Greetings, I am Dr Karl Nath, the Editor-in-Chief of Mayo Clinic Proceedings, and I am pleased to welcome you to the multimedia summary for the journal’s April 2022 issue. There are three articles that have been selected as our Editor’s Choice or Highlights articles this month.

The Editor’s Choice this month is an Original Article entitled “Health Care Expenditures Attributable to Primary Care Physician Overall and Burnout-Related Turnover: A Cross-Sectional Analysis.” It is authored by Dr Christine Sinsky from the American Medical Association in Chicago, Illinois, and colleagues from Stanford University, in Palo Alto, California; Mayo Clinic, in Rochester, Minnesota; and the University of Notre Dame in Notre Dame, Indiana.

Continuity of care is beneficial in numerous ways that include improved patient well-being and outcomes, lower rates of emergency room visits and hospitalization, greater patient compliance with prescribed therapies and management, greater patient contentment with and approval of their care, lower mortality, and reduced medical care costs. Continuity of care has an impact even in hospitalized patients in whom outcomes may be better when patient care is provided by hospitalists with a less interrupted work schedule.

Continuity of care may be disrupted by several factors including physician turnover. Sinsky et al assessed the health care cost imposed by physician turnover. Drawing upon data from the American Medical Association Physician Masterfile, published information regarding Medicare patients, and estimates for non-Medicare patients, these authors determined that health care costs ascribed to primary care physician turnover approximated $90,000 in the first year a primary care physician left practice, with total annual excess health care costs from such turnover approximating $1 billion in the first year; health care costs from physician turnover specifically caused by burnout exceeded 25% of the total annual excess health care costs. The disruption of continuous care thus not only deprives patients of the benefits that accrue from continuous care, but also imposes a substantial financial burden on the health care system. Why health care costs are less with continuous care is an important question, and one discussed by Sinsky et al; a plausible proffered explanation resides in the sense of trust engendered by, and which subsequently informs, a long-term engagement between patients and their physicians.
Trust-based partnerships are cornerstones in health care services for a number of altruistic, mission-based, and compelling reasons, as discussed by Berry et al last year in *Mayo Clinic Proceedings*. Trust between patients and their physicians, as engendered by continuous care, likely influences diagnostic evaluation, referrals, management, hospital admission, and other aspects of patient care such that health care costs are inherently less. With physician turnover, and a trust-based relationship yet to be developed with a new physician, health care costs attendantly increase. Physician turnover, especially due to burnout, are addressable issues in current attempts to curtail the continuous increase in US health care costs.

The first Highlight article in the present issue of *Mayo Clinic Proceedings* is an Original Article entitled “An Electronic Health Record-Compatible Model to Predict Personalized Treatment Effects From the Diabetes Prevention Program: A Cross-Evidence Synthesis Approach Using Clinical Trial and Real-World Data.” It is authored by Dr David Kent from Tufts University in Boston, Massachusetts, and colleagues from the Allegheny Health Network in Pittsburgh, Pennsylvania; Mercy Health in St. Louis, Missouri; Erasmus MC University Medical Center in Rotterdam, the Netherlands; and the American Medical Group Association in Alexandria, Virginia.

Prediabetes occurs in approximately one third of the US population, and either lifestyle modification or pharmacotherapy may interrupt its progression to type 2 diabetes. The article by Kent et al describes an electronic health record (EHR)-compatible model that assesses the individual risk for diabetes and how such an assessment may aid in deciding where preventive interventions may be especially warranted.

This study was predicated on the following considerations discussed by Kent et al. First, the Diabetes Prevention Program Study by Knowler et al published in 2002 clearly established the efficacy of either lifestyle modification or metformin in reducing the risk of occurrence of type 2 diabetes. However, the risk of occurrence of type 2 diabetes varies markedly in prediabetic subjects. Uncertainty thus surrounds which patients would benefit from preventive interventions, the latter less likely to be valuable in low-risk patients. Second, there are relevant issues as regards preventive interventions: intensive lifestyle modifications require health care resources and patient compliance, while the use of metformin may be attended by
significant side effects. Third, extrapolation of findings from randomized clinical trials to patients in the “real world” may be challenged by heterogeneity in this patient population and in their response to treatment. Kent et al used the OptumLabs Data Warehouse (OLDW) observational database to develop and validate a risk prediction model based on 11 variables; these variables include age, sex, race, smoking, BMI, hypertension, systolic blood pressure, HDL cholesterol, triglycerides, fasting glucose, and HgbA1c; the predicted 3-year rates for diabetes based on this model faithfully correlated with observed rates.

The OptumLabs Data Warehouse model was then applied to the Diabetes Prevention Program data. There were several notable findings that include the following three: First, the effect of lifestyle modification tended to be comparable across all risk groups, whereas the treatment effect of metformin increased as risk increased. Second, the 3-year predicted risk of developing diabetes was 9.0%, 6.0%, and 3.9% for usual care, metformin therapy, and lifestyle modification, respectively. And third, lifestyle modification or metformin, singly applied, prevented more than 50% or 70%, respectively, of preventable diabetic cases in the highest risk quartile of patients.

This analysis and modeling by Kent et al are important and timely, especially as they culminated in a valuable EHR-compatible tool. This SMART app automatically predicts individual risk for type 2 diabetes; it identifies those high-risk patients for whom preventive intervention would likely interrupt the development of type 2 diabetes; and it promotes shared decision making with prediabetic patients regarding the prudent course of their management.

The second Highlight is an Original Article entitled “Association of Physical Activity With Primary Cardiac Arrest Risk in the General Population: A Nationwide Cohort Study of the Dose-Response Relationship.” It is authored by Dr Moo-Nyun Jin from Inje University College of Medicine in Seoul, Republic of Korea; and colleagues from Yonsei University College of Medicine in Seoul, and CHA University in Seongnam, both in the Republic of Korea.

The health benefits of physical activity are indisputable and diverse, ranging widely from reductions in all-cause and cardiovascular mortality to salutary effects on irritable bowel disease and depression. However, still to be fully resolved are
such issues as the level of physical activity that exerts the optimal beneficial effects; the nature of the relationship between health benefits and a graded increase in physical activity; and the clearly troubling one whether too much physical activity may prove damaging, indeed, fatal. As regards the latter, vigorous physical activity has been linked, albeit relatively rarely, to sudden cardiac arrest. The study by Jin et al addresses such issues using primary cardiac arrest as the primary outcome.

These authors utilized the Korean National Health Insurance Service National Sample Cohort database; this database includes a National Health Screening dataset that compiled data on questionnaire-derived physical activity. Physical activity was estimated as a metabolic equivalent task (MET) and ranked into 7 levels of increasing activity, with the relevant unit being MET-hour/week, that reflected multiples of the World Health Organization and United States recommended minimum physical activity/week (7.5 MET-hour/week or 150 minutes/week of moderate intensity or 75 minutes/week of vigorous intensity).

The data obtained from more than a half million participants in this screening program from 2009 to 2014 demonstrate the following: First, compared with inactivity, physical activity was associated with less primary cardiac arrest, with beneficial effects discerned at levels of physical activity below the recommended minimum of 7.5 MET-hour/week, and at all seven levels of activity, including physical activity greater than 37.5 MET-hour/week; second, these associations generally held true, irrespective of age, sex, BMI, and relevant comorbidities; third, maximal benefit was observed with physical activity in the range of 15.0 to less than 22.5 MET-hour/week; fourth, primary cardiac arrest was not increased when physical activity was greater than or equal to 37.5 MET-hour/week, irrespective of lifestyle risk factors or cardiovascular disease; and fifth, increased physical activity associated with diminished all-cause and cardiovascular mortality.

These findings are important and reassuring because they underscore the beneficial effects of physical activity, and they demonstrate that the highest levels of physical activity in this study were not associated with an increased risk for primary cardiac arrest.

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