

## Clark et al, 2011 – Urine volume and change in estimated GFR in a community-based Cohort study

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*Summary provided by William F. Clark, Professor of Medicine at the Western University Canada, Scientist at the Lawson Health Research Institute, and Director of Apheresis and Consulting Nephrologist at the London Health Sciences Centre.*

### Introduction

The message to drink “at least 8 glasses of water a day” is widespread despite a lack of evidence to support this claim. There is some experimental evidence in rats to suggest that fluid loading slows the progress of renal impairment and one recent article (MDRD Study) in patients with advanced kidney failure that suggests the reverse. We wished to study the effect of increased fluid intake on kidney function by evaluating the relationship between urine volume and renal decline over six years in a large community-based cohort. The prospective cohort study was undertaken in Canada from 2002 to 2008 and we obtained 24-hour (validated by urine creatinine) samples from adult participants with estimated GFR (eGFR) of greater than 60 l/min/1.73m<sup>2</sup> at study entry. Percentage annual change in eGFR from baseline was categorized as an average decline (less than 1 percent per year), between 1% and 4.9% (mild to moderate decline) or greater than 5% (rapid decline).

### Key findings

2148 participants provided valid 24-hour urine samples, grouped as less than 1 litre per day (14.5%); 1-1.9 litres per day (51.5%); 2-2.9 litres per day (26.3%); and greater than 3 litres per day (7.7%). Overall eGFR declined by 1% per year with 10% of participants demonstrating rapid decline and 40% demonstrating mild to moderate decline. An inverse graded relationship was evident between urine volume and eGFR decline and for each increasing category of 24-hour urine volume a percentage annual eGFR decline was progressively slower from 1.3% to 1% to 0.8% to 0.5 percent respectively (P=0.02).

Participants with urine volumes of greater than 3 litres per day, were significantly less likely to demonstrate mild to moderate decline (odds ratio 0.66, 95% CI, 0.46-0.94) or rapid decline (adjusted odds ratio of 0.46, 95% CI, 0.23-0.92) when adjusted for age, gender, baseline eGFR, medication use for hypertension including diuretics, proteinuria, diabetes and cardiovascular disease. These results indicated that in a community-based cohort, decline in kidney function is significantly slower in those with a higher versus lower urine volume and presumed fluid intake.

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## Relevance for healthy hydration

We would concur with the editorial in the same issue of CJASN, by Chang and Kramer, that this study provided the strongest data to date supporting higher fluid intake as a preventative measure for GFR loss among individuals with an eGFR of greater than 60ml/min/1.73m<sup>2</sup>. The old adage that suggests “drinking 8 glasses of water per day is good for you” may now have some evidentiary basis. We would also indicate that this work suggesting benefit does create a condition of equipoise in view of the previous MDRD results and emphasizes the necessity of a randomized control trial to test whether increasing fluid intake will result in slowing the progression of renal impairment in patients with mild kidney disease.

*William F. Clark, Jessica M. Sontrop, Jennifer J. Macnab, Rita S. Suri, Louise M. Moist, Marina I. Salvadori and Amit X. Garg; Urine Volume and Change in Estimated GFR in a Community-Based Cohort Study. Clinical Journal of the American Society of Nephrology 6:2634-2641, 2011.*