

## Medication Adherence in Chronic Kidney Disease

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### Abstract

**Background:** End stage renal disease (ESRD) is an important public health problem in the United States, and is associated with significant morbidity and a high annual mortality rate. Chronic kidney disease (CKD) is a precursor to ESRD and also directly increases rates of hospitalization and cardiovascular or all cause mortality. Both diabetes and hypertension are the most frequent contributors to the growing incidence and prevalence of CKD and ESRD. Influencing the rate of progression of CKD to ESRD remains a challenging yet a critical target in improving patient outcomes. Treatment of hypertension with a rennin-angiotensin system blockers, reduction of proteinuria, glycemic control, lipid reduction, anemia management and treatment of bone/mineral disorders are among the evidence based therapeutic targets in management of CKD patients. Data regarding physician conformity or medication adherence for their impact on CKD progression remains poorly described.

**Aim:** i) We aim to examine patterns of medication adherence used in treating evidence based therapeutic targets in chronic kidney disease; by studying distribution of medication adherence, including physician conformity to practice guidelines. ii) We also aim to examine predictors of poor adherence for medications used to treat co-morbid conditions in CKD, including demographic factors, co-morbid conditions, drug related factors, and physician/provider related factors; and iii) we aim to examine the relationship between measured clinical indicators and drug adherence, particularly the clinical measures of hypertension control and proteinuria reduction in patients with chronic kidney disease.

**Methods:** The proposed study is a retrospective observational cohort study that will include all patients who attended VA clinics and received a prescription at out-patient pharmacy between the period of 1/1/06 and 1/1/08, and who also had an estimated glomerular filtration rate between 15 and 59 ml/min/1.73m<sup>2</sup>. Demographic, co-morbid, and laboratory variables will be extracted using electronic records, along with blood pressure measurements during all clinic visits during the study period. Drug information on all of the prescribed medications, excluding diagnostic/prosthetic supplies and investigational drugs, will be extracted for the study period including a 90 day "washout" period before 1/1/06 and after 1/1/08 respectively. Medication possession ratio (MPR) will be calculated by dividing actual treatment days by total available treatment days for each drug class for each patient; MPR of <0.8 will be classified as poor adherence. All available co-variables will be compared across classes of MPR by univariate (Chi-Square, Fishers exact and Wilcoxon rank-sum tests) and multivariable logistic regression analysis. Predictive index of poor adherence will be developed and validated within the retrospective cohort. MPR, as a continuous variable, will be assessed to as a predictor variable for clinical measures of hypertension control (average blood pressure <130/80), or proteinuria reduction (average excretion of <1 gram per day).

**Significance:** If successful, the proposed study will significantly contribute to an area of literature which remains poorly investigated at the present time. It will allow the development of a clinical tool to predict poor adherence after adjusting for co-morbid conditions, examine patterns of physician conformity for difference classes of medications used in CKD management, and test the optimal threshold of MPR by correlating with clinical

measures. These data can then be validated across other medical centers within the VA healthcare system; most importantly, the proposal will aid in fostering an interdisciplinary collaboration which will be competitive in contributing to literature as well as obtaining extra-mural funding to aid career development.