Supplemental Methods:

All kidney biopsies were performed and evaluated by four attending interventional radiologists under real-time imaging guidance. The radiologists' post-training experience ranged between 1 and 15 years, with a mean of 6.5 years and standard deviation of 5.6. Real-time ultrasound guidance was used as the default option. CT guidance was used in patients with poor visualization of native kidneys on ultrasound, or if the patient had a prior history of failed ultrasound-guided but successful CT-guided biopsy. Semi-automated spring-loaded core biopsy needles were utilized for performing all kidney biopsies as per institutional protocol. The length of each core specimen was measured immediately on a moistened, non-adhesive dressing pad. Using an Apple iPhone 7, only used for this project, a photograph of the specimen was then obtained. The smartphone was held approximately 6 inches from the specimen when the picture was obtained. Auto-focus was employed without using optical zoom.

An adequacy rating was recorded by the performing radiologist based on the length of the tissue specimen and examination of the smartphone photograph (zoomed in) on a desktop screen. Tissue was deemed adequate based on a core length approaching 1 cm and the presence of brown speckless on the background of light tan tissue, indicating a cortical specimen. In our experience, operators can distinguish between the appearance of the renal capsule, cortex, medulla, and fibro-fatty tissue using gross appearance. Renal capsule appears like a string of fibrofatty tissue. Fat is yellowish and easy to identify. Renal cortex has brown speckles on the background of light tan tissue while the medulla has a paler appearance **(Figure 1).**

The biopsy specimens were then taken to the pathology department for microscopic evaluation to determine specimen adequacy, as routinely done for all kidney biopsies. Microscopic evaluation was used to determine necessity for more specimens. On microscopy, a core specimen was

considered adequate if at least 7-8 glomeruli were present and the specimen was predominantly renal cortex. The sampling was considered complete if a minimum of 20 glomeruli had been obtained between all core specimens. Photographs, and the process for adequacy assessment were repeated if more samples were required. Once adequate specimens were obtained, the procedure was completed. Patient demographics and clinical data were obtained by chart review. The kappa statistic and confidence intervals accounting for clustered matched-pair data was calculated to measure the level of agreement between the bedside smartphone-assisted assessment and the microscopic assessment. To check for confounding by imaging modality, a sensitivity analysis was performed, using data only from ultrasound-guided biopsies. All analyses were performed using SAS version 9.4 (SAS Institute Inc., Cary, NC, USA). Our research protocol was approved by the Geisinger Institutional Review Board.