expanding Cardiovascular Services, including a state-of-the-art hybrid operating room.

“Over the years, Southcoast Health has transformed itself from a system of community hospitals serving the basic needs of its patients to a front-line provider of some of the most innovative medicine available,” said Keith Hovan, President & CEO of Southcoast Health. The hybrid OR is a cardiovascular surgical theatre equipped with advanced medical imaging devices to enable minimally-invasive surgery while bringing together doctors of different disciplines in the same operating room. The hybrid OR will support Southcoast Health’s structural heart procedures, vascular surgery and endovascular medicine.

Studies also suggest that the hybrid OR will increase patient satisfaction and reduce overall costs. This cost reduction will be achieved by reducing length of stay, ICU usage and surgical infections. The dual achievements of reduced inpatient stays and fewer surgeries increases patient satisfaction. This new operating room will be used exclusively for inpatients and is designed for a range of cardiovascular procedure applications, including Transcatheter Aortic Valve Replacement (TAVR) technology. TAVR is a highly-specialized valve replacement surgery that eliminates the need for open-heart surgery and gives new hope and relief from pain to high-risk patients with heart valve disease. Due to the complexity of these inpatient cases, Southcoast anticipates 40 to 50 TAVR and 124 open complex vascular surgical cases in 2015.

The Harold and Virginia Lash Heart and Vascular Center will cost approximately $9.5 million to complete. The construction was made possible in large part by a donation from the Harold and Virginia Lash Trust and other major commitments from the Auxiliary of Charlton Memorial Hospital and the Oliver S. and Jennie R. Donaldson Charitable Trust.

CMM Picks RI for $20M Healthcare Payment/Service Delivery ‘Model Test’ Award

PROVIDENCE – Rhode Island has been selected for a $20 million Model Test Award under the second round of the Centers for Medicare and Medicaid Services State Innovation Models initiative. The grant period begins on February 1, 2015, and continues over a 48-month project period.

The State Innovation Model initiative provides financial and technical support to states to design or test innovative, multi-payer health care payment and service delivery models that will improve health system performance, increase quality of care, and decrease costs for Medicare, Medicaid and Children’s Health Insurance Program beneficiaries. Rhode Island is one of 11 states to receive a test grant this round – 21 states received a design grant.

“This is an incredible opportunity for strategic federal investments that will ensure Rhode Islanders receive the highest quality care with better health outcomes in the years to come. I look forward to working in a unique public-private partnership with the Healthy Rhode Island steering committee to make this opportunity a reality,” said Lt. Gov. Elizabeth Roberts.
IN THE NEWS

Providence VA Expands Services in Renovated Outpatient Clinic in New Bedford

NEW BEDFORD, MASS – The New Bedford mayor cut the ribbon for the Providence VA Medical Center’s newly-renovated Community-Based Outpatient Clinic here during an event Monday, December 22, 2014.

Located at 175 Elm Street, the clinic provides a local primary health care option for Veterans in southeastern Massachusetts and nearby areas of Rhode Island.

“The improvements here are excellent examples of the VA’s commitment to provide high-quality, accessible health care to Veterans in our community,” said DR. SUSAN MACKENZIE, director of the Providence VA Medical Center.

The facility was renovated beginning in September 2013 to expand services and improve patient access. Improvements to the facility included adding a physical therapy clinic, women’s health exam rooms, additional exam rooms and restrooms, renovated space for home-based primary care support, and an enhanced reception area where customer service can assist up to four Veterans at once. Climate control and security systems were also upgraded, as were information technology services, enhancing telemedicine capabilities. In all, the $3.5 million project added 2,000 square feet to the building, for a new total of 11,965 square feet.

HEALTH Accepting Applications for Health Professional Loan Repayment Program

PROVIDENCE – The Rhode Island Department of Health [HEALTH] has announced that the 2015 Rhode Island Health Professional Loan Repayment Program application cycle is open through February 13, 2015. The program offers health education loan repayments to eligible health professionals who serve in a variety of disciplines, including primary care, dentistry, and mental health, that have made a commitment to practice in under-served communities in Rhode Island.

The Health Professional Loan Repayment Board will review and evaluate all applications received from healthcare professionals and sites to determine program eligibility based on regulations and the availability of funding. A total of $350,000 has been allocated to the State of Rhode Island for eight to 10 awards, which are expected to be announced by the end of April 2015.

“This program is designed to address health disparities by improving access to care in under-served communities,” said JANE A. HAYWARD, president and CEO of the Rhode Island Health Center Association.

Information about how to apply for loan repayment assistance, individual and site eligibility requirements, and designations of under-served areas [as defined by the U.S. Department of Health and Human Services, Health Resources and Services Administration] can be found at http://www.health.ri.gov/grants/healthprofessionalloanrepayment.

From left, Dr. Heather Mackey-Fowler, Dr. Mark Zullo, Dr. Gloria Sun, and Dr. Hana Hagos participate in a ribbon-cutting ceremony to celebrate the opening of the South County Primary Care Family and Internal Medicine office at South County Hospital in November. The facility officially opened in September.
Appointments

Lawrence A. Aubin, Sr., Named Chairman of Lifespan Board of Directors

PROVIDENCE – The Board of Directors of Lifespan has named LAWRENCE A. AUBIN, SR., to lead the board. With his election, Aubin becomes the fifth chairman of the board in Lifespan’s 20-year history. He succeeds Scott Biren Laurans, who served a three-year term as chairman.

Aubin, who is the president and CEO of Seekonk, Massachusetts-based Aubin Corporation, is well known in the Lifespan community. Since the 1990s, he has been an active fundraiser for Hasbro Children’s Hospital, the pediatric division of Rhode Island Hospital, and has chaired or served on a number of Lifespan boards and committees, including as chairman of the Rhode Island Hospital Board of Trustees.

“Our board of directors could not have chosen a more qualified or committed individual to serve as chairman,” said Timothy J. Babineau, MD, president and chief executive officer of Lifespan. “I’ve had the pleasure of working with Larry since I first joined Rhode Island Hospital in 2008. Time and again, he has demonstrated his vast knowledge of our health care landscape, commitment to Lifespan and its partners, and profound dedication to the community we serve. He was integral in helping raise the philanthropic capital needed to create Hasbro Children’s Hospital, as well as the Child Protection Program that now bears his name.”

Aubin first joined the Rhode Island Hospital Board of Trustees in 1994, becoming its vice chairman in 2005 and then chairman in 2007. He became the vice chairman of the Lifespan Board of Directors in 2011. During his board tenure, Aubin has served on nearly all of the board’s committees. Through those efforts, he contributed to the completion of a number of significant building projects, such as the Bridge Building, the Andrew F. Anderson Emergency Center and the Comprehensive Cancer Center, which transformed the Rhode Island Hospital campus.

For nearly 20 years, Aubin has chaired or co-chaired the annual Hasbro Children’s Hospital Invitational Golf Tournament, which has raised more than $5 million. Aubin is also a member of the Regional Advisory Board of Citizens Bank, New England, and has served on the boards of Durfee-Attleboro Bank, South Shore Bank and Bank of Boston. He is also a member of the Providence College Business Advisory Council.

Aubin’s election to chairman coincides with other changes to the Lifespan Board of Directors. Joining the board are Jane Williams, PhD, RN, and Roger Begin. Completing their terms are Scott Biren Laurans, Michael G. Ehrlich, MD, Ellen Collis, David Brown, Jerrold Lavine and Jason Fowler.

Lester P. Schindel Named CEO of CharterCARE Health Partners

PROVIDENCE – LESTER P. SCHINDEL has been appointed Chief Executive Officer of CharterCARE Health Partners, a coordinated regional health care network that operates Roger Williams Medical Center, Our Lady of Fatima Hospital and a number of affiliated physician and health provider entities.

Schindel has spent the past five years as CEO and President of Steward Holy Family in Methuen, Mass., and Merrimack Valley Hospital in Haverhill, Mass., a 402-bed, two-campus hospital north of Boston that employs more than 2,100 health professionals, has a combined medical staff of 650 doctors and generated $280 million in net revenues last year. In addition, he has extensive experience in physician practice development and in the development of innovative collaborations and partnerships with allied health providers.

He will succeed Thomas Reardon who has served as Interim CEO and who will continue as President of Prospect East Holdings, Inc., a subsidiary of Prospect Medical Holdings, Inc. CharterCARE Health Partners is jointly owned by Prospect Medical Holdings, Inc. and CharterCARE Community Board.

“Our national search for a system CEO has led us to Lester, whose ability to manage a similar health system while developing effective strategic initiatives makes him a perfect fit for our organization,” Reardon said. “His experience will be critically important as CharterCARE continues to sustain, improve, and grow in Rhode Island.”

“I look forward to working with the CharterCARE physicians and staff and to guiding our system through a healthcare marketplace that, while challenging in many regards, also presents opportunities for organizations that deliver exceptional quality, improve access to services and manage costs,” stated Schindel.

Schindel will lead the further development of CharterCARE Health Partners. In particular, he will oversee the implementation of CharterCARE’s strategic plan, which envisions an integrated, multi-level network of healthcare providers to provide convenient access to high-quality care at lower costs. The complete network is expected to include urgent care centers, diagnostic services centers and additional physician groups.

Prior to leading Steward Holy Family and Merrimack Valley Hospital, Schindel was CEO of Essent Merrimack Valley Hospital, COO of Metrowest Medical Center in Natick, Mass and COO of Leonard Morse Hospital, also in Natick. Schindel is a graduate of Rutgers University and received a master’s degree in health care administration from George Washington University. A Fellow of the American College of Healthcare Executives (FACHE), Schindel has delivered numerous addresses to a variety of national and regional health care organizations.
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Recognition

URI College of Pharmacy Exceeds National Marks in Several Categories

99 percent pass rate on national board exam, student satisfaction measure among areas of excellence

KINGSTON – Students earning a six-year doctor of pharmacy degree from the University of Rhode Island achieved a 99 percent pass rate on the North American Pharmacist Licensure Examination, according to a 2014 report by the National Association of Boards of Pharmacy.

URI’s 2013 pass rate was four points higher than the national average and placed URI’s College of Pharmacy in a tie for first in New England with the University of Connecticut’s pharmacy school.

E. PAUL LARRAT, interim dean of URI’s College of Pharmacy, said the pass rate and a number of other benchmarks show that URI is not only keeping pace with pharmacy colleges across the country, but it is a national leader.

“During the last four years, our pass rate has been either 100 percent or 99 percent,” he said.

URI’s pharmacy employment rate at graduation of 97 percent makes it tops in New England. For every open seat in the college, URI has 10 qualified applications compared to the national average of 5.6. And the College of Pharmacy’s on-time (six-year) graduation rate of 93 percent tops the national average by 4 points.

Women & Infants Honors Ivonilde Burgess, RN, with DAISY Award

PROVIDENCE – Women & Infants Hospital recently honored IVONILDE BURGESS, RN, of Johnston, RI, a nurse in the hospital’s Infusion Center. The award is part of the DAISY Foundation’s program to recognize the above and beyond efforts performed by nurses every day. Ivonilde has been a nurse with Women & Infants for 14 years.

The not-for-profit DAISY Foundation is based in Glen Ellen, CA, and was established by family members in memory of J. Patrick Barnes. Patrick died at the age of 33 in late 1999 from complications of Idiopathic Thrombocytopenic Purpura (ITP), a little known but not uncommon autoimmune disease. The care Patrick and his family received from nurses while he was ill inspired this unique means of thanking nurses for making a profound difference in the lives of their patients and patient families.

Said Bonnie Barnes, president and co-founder of the DAISY foundation, “When Patrick was critically ill, our family experienced first-hand the remarkable skill and care nurses provide patients every day and night. Yet these unsung heroes are seldom recognized for the super-human work they do. The kind of work the nurses at Women & Infants Hospital are called on to do every day epitomizes the purpose of The DAISY Award.”

Ivonilde is the third recipient of the newly created DAISY award at Women & Infants and the second Infusion Center nurse to be honored.

Appointment

Edward Donnelly, MD, Joins Newport Neurology

NEWPORT – Newport Hospital announced that neurologist EDWARD DONELLY, MD, has joined Newport Neurology Services at Newport Hospital. Dr. Donnelly, who also serves as medical director of the hospital’s stroke program, began seeing patients on December 1.

Dr. Donnelly’s areas of specialty in neurology include epilepsy and seizures. As director of the Newport Hospital stroke program, he’ll provide both patient stroke care and community and physician education about stroke treatment and care.

Dr. Donnelly comes to Newport from Neurohealth, Inc. in Warwick. He is a graduate of Dartmouth Medical School and completed a fellowship in clinical neurophysiology at Rhode Island Hospital, where he also completed a residency in neurology. He is certified by the American Board of Psychiatry and Neurology.

Women & Infants Awarded 2014 Leapfrog Top Hospital Distinction

Recognition highlights the nation’s premier hospitals for safety and quality

PROVIDENCE – For the first time, The Leapfrog Group has named Women & Infants Hospital to its annual list of Top Hospitals. A distinction awarded to hospitals nationwide for demonstrating excellence in hospital safety and quality through the Leapfrog Hospital Survey, the Leapfrog Hospital Award is given to less than seven percent of all eligible hospitals.

Women & Infants was one of 94 Top Hospitals recognized nationally, including 24 Top Rural Hospitals, 61 Top Urban Hospitals, and nine Top Children’s Hospitals. Among the hospitals reaching this achievement are academic medical centers, teaching hospitals, and community hospitals in rural, suburban and urban settings.

“We are so proud of this honor and to be recognized among some of the best hospitals in our country,” said Mark R. Marcantano, W&I’s president and chief operating officer. Women & Infants Hospital. “This designation as a Top Hospital by The Leapfrog Group is a recognition of our organization’s continuous focus on improving the safety and the quality of the care that we provide to the women and newborns of our region.”

The selection is based on the results of The Leapfrog Group’s annual hospital survey, which measures hospitals’ performance on patient safety and quality, focusing on three critical areas of hospital care: how patients fare, resource use and management structures established to prevent errors. Performance across many areas of hospital care is considered in establishing the qualifications for the award, including rates for high-risk procedures and a hospital’s ability to prevent medication errors.

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Research

Bradley’s Marina Tolou-Shams, PhD, Awarded $2M Grant from National Institute on Drug Abuse

EAST PROVIDENCE – MARINA TOLOU-SHAMs, PHD, a psychologist from the Bradley Hasbro Children’s Research Center, has received a $2 million grant to study the efficacy of an intervention program for court-involved, non-incarcerated girls who use illicit substances.

The study, funded by the National Institute on Drug Abuse, will compare the gender-responsive program’s effect on reducing drug use and sexual risk behaviors relative to other community-based services that girls are typically referred to by the court.

“Compared to both non-offending girls and male offending counterparts, offending girls are at significantly greater risk for the development of substance use disorders, psychiatric symptoms and negative health outcomes, such as HIV/AIDS or other sexually transmitted infections,” said Dr. Tolou-Shams.

The study will enroll 200 Rhode Island Family Court-involved girls between the ages of 12 and 18 in either a gender-responsive drug use treatment program called VOICES, or into other community-based services deemed appropriate and necessary by the court. Dr. Tolou-Shams’ team will monitor the programs’ effects on the girls’ drug and alcohol use, HIV/STD risk behaviors, psychiatric symptoms and recidivism over both the short-term (three months post-program completion) and long-term (12 months post-completion).

The study will also identify the family and community factors that may impact the girls’ risk behaviors, such as parent/child communication or neighborhood environment. “Lack of engagement in treatment is a huge barrier to helping these young girls improve their health outcomes,” said Dr. Tolou-Shams.

She continued, “We have heard from facilitators across the country who already are implementing VOICES that girls continue to attend the program despite its frequency and intensity of 18 sessions, each 90 minutes long. If the VOICES intervention proves to be both efficacious in reducing juvenile justice girls’ drug use and co-occurring sexual risk behaviors and is perceived as more engaging by young girls, then we can feel more confident in continuing to disseminate this much-needed intervention to juvenile justice systems.”

Dr. Tolou-Shams, who is also director of the Rhode Island Family Court Mental Health Clinic, hopes that the findings from this study can immediately affect the way that practitioners help girls in the court system.

William M. Sikov, MD, Presents Benefits of Drug Additions on Women with Triple-Negative Breast Cancer

PROVIDENCE – WILLIAM M. SIKOV, MD, a breast cancer specialist and clinical research specialist at Women & Infants Hospital, presented research recently at the 2014 San Antonio Breast Cancer Symposium showing that adding either the chemotherapy drug carboplatin or the blood vessel-targeting drug bevacizumab to the standard treatment of chemother-apy before surgery helped women who have the basal-like subtype of triple-negative breast cancer.

“We found that adding either carboplatin or bevacizumab to standard preoperative chemotherapy increased pathologic complete response rates for women with basal-like cancers – that is, it increased the proportion of women who had no residual cancer detected at surgery. At the same time, we found that while carboplatin had a similar effect in the smaller group of triple-negative patients with nonbasal-like cancers, adding bevacizumab actually decreased response rates for women with nonbasal-like cancers,” he said. He is associate chief of clinical research with the Program in Women’s Oncology at Women & Infants and associate professor of medicine at The Warren Alpert Medical School of Brown University.

Last year, Dr. Sikov and colleagues reported in a randomized, phase II clinical trial called CALGB/Alliance 40603 that adding either carboplatin or bevacizumab to standard preoperative chemotherapy increased pathologic complete response rates in 443 women with operable stage II or III triple-negative breast cancer. These latest results are based on analysis of tissue samples obtained before patients started treatment, correlated with findings at surgery after treatment. Pretreatment tumor samples from 360 of the patients showed that 314 were basal-like and 46 nonbasal-like.

“We have also looked at expression of variety of gene signatures in the pretreatment tissue samples to determine if they benefit from the addition of bevacizumab or carboplatin” Dr. Sikov said. “We found that gene signatures characteristic of high proliferation rates and low estrogen-receptor signaling, which are both considered characteristics of more aggressive disease, are associated with higher rates of response rates overall and increased benefit from adding bevacizumab.”

Other studies using tissue and blood samples obtained from the patients treated on this study – funded by the National Cancer Institute, Roche-Genentech, and the Breast Cancer Research Foundation – are ongoing. ☯
Obituary

**DR. ANTHONY T. CARRELLAS**, 91, of Newport, died Friday, December 19, 2014 at Forest Farm Health Care Center Middletown, RI with his family by his side. He was the husband of the late Mary Louise (Stanton) Carrellas.

He graduated from the College of The Holy Cross in 1945 in three years. At the time, all male college students were required to take part in a new program established by the government. Termed “Accelerated Schooling,” it sped up one’s college education to facilitate the draft. Dr. Carrellas attended New York Medical College, Flower and Fifth Avenue Hospitals from 1945–1949. He completed a two-year rotating internship in Washington, D.C., from 1949–1951.

Subsequently he served in the United States Army Medical Corps for nearly two years during the Korean War. Dr. Carrellas then completed a two-year residency in pediatrics at the District of Columbia General Hospital in Washington, D.C. In 1954, while at a hospital Christmas party, he met his future wife, pediatric nurse, Mary Lou Stanton. They were married October 1, 1955 in Johnstown, PA, and returned to Newport, where Dr. Carrellas practiced pediatrics until 1992.

Affectionately known as “Dr. Bowtie,” he served young patients from all over Aquidneck Island for 37 years. Dr. Carrellas was renowned for the numerous house calls he made throughout his career. He served as the medical staff president for Newport Hospital from 1972–1974.

Dr. Carrellas served as the Middletown school physician for almost twenty years. He was a board member of The Boys and Girls Club of Newport County as well as The Newport Federal Savings Bank for many years. Dr. Carrellas was an active supporter of a variety of organizations within his community. He was particularly fond of volunteering for Meals on Wheels.

He is survived by his children, Dr. Robert A. Carrellas and his wife Mimi of Middletown, David Carrellas of Newport, Ann Carrellas of Ann Arbor, MI; Dr. Joan Carrellas and her husband Vincent Chmielarczyk of Santa Fe, NM; and Patricia G. Carrellas and her husband Stephan Boneu of Portsmouth, and his many grandchildren.

Donations in his memory may be made to the Newport Hospital Foundation, 11 Friendship Street, Newport RI 02840 or to Meals on Wheels, 70 Bath Street, Providence RI 02903.
The Compulsion to Do Away With Anonymity

STANLEY M. ARONSON, MD

Of the countless responsibilities borne by physicians there is the chore of naming hitherto unreported ailments [as well as their clinical features and causative pathognomonic organisms]. This awesome burden derives its origins in the Scriptural command that mankind name the tangible things around him [Genesis 2:20].

Naming of human disease, for example, takes a number of rhetorical forms: (1) By providing geographic names to a newly characterized disease, using the site where the first case [eg, Nantucket fever] had been documented. Names from these sources are referred to as toponyms. (2) By providing the discoverer’s family name [eg, Alzheimer’s disease]. Such designations are called eponyms. As a subdivision, there are diseases [or pathognomonic features] named for mythical creatures [eg, syphilis, narcissism, Pickwickian syndrome, Achilles heel]. And (3) diseases that are named after a pathognomonic sign thus to describe the entire picture of the disorder, often using a discoverer’s name [eg, Charcot joint, Babinski sign, Meckel diverticulum].

Amongst the many toponyms [with their geographic sites in parentheses], there are West Nile fever [Western Uganda]; Lyme disease [southern Connecticut]; Ebola fever [Ebola river, NW Congo]; Haverhill fever [Haverhill, Mass.]; tularemia [Tulare, California]; Coxsackie fever [Coxsackie, NY]; Marburg fever [Marburg, Germany]; Nantucket fever [Nantucket, Mass.]; Rocky Mountain Spotted Fever [northern Rockies]; Lassa fever [village in Nigeria], and San Joaquin fever [San Joaquin, California].

Mention should be made, too, of the many pathogenic micro-organisms named for their discoverers. Eponymic pathogens named for such scientists include: Rickettsia, Ehrlichia, Klebsiella, Bordetella, Brucella, Salmonella, Coxiella, Neisseria, Nagleria, Yersinia, Wuchereria, and, of course, Pasteurella. It must be stressed that the retroviruses were not named after any particular legislator.

These names represent but a handful of the many geographic eponyms. These are additional diseases named for Kandahar, Delhi [including Delhi Belly], Malta, Crimea, Aleppo and Baghdad. The widespread use of these names has sometimes brought shame to the residents of the named community. Queensland fever [Queensland, Australia] stirred up so much anger amongst its citizens; they claimed that it was a needless insult to the reigning queen in London. And so conciliatory meetings were held and the name, officially, was abbreviated to Q Fever, and all were satisfied.
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One hundred years ago, in January 1915, Newport native **DR. HARRIET ALLEYNE RICE** (1866–1958), worked as an “interne” and “infirmiere” in French military hospitals to treat the World War 1 wounded. She had applied to the American Red Cross, but was turned down, according to her later accounts.

After serving three years, until the Armistice, the *Journal of the American Medical Association* reported that the French Embassy in Washington, DC, presented her with the *Medaille de Reconnaissance de la Francaise* (Medal of French Gratitude) for outstanding service by a civilian.

Racism and sexism were dual battles Dr. Rice fought throughout her long professional life.

**Early life**

Harriet was one of four children born to George Addison Rice and Lucinda (Webster) Rice, who owned their own home on Spring Street in Newport. Her father worked as a steward on the New England steamship, “The Pilgrim.”

Remarkably, Harriet’s much older brother, George, overcame the burden of race in the U.S. by studying in Europe. According to Sutton, London archival materials, Dr. Rice “denied access to Columbia University's College of Physicians in the USA, moved to Paris. But, because of the outbreak of the Franco-Prussian War, he moved on to Edinburgh in 1870, where he studied medicine under Joseph Lister [pioneer of antiseptic surgery]. In 1877 he applied for the post of Medical Superintendent at the Woolwich Union Workhouse Infirmary in Plumstead [England]. Five candidates were interviewed for this important post but George Rice was chosen.”

Brother and sister reconnected in London, before Harriet headed for the French battlefields.

In his archival papers, there is a newspaper clipping which reports that Harriet achieved the top ranking in Greek in her Rogers High School graduating class but that she was not eligible for the prize of $75 given annually to the best male Greek scholar. Another publication, the *Friends Review*, carried the story and stated, “as she was not eligible to the award a gentleman from New York City sent her $75 in gold.”

**First African-American graduate at Wellesley**

After high school, Harriet went on to Wellesley College and was its first African-American graduate, in 1887. She studied medicine at the Women’s Medical College of the New York Infirmary for Women and Children,
June 12, 1933

Dear Miss Mary:-

After all these years of steady hard work at this great Medical Center, the "financial depression" is going to put an end to my steady job the first of July. So that I’ve got to go back to the old, demoralizing, heart-breaking occupation of begging for work. It makes everything, life and work and all, seem awfully futile. The favorite form of diversion -- shall I say? -- in New York at present is jumping out of window, or turning on the gas, or the like. But, somehow, I’m not quite ready for that yet --, although after some months of enforced idleness and “puttering about” and begging for work, -- why, I may be.

I dared not write Miss Addams, not knowing her condition of health (which I hope is good). So I am asking -- not with joy, upon my word; -- if there is any corner into which I might fit at Hull-House; or in Chicago, in fact. I “fit in” much better than I used. I know a little more of the world though I cannot say I understand life any better than I did. My thoughts turn to Hull-House. -- well, it’s not unnatural after being there so long. I speak several languages and opportunities there are varied. Although my work for these years has been purely scientific, it has brought me no recognition. This is a man’s world, and they won’t let a woman get any farther than they can help -- or hinder.

I’ll not write any more because it is all -- everything is -- so frightfully useless. I am no worse off than many another; only it is hard to take things “lying down.” I just to have to keep on fighting a while longer.

Faithfully yours,

Harriet A. Rice

Born during the so-called “Progressive Era,” Dr. Rice lived to the age of 92 and is buried with her parents in God’s Little Acre colonial cemetery in Newport. Today, she is recognized as a pioneer in the African-American community.

Columbia University Medical Center
630 West 168th Street, New York City

June 12, 1933

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