

## **THE COST-EFFECTIVENESS OF SCREENING FOR MICROALBUMINURIA: A SIMULATION MODEL FOR CHRONIC KIDNEY DISEASE**

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**Purpose:** To develop a simulation model of the progression and costs associated with chronic kidney disease (CKD) in order to evaluate the cost-effectiveness of microalbuminuria screening.

**Methods:** The model has 7 states—no CKD, CKD stages 1 to 5, and death. Based on NHANES laboratory data, the model simulates glomerular filtration rate (GFR) and albuminuria levels, two predictors of CKD progression. The model includes several risk factors for CKD and CVD, including diabetes, hypertension, smoking, and cholesterol. Each model stage and complication was assigned an associated cost and quality of life value based on published data. Costs were also estimated for microalbuminuria screening and subsequent treatment with ACE inhibitors or angiotensin II-receptor blockers. We simulated the population from age 30 until death and assessed the cost-effectiveness of screening for microalbuminuria.

**Results:** We validated the model against NHANES and USRDS data, demonstrating that it can be used to accurately evaluate the cost-effectiveness of CKD interventions. Universal, annual screening for microalbuminuria beginning at age 50 has a cost-effectiveness ratio of \$67,000/QALY relative to no screening and \$172,000/QALY relative to usual care. Relative to no screening, targeted annual screening had cost-effectiveness ratios of \$6,000/QALY, \$48,000/QALY, and \$154,000/QALY, for persons with diabetes, hypertension, or neither condition, respectively.

**Conclusions:** Screening for microalbuminuria is cost-effective for persons with diabetes or hypertension but is not cost-effective for persons with neither diabetes nor hypertension. The model can be used to evaluate other CKD interventions and can be updated as improved data on progression become available.