Implementation of interprofessional training to improve uptake of noninvasive ventilation in patients hospitalized with severe COPD exacerbation

We interviewed Mihaela Stefan, MD, PhD, Associate Director of the Institute for Healthcare Delivery and Population Science (IHDP) and Associate Professor in the Department of Medicine at UMMS-Baystate, about her first R01, a five-year, $3.2 million dollar grant from the National Heart, Lung, and Blood Institute that was awarded in May 2019. Dr. Stefan is the principal investigator on the grant, and leads a team of both local collaborators (Drs. Peter Lindenauer, Penny Pekow, Jay Steingrub and MaryJo Farmer) and collaborators from other institutions (Nicholas Hill from Tufts University School of Medicine, Ashley Hughes from University of Illinois, and Christopher Shea from University of Chapel Hill).

Why did you choose to focus your research on implementing strategies to improve the uptake of noninvasive ventilation in patients with COPD?

Chronic obstructive pulmonary disease (COPD) is the fourth leading cause of death in the US, and COPD exacerbations result in approximately 700,000 hospitalizations annually. Patients hospitalized with an exacerbation of COPD who do not respond to usual therapy are placed on invasive mechanical ventilation (IMV, using endotracheal intubation) or on noninvasive mechanical ventilation (NIV, using a mask). Although IMV is a lifesaving intervention it can cause significant complications and high morbidity and mortality. There is strong evidence that NIV reduces mortality and length of hospital stay in patients with an exacerbation of COPD. Despite the well-established benefits and strong recommendations in clinical guidelines, our research has shown that there is wide variation in the use of NIV across hospitals. Low hospital rates of NIV in patients admitted for severe COPD represent a missed opportunity to reduce inpatient mortality among this vulnerable population.

What are the goals of this project?

The overarching goal of this research is to improve the outcomes of patients with COPD by increasing the use of evidence-based interventions. Several studies, including Dr. Peter Lindenauer's prior NHLBI-funded R18 study, have found that to achieve optimal clinical outcomes, physicians, respiratory therapists (RTs), and nurses must collaborate to select and manage patients with COPD most likely to benefit from NIV. In this project, we will conduct a pragmatic, parallel 2-arm randomized trial to compare the effectiveness of two implementation strategies: interprofessional education (IPE) and on-line education, on NIV use in appropriate patients hospitalized with COPD. We believe that IPE will outperform conventional continuing education, leading to greater improvement in the uptake of NIV. Using a dataset of more than 500 US hospitals we will first identify low performing hospitals, defined as those with low rates of NIV use compared with their peer-hospitals. We will
Apply for an IHDPS 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, MM5

For the month of August, weekly seminars will be on hiatus

Sept 4: Ashish Atreja, MD, MPH
Digital Transformation Across Specialties: The Time is Now!

Sept 11: Alyna Chien, MD, MS
The Early Healthcare Trajectory Persons with Complex or Disabling Health Conditions

Sept 18: Kathleen Szegda, PhD, MPH, MS; Kim Gilhuly
Baystate Community Health Needs Assessments

Sept 25: Jeff Schnipper, MD, MPH
Development and Evaluation of a Novel Patient Safety Dashboard Integrated into a Vendor EHR

For a full listing of events, see here

then recruit 20 hospitals and randomize them in the two arms. In the IPE arm, teams of RTs, physicians and nurses will be trained together and these three professions will learn from, with and about each other’s roles and responsibilities in regards to the NIV. We will measure the hospitals’ rates of the NIV use at 18 and 36 months after the intervention.

Why is this research important?

NIV is the only therapy that has been shown to improve short-term survival for patients hospitalized for an exacerbation of COPD, yet more than 15 years after high-quality evidence became available, a large number of hospitals have still not completely adopted this approach. Developing effective implementation strategies for the adoption of guideline-based NIV should improve the quality of care and the outcomes of patients hospitalized with COPD. This work promises to change practice by offering approaches to facilitate greater uptake of evidence-based NIV application. Moreover, we will contribute to the development of evidence about the benefits of IPE as an implementation tool throughout the hospital setting.

What does this research mean for patients cared for at Baystate?

Although Baystate will not be one of the hospitals participating in the study, two pulmonologists and two hospitalists are part of the research team. The investigators will develop significant understanding of and experience in implementing interprofessional training which could be used for other complex, interprofessional team-based interventions in the critically ill, such as rapid-response teams, mobilization in ICU, or weaning from mechanical ventilator and may generalize to other interventions directed to seriously ill patients.

Future arrests in adults with OUD receiving naltrexone


We interviewed William Soares, MD, IHDPS Fellow and Assistant Professor of Emergency Medicine at UMMS-B about his recent paper, which appeared in Drug and Alcohol Dependence.

What was the motivation for the study?

Opioid Use Disorder (OUD) is common in adults involved in the criminal justice system (CJS), including those who are incarcerated or on parole after incarceration. Historically, concerns with stigma and a lack of medical resources has limited treatment options offered to CJS patients with OUD. Without treatment, CJS patients often relapse on opioids upon release, resulting in increased rates of future arrests, re-incarceration and deaths due to overdose. Through prior work by Dr. Peter Friedmann, we know that Extended Release Naltrexone (XR-NTX), a once monthly injectable treatment for patients with OUD, reduces opioid relapse and future opioid use in a CJS population. However, the impact of XR-NTX on other important social determinants of health for CJS patients, including future arrests, remains unknown.

Our study was an evaluation of the data collected during the original trial of XR-NTX for CJS participants. In the first trial, 308 patients were randomized to receive either XR-NTX medication or treatment as usual, defined as providing referrals to resources and counseling. To complete our study, we collected and categorized both self-reported arrests as well as official county arrest reports for all patients during the entire 72-week trial. We believed that those patients who were randomized to XR-NTX treatment would have fewer arrests compared to the treatment as usual group. Put
another way, by effectively treating the patients’ OUD with XR-NTX, we might also reduce future arrests.

**What were the main findings?**
We were able to retrieve arrest data on 300 of the 308 participants of the original study. The three most common causes for arrest in the population during the study were for drug offenses, parole violations, and larceny (theft of personal property).

<table>
<thead>
<tr>
<th>Crime</th>
<th>NTX (N = 153)</th>
<th>TAU (N = 155)</th>
</tr>
</thead>
<tbody>
<tr>
<td>Drug offense</td>
<td>33 (21.6%)</td>
<td>29 (18.7%)</td>
</tr>
<tr>
<td>Parole violation</td>
<td>23 (15.0%)</td>
<td>30 (19.4%)</td>
</tr>
<tr>
<td>Larceny</td>
<td>25 (16.3%)</td>
<td>24 (15.5%)</td>
</tr>
<tr>
<td>Other offense</td>
<td>20 (13.1%)</td>
<td>22 (14.2%)</td>
</tr>
<tr>
<td>Assault</td>
<td>15 (9.8%)</td>
<td>8 (5.2%)</td>
</tr>
<tr>
<td>Trespass</td>
<td>7 (4.6%)</td>
<td>6 (3.9%)</td>
</tr>
<tr>
<td>Stolen property</td>
<td>5 (3.3%)</td>
<td>4 (2.6%)</td>
</tr>
<tr>
<td>Weapons violation</td>
<td>5 (3.3%)</td>
<td>1 (0.7%)</td>
</tr>
<tr>
<td>Vandalism</td>
<td>4 (2.6%)</td>
<td>1 (0.7%)</td>
</tr>
<tr>
<td>Burglary</td>
<td>3 (2.0%)</td>
<td>3 (1.9%)</td>
</tr>
<tr>
<td>Disorderly conduct</td>
<td>2 (1.3%)</td>
<td>2 (1.3%)</td>
</tr>
<tr>
<td>DUI</td>
<td>2 (1.3%)</td>
<td>2 (1.3%)</td>
</tr>
<tr>
<td>Robbery</td>
<td>2 (1.3%)</td>
<td>2 (1.3%)</td>
</tr>
<tr>
<td>Fraud</td>
<td>2 (1.3%)</td>
<td>1 (0.7%)</td>
</tr>
</tbody>
</table>

1 Participant could have been arrested for more than one crime.

2 Other offenses include: reckless endangerment, possession of instrument of crime, public urination, conspiracy, fugitive from justice, obstruction of govt’t administration, resisting arrest, unauthorized sale of mass transit services, unknown offense.

Unfortunately, we found no difference in the incidence of arrests between the groups, even when we controlled for variables that could confound or bias results, including age, gender, previous criminal activity, and use of non-opioid illicit drugs. Further, the overall numbers of arrests per participant and the time to first arrest were not different between groups.

**How do the results apply to our patients at Baystate?**
While relatively few providers at Baystate treat CJS patients with OUD, our study demonstrates that issues related to social determinants of health, including criminal activity, are often due to a combination of factors, including personal, economic and societal factors. It follows that, treating the medical condition alone may not be enough to improve other aspects of the patient’s life. For CJS patients with OUD, although XR-NTX reduced future opioid use, we detected no significant change in future arrests.

Our study serves as a reminder that we, at Baystate, treat a patient population with both complex medical and social issues, all of which play a role in determining health. It is not enough to simply address the medical cause of disease; instead, we must continue to work to address other social determinants of health if we hope to truly impact the lives of our patients.

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**The Learning Health System at Baystate**

We recently interviewed Mihaela Stefan, MD, PhD, Associate Director of the IHDPS, and Associate Professor in the Department of Medicine at UMMS-Baystate, about the concept of the Learning Health Systems.

**Mihaela, we recently began holding Learning Health System (LHS) rounds at Baystate. The term LHS is not something many people in the organization are familiar with. Can you briefly describe the concept and it origins?**
In a broad sense, the LHS is an approach for improving the outcomes of individuals, populations, and health care organizations, one which is being rapidly adopted at health systems throughout the US and elsewhere. The concept of the LHS grew out of the recognition by the Institute of Medicine of persistent gaps between the best available evidence and its incorporation into routine clinical practice. This, combined with the widespread adoption of electronic health records, creates a context for the emergence of LHS. The shift towards value-based care is another catalyst for the LHS.

As you can see in the figure to the right, Learning Health Systems is a virtuous cycle that puts patients in the center and begins with an appraisal of external evidence about a particular problem. The Knowledge to Performance (K2P) step involves the process of putting evidence into practice, though things like education, care redesign, reminders and order sets. The Performance to Data (P2D) step describes the ability to capture data through the EMR as a byproduct of routine clinical care. Finally, the Data to Knowledge (D2K) step is where internal data are analyzed to generate new knowledge. The cycle is virtuous because the knowledge gained allows the health system to continually refine and improve its practices.

**Is Baystate a LHS? If not, what will it take to become one?**
We have the main ingredients to become an LHS but I don’t think we are quite there yet. Becoming an LHS is an iterative journey characterized by strong leadership, effective use of data in the clinical setting, and both a culture and employees committed to continuous learning and improvement. We have leadership buy-in but we need further commitment to making system-wide investments in becoming an LHS. One strategy is to better align the work in the IHDPS, DHQ, Operation Excellence, Analytics, and Epidemiology to lead to improvement and innovation across our health system. Each of these departments does terrific work, but to some extent, we each operate in silos. We need LHS researchers embedded in our system to lead or assist with the development, implementation, and evaluation of innovations which should be designed to address questions of interest to the stakeholders. Accessible, reliable and analyzable health data is another key ingredient of the LHS. Our organization has invested heavily in having one EHR system for all its hospitals and clinics and this is a big plus. But we need to continue to invest in our Data Warehouse and analytics capabilities to identify opportunities for improvement and to be able to evaluate the effects of our interventions efficiently. Dedicated analytic support is of paramount importance in the LHS. We don’t have this yet; there are analysts in the IHDPS, in the EBRC, DHQ, and the informatics department but their time is not currently allocated to LHS projects. Finally, we need a way to provide seed funding to support innovative LHS projects, something akin to our Research Pilot Awards Program.

**You recently began organizing LHS rounds at Baystate. Who has been involved, what have you learned, and where is this headed?**
In January 2019, we convened individuals from across the health system with expertise in analytics, change management, quality and safety, research, epidemiology, and implementation science. We have held monthly meetings where we learned about each other, about our strength and weaknesses and explored opportunities for collaboration toward the common
goal of transforming BH into a LHS. At our most recent meeting, we completed a SWOT analysis, assessing Strengths, Weaknesses, Opportunities, and Threats and we are working toward proposing actionable strategies to accelerate BHS journey to becoming a LHS. This as an opportunity to bring together teams that are central to the concept of the LHS and strengthen our ties; develop a shared language, vision, and ultimately collaborate more effectively. We want to support BHS to become an organization that prioritizes learning and knowledge generation as part of its day-to-day operations to ensure patients get the best care possible; an organization that systematically collects data and evaluates results to understand the true impact of the change, whether it’s testing a new technology, a new nursing structure, or a promising new workflow intervention.

Farewell to Haley & Lauren

While we are sad to say goodbye to Research Coordinators Haley Guhn-Knight and Lauren Williams, we’re thrilled that they will both be embarking on the next phase of their careers! In August, after 5 years with Baystate, Haley will be starting vet school at the University of Pennsylvania School of Veterinary Medicine; and Lauren, after 6 years with Baystate, will be starting med school at the Philadelphia College of Osteopathic Medicine. Thank you for all of your contributions to the IHDPS and Baystate these last several years! We will miss you.

Summer Scholars

This summer, we had a bumper crop of college and med students join us, to gain experience and exposure to research. Meet the crew!

I’m a rising second year medical student in the PURCH track at University of Massachusetts Medical School, working with Dr. Peacock-Chambers on the project, “Integrating a Parenting Intervention for Mothers with Opioid Use Disorders Through Child Development Services.” My academic background is in human rights and gender studies, which I hope to incorporate into research throughout my career as a physician. This summer, I have enjoyed developing my qualitative research skills and meeting newborns and their families in clinic!

Deirdre Buckley

I just finished my first year at Bowdoin College. This summer, I’m working with Dr. Soares on two projects, both focused on the opioid epidemic. In the first project, we are hoping to complete a series of interviews with hospitals in Massachusetts. In the second project, we aim to assist in the development of a patient follow up database designed for patients seen in the emergency department who present with opioid use disorder. I hope to go to med school in the future, and so far I’ve enjoyed helping select which hospitals we plan to interview and shadowing Dr. Soares in the emergency department.

Michael Dean
I’m a rising second-year at the UMass Medical School working with Dr. Lagu on qualitative analyses that examine how healthcare is delivered and how it is affected by patient/provider interactions. I hope to practice pediatric and adult primary care. This summer, I’m thrilled to be surrounded by such productive and passionate researchers and leaders in healthcare.

I graduated from Skidmore College in 2015 with a major in government and a minor in computer science. I just finished a post-baccalaureate program and applied to medical school this cycle. I am working with Dr. Lindenauer this summer on a project understanding antibiotic prescribing patterns and variation in diagnoses in children admitted for asthma exacerbation. I’m interested in pediatric healthcare delivery research and plan to continue this work throughout medical school. This summer, I have been particularly inspired by the camaraderie between the Institute’s leaders. Thank you for modeling what supportive and effective discourse ought to look like in the research world.

I’m a rising junior majoring in chemistry at the SUNY College of Environmental Science and Forestry. I’m working with Dr. Lagu on a number of projects including a project examining physician bias against patients with disabilities, an assessment of the ACOs nationally, and the Baystate HCAHPS coding project. I’m not quite sure what field I want to go into but I am considering drug development, specifically cancer treatments. This program has been a really great experience for me so far; I’ve really enjoyed getting a window into the research world and seeing how the whole process works. Other than that, I’ve mostly been spending this summer hiking with my dog and appreciating the summer weather.

I am a second year medical student at University of Massachusetts Medical School. I am working with Dr. Pack on the “Assessment and Perception of Alcohol Use and Cardiovascular Disease” project. I have enjoyed regular interactions with patients and hearing about their experiences.

I am a second-year medical student at UMass, working with Dr. Lagu on her disability project (among many others). I spent two years before entering medical school researching with a health policy group, so I am excited to jump back into the field. I hope to learn a bunch about qualitative research and approach and to get to know the Institute’s team this summer!

I’m a rising second year medical student at the University of Massachusetts Medical School working with Dr. Tara Lagu this summer on multiple projects. I most enjoyed working in the field of social sciences again after a year of clinically-focused learning. I hope to continue to expand my research skills and knowledge as I continue my medical career.

I’m a rising second-year at the UMass Medical School working with Dr. Quinn Pack in research regarding exercise prescription in cardiac rehabilitation. I hope to eventually return to my hometown of New Bedford, MA to practice in my community. My favorite part of this summer experience has been working directly with patients while partaking in research.
I am a sophomore at Vassar College and am working with Dr. Mihaela Stefan on a QI project to evaluate the feasibility of bedside assessment of frailty in the Baystate ICU. Frailty is a measure of diminished physiological reserve that may impact outcomes. I plan to study neuroscience as an undergraduate student. I am enjoying meeting the other summer interns and all of the Baystate staff.

Anna Tidswell

Qualitative Boot Camp

As part of the summer scholars' programming, Christene DeJong, MA, MA, and Kerry Spitzer, PhD, MA, research coordinators in the IHDPS, created a qualitative research boot camp in which 22 participants (ranging from undergraduate summer scholars and summer medical students to residents, fellows, and seasoned physicians) learned the basics of qualitative methodology. Participants learned to articulate when, how, and why to use qualitative research methods in medical research, to identify and evaluate rigorous qualitative methods, to explain ethical concerns and considerations within qualitative methods, and to conduct, at a basic level, content analysis coding and interviewing techniques.

Recent IHDPS Publications: June-July