



# The **pair** Center

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## Our Mission

The PAIR Center's mission is to generate high-quality evidence to advance healthcare policies and practices that improve the lives of all people affected by serious illness.

We will achieve this mission by developing and rigorously evaluating scalable interventions at the patient, clinician, and system levels that improve:

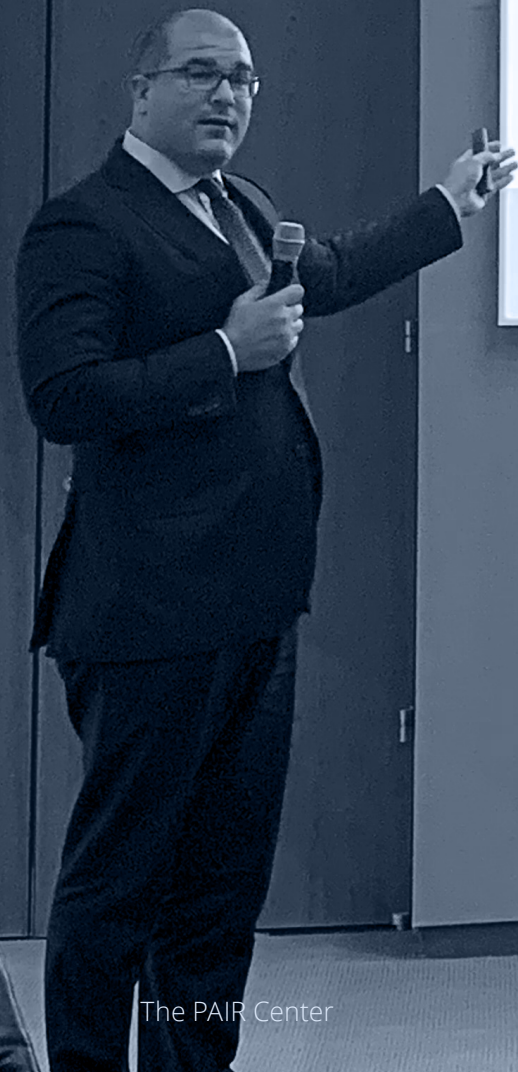
- The responsiveness of healthcare to the multiple and often nuanced goals of patients with advanced illnesses and their families;
- The efficiency with which potentially scarce intensive and palliative healthcare services are delivered.

## Our Vision

We envision a future healthcare system in which:

- Patients with serious illness spend more of their time pursuing life goals outside of health care settings.
- Health system leaders and clinicians have the real-world evidence necessary to implement interventions that improve patient outcomes.
- Payers have high-quality data upon which to base coverage decisions, thereby promoting high-value service provision for patients with serious illness.

Michael Harhay, PhD presents at this year's External Advisory Board meeting



# Our Work

## Methodological Expertise



Efficacy trials



Pragmatic trials



Decision science



Clinical informatics



Observational studies



Implementation science



Qualitative studies

## Content Areas



Serious illness communication and decision making



Palliative care delivery



Acute care delivery and outcomes



Innovation in research methods and ethics

# Letter from the Director



PAIR Center team members at our office space

substantial strides towards achieving our long-term aims to:

- Develop innovative solutions to address the challenges of the palliative care workforce
- Become the nation's leader in leveraging data science to improve serious illness care
- Build the infrastructure needed to sustainably improve serious illness care in the real world

As has been true from our beginning, we've realized progress by cultivating growth in our faculty and staff, and by expanding our research portfolio and pool of collaborators across the nation.

## People

Our greatest asset in pursuit of these goals has been, and will always be, the strength of our team. Two outstanding physician-scientists, Drs. Katherine Courtright and Gary Weissman joined our faculty in 2019 as Assistant Professors of Medicine (see page 12).

These additions to our ranks, coupled with the success

of our existing faculty attaining new grant awards, has allowed for continued growth in our research staff. Indeed, we have seen a 57% increase in our staff. As we have built capacity for our team to support our burgeoning portfolio, we have made essential

In 2017 and 2018, we worked to align our research priorities with our mission statement to better guide the kind of impact we want the PAIR Center to have on the world. In 2019, we've been fortunate to enter a period of

***Our greatest asset in pursuit of these goals has been, and will always be, the strength of our team.***

growth: we've expanded our faculty and grant portfolio, and we've invested heavily in Ph.D.-trained scientists who diversify our methodological expertise. This growth has allowed us to execute initiatives in our core areas of research and make

hires in the areas of data science, advanced statistics, qualitative research, and communications and engagement.

## Research

This year marked the start of two ambitious and exciting research initiatives for the PAIR Center. In March 2019 we began work on our Patient-Centered Outcomes Research Institute (PCORI) grant focused on improving the lives of older, underserved patients eligible for lung cancer screening by helping them stop smoking. This large pragmatic clinical trial among four health systems will test novel interventions for smoking cessation to prevent or stop the progression of serious lung diseases. PCORI funding affords us a unique opportunity to work closely with local community members and our diverse Stakeholder Advisory Committee to fully incorporate the patient voice: ensuring patients stay enrolled, engaged and benefit from their participation in the study.

In the fall of 2019, we were awarded an Edward R. Roybal Center grant from the National Institute on Aging (NIA). PAIR's Roybal Center on Palliative Care in Dementia, one of four dementia-focused Roybal Centers awarded across the U.S., and the only one focused on palliative care, aims to use data science and behavioral economics to improve processes and outcomes of care for people living with dementia in nursing home and other long-term-care settings. PAIR's Roybal Center is also unique due to our partnership with Genesis HealthCare, one

of the nation's largest long-term care companies. Genesis nursing homes serve as learning labs for researchers and pilot studies, informing our work with real-



**John M. Eisenberg, MD**

world insights and solving for the challenges facing persons with dementia and their caregivers today.

## Collaboration

Our collaboration with Genesis is indicative of our overall approach – seeking to conduct our research, whenever possible, in the real-world settings in which most Americans receive their care. PAIR Center studies are ongoing or planned at more than 400 health care facilities across the nation. In addition to broadening our national reach, we are building relationships with local community organizations. Through our partnerships with local senior centers and community organizations, we're now much better positioned to achieve our mission of improving the lives of all seriously ill patients and their families.

Finally, this year I had the great honor of being named the inaugural John M. Eisenberg Professor in Medicine at the

University of Pennsylvania. Thanks to the selfless generosity of Janet and John Haas, the Chair was named after John M. Eisenberg, who spent 20 years at Penn, including as the founding Chief of Penn's Division of General Internal Medicine. Widely regarded as a founder of the field of health services research, and one of the most devoted and accomplished mentors in academic medicine, Dr. Eisenberg went on to become the Chair of the Department of Medicine at Georgetown University before becoming the Director of the federal Agency for Healthcare Research and Quality, where he was admirably referred to as "John of AHRQ."

Taken too soon by brain cancer in 2002, Senator Ted Kennedy said of Dr. Eisenberg, "There are few in this world who can say that their work has helped millions of people have fuller, better lives. But John was in that extraordinary group of people who have done so much for so many." It is in that spirit of trying to fulfil Dr. Eisenberg's legacy of helping so many that the PAIR Center heads into our 4th year in 2020.



A handwritten signature of Scott Halpern in black ink.

**Scott Halpern, MD, PhD**  
Director, The PAIR Center

# Leadership

## External Advisory Board



**Susan Block, MD**

Professor of Medicine, Harvard Medical School



**Stephen Evans, MD**

Executive Vice President, Medical Affairs, and Chief Medical Officer, MedStar Health



**Maureen Henry, JD, PhD**

Former Research Scientist, National Committee of Quality Assurance



**Sarah Hill, PhD**

Chief Mission Integration Officer and Vice President of Palliative Care, Ascension Medical Group



**Howard Koh, MD, MPH**

Harvey V. Fineberg Professor of the Practice of Public Health Leadership, Harvard School of Public Health & the Harvard Kennedy School



**Shari Ling, MD**

Deputy Chief Medical Officer for the Centers for Medicare and Medicaid Services (CMS)



**Diane Meier, MD, FACP**

Director of the Center to Advance Palliative Care (CAPC)



**Bruce Miller, MD**

Palliative Care Physician & Advocate



**Arnold Milstein, MD, MPH**

Director, Clinical Excellence Research Center Stanford University



**Bill Novelli, MA**

Founder, Global Social Enterprise Initiative and Distinguished Professor of the Practice, McDonough School of Business, Georgetown University



**Tammie Quest, MD**

Director, Emory Palliative Care Center Robert W. Woodruff Health Sciences Center of Emory University



**Dan Roth, MD**

Executive Vice President and Chief Clinical Officer, Trinity Health



**Richard Snyder, MD**

Senior Vice President and Chief Medical Officer, Independence Blue Cross



**B. Vindell Washington, MD, MHCM, FACEP**

Chief Clinical Officer at Verily Health Platforms

## Internal Advisory Board



**Patrick J. Brennan, MD**  
Senior VP and Chief Medical Officer, UPHS



**Risa Lavizzo-Mourey, MD, MBA**  
University Penn Integrates Knowledge Professor (PIK) of Health Policy and Health Equity, University of Pennsylvania



**Kevin Mahoney, MBA**  
Chief Executive Officer, University of Pennsylvania Health System



**Mary D. Naylor, PhD, RN, FAAN**  
Director, NewCourtland Center for Transitions and Health



**Michael Parmacek, MD**  
Chair of Department of Medicine, University of Pennsylvania



**Lynn Schuchter, MD**  
Chief of Division of Hematology-Oncology, University of Pennsylvania

## Steering Committee



**Elizabeth Cooney-Zingman, MPH**  
Director of Research Operations, PAIR Center



**Mike Draugelis**  
Chief Data Scientist, Penn Medicine



**Scott Halpern, MD, PhD**  
Director, PAIR Center



**Vanessa Madden**  
Assistant Director for Project Management, PAIR Center



**Mark Mikkelsen, MD, MSCE**  
Chief, Section of Critical Care Medicine, Pulmonary, Allergy, & Critical Care



**Mark Neuman, MD, MSc**  
Director, Penn Center for Perioperative Outcomes Research and Transformation (CPORT), Penn Medicine



**Nina O'Connor, MD**  
Chief of Palliative Care, Penn Medicine



Tamar Klaiman, PhD, MPH speaks at a panel at this year's research retreat

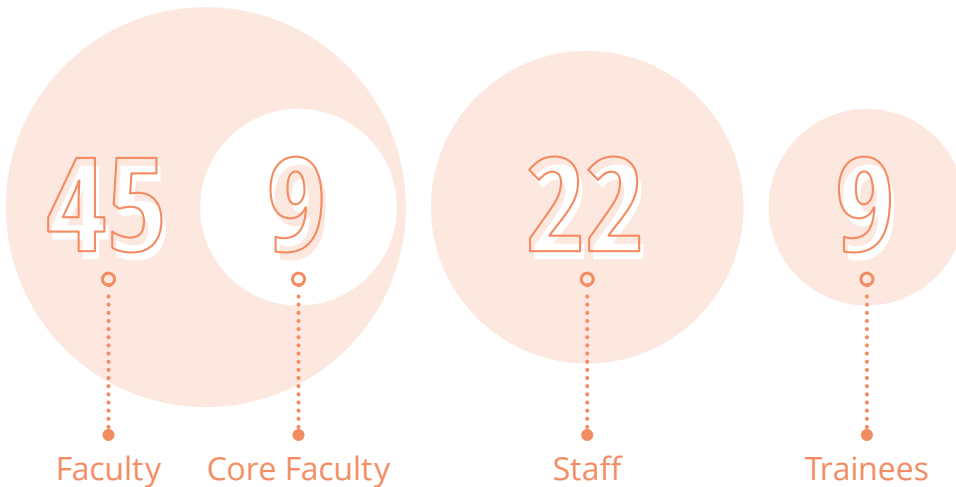
# Partners





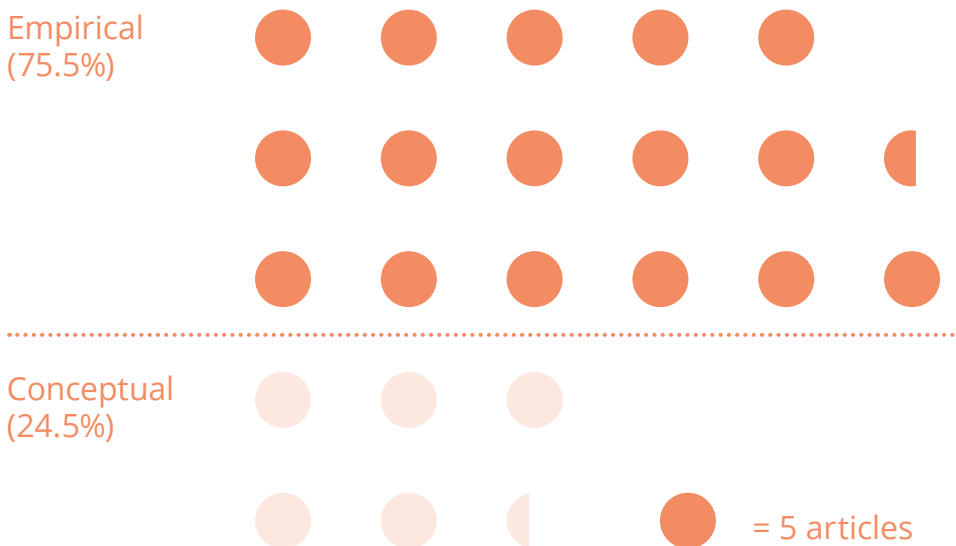
# 2019 at a Glance

## People



## Publications by Core Faculty

110 articles



## Notable Publications

JAMA Open  
**Intuitive vs Deliberative Approaches to Making Decisions About Life Support: A Randomized Clinical Trial**  
 Emily Rubin, Anna Buehler, Elizabeth Cooney, Nicole Gabler, Adjoa Mante, Scott Halpern

JAMA  
**Reconsidering the Consequences of Using Race to Estimate Kidney Function**  
 Nwamaka Eneanya, Wei Yang, Peter Reese

JGIM  
**Use of Advance Care Planning Billing Codes in a Retrospective Cohort of Privately Insured Patients**  
 Deepshikha Ashana, Scott Halpern, Craig Umscheid, Meeta Kerlin, Michael Harhay

NEJM  
**Goal-Concordant Care - Searching for the Holy Grail**  
 Scott Halpern

JGIM  
**Electronic Health Record Mortality Prediction Model for Targeted Palliative Care Among Hospitalized Medical Patients: a Pilot Quasi-experimental Study**  
 Katherine Courtright, Corey Chivers, Michael Becker, Susan Regli, Linnea Pepper, Michael Draugelis, Nina O'Connor

## Research Sites

# 400+ collaborations



Clinics



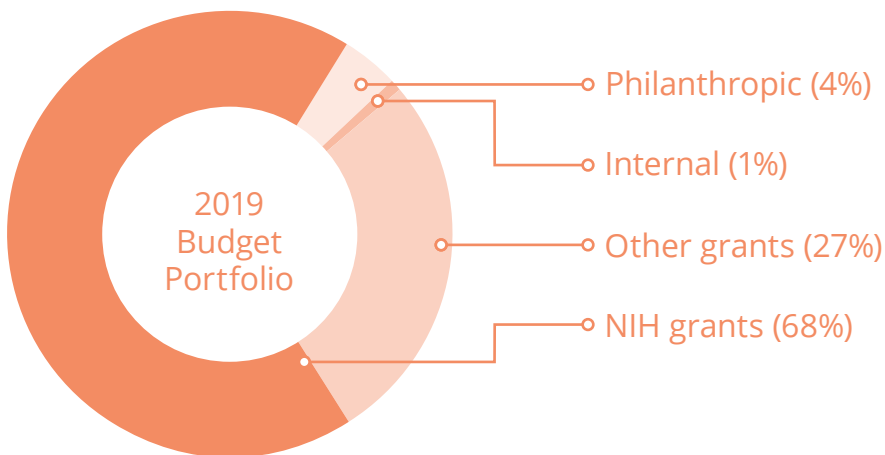
Long-term support facilities



Hospitals

## Total New Awards 2019

# \$20,341,153



## Awards and Recognition

### Scott Halpern

Elected to the Association of American Physicians, Awarded Penn's Arthur K. Asbury Outstanding Faculty Mentor Award

### Michael Harhay

Named an Associate Editor at the International Journal of Epidemiology, Early Career Award from the International Society of Heart and Lung Transplantation

### Joanna Hart

Appointed to the Diversity and Inclusion Committee for the Society of Critical Care Medicine

### Meeta Prasad Kerlin

Early Career Achievement Award from the Behavioral Science and Health Services Assembly of the American Thoracic Society

Joanna Hart, MD, MSHP speaks at The Franklin Institute as part of their Facebook Live series



# The Penn Roybal Center on Palliative Care in Dementia

In the fall of 2019, the PAIR Center was awarded a Roybal Center to transform residential palliative care for persons with dementia through behavioral economics and data science. Named for the former California Congressman and formative Chairman of the Select Committee on Aging, the National Institute on Aging's Edward R. Roybal Centers for Translational Research in the Behavioral and Social Sciences of Aging grants are designed to provide infrastructure

for multidisciplinary teams of behavioral scientists to develop practical interventions to improve the lives of older Americans.

Of the 13 Roybal Centers throughout the country, four are focused on dementia, and the Penn Roybal Center on Palliative Care is the only one of these focused on palliative care. Penn also has the unique distinction of being the only institution in the country with two Roybal Centers,

the other residing within the Center for Health Incentives and Behavioral Economics (CHIBE) -- a sister Center to PAIR. Our Center harnesses the multi-disciplinary expertise of internationally renowned dementia experts from 11 leading institutions alongside more than 40 Penn faculty from five different schools -- medicine, nursing, computer science, psychology, and statistics. Our pilot core is led

**Continued on page 14**

# Growing the Pipeline of Future Leaders in Serious Illness Care

## 2019 PAIR Faculty Appointments



**Katherine Courtright, MD, MS**  
Assistant Professor of Medicine

**Research Focus:**

Developing a novel precision medicine approach to palliative care delivery for patients with serious illness using predictive analytics and behavioral economics, with evaluation in large pragmatic trials to optimize the value of limited specialty palliative care resources.



**Gary Weissman, MD, MS**  
Assistant Professor of Medicine

**Research Focus:**

The longitudinal pathways of people with critical illness as they move from the community through the healthcare system, and how clinical informatics approaches can best support their care at each step.

## 2019 PAIR Trainee Faculty Appointments



**Cameron Baston, MD, MS**  
Assistant Professor of Clinical Medicine, Univ. of Pennsylvania



**Dustin Krutsinger, MD, MS**  
Assistant Professor of Medicine Univ. of Nebraska



**Kelly Vranas, MD, MS**  
Assistant Professor of Medicine, Oregon Health & Science Univ.

# Critical Care Health Policy Research (CCHPR) Training Grant Renewal

Katherine Courtright, MD, MS speaks at DUKE -NUS & Lien Center for Palliative Care's 10th anniversary conference



The PAIR Center is fortunate to hold a NIH-funded T32 training grant to support postdoctoral training in acute care policy-oriented research. The only program of its kind in the nation, we have, for the past 10 years, been developing physician-scientist leaders in acute care medicine who are trained to analyze clinical and economic outcomes, and translate such findings into higher-value practices and better-informed policies.

The program supports an annual cohort of six post-doctoral fellows from diverse clinical disciplines that touch upon acute care medicine. Fellows pursue a Master of Science in Health Policy Research (MSHP) or similar didactic training, and couple

this training with experiential health services research, ongoing clinical experience, policy analysis, and leadership and career development opportunities. In part because of this training program, and the successes of past trainees in applying for and receiving F-, K-, and R-level NIH awards, Penn routinely attract the nation's most sought-after residency and fellowship applicants in its several acute care disciplines. Our demonstrated successes recently led to a renewal of the training grant for another five years, specifically years 11-15.

The CCHPR training program provides a unique opportunity for the PAIR Center to forge a pipeline of future critical care leaders. To date we have enrolled 26 trainees, of whom

20 have completed their training. Fellows remarkably produced an average of 8.5 publications emanating directly from their training, including an average of 5 as first author. Given the marked gender and racial imbalances that continue to pervade critical care medicine, we are particularly proud of our continued efforts to promote the enrollment, training, and career placement of women and underrepresented minorities in CCHPR. Over 60% of all trainees are women, many of whom have gone on to tenure-track, research-oriented academic careers. To learn more about our past trainees, please visit: <http://pair.upenn.edu/partners-programs/t32program>. Many

**Continued on page 14**

### **CCHPR Training Grant cont.**

of our PAIR core faculty are alumni of our CCHPR program, including Drs. Joanna Hart, Gary Weissman, Katherine Courtright, and George Anesi. Several of these former mentees are now giving back by co-mentoring the next generation of T32 fellows and Dr. Weissman now teaches a full-credit elective course entitled “Applied Predictive Modeling for Health Services Research” in the MSHP degree.

### **CCHPR Postdoctoral Steering Committee:**

#### **David Asch, MD, MBA**

John Morgan Professor of Medicine, Health Care Management, and Medical Ethics

#### **Lee Fleisher, MD**

Robert D. Dripps Professor and Chair of Anesthesiology and Critical Care

#### **Scott Halpern, MD, PhD**

Director, PAIR

#### **Eve Higginbotham, SM, MD**

Vice Dean of Inclusion and Diversity, Penn Medicine

#### **Meeta Kerlin, MD, MS**

Assistant Professor, PAIR

### **Roybal Center cont.**

by Dr. Jason Karlawish from the Penn Memory Center and Institute on Aging.

Our new Center represents an innovative collaboration with Genesis HealthCare, the largest owner of nursing homes in the country. Genesis facilities, almost 400 locations throughout the country, will allow our researchers to learn and develop interventions that bridge the gap between the supply of, and need for palliative care services among persons with dementia living in long-term services and support facilities, as well as family caregivers. With an eye on generating real-world evidence to guide serious illness care, this learning-lab environment will allow researchers to develop and test small-scale behavioral studies leading

to large-scale pragmatic clinical trials in later years. Each year, the Center will fund roughly two pilot grants through a competitive request for applications.

In its first year, the Center funded two pilots that have the potential to transform advance care planning discussions for persons with dementia. The first pilot will adopt data science techniques to understand who the clinician influencers are within a network and to better understand specific clinician factors driving advance care discussions. The second study will adapt Penn’s online advance care planning tool, Our Care Wishes, for persons with dementia and test its acceptability in a randomized pilot within Genesis HealthCare facilities.

### **Penn Roybal Center on Palliative Care in Dementia Steering Committee:**

#### **Kathy Bowles, PhD, RN, FAAN, FACMI**

Professor of Nursing & van Ameringen Chair in Nursing Excellence

#### **Elizabeth Cooney-Zingman, MPH**

Director of Research Operations, PAIR

#### **George Demiris, PhD, FACMI**

Penn Integrates Knowledge Professor, Schools of Nursing & Medicine

#### **Scott Halpern, MD, PhD**

Director, PAIR

#### **Jason Karlawish, MD**

Professor of Medicine, Perelman School of Medicine; Co-Director, The Penn Memory Center

#### **Honora Kelly, MFA**

Communications & Engagement Manager, PAIR

#### **Vanessa Madden, BSc Hons**

Assistant Director of Project Management, PAIR

#### **Rachel Werner, MD, PhD**

Executive Director, Leonard Davis Institute of Health Economics; Robert D. Eilers Professor of Health Care Management, Wharton School; Professor of Medicine, Perelman School of Medicine

# Faculty Spotlight: Meeta Prasad Kerlin



## How did you become a health services researcher?

Like most things in my career, I did not get here via a straight line, though when I look back, the seeds were definitely planted when I was a trainee. I have always found that I am drawn to asking questions about the issues and problems I see around me. As a research fellow during my critical care training, I led a project that examined whether an organizational factor – the availability of mechanical ventilation protocols – influenced trainee knowledge about mechanical ventilation management. The idea for this project came from my perceptions about my own education and competency,

## *Interprofessional collaboration is an essential component of high-quality critical care*

but it drew me to thinking about the many ways in which organizational decisions and factors may affect different domains of patient care quality

and outcomes. The ICU a complex, fast-paced, high-stakes environment – of course organization matters. After that first project, my passion for understanding the bigger systems that drive care and outcomes of critically ill patients grew and led me to where I am today.

## What do you enjoy about critical care implementation research?

In critical care, unfortunately a common problem is a mismatch between the best evidence and clinical practice. After taking a course in implementation research, more out of curiosity than a concrete research plan, a light bulb went off for me. I realized there was an entire field of research dedicated to creating knowledge about how to get evidence into practice. I learned about methods to understand why the mismatch I saw existed, and, even more exciting to me, methods to develop and test strategies to overcome the factors that led to that mismatch. I especially enjoy the interprofessional collaboration that is necessary for ICU-based research, which makes the ICU a rich laboratory for implementation research. Last, I believe that improving the quality of care – that is, improving the delivery of

# The PAIR Center Series

## Faculty Spotlight cont.

evidence-based care – to critically ill patients has the potential for great impact. The chance to truly save a life led me to critical care as a clinical specialty; the same thing, on a broader scale, excites me about critical care implementation research.

## What are some future directions for your work?

I expect that I will continue to focus my career on improving care of critically ill patients through complementary research projects. I hope to expand my implementation research portfolio to focus on other interventions for patients who undergo mechanical ventilation. I also am interested in pursuing research dedicated to better understanding and optimizing teamwork in the ICU. Interprofessional collaboration is an essential component of high-quality critical care; however, best practices are not well defined and measuring team performance has been elusive. I hope to extend my research program to answer some of the critical and foundational questions about team dynamics and collaboration, and hope to bring behavioral and management science into ICU organizational research in the future.

SEP 17, 2019

## Symptoms and Function at the End of Life: Insights from the Yale PEP Study

Thomas M. Gill, MD, Professor of Medicine, Epidemiology & Public Health, Yale School of Medicine

NOV 5, 2019

## Developing an Age-Friendly Health System

Lisa M. Walke, MD, MSHA, AGSF, Associate Professor of Medicine, University of Pennsylvania

DEC 3, 2019

## The Illusion of Choice? Post-acute Care Decisions and Consequences

Robert E. Burke, MD, MS, FHM, Assistant Professor of Medicine, University of Pennsylvania

FEB 4, 2020

## Advanced Dementia: The Evolution of Research Informing Practice

Susan Mitchell, MD, MPH, Professor of Medicine, Harvard Medical School

MAR 10, 2020\*

## Supportive Care Interventions for Patients with Hematologic Malignancy

Areej El-Jawahri, MD, Assistant Professor of Medicine, Harvard Medical School

APR 21, 2020\*

## "The Informatist Will See You Now"

Matthew Gonzales, MD, Chief Medical Information Officer, Institute for Human Aging, Providence St. Joseph Health

\*Canceled due to COVID-19. We look forward to welcoming these speakers at a later date TBD.

Lisa Walke, MD, MSHA presents at The PAIR Center Series





PAIR team  
building event at  
Yards Brewery



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