Exploring Implementation of a Home-Based Test for Kidney Disease: A Feasibility Study

Joshua J. Gregoire[1], MS, MPH, RN, LSSBB, NEA-BC, Cori Grant[2], PhD, MBA, MS, Stephanie Omuemu[3], RN BSN MPH

[1]Valley Health System, Paramus, NJ, [2]AMGA, Alexandria, VA, [3]Healthy.io, Boston, MA

Background and Objective

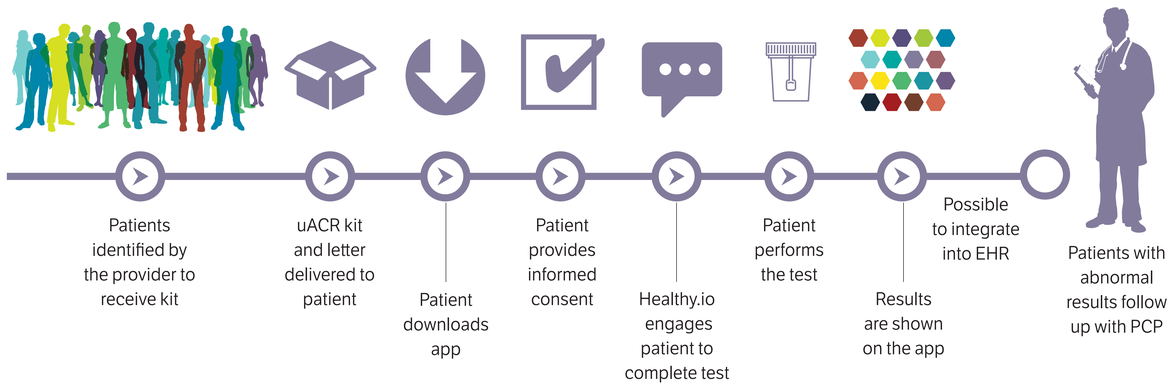
- The coronavirus pandemic revealed how technology can help remove barriers and bridge care gaps by shifting healthcare to people's homes.[1]
- Diabetes and hypertension (HTN) are the leading causes of chronic kidney disease (CKD). Approximately 37 million Americans have CKD but nearly 90% of them are unaware.[2]
- Clinical guidelines for people with type 2 diabetes (T2DM) recommend screening annually for kidney disease using the urine albumin-to-creatinine ratio (uACR).[3]
- Screening is recommended at diagnosis for patients with HTN to establish a baseline for monitoring renal function and to inform dose adjustments for medications that rely on renal excretion.[4]
- An analysis by AMGA of electronic health record (EHR) data from 24 geographically diverse member organizations found only 45% of patients with T2DM and 17% with HTN had uACR measured in the past year.[5]
- Barriers to implementation were assessed according to the Consolidated Framework for Implementation Science.[6]

Study Design

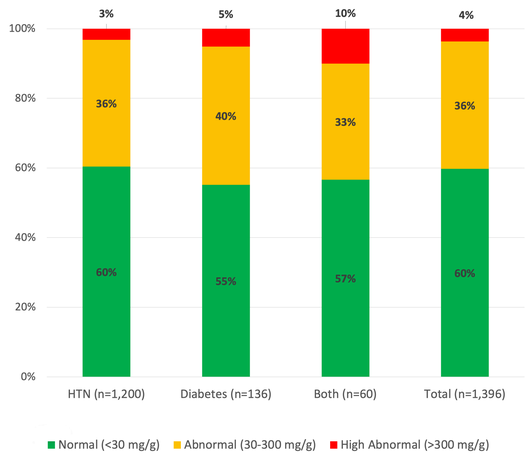
- AMGA partnered with Valley Medical Group in New Jersey to study the implementation of the first FDA-cleared home-based uACR test, Minuteful Kidney, from Healthy.io. The test was used as a population health screening tool.
- A test kit was sent to the patient's home including a specimen cup, a dipstick, and a reference card that was used by an app on a smartphone to determine the result. Within minutes the patient had their result, which was transmitted to Healthy.io and then faxed to the patient's primary care provider (PCP). No laboratory was needed.
- Patients were included if they had a diagnosis of T2DM or HTN, did not have a uACR documented in their health record for the prior 12 months, and did not have a diagnosis of CKD.
- The semi-quantitative uACR provided one of three results: normal (< 30 mg/g), abnormal (30–300), and high abnormal (> 300).
- Patients also received a 10-question survey about their experience with the Minuteful Kidney screening tool that they completed in the app.
- The proportion of eligible T2DM and HTN patients who completed the screening was assessed.
- A roundtable discussion was held with PCPs to understand their experience with implementation, documentation of results, and follow-up.

Principal Findings

Steps in the Minuteful Kidney Implementation Research



Screening Results by Diagnosis



Roundtable Discussion: Select Barriers and Mitigation Strategies

Major themes	Identified Barrier	Applied mitigation strategy
Adaptability Identifying patients in the EHR	Missing uACR results in the EHR; missing/outdated contact information	Providers review list of patients from EHR to identify appropriate patients; discuss need for screening with patient and request uACR records if completed elsewhere; leverage health information exchange to reconcile test results
Complexity Explaining study results to patients	No information was provided to patients explaining the sensitivity of the semi-quantitative test and how to interpret a positive result	Provide clear communication in the app that explains the chance of a false-positive result and when and how to follow-up
Complexity Educating specialists across the organization	Patients called specialists to discuss results and the specialists were not aware of the study	Provide information including standard Q&As, information on how to find the results in the EHR, and details of when to follow-up
Need for change Incorporating screening for patients with HTN	US guidelines for uACR screening are ambiguous for people with HTN	Educate PCPs about the importance of screening among patients with HTN using American Society of Nephrology and National Kidney Foundation recommendations
Resource needs Follow-up with patients	Follow-up with patients who have a positive screen may be resource intensive	Target the patients with HTN who are more likely to have CKD, e.g., those with severe or chronic HTN

- A total of 2,840 patients (86% HTN, 10% T2DM, and 4% both) received screening kits.
- **Among them, 1,396 (49%) completed the at-home screen.**
- The rate of completion among those with HTN only, T2DM only and both were 50%, 47%, and 53% respectively.
- The average age of participants was 66 (range: 23–100).
- Sixty percent of the screens were in the normal range, 36% abnormal, and 4% high abnormal.
- The top two reasons for eligible patients opting out were a lack of interest (43%) and lack of access to a smart phone (18%).
- Among patients who completed the screen, 93% rated Minuteful Kidney as easy or very easy to complete, and 95% said they would recommend it to a friend.

Implications for Policy and Practice

- Workflows were designed to improve communication between patients and their care teams to ensure successful screening and follow-up making the implementation into primary care feasible.
- Home-based testing using tools like Minuteful Kidney may facilitate a population health approach to the identification of CKD resulting in earlier management of the disease.
- Tools like this may serve as a feasible alternative to office-based testing when patients lack transportation or prefer to manage their health from home and may help close the gap on quality measures related to T2DM screening.

Conclusions

Nearly half of eligible patients completed the Minuteful Kidney home-based CKD screen

- Minuteful Kidney proved to be a useful tool for increasing uACR testing among patients with T2DM and HTN who had not been tested in the past 12 months.
- Despite the barriers, many clinicians eventually embraced the use of the tests.
- Patients found Minuteful Kidney easy to use and reported high satisfaction with a home-based testing tool.
- To ensure success, communication in advance between patients and providers is paramount. Patients need to be informed about the test and understand its limitations, while providers need to be informed and support patients using the test.

Contact: Cori Grant, PhD, MBA, MPH
cgrant@amga.org

References

1. Gorin SNS, Jimbo M, Heizelman R, et al. The future of cancer screening after COVID-19 may be at home [published correction appears in Cancer. 2021 Nov 15;127(22):4315]. Cancer. 2021;127(4):498-503.
2. Centers for Disease Control and Prevention. Chronic Kidney Disease in the United States, 2021. Atlanta, GA: US Department of Health and Human Services, Centers for Disease Control and Prevention; 2021.
3. ElSayed NA, Aleppo G, Aroda VR, et al. Summary of Revisions: Standards of Care in Diabetes-2023. Diabetes Care. 2023;46(Suppl 1):S5-S9. doi:10.2337/dc23-Srev.
4. Reboussin DM, Allen NB, Griswold ME, et al. Systematic Review for the 2017 ACC/AHA/AAPA/ABC/ACPM/AGS/APhA/ASH/ASPC/NMA/PCNA Guideline for the Prevention, Detection, Evaluation, and Management of High Blood Pressure in Adults: A Report of the American College of Cardiology/American Heart Association Task Force on Clinical Practice Guidelines. Circulation. 2018;138(17):e595-e616. doi:10.1161/CIR.0000000000000601.
5. Stempniewicz N, Vassalotti JA, Cuddeback JK, et al. Chronic Kidney Disease Testing Among Primary Care Patients With Type 2 Diabetes Across 24 U.S. Health Care Organizations. Diabetes Care. 2021;44(9):2000-2009. doi:10.2337/dc20-2715.
6. Damschroder LJ, Aron DC, Keith RE, et al. Fostering implementation of health services research findings into practice: a consolidated framework for advancing implementation science. Implement Sci. 2009;4:50. doi:10.1186/1748-5908-4-50.