Cleveland Clinic

Center for Value-Based Care Research

Value Added

CVCR Newsletter | Second Quarter 2020

July 2020

Welcome to this quarter's issue of *Value Added.*

The Center for Value-Based Care Research (CVCR) conducts novel research on interventions that improve value in healthcare. With a mission of making quality healthcare possible for all Americans by conducting research to identify value in healthcare, CVCR seeks to deliver the right care, at the right time, to the right patients, at lower costs.

In this issue, we report on two of our recent research initiatives. Dr. Jarrod Dalton discusses his work on evaluating the effectiveness of current practices in cardiovascular risk prediction for elderly patients using the Pooled Cohort Equations (PCE) risk model. Following this, Dr. Pappas talks about his work on understanding hospital costs related to physician turnover. Having a sense of turnover cost can be useful for best administrative decision-making.

Lastly, Internal Medicine resident, Dr. Essa Hariri and Dr. Elizabeth Pfoh have summarized in the *Journal of General Internal Medicine* the most recent data on late diagnosis of COVID-19 in admitted hospital patients. We hope you enjoy reading!

Featured Publication

The Six-Clicks Mobility Measure: A Useful Tool for Prediction Discharge Disposition.

Pfoh ER, Hamilton A, Hu B, Stilphen M, Rothberg MB.

Archives of Physical Medicine and Rehabilitation

CVCR CELEBRATIONS

Dr. Anita Misra-Hebert presented as an invited educator at *Johns Hopkins Mixed Methods Research Training Program for Health Sciences*, June 22-24th, 2020. The Mixed Methods Research Training Program for the Health Sciences is funded by the National Institutes of Health through the Office of Behavioral and Social Science Research (OBSSR), and is the only program of its kind in the United States. This program has been reported about in three peer-reviewed publications. Congratulations to Dr. Misra-Hebert!

Investigators **Dr. Matthew Pappas** and **Dr. Aaron Hamilton** were recognized for publishing **two out of the top ten papers** in the Journal of Hospital Medicine in 2019. Be sure to check out these articles: *Resuming Anticoagulation Following Upper Gastrointestinal Bleeding Among Patients With Nonvalvular Atrial Fibrillation-A Microsimulation Analysis* and *Increasing Mobility via In-hospital Ambulation Protocol Delivered by Mobility Technicians: A Pilot Randomized Controlled Trial.* Congratulations to both investigators for their great accomplishments!

Featured Study: Accuracy of Cardiovascular Risk Prediction

Can you describe the tool that you are looking to evaluate in this study?

The American College of Cardiology and the American Heart Association (ACC/AHA) have established the Pooled Cohort Equations (PCE) risk model to guide caregivers and their patients in determining risk-tailored treatments for reducing risk of major cardiovascular events such as heart attacks and strokes. The risk assessment tool was developed using national data on individuals aged 40-79 years.

What was the motivator or indicator that PCE risk model may not adequately predict cardiovascular events in older patient populations?

Our research team has previously identified that the PCE risk model systematically underestimated risk of major cardiovascular events in socioeconomically-disadvantaged patient populations. Since that study, we have been exploring other potential risk factors that may uniquely describe risk for specific patient populations, particularly vulnerable populations such as those who are socioeconomically-disadvantaged and older adults (Figure). For example, we found in another study that lymphopenia, a condition characterized by low counts of a specific type of white blood cell, was related to increased mortality risk. Given this line of research, and also that most of the patients in the national studies used to establish the PCE model were under 65 years, we felt that it was important to examine the ability of the model to accurately characterize risk in older adults.

Failure of traditional risk factors to adequately predict cardiovascular events in older populations.

Jarrod Dalton, PhD, Michael Rothberg, MD, Neal Dawson, MD, Nikolas Krieger, MS, David Zidar, MD, PhD, Adam Perzynski, PhD

Journal of the American Geriatrics Association

What did you find? Is the PCE inadequate? Under what conditions?

We found that, with increasing age, the risk prediction accuracy substantially deteriorates, to the point that predictions are essentially unrelated to observed cardiovascular event rates in patients over 85 years old. We also found interesting relationships (or lack thereof) between traditional cardiovascular risk factors and cardiovascular event risk. For example, diabetes was unassociated with cardiovascular events among individuals older than 85. We think that *attrition (or residual cohort) effects*, in which diabetics who were at particularly increased risk may have died prior to age 85, while the subgroup who survived to that age may have some other means of resilience from cardiovascular events. However, scientists don't yet understand these biological processes well enough.

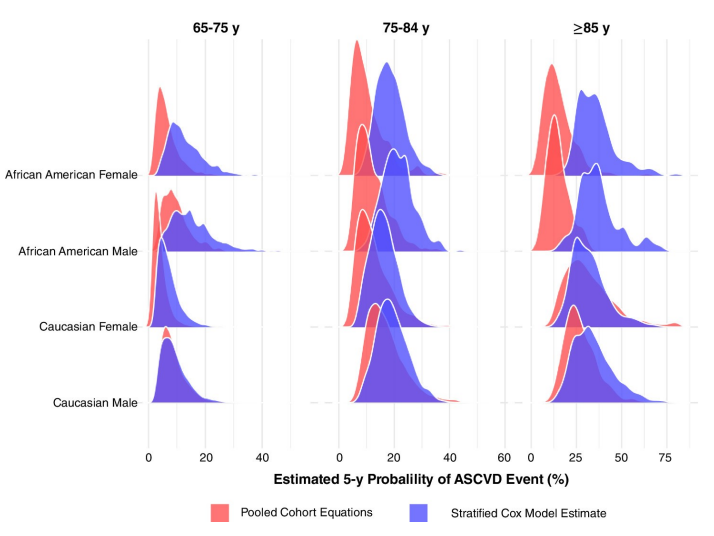

Figure. Density plots of predicted 5-year atherosclerotic cardiovascular disease (ASCVD) event risk from the American College of Cardiology and the American Heart Association Pooled Cohort Equations risk model and from an internally derived stratified Cox proportional hazards regression model, by age category, sex, and race.

How would you like to see investigations move forward with what you've found?

The medical field has made major advances in drug therapies for preventing heart attacks and strokes over the past several decades extending life for millions of people worldwide. So much so, that nowadays these events primarily impact older people. We need a deeper understanding of the biological processes leading to cardiovascular aging in older adults. In particular, we need to identify risk factors that uniquely impact the growing population of older adults and continuously (re-)evaluate the effectiveness of preventive interventions for that population.

Ongoing work: Cost of Turnover in Hospital Medicine

What prompted your interest in studying the cost of Hospitalist turnover?

Earlier work (including by our own Dr. Misra-Hebert!) suggests that it can cost 1 million dollars to replace a physician. But there are some medical specialties that don't depend on a fixed group of patients, like Emergency Medicine, Critical Care, and Hospital Medicine. That gives the job market in these fields more flexibility, but means it might not be quite as costly to replace physicians in these settings.

What are your goals in identifying cost of hospitalist turnover?

There's a huge amount of work that comes with physician recruitment. Some of those costs, like advertising that the job is available, are fixed regardless of how many new physicians are hired. Other costs, like licensure, travel, and relocation vary with the number of physicians that are recruited and by department. Ultimately, the goal is to let departments make intelligent staffing and retention decisions.

What factors do you predict will make the most impact in cost? The least?

I expect that the greatest cost will be from any billing gaps during a period of physician turnover. A hospital collects revenue based on what a hospitalist bills, so small differences in billing and coding could lead to large differences in the cost of turnover. That's what drove the cost of turnover in earlier studies. Specialties that are organized around a site of care have probably reduced those costs, but they haven't gone away entirely.

What is your prediction of cost of hospitalist turnover compared to other practices?

I expect that the costs of turnover in Hospital Medicine will be lower than practices organized around a patient panel. There are advantages to low barriers to entry and exit – a physician has more flexibility to relocate, and a hospital can recruit to meet changing care needs, for example. The turnover within this profession suggests to me that costs of turnover are low.

How do you think your findings will impact the approach to cost-effective turnover?

Hospital Medicine is a young profession, and its organization offers young internists more flexibility than a panel-based practice. That flexibility is nice to have in a labor pool, but turnover carries costs for hospitals that are trying to take care of a population. If a hospital is going to meet the care needs of a population at the lowest cost, it needs to know how to purchase physician labor efficiently. That might mean retention bonuses, or it might mean tolerating turnover. But it's hard to make good staffing decisions if you don't know how much it costs to hire a new physician.

In economic terms, lower barriers to entry and exit commodifies and modularizes a labor pool. If turnover had no cost at all, a hospital could cycle through physicians endlessly. But that would be a miserable place to work, and I think most of us would prefer to work with teams of excellent people that we trust and want to keep working with. If organizations want to make good decisions that appropriately balance the many competing goals here, they have to have a sense of how much turnover costs.

Look out for publications and presentations from Dr. Pappas related to this project in the future.

Report: Late Diagnosis of COVID-19

Knowing when hospitalized patients with SARS-CoV2 test positive for COVID-19 is important because undiagnosed patients can increase caregivers' risk of infection, as protective equipment may not be used. Currently the Centers for Disease Control and Prevention recommends that hospitalized patients with symptoms receive priority for testing patients and patients with less common symptoms may be missed. Further test sensitivity depends on the site sampled and hospital protocols usually rely on nasal samples. In our concise report of 356 hospitalized patients, we found that 86% were diagnosed on and 14% after admission (n=49). Patients diagnosed after admission presented without fever, shortness of breath or cough 29% of the time. Eleven patients diagnosed after admission had a false-negative result on admission. Four of 11 had their true-positive result collected from a non-nasal site. Retesting of false negatives often occurred after clinical deterioration, but 2 patients were not diagnosed until discharge. It is important to note that this study is limited because we could only identify false negatives if a patient was retested. We concluded that routine testing on admission may reduce delayed identification of COVID-19 and that retesting is also warranted.

Look out for CVCR publications on COVID-19 related research in the near future.

RECENT PUBLICATIONS

The Impact of Systematic Depression Screening in Primary Care on Depression Identification and Treatment in a Large Health Care System: A Cohort Study. Pfoh ER, Janmey I, Anand A, Martinez KA, Katzan I, Rothberg MB. Journal of General Internal Medicine.

The Six-Clicks Mobility Measure: A Useful Tool for Prediction Discharge Disposition. Pfoh ER, Hamilton A, Hu B, Stilphen M, Rothberg MB. Archives of Physical Medicine and Rehabilitation.

Early Readmissions after Esophagectomy for Esophageal Adenocarcinoma: Does Facility Case-Volume Matter? Oware Adu-Gyamfi K, Pant C, Deshpande A, Jassim H, Olyaee M. Surgery Research and Practice.

The Impact of Clinical Decision Support Alerts on Clostridium difficile Testing: A Systematic Review. Dunn AN, Radakovich N, Ancker JS, Donskey CJ, Deshpande A. Clinical Infectious Disease.

Risk prediction for severe hypoglycemia in a type 2 diabetes population with previous non-sever hypoglycemia. Misra-Hebert AD, Ji X, Pantalone KM, Hu B, Dey T, Milinovich A, Bauman JM, Zimmerman RS, Kattan MW. Journal of Diabetes Complications.

Use of Antihyperglycemic Medications in U.S. Adults: An Analysis of the National Health and Nutrition Examination Survey. Le P, Chaitoff A, Misra-Hebert AD, Ye W, Herman WH, Rothberg MB. Diabetes Care.