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Kudos

Mihaela Stefan, MD, PhD, was just awarded 5 years of funding from the NHLBI for her R01 proposal “Implementation of interprofessional training to improve uptake of noninvasive ventilation in patients hospitalized with severe COPD exacerbation.”

Lauren Westafer, DO, MPH, received the Academy for Women in Academic Emergency Medicine’s Outstanding Research Publication of the Year Award at the 2019 Society for Academic Emergency Medicine Annual Meeting.

Aruna Priya, MA, MSc, just celebrated her 10 year anniversary at Baystate. Congratulations, Aruna!

Springfield Healthy Homes Asthma Project

We interviewed Peter Lindenauer, Assistant Dean for Population Health at the University of Massachusetts Medical School – Baystate, and Director of the Institute for Healthcare Delivery and Population Science, about the Springfield Healthy Homes Asthma Project, an initiative funded by the Massachusetts Health Policy Commission, with in-kind support from Baystate Health and the Public Health Institute of Western Massachusetts.

What can you tell us about this project? The Springfield Healthy Homes Asthma Project (SHHAP) is a program of the BeHealthy Accountable Care Organization, focused on improving the health of low-income families living with asthma in Springfield and surrounding communities. The project represents a collaboration between a large number of local and national organizations, including the University of Massachusetts Medical School-Baystate Institute for Healthcare Delivery and Population Science, the Public Health Institute of Western Massachusetts, Baystate’s Pulmonary Rehabilitation Department, Revitalize Community Development Corporation, the Pioneer Valley Asthma Coalition, the Green and Healthy Homes Initiative, Springfield Partners for Community Action, and the City of Springfield. And, of course, the BeHealthy Partnership itself. Over the next two years, we will be delivering services to approximately 150 families with asthma in our region. Our goal is to lower the rate of Emergency Room visits and hospital admissions due to asthma, while reducing asthma symptoms and improving health related quality of life.

Why focus on asthma? Although it often comes as a surprise when I tell people this, Springfield is ranked as the worst city in the United States to live if you have asthma – and has been for the last two years running. This ranking is based on a combination of factors, including the prevalence of asthma in our area, the high rates of Emergency Department visits and Hospital admissions, and a high incidence of mortality related to severe asthma. Additionally, our region is marked by large disparities in asthma prevalence on the basis of race and ethnicity, with black and Hispanic children having rates of asthma some four-fold higher than their white/non-Hispanic counterparts. Furthermore, among individuals with asthma, black and Hispanic children (and adults too) are much more likely than other patients to seek care in the Emergency Room and Hospital for asthma exacerbations. Poorly controlled asthma puts an enormous strain on families, contributes to many missed days of school and work, and ultimately perpetuates economic inequality. From the perspective of our accountable care organization, helping patients take better care of their asthma is appealing as a way to improve clinical outcomes and lower costs.

Tell us a little bit about the intervention itself. The SHHAP builds on the concept of Asthma Home Visiting Programs, an approach
Apply for an IHDP Appointment

If you have an interest in pursuing research focused on healthcare delivery or population health we want you to join us. We welcome applications for faculty appointments in the Institute for Healthcare Delivery and Population Science.

For more details, see here

Upcoming events

Weekly seminar, 12-1pm, MMS
July 3, 2019: Christian Salmon, PhD, MS  Lowering barriers to healthcare at the frontiers of global health
July 10: Joeli Hettler, MD  A Cost Comparison of Pediatric Behavioral Health Boarding: Emergency Department vs an Inpatient Medical Unit
July 17: Laura Madore, MD  The impact of human breast milk analysis and target fortification on the preterm infant
July 24: Liana Fraenkel, MD, MPH  Why and How to Measure Patient Preferences
July 31: Margaret Samuels-Kalow, MD  Unmet needs at the time of emergency department discharge: Language, literacy, and social context

For a full listing of events, see here

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Guidelines for Perioperative Care in Cardiac Surgery: ERAS Society Recommendations


We interviewed Daniel Engelman MD, Medical Director of the Heart, Vascular, and Critical Care Units at BMC, Associate Professor of Surgery at UMMS-B, and IHDP Fellow about his recent paper, which appeared in JAMA Surgery.

Dan, what was the motivation behind the development of ERAS guidelines for Cardiac Surgery, and what was your role?

Cardiac surgeons have historically spent the majority of their research and annual meeting discussions focused on improving techniques for the operative portion of cardiac surgical care. However, it has been demonstrated that 80% of preventable morbidity and mortality following cardiac surgery occur in the pre-and post-operative timeframe. I realized that there were no published guidelines for comprehensive evidence-based best practice for the perioperative care of these patients. In addition, in all other surgical subspecialties an Enhanced Recovery after Surgery (ERAS) movement had begun to standardize best practice. ERAS programs are widely utilized in many surgical specialties, but only recently have begun in cardiac surgery. These programs aim to reduce complications, length of stay and promote an earlier return to normal activities. Over the past 2+ years, I led a group of experts in perioperative cardiac surgical care, and utilized standard Delphi methodology to grade available evidence and make guideline recommendations. These recommendations were published last month in JAMA Surgery. The recommendations are the #1 most downloaded JAMA Surgery manuscript ever in a four-week span. I’m proud to say that the manuscript has already been viewed over 44,000 times.

Can you describe a few of the key recommendations coming out of the guidelines?

The key takeaways are that we need to better prepare patients for elective cardiac surgery. This would involve a prehabilitation program to optimize nutritional status and glucose control, increase mobility, and include ETOH and smoking cessation. In the operating room, we need to focus on multimodal analgesia to reduce opioid and benzodiazepine use. Postoperatively, we need to standardize VTE and infection prevention protocols, continue non-opioid anesthetics, and use goal-directed fluid management strategies to reduce kidney injury.
Need help with your research?
We are available for consultation with an appointment – in person, through video conference, or phone.
For more information, see here.

How do the results apply to our patients at Baystate?
At Baystate Medical Center, in cardiac surgery, we are committed to the principles of ERAS and standardization of care utilizing evidence-based best practice. We have excelled at multimodal analgesia to reduce opioid consumption, utilizing novel informatics platforms for patient engagement and education, reducing cardiac surgery associated acute kidney injury utilizing a novel acute kidney response team triggered by urinary biomarkers, and have just implemented a comprehensive prehabilitation program prior to surgery.

Population Health Snapshot:
The Women’s Health Network
Reducing Disparities in Breast & Cervical Cancer Screening

Cancer is the 2nd leading cause of death in the U.S. second only to heart disease. Breast cancer is the leading type of cancer overall and second highest cause of cancer-related death among females in the U.S. Nearly two thirds (65%) of females in the U.S. aged 40 and over had a mammogram within the past 2 years. Cervical cancer rates have declined substantially since the 1980s with increased Pap screening. As of 2015, 69% of females 18 and older had a Pap test within the past 3 years. However, for both breast and cervical cancer, racial/ethnic disparities persist in incidence and screening rates. In Massachusetts, the cervical cancer rate is nearly double among Black individuals (9.7 per 100,000) compared to white individuals (5.4 per 100,000).

Early detection programs are the gold standard approach to reduce mortality and morbidity from cancer. Toward a goal for health equity, the “Women’s Health Network” ("WHN") was funded in 2018 by the Massachusetts Department of Public Health (MA DPH), the CDC, and the National Breast & Cervical Cancer Early Detection Program (NBCCEDP) to provide comprehensive and coordinated breast & cervical cancer (BCC) screening services. The BeHealthy Partnership ACO was awarded a WHN grant that is a community partnership model between Baystate Mason Square Neighborhood Health Center, Caring Health Center, and Gandara Center to implement community health worker-driven outreach, engagement, and follow-up with patients for BCC screenings.

Since the start of the grant in January 2019, Caring Health has

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1 In this summary, female is used to refer to the reported sex and is understood as sex assigned at birth but does not necessarily represent the gender identity of the individuals or populations included.
performed outreach to 343 females and successfully enrolled 188 of 206 eligible patients (91% enrollment rate). Of those enrolled, 69% are Hispanic and 17% are Black and 7% are Arabic or Russian. Breast cancer screening rates have increased by 9% among individuals ages 40-69 and cervical cancer screening rates increased by 34% among individuals ages 21 to 64 (Figures 1 & 2).

At Mason Square Neighborhood health center, CHWs have successfully enrolled 235 of 502 eligible patients (46% enrollment rate). Of those enrolled, 61% are Hispanic, 29% are Black, and 30% represent others (Asian, Somalian, etc.). Breast cancer screening rates have increased by 10% among individuals ages 40-69 and cervical cancer screening rates increased by 13% among individuals ages 21 to 64.

CHW-led outreach to engage individuals in BCC screening is proving very successful. CHW’s play a pivotal role through in-reach and as the linkage across internal stakeholders - medical assistants, nurses and physicians - creating a team-based approach to screening. They can help to drive improved work flows using an evidence-based navigator intervention. New systems are emerging to support providers, moving from individual-level tracking by providers to a population-based registry. However, obtaining accurate screening rates is still limited by proper documentation into the electronic medical record. Additional clinical workflow initiatives are being identified and implemented further support comprehensive clinical data integration and accurate reporting. The WHN measures success as decreased disparities and improvements in early detection (intermediate outcomes) and, ultimately, as reduced breast & cervical cancer morbidity & mortality. This important collaboration is working steadily toward achieving success in BCC screening.

Focus on Analytics: Using Machine Learning to Predict Asthma Exacerbations

Joe Comer, a student in the Master’s program in Data Science at New College of Florida, interned with the Center for Analytics and the IHDPS for his spring semester. During his time here, he worked on developing a machine learning algorithm to predict asthma exacerbations.

Joe – tell us what led you to work on this interesting project.

There were two key motivations for this study. First, Springfield, Massachusetts was rated the asthma capitol of the United States by the Asthma and Allergy Foundation of America in 2018, as discussed in the July 2018 IHDPS newsletter. It has both higher rates of asthma than any other city in the US, and, among asthma sufferers, a much higher incidence of asthma exacerbation. With this project, one of the hopes
was that we might be able to identify previously unidentified indicators for poor asthma control, so that patients likely to suffer an asthma attack in the near future could receive intervention. Second, Baystate Health was a very early adopter of keeping health records in electronic form, and as such has an absolutely ponderous amount of digital data relating to patients’ health histories and outcomes. We hoped to put some of this data to good use by trying out some state-of-the-art machine learning techniques.

**How did machine learning factor into the work?**

The core of the investigation was a machine learning algorithm called Med-2-Vec developed by Edward Choi, which is meant to find signals in categorical data—like the diagnosis codes associated with a patient’s visit, or what medications they were prescribed—by combining it with demographic data like age and sex. In simple terms, the algorithm converts this information from each visit into a set of numbers which can then be used in conventional statistical analysis, the way you might use other numbers—like heart-rate or spirometry readings—to make predictions.

**Tell us about your results.**

The results were mixed. Our objective was to create a predictive score that communicates the probability that a patient visiting the hospital today for any reason will return within thirty days for asthma exacerbation, which was not successful. Unfortunately, for now most machine learning techniques require very large amounts of complete data. By complete, we mean that any information you have about one visit, you need to have about all visits in order to include that information in the model. You can’t, for example, have blood-pressure readings for some patients’ visits and not others. This meant that what was useable in training the model was a relatively small fraction of all the data on record at Baystate. On the bright side, the model was able to extract some signal, despite many desirable variables like spirometry being necessarily left out. Although the model had poor discriminative power, it was fairly well-calibrated. That is, it was very unlikely to predict that someone would suffer an asthma attack within 30 days, but when it did make that prediction, it was correct more often than not. That’s not very useful as a tool for making diagnoses, but it does suggest that there may be more signal in medical records than is currently being used in predicting asthma exacerbations, and that with some modification in the model or in the data fed into the model, a reliable prediction score such as the one we were trying to produce may be possible.

**Graph of the prediction model’s calibration.**

In a perfectly calibrated model, each circle’s center would lie exactly on the dotted line. The calibration shown here is imperfect, but substantially better than random, suggesting that the algorithm was able to extract useful information despite the necessary exclusion.

**Recent IHDPS Publications: Apr-May**


