revolution is far from over. Should the patient's home be considered an originating site? Must each site be required to have the capability to do a full physical exam? How can a telemedicine clinic be incorporated into an already busy physician schedule? What are the liabilities?

The questions don't stop there. The Kidney Health Initiative (KHI) Workgroup project on Advancing Technologies to Facilitate Remote Management of Patient Self-Care in Renal Replacement Therapy aims to develop an understanding of and solutions to these issues.

The dream of Dr. Moncrief is literally at our fingertips with a new age of smaller, faster, and much less expensive technologies. Opportunities to improve patient care, and access to that care, must be harnessed. It is our obligation to patients to accelerate and through experience guide this slow revolution that holds so much promise to improve their lives. ●

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The workgroup reviewed and supports this commentary. To learn more about KHI, visit www.kidney-healthinitiative.org.

Could CKD Become a Model for Use of EHRs for Quality Improvement?

By Bridget M. Kuehn

Electronic health records (EHRs) have made it much easier for physicians treating patients with chronic kidney disease (CKD) to collect data, including glomerular filtration rate (GFR), creatinine, blood pressure, cholesterol, anemia, and bone health, said Joseph Nally, MD, Director of the Center for Chronic Kidney Disease at the Cleveland Clinic. But they don't always make it easy for physicians to use the data to improve patient care.

"The EHR has simplified the process in terms of information gathering, but it is still up to the physicians and caregiver team to do all the right things to optimize patient care," Nally said.

It can be an exercise in frustration for clinicians to access the data. Physicians may have to visit multiple screens and may not be able to easily look at trends in the data over several months, said Paul E. Drawz, MD, a nephrologist at the University of Minnesota. The "holy grail" for CKD patients would be to develop a care plan that makes all the critical clinical information and patient preferences easily accessible, said Nally.

To make such a patient plan a reality, Drawz, chair of the National Institute of Diabetes and Digestive and Kidney Diseases (NIDDK) Health Information Technology Working group, is working with Nally and other nephrologists and technology experts from across the country. Building off progress made at a meeting held at NIDDK last October, the working group has begun to develop the plan and other tools that will help nephrologists and their institutions better leverage EHR data to improve patient care (Drawz PE, et al. *Clin J Am Soc Nephrol* 2015; 10:1488).

The "holy grail"

For patients with CKD, it is especially important for a care plan to be portable. The plan needs to be able to follow the patient from the dialysis unit, to the emergency department, to the hospital, and back to their physician, said Andrew S. Narva, MD, Director of the NIDDK's National Kidney Disease Education Program.

"The CKD patient in many ways is the perfect storm of the patient who suffers from not having something like this," said Narva. "These patients are on a lot of medicines, they are very complicated, and they get their care in many different places that don't usually talk to each other."

The NIDDK working group is working closely with the Office of the National Coordinator for Health Information Technology, which is working on developing electronic care plans for many conditions as a way to boost evidence-based care, improve outcomes, and lower care costs, noted Jenna Norton, a project manager aiding the effort at NIDDK.

"We are having a rapidly escalating collaboration with them to do this because they now understand that CKD patients are sort of a model chronic disease patient likely to benefit from this," Narva said.

For patients, the care plans will help ensure that their desires and goals stay at the forefront even as they transition between care settings. For example, if a patient ends up in the emergency department in need of dialysis, there will be something in the care plan that indicates the patient's preferences regarding dialysis modality, Narva said.

"It will allow the oatuebts; not to have to repeat themselves over and over and to have more of a voice in their care," Drawz said.

To ensure that patients' needs are considered, the working group includes representatives from the American Association of Kidney Patients.

"It's not happening in a vacuum," Narva said. "We all understand that patient input and the patient voice is key."

Initially, the care plan document will be physician-facing, Norton said. But eventually the working group would like to provide a way for patients to see their information in one place or to engage their physicians. One possibility is creating a mobile application so the patient can navigate his or her care, Norton said.

Challenges ahead

But creating such a care plan is not an easy process. The plan can't be so long or complex that physicians won't use it, Narva said. It also must avoid being "nephrocentric." He explained that most patients with CKD die from heart disease, so other specialists like cardiologists must be able to use it as well. It must be designed to avoid having different recommendations, for example for blood pressure, given by different specialists.

"There's a long way to go before we have a digital information system that really works for patients and clinicians," Narva said.

One of the first hurdles will be deciding how to define CKD. One of the reasons EHRs are particularly useful for CKD care is that the diagnosis of the disease is based on objective laboratory values, which can be identified in EHRs, Narva said.

"CKD is a great example of a computable phenotype that can be a prototype for other conditions moving forward," Drawz said.

The working group is currently hammering out what the "computable phenotype" for CKD diagnosis will be. For example, what are the cutoff readings for laboratory values that indicate CKD? The group is also working on an electronic profile of CKD patients at risk of progression. Already, the group has made substantial progress toward these goals, Drawz said.

Interoperability problems between organizations' electronic records systems are another challenge the working group is trying to address.

"The data doesn't move between providers," Drawz explained. "Just about every single EHR has so many homegrown aspects it is difficult to collaborate across sites."

Blueprint for population health

Finally, the working group is developing a business case for why health systems should invest in the tools and upgrades necessary to use health information technology for population health management.

For example, most patients with CKD go undiagnosed, even though the data needed to identify these patients is in their EHRs. Large organizations like the University of Minnesota's health system have been able to develop tools that can extract this kind of data from their electronic medical record systems to drive quality improvement efforts and research, said the University of Minnesota's Drawz. But it wasn't an easy process. It took hours of a computer programmer's time and the resulting programs can't easily be shared with other institutions, he said. So, many smaller systems go without such tools, leaving CKD patients unrecognized. Or other large systems have to duplicate these efforts.

"You have hundreds, if not thousands, of programmers around the country doing these one-off designs," he said. "If a system were built so it could be exported from one institution to another there would be tremendous savings."

The working group hopes to enable that kind of sharing. The tools developed as a result will help health systems adapt to the ongoing shift toward accountable care organizations and value-based payments from public and private insurers, for example, by helping systems identify CKD patients at risk of hospitalization or those receiving contraindicated medications, Drawz said.

"Once these new payment systems are in place it becomes something that saves money and improves the health of the population," he said.

Ultimately, Drawz said the goal is to provide nephrologists with a blueprint for population health and the tools to implement it.

"The bottom line is we can't improve care without data, and if we can't find CKD patients we can't get the data," Narva said. "These tools are critical as we move forward." ●