Levels of proteinuria

- Level of proteinuria (elevated protein in the urine) can indicate kidney injury and provide information about kidney disease progression.

Levels of proteinuria

- Proteinuria: proteinuria is measured in several distinct ways and standardized representation in the CDM varies, e.g.,
  - Urine dipstick: "+" to "4+" scale (value as concept id) or numeric mg/dL estimates (value as number)
  - Urine protein to creatinine ratio (UPCRs): not always directly reported, can be calculated from urine protein and urine creatinine measurements

Implementation:

- Heterogenous urine dipstick results are classified. Where UPCRs are not directly reported, UPCR are calculated from separate urine protein and urine creatinine labs within the specified time window.

Evaluation:

- Deriving UPCR from separate urine protein and urine creatinine measurements leads to a >2x increase in the number of patients with available data for both cohorts. A greater proportion of patients in the longer-term nephrophy cohort have urine protein measurements available and meet criteria for proteinuria, as expected. Periodic manual re-review is required as data is updated.

Future work:

- Further parameterize approach to incorporate flexibility but reduce variability in downstream processing decisions, e.g., thresholds for proteinuria, plausible bounds for quantitative measurements, time window for associating urine protein and urine creatinine measurements.

Presence of hematuria

- Blood in the urine (hematuria) can be a sign of glomerular kidney disease.

Levels of hematuria

- Hematuria: Hematuria is measured in several distinct ways and standardized representation in the CDM varies, e.g.,
  - Urine dipstick: "+" to "4+" scale (value as concept id) or numeric mg/dL estimates (value as number)
  - Urine protein to creatinine ratio (UPCRs): not always directly reported, can be calculated from urine protein and urine creatinine measurements

Implementation:

- Assessment of hematuria is identified as dipstick/microscopy based on result. Heterogenous results are classified. Hierarchy is applied so microscopy results take precedence. For both test types, CDM results are hematuria and report classification, e.g.,
  - Microscopy: None, 0-2/5/5-10, NTNC ("Too numerous to count")

Evaluation:

- A greater proportion of longer-term cohort have measurements available and evidence for hematuria, as expected. Periodic manual re-review is required as data is updated.

Future work:

- Parameterize timeframe for associating multiple urine blood tests, increase granularity of categorization (e.g., from NEGATIVE/POSITIVE to NEGATIVE1+2+ etc.).