Journal of Community Hospital Internal Medicine Perspectives

Volume 12 | Issue 6 Article 1

2022

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Recommended Citation

Luu, Stephanie; Rivera, Jose; Aragon, Daniel; Zamora, Victor; Huayanay, Irma; Majzoub, Reham; Baird, Andreina; Escobar, Cristina; Sanchez, Eric; Lopez-Alvarenga, Juan Carlos; Hernandez, Daniela; and Chang, Chelsea (2022) "Getting Ahead: A Resident Led Quality Improvement Project to Increase Diabetic Nephropathy Screening in an Underserved Hispanic-Predominant Population," *Journal of Community Hospital Internal Medicine Perspectives*: Vol. 12: Iss. 6, Article 1.
DOI: 10.55729/2000-9666.1130
Available at: https://scholarlycommons.gbmc.org/jchimp/vol12/iss6/1

Getting Ahead: A Resident Led Quality Improvement Project to Increase Diabetic Nephropathy Screening in an Underserved Hispanic-Predominant Population

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Abstract

Introduction: **Diabetes is the leading cause of end-stage renal disease (ESRD) in the United States (US), with 37 million having chronic kidney disease. Despite national guidelines recommendations for diabetic nephropathy screening with urine albumin-to-creatinine ratio (UACR), less than 50% receive full screening.**

Our Internal Medicine residents led a quality improvement project to increase diabetic nephropathy screening rate with UACR in our resident clinic by 50% in one academic year.

Methods: **We conducted the resident-led quality improvement project from July 2021 to April 2022. We reviewed the electronic medical records (EMR) from our clinic pre-intervention July 2020 to June 2021 and compared this to post intervention July 2021 to March 2022 determining the nephropathy screening rates in patients with diabetes. Our interventions included resident education, pre and post surveys to test foundational knowledge, adding UACR in the affordable laboratory order form and establishing normal reference range of UACR in the EMR.**

Results: **We collected 217 patients with diabetes, 27% were uninsured, 38% had Medicare/Medicaid and 90% identified as Hispanic. Comparing pre to post intervention, there was a significant change of 45 (20.7%) vs 71 (32.7%) patients screened for diabetic nephropathy with a UACR. The correct average score of knowledge-based questions was 82% on the pre survey, which increased to 88% in the post survey.**

Conclusion: **Our study showed promising results on improving diabetic nephropathy screening. The comprehensive approach including resident education about diabetic nephropathy screening with UACR and more so facilitating the order set in the EMR were key to achieve this goal.**

Keywords: Diabetic nephropathy screening, Hispanic population, Resident education, Quality improvement

1. Introduction

Diabetic nephropathy is the leading cause of end stage renal disease (ESRD) in the United States (US) and 37 million Americans suffer from chronic kidney disease.[1,2] Despite this high prevalence and guidelines for screening for diabetic nephropathy, a 2021 study examining over 1.8 million patients with diabetes found that less than 50% received full screening with the recommended annual urine albumin-to-creatinine ratio (UACR) and the estimated glomerular filtration rate (eGFR).[3,4]

The American Diabetic Association (ADA) recommends an assessment of glomerular function and of urine albumin excretion annually in patients with diabetes.[5] Similarly, the US Kidney Disease Outcomes Quality Initiative (KDOQI) and Kidney Disease Improving Global Outcomes (KDIGO) recommend the UACR and the eGFR for annual screening for diabetic nephropathy.3 The spot collection of the UACR is endorsed over the 24-h

Received 5 July 2022; revised 17 August 2022; accepted 31 August 2022.
Available online 7 November 2022

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https://doi.org/10.55729/2000-9666.1130

urine collection to improve compliance and feasibility.[6–9] Nevertheless, multiple studies across different laboratories and practice settings demonstrate suboptimal diabetic nephropathy screening.[2–4]

Barriers to albuminuria testing include inefficient collection of urine sample, confusion of UACR with microalbumin, exclusion of UACR from order sets, lack of provider knowledge in ordering and interpreting, laboratory errors in reporting, and lack of a standardized way to measure urine albumin.[3] To address these barriers, quality improvement efforts have succeeded with electronic clinical decision support systems, educational sessions, guideline reminders and processes to collect labs immediately following the clinic visit.[3,9,10] A 2020 article from Curran et al. described senior residents leading a successful quality improvement project to improve the resident clinic compliance with the Medicare Healthcare Effectiveness Data and Information Set (HEDIS) measure for "medical attention to nephropathy."[11] Other studies have been done in resident clinics but the effect and feasibility of a resident-led quality improvement initiative for diabetic nephropathy is not well-known.[11–13]

Our resident-led quality improvement initiative also aims to address health disparities as we are located in Hidalgo County in South Texas with a 30.7% prevalence of diabetes compared to 12.3% nationally; with most of the patients with poor health literacy, and inadequate access to medical care.[14] Obesity prevalence for Hidalgo county is 42.9% well above the state prevalence of 35.7% and also above the national average of 41.9%.[15,16] The region is 92.5% Hispanic, with 31.2% below the poverty line and 29.7% uninsured.[17] Our University of Texas Rio Grande Valley (UTRGV) - Doctors Hospital at Renaissance (DHR) Internal Medicine resident clinic patient population averages 27% uninsured and 38% Medicare/Medicaid. Though some teams have found success in improving diabetic nephropathy screening in the underinsured, the impact of a quality improvement initiative in this high-risk population is not well-established.[10,18] However, there have been successful attempts at increasing other healthcare screening such as rate of colon cancer or cervical cancer in the Hispanic population.[19,20]

In order to improve healthcare disparities for these underserved populations and following evidence-based guideline recommendations, we led a quality improvement initiative to increase diabetic nephropathy screening rate with UACR in our UTRGV-DHR Internal Medicine resident clinic by 50% from baseline screening rate in one academic year.

2. Methods

2.1. Context

In the internal medicine residency at UTRGV-DHR all residents must lead a group QI project each academic year. Our group of 11 residents and 2 faculty led this project from July 2021 to April 2022 in our resident clinic where all 50 residents have a continuity clinic. Following the Institute for Healthcare Improvement model, we began by developing a driver diagram to identify primary and secondary drivers to develop ideas to reach our aim (Fig. 1).

For our EMR review our inclusion criteria were patients with diabetes as determined by diabetes-related diagnoses in the EMR. Pre-intervention dates were visits between 7/1/2020 to 6/30/2021. We kept the list of patients from that academic year and used the same set of patients for the intervention academic year to assess compliance with nephropathy screening. Post-intervention dates were 7/1/2021 to 3/30/22. The identical list of patients was used to extract data in the pre and post intervention periods. Exclusion criteria were new patients first seen after 7/1/2021, patients not seen since 7/1/2020, patients with ESRD, patients without diabetes (determined through chart review, patient was seen with no documentation of diabetes diagnosis, no supporting labs to confirm the diagnosis), and patients whose primary care physician was not a resident. The study was deemed exempt from IRB by UTRGV IRB.

To determine compliance with nephropathy screening, we used a population health management tool called the Dynamic Worklist feature in the Cerner EMR to search for patients whose primary physician was one of our residents, patients who had diabetes and patients who had been seen in the DHR Internal Medicine GME clinic after 07/01/2020. We checked the charts of 272 patients who met the inclusion criteria to see if they had a completed UACR from 7/1/2020–6/30/2021. We excluded 55 patients. A total of 217 patients remained, of which 90% were of Hispanic ethnicity, who were included in this study (Fig. 2). There was 1 patient with type 1 diabetes, who was included in the 217 patients. For the patients who did not have UACR screening in the pre-intervention period, we checked to see if they had different methods of screening, including urine microalbumin level, urine protein-creatinine ratio, urinalysis, or no urine studies. We compared the number of pre-intervention (from 7/1/2020–6/30/2021) and post-intervention (from 7/1/2021–3/31/2022) compliance with UACR screening and plotted

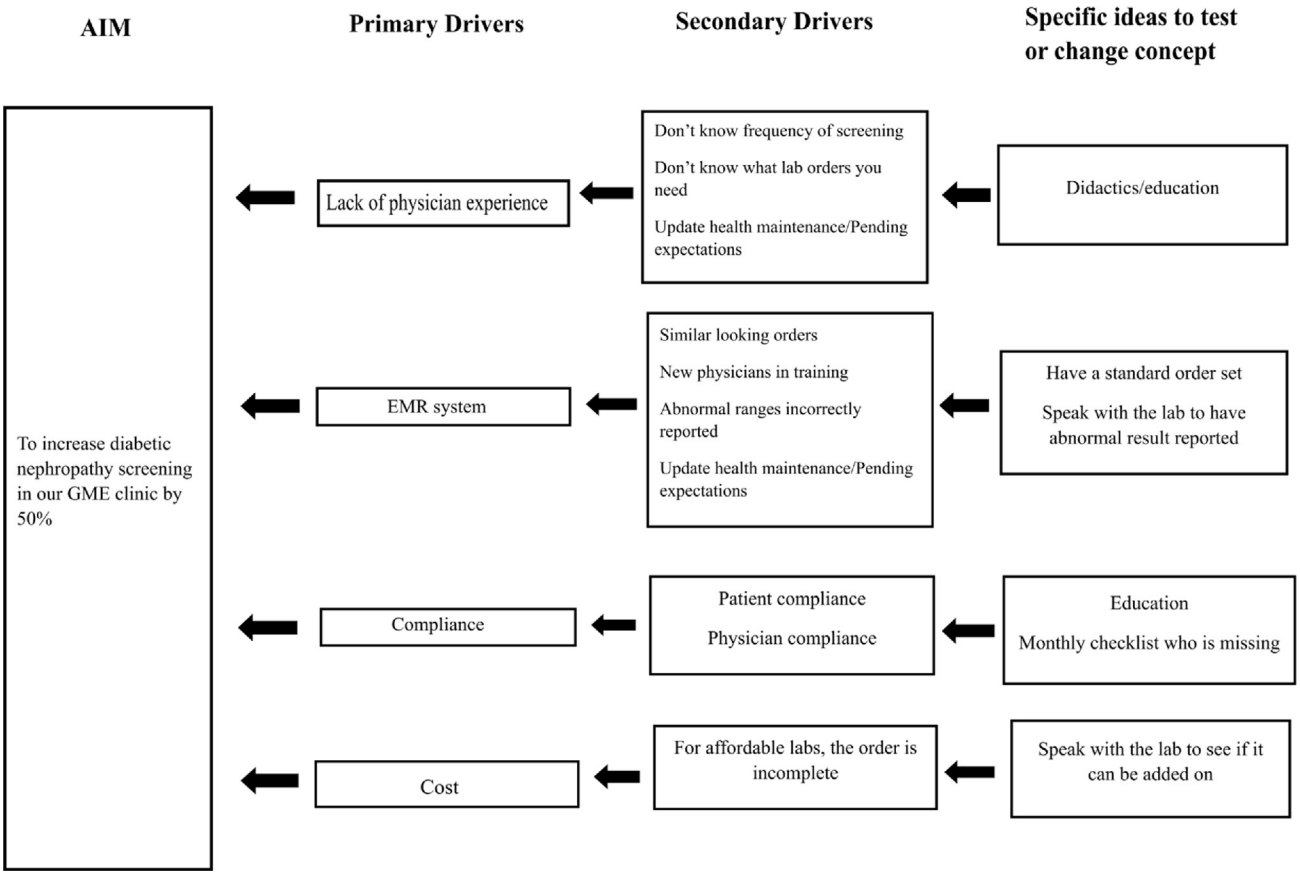

Fig. 1. Driver diagram highlighting the primary and secondary drivers that affect our goal.

the number of UACR results each month during the pre and post intervention periods by all 50 residents in the clinic as a surrogate marker.

2.2. Affordable lab order form

With 27% of our patients uninsured and 38% Medicare/Medicaid in our clinic, many residents use an affordable lab order form (see Appendix Image 1), a physical paper form with the total out of pocket cost of individual and package labs at our in-hospital laboratory. The current form listed urine microalbumin alone with no option for urine creatinine or any ratio. We aimed to have the UACR added to the affordable lab order form to aid physicians and patients in obtaining proper nephropathy screening (see Appendix Image 2).

With our faculty support and enlisting the support of the Chief Academic Officer at our clinical site DHR, we initiated monthly meetings to propose these changes to the laboratory and laboratory order form. In discussion with our laboratory partners, updating the affordable lab order form was a feasible next step and therefore we made this the top priority in our project for the lab.

2.3. Electronic medical record UACR optimization

The EMR at our local institution did not have a reference range for UACR and therefore abnormal results were not flagged. Physicians are accustomed to having abnormal results automatically highlighted and are frequently reviewing 20 or more individual results. The current system depends on physicians to analyze the UACR, know the normal values or search for reference ranges. In the same meetings mentioned above with our faculty, Chief Academic Officer and laboratory leadership, we proposed implementing a reference range for the UACR into the system-wide EMR. We conducted several meetings to discuss the importance of these changes, follow the appropriate protocols for implementing changes in laboratory results, and provided examples from other laboratories reporting abnormal UACR values. The laboratory partners identified this requested change as more complex

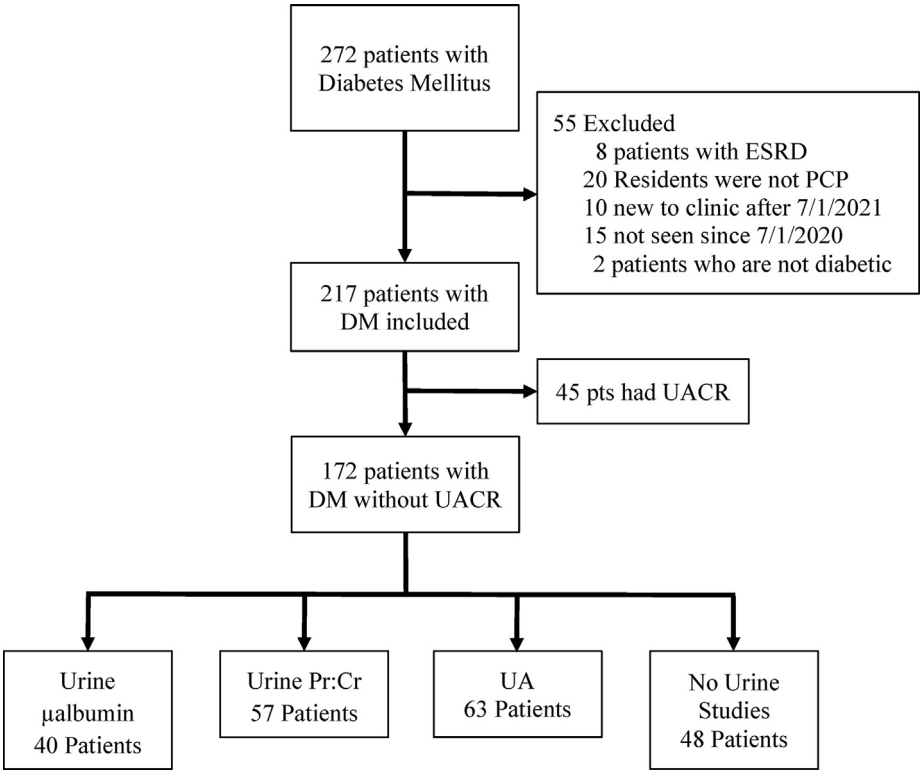

Fig. 2. Pre-intervention analysis of patients with diabetes in resident internal medicine clinic.

and therefore we listed it as the second priority, after getting the affordable lab order form updated.

2.4. Statistical analysis

Resident Education. To test the foundational knowledge of the residents on diabetic nephropathy screening, we created a pre-survey in RedCap to distribute prior to our didactic session. The survey consisted of 7 questions with 6 knowledge-based questions and 1 question to assess resident's perception of barriers to diabetic nephropathy screening.

We then conducted a didactic session on the importance of screening for diabetic nephropathy, the method for screening, frequency, and timing for screening, and how to interpret normal and abnormal values. We constructed a "diabetic patient order set" on the EMR and showed the residents how to access this order set. This order set included ordering glucometer, glucose strips, lancets, HgbA1c, CMP, lipid panel, UACR, annual foot exam, and referrals to ophthalmology and optometry.

Independent Probabilities. We then administered an anonymous post-survey to the residents during noon conference and resident leaders of the project encouraged their colleagues to complete surveys. We used independent analysis to compare pre and post-survey results. Due to the resident survey being anonymous, we were unable to perform pairing during our analysis, leading to a loss of statistical power.

Conditional Probabilities. In this cohort study, data from 217 patients with diabetes was collected. Success was considered if a patient was screened obtaining dichotomized variables (0 = No, 1 = Yes). Paired analysis for patients was done in a two by two contingency table. We categorized the visits as initial and post intervention in order to calculate the conditional probability of successfully ordering a test in the second visit. We monitored the improvement of ordering the test in the second visit conditioned if the test was obtained or not in the first visit. . The same patient list was used in the pre intervention and post intervention data collection. The effect of the intervention was calculated with risk ratio, and absolute difference in the pre and post intervention period. The 95% confidence intervals were calculated with Wolff method and chi squared with McNemar for paired samples in patients. All calculations were made with Stata release 17.0.

3. Results

In the pre-intervention data collection, out of the 217 total patients, 172 (79.5%) patients did not have a

UACR. From the patients without UACR, 40 (23.3%) patients had a urine microalbumin level only, 57 (33.1%) patients had a urine protein/creatinine ratio, 63 (36.6%) patients had a urinalysis (UA), 48 (27.9%) patients had no urine studies (Fig. 2). 36 patients had two studies either a UA plus a microalbumin or a UA plus a protein/creatinine ratio. From the 217 patients included, 195 (89.9%) were inappropriately screened with a GFR through a general basic metabolic panel.

Regarding the affordable lab order form (see Appendix Image 1 and Image 2), the laboratory director was able to obtain a UACR for $30 out of pocket, compared to the urine microalbumin order alone which was $10. The updated order on the paper also required an updated order in the EMR and both were accomplished in March 2022 (Fig. 3).

Regarding the EMR UACR optimization, the laboratory had various steps that required time and deliberation including checks from their accrediting agency, The College of American Pathologist, including information going from the test environment to the production environment for validation. During meetings the resident leaders and program faculty used patient safety, the Clinical Learning Environment Review program and other shared goals between the residency and the clinical site to make progress on the goals. The reference range and highlighted abnormal values went "live" March 2022 (Fig. 3).

Regarding resident knowledge, 47 of 50 (94%) of residents completed the pre-survey and 50 out of 50 (100%) residents completed the post-survey. The pre-intervention survey showed the correct average score of knowledge-based questions was 82%. The

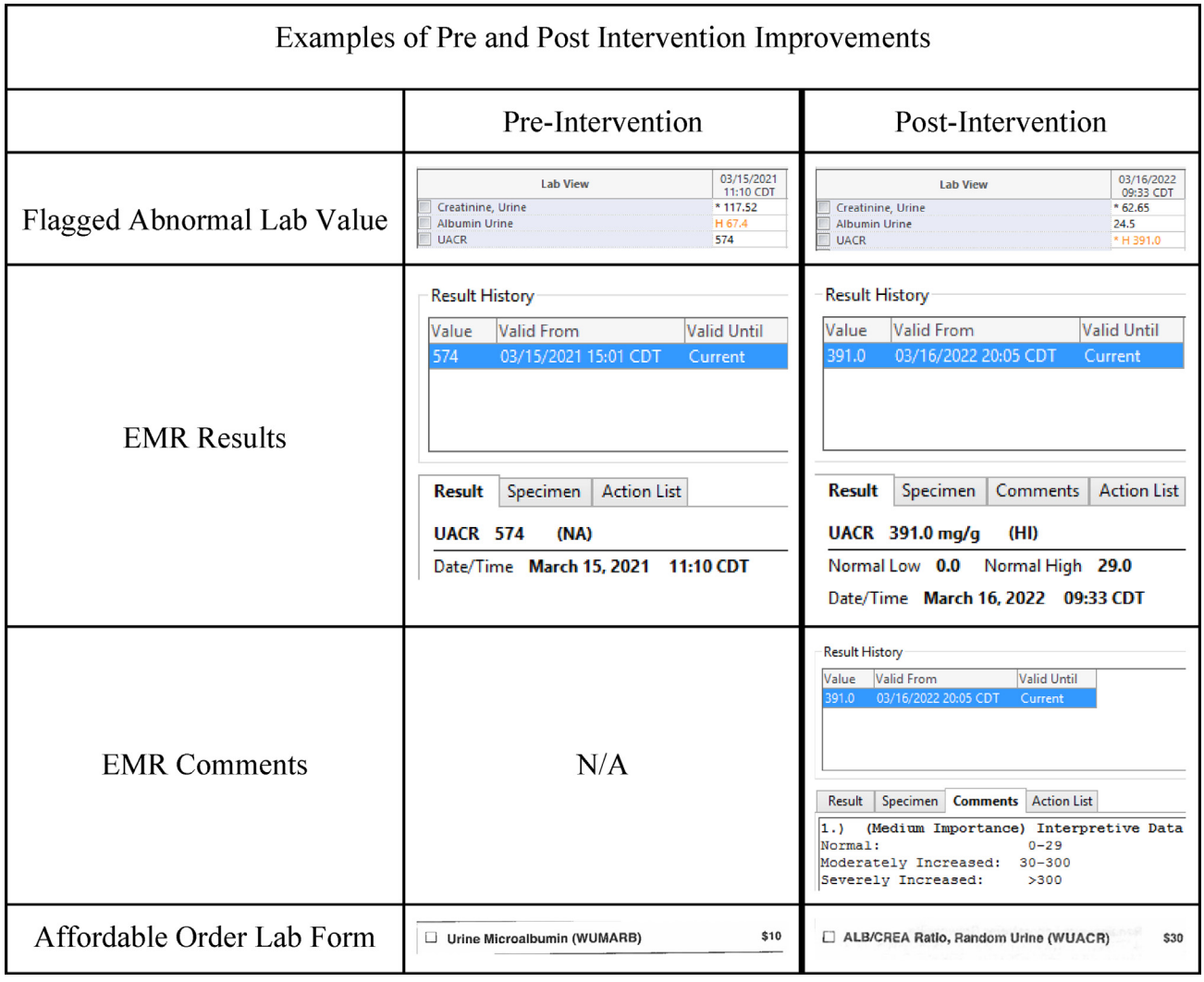

Fig. 3. Examples in pre and post intervention improvements including flagged abnormal lab values and the interpretation of lab values.

resident-perceived most frequent reason why the UACR was not completed was "patient lost to follow up". The post-intervention survey showed an increase in the average score to 88%. The resident-perceived most frequent reason why the UACR was not completed was a tie between "provider not aware to screen for diabetic nephropathy" and "patient lost to follow up", as seen in Fig. 4. The average of correct answers per question is noted in Table 1.

Pre and post surveys were analyzed using independent analysis due to surveys being anonymous and unable to pair among residents. This led to a decrease in statistical power resulting in a positive trend in knowledge base, however without statistical significance. This was aggravated by our low sample size.

In the post-intervention data collection, the probability ratio for being screened before intervention (Period 1) was 1.6 (95% CI 1.2, 2.1; $p = 0.003$). If screening was only completed in the post-intervention period (Period 2) the probability ratio increased to 3.2 (95% CI 2.4, 4.3; $p < 0.001$) with an attributable increase on probability ratio due to the intervention of 46%, (95% CI 37, 56%), as seen in Fig. 5.

The number of UACRs performed per month in our clinic is plotted over time along with notations of our interventions in Fig. 6.

4. Discussion

The goal of this project was to increase diabetic nephropathy screening rate in our GME clinic by 50% from our baseline. This was achieved by

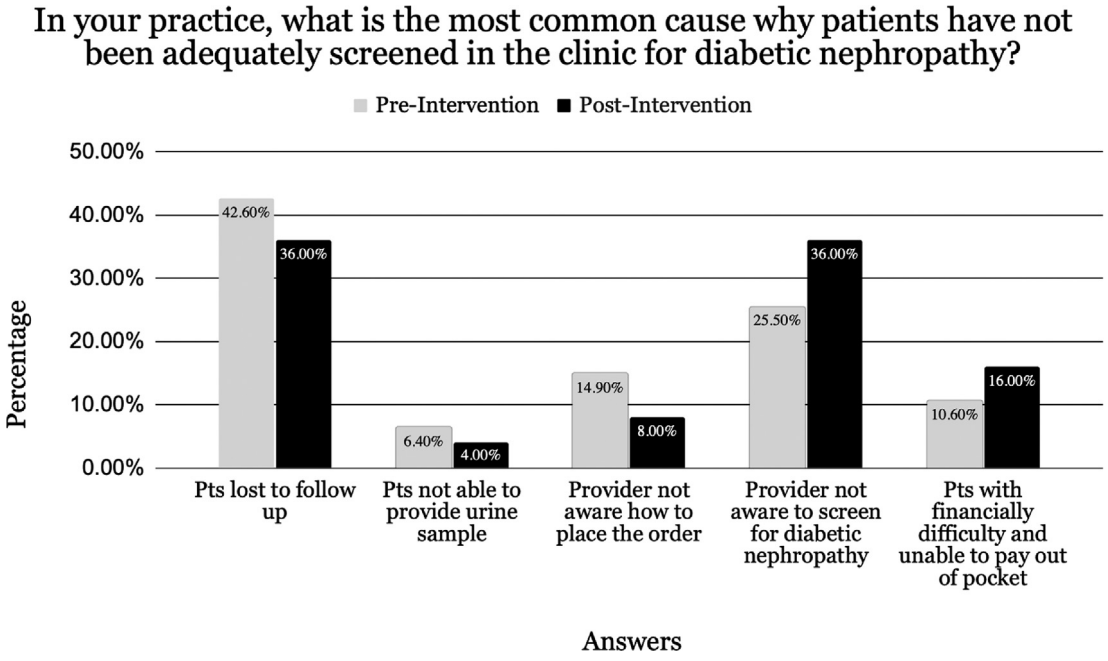

Fig. 4. Comparison of pre and post intervention survey data on what is the resident-perceived most common cause why patients are not screened for diabetic nephropathy showing no significant difference (chi-square = 2.93, d.f. = 8, p-value = 0.57).

Table 1. Comparison of the number of residents who answered correctly on knowledge-based questions on pre and post intervention surveys. Post intervention survey showed an improving trend in our knowledge base.

Question	Pre-Intervention # of residents who answered correctly (%)	Post-Intervention # of residents who answered correctly (%)	p-values
What is the purpose of screening for diabetic nephropathy?	46/47 (97.9%)	50/50 (100%)	0.27
When do you start screening for diabetic nephropathy?	28/47 (59.6%)	34/50 (68%)	0.38
What is the recommended screening strategy for diabetic nephropathy?	40/47 (85.1%)	43/50 (86%)	0.90
What is a positive UACR test?	40/47 (85.1%)	47/50 (94%)	0.14
How often do we screen diabetic patients for nephropathy?	43/47 (91.5%)	49/50 (98%)	0.14
What is the recommended treatment for diabetic nephropathy?	33/47 (70.2%)	40/50 (80%)	0.26

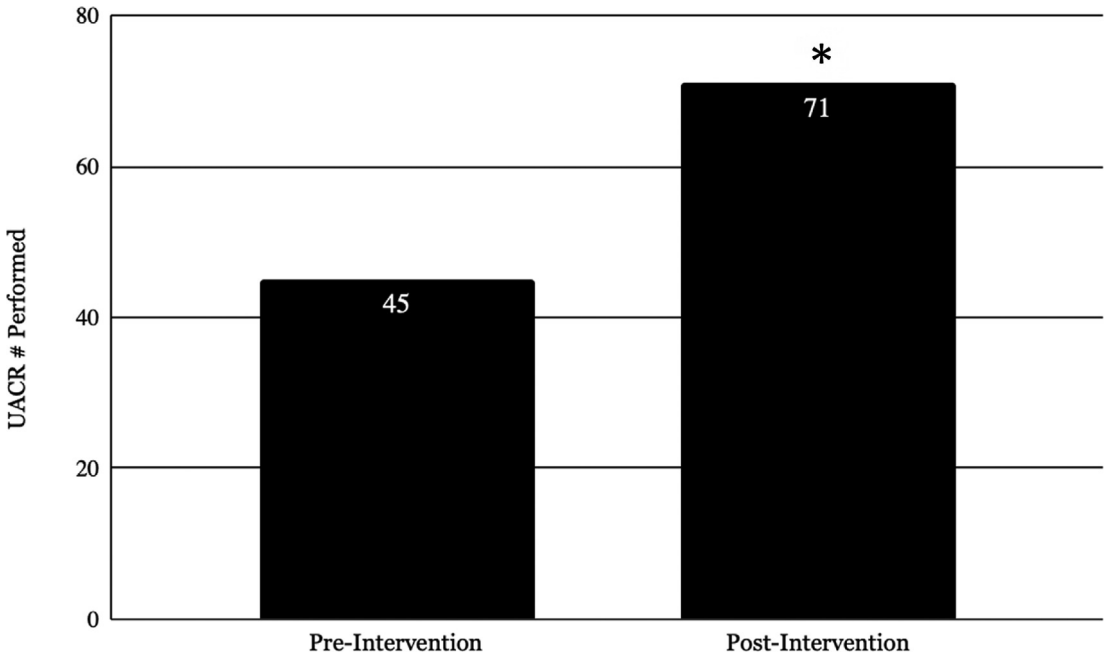

*Fig. 5. Comparison of number of UACR performed pre and post intervention. Pre-Intervention: 45 UACRs performed (20.7%). Post-Intervention: 71 UACRs performed (29%). * RR = 3.2 (95% CI 2.4, 4.3; p-value <0.001), if no screening in Pre-Intervention and screened in Post-Intervention.*

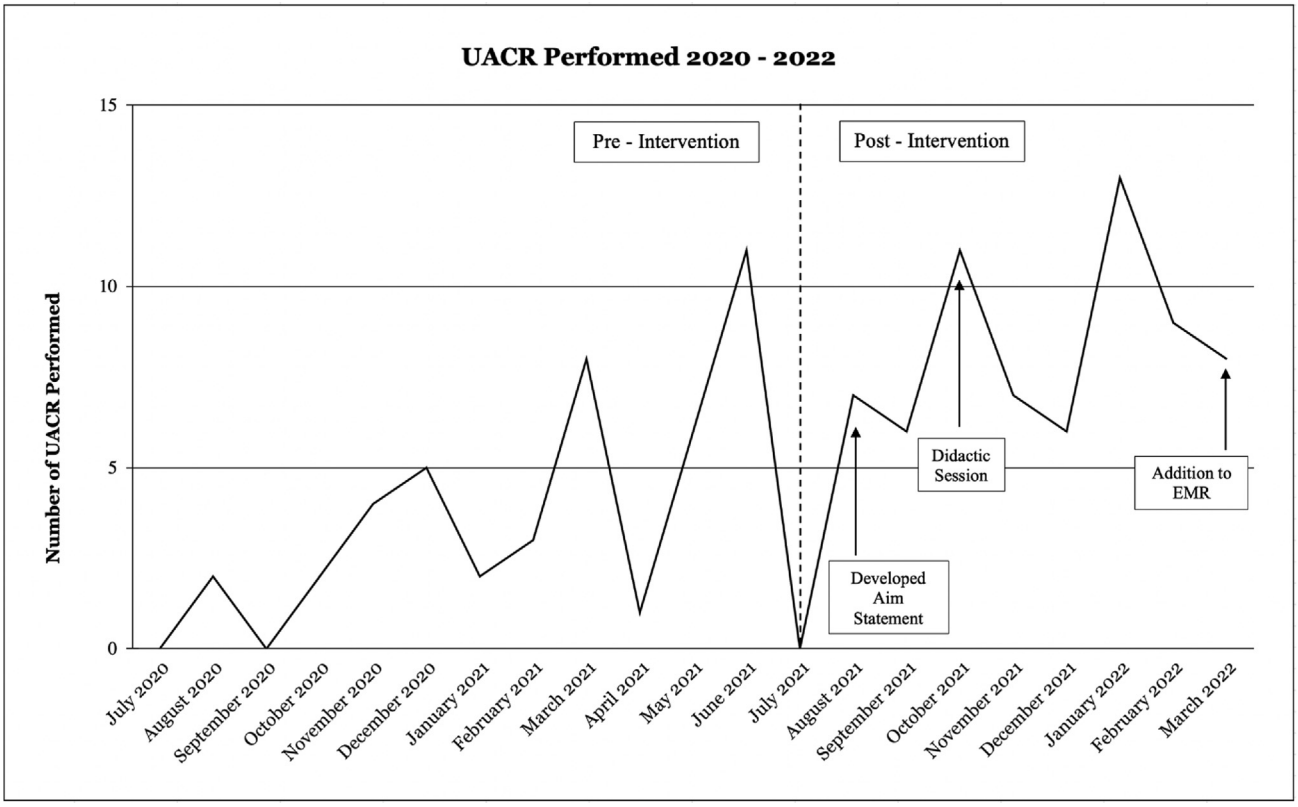

Fig. 6. Number of UACR performed over the study period. Dotted line separates the "Pre-Intervention" Period on left and "Post-Intervention" on right. Aim statement was developed in August 2021. Didactic session was held in October 2021. UACR order was added to the institution-wide EMR in March 2022.

increasing UACR screenings from 20.7% to 32.7%. The primary drivers we identified as contributing to our goal were 1) lack of physician experience, 2) the electronic medical record system, 3) compliance, and 4) cost. These primary drivers had specific secondary drivers that were identified and listed (Fig. 1). Specifically, Clinic No-Shows are the main secondary driver under compliance. This was addressed with patient education on the importance of obtaining a timely UACR result. In the last column on the right are listed specific interventions we have implemented to address each primary and secondary driver.

The resident-led nature of this project led to an increase resident buy-in to complete surveys and actively participate. Leaders of this QI project used several interventions including resident education, changes in affordable lab orders to include UACR and changes in EMR results. EMR use influences physician decisions. Being alerted to abnormal lab values prompts a physician to act on them. Therefore, the most enduring interventions of this QI project include changes to the EMR, addition of UACR reference ranges, flagging of abnormal results and addition of UACR in the affordable lab order form which ultimately occurred towards the end of the post-intervention. This cohort study shows that a resident-led quality improvement initiative with faculty support was successful in significantly improving screening for diabetic nephropathy in a Hispanic-predominant clinic population.

Our study in the context of other works. Our study contributes to the literature supporting the effectiveness of quality improvement projects in resident clinics to improve diabetic nephropathy.[11–13] Furthermore, it adds to the small amount of literature available showing the success of resident-led quality improvement projects to address this national gap in screening for diabetic nephropathy such as Curran's resident-led project using the HEDIS measure for nephropathy.[11] The benefits of a resident-led approach include accomplishing the Accreditation Council for Graduate Medical Education requirements surrounding experiential learning in quality improvement, accomplishing the Clinical Learning Environment Review requirements, and resident "buy in" or engagement.[21] Residents were proud to have made a long-term impact on our community as recognizing the presence of diabetic nephropathy is the first step in treating and halting progression of this disease that is so prevalent in our region.

Reflections on implications of our results. Our pre-intervention diabetic nephropathy screening rates at 1 in 5 patients successfully screened are similar to national rates suggesting that our population and/or providers face similar barriers to others.[3,22] It is interesting to note that 85% of residents answered the questions about nephropathy screening and UACR correctly in the pre-survey, yet, our clinic population was only 20.7% correctly screened in the pre-intervention period. Though we did not chart review to identify specific barriers such as patient noncompliance or competing priorities during office visits, high pre-survey medical knowledge leads us to believe that lack of medical knowledge was not a major contributing factor to low pre-intervention nephropathy screening rates in our resident clinic.

Our resident-perceived barriers are consistent with multiple studies showing high testing rates with eGFR and poor adherence for testing with UACR.[3,22] This factor is likely secondary to eGFR and serum creatinine being part of BMPs and CMPs which are routinely ordered for multiple reasons. The two tests are also blood tests which often come with less logistical difficulties than urine collection. Our study serves as groundwork to educate the health care community from moving away from misappropriately using eGFR for diabetic nephropathy screening and adequately using UACR as established in the national guidelines.

The success of our intervention, similar to other successful QI projects for diabetic nephropathy, depended partially on EMR optimization.[3,9,10] Unique to our study was the approach to address our underinsured population by updating our affordable lab order form. For years, residents had used this lab order form which obtained a urine microalbumin level alone which could not be clinically interpreted, and residents had no way of knowing the cost if they were to order separately a UACR. This study served as a benchmark in assessing general resident knowledge. Through its completion, this study also highlighted that motivated residents should be key stakeholders in institutional quality improvement efforts as they can have influence over a health system to implement system wide changes.

Limitations of our study. We faced several challenges including a cumbersome EMR where the health maintenance tab did not effectively record core measures for patients with diabetes, outside labs being scanned in a separate folder, and an extended amount of time to go through the processes to change our lab reporting and ordering. With our third-year residents being the leaders of this resident-led project, we concluded data collection by March to allow for project completion prior to graduation. This resulted in the data having little

impact from the EMR intervention which ultimately went live in March as well. Our pre-intervention was a full year while our post-intervention was July to March, and since the screening UACR is annual we cannot see the full results of the intervention as more screening could be scheduled later in the year. Yet despite these factors, we still identified a significant increase in diabetic nephropathy screening which is promising.

Limitations include being a single-site and single-academic year intervention. Increases in UACR ordering could be partially from the Hawthorne effect, as residents knew they were being monitored and particularly 1/5th of the residents were leading the project themselves, therefore very motivated. In regard to resident knowledge assessment, the surveys had a high response rate, but residents were not matched to answers in the pre and post questionnaires. Furthermore, low sample size due to size of residency program and attendance at the didactic session not being a requirement, made conclusions from the survey limited. For future projects, tracking responses by individual residents by establishing unique identifiers and correctly identifying which residents attended the didactic session would allow us to increase power.

Future research. Future research can include continued monitoring of diabetic nephropathy screening to see if system-level changes were a primary driver as these residents graduate and a new set of residents begin. More research is needed in the underinsured to identify effective approaches for increasing screening compliance in this population.

Conclusion. Through resident education, EMR optimization and affordable lab order form updates, our resident-led quality improvement project increased screening for diabetic nephropathy from 20.7% to 32.7% thus reaching our aim of increasing screening rate by 50%. We found the resident-led QI project to be feasible and effective even in an underinsured and high-risk Hispanic population.

Disclaimers

Authors confirm the article has not been submitted to other publications and/or presented at a conference or meeting.

Source(s) of support

No grants, drug(s), equipment, and/or other support facilitated the conduct of the work.

Acknowledgements

We thank Sumandeep Brar, M.D. and Kalyana Mondreti, M.D. for their contributions.

Appendix

Patient: Name_____ Date of Birth_____

Packages:		Additional lab tests that may be added on to any package or purchased individually:	
☐ **General Wellness Screening (GWELL)** • CBC, CMP (must be fasting for accurate blood sugar level) • Cholesterol and Lipid Profile (must be fasting)	$20	☐ **Complete Blood Count (WACBC)** * Broad screening test to check for anemia, infection and many other diseases	$15
☐ **Women's Wellness Screening (WWELL)** • CBC, CMP (must be fasting for accurate blood sugar level) • Cholesterol and Lipid Profile (must be fasting) • Thyroid Stimulating Hormone • Iron	$30	☐ **Thyroid Stimulating Hormone (WTSH)** * Evaluate thyroid Function	$10
☐ **Men's Wellness Screening (MWELL)** • CBC, CMP (must be fasting for accurate blood sugar level) • Cholesterol and Lipid Profile (must be fasting) • Prostate Specific Antigen • Testosterone	$45	☐ **Hemoglobin A1c (WA1C)** * Reflects your average blood glucose level over the last 3 months	$15
☐ **Diabetes Screening (WDIAB)** • Hemoglobin A1C, Glucose, Insulin	$25	☐ **Prostate Specific Antigen (WPSA)** * PSA is detected in men who have an abnormal prostate gland and aids in the detection of prostate cancer	$15
☐ **Heart Screening (HEART)** • Cholesterol and Lipid Profile (must be fasting) • WHSCRP	$25	☐ **Prothrombin Time (WPT)** *A blood test that measures the time it takes for the blood to clot	$15
☐ **Anemia Profile (WANP)** • Vitamin B12 Level, H&H, Ferritin, Folate, Iron, Transferrin	$20	☐ **Helicobactor Pylori (serum IgG) (WHPY)** * Detects the presence of H. Pylori in the stomach. Researchers believe H. Pylori is responsilbe for peptic ulcers	$20
☐ **Arthritis Profile (WARP)** • Anti-Nuclear Antibody, C-Reactive Protein, Sedimentation Rate, Rheumatoid Factor, Uric Acid	$30	☐ **Cancer Antigen 125 (WCA125)** * Tumor marker or biomarker that may be elevated in the blood of some patients with ovarian cancers	$30
☐ **Thyroid Panel (WTP)** • Thyroid Stimulating Hormone, Total T3, Total T4, T3 Uptake, • Free T4	$30	☐ **Urinalysis (WUACM)**	$20
☐ **Vitamin D (WVITD)**	$20	☐ **Urine Microalbumin (WUMARB)**	$10
		☐ **High Sensitivity C-Reactive Protein (WHSCRP)** * CRP is a general marker for inflammation and infection. It can be used to assess for heart disease risk.	$15
		☐ **Human Chorionic Gonadotropin (serum) (WHCG)** * hCG is a glycoprotein hormone produced during pregnancy.	$15
		☐ **HCG Urine (WUPREG)**	$14

Image 1. Pre-Intervention affordable lab order form.

Patient: Name_____ Date of Birth_____

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☐ **General Wellness Screening (GWELL)** • CBC, CMP (must be fasting for accurate blood sugar level) • Cholesterol and Lipid Profile (must be fasting)	$20	☐ **Complete Blood Count (WACBC)** * Broad screening test to check for anemia, infection and many other diseases	$15
☐ **Women's Wellness Screening (WWELL)** • CBC, CMP (must be fasting for accurate blood sugar level) • Cholesterol and Lipid Profile (must be fasting) • Thyroid Stimulating Hormone • Iron	$30	☐ **Thyroid Stimulating Hormone (WTSH)** * Evaluate thyroid Function	$10
☐ **Men's Wellness Screening (MWELL)** • CBC, CMP (must be fasting for accurate blood sugar level) • Cholesterol and Lipid Profile (must be fasting) • Prostate Specific Antigen • Testosterone	$50	☐ **Hemoglobin A1c (WA1C)** * Reflects your average blood glucose level over the last 3 months	$15
☐ **Diabetes Screening (WDIAB)** • Hemoglobin A1C, Glucose, Insulin	$25	☐ **Prostate Specific Antigen (WPSA)** * PSA is detected in men who have an abnormal prostate gland and aids in the detection of prostate cancer	$15
☐ **Heart Screening (HEART)** • Cholesterol and Lipid Profile (must be fasting) • High Sensitivity C-Reactive Protein	$30	☐ **Prothrombin Time (WPT)** *A blood test that measures the time it takes for the blood to clot	$15
☐ **Anemia Profile (WANP)** • Vitamin B12 Level, H&H, Ferritin, Folate, Iron, Transferrin	$30	☐ **Helicobactor Pylori (serum IgG) (WHPY)** * Detects the presence of H. Pylori in the stomach. Researchers believe H. Pylori is responsilbe for peptic ulcers	$20
☐ **Arthritis Profile (WARP)** • Anti-Nuclear Antibody, C-Reactive Protein, Sedimentation Rate, Rheumatoid Factor, Uric Acid	$40	☐ **Cancer Antigen 125 (WCA125)** * Tumor marker or biomarker that may be elevated in the blood of some patients with ovarian cancers	$30
☐ **Thyroid Panel (WTP)** • Thyroid Stimulating Hormone, Total T3, Total T4, T3 Uptake, • Free T4	$30	☐ **Urinalysis (WUACM)**	$20
☐ **Vitamin D (WVITD)**	$20	☐ **Urine Albumin (WUMARB)**	$10
		☐ **ALB/CREA Ratio, Random Urine (WUACR)**	$30
		☐ **Human Chorionic Gonadotropin (serum) (WHCG)** * hCG is a glycoprotein hormone produced during pregnancy.	$15
		☐ **HCG Urine (WUPREG)**	$14

Image 2. Post-Intervention affordable lab order form.

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