Twenty-Four-Hour Urine Osmolality as a Physiological Index of Adequate Water Intake

Erica T. Perrier, Inmaculada Buendia-Jimenez, Mariacristina Vecchio, Lawrence E. Armstrong, Ivan Tack, and Alexis Klein. Disease Makers 2015:
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Erica Perrier earned her MS and PhD in Exercise and Sport Science from Oregon State University, and is a NSCA Certified Strength and Conditioning Specialist with a background in sports performance and exercise physiology. Currently at Danone Nutricia Research, Erica oversees research programs investigating the mechanisms regulating total body water balance, in order to understand the mechanisms and consequences of fluid balance regulation in adults and children.

Summary by Erica T. Perrier, PhD, CSCS

Introduction: While water is essential to health and life, there is no single reference value for total daily water intake that is appropriate for all people, in all circumstances. This is because the amount of water you need depends on factors such as the climate you live in, your daily activities, and even the foods you eat. Because of this, it is difficult for health organizations to set a single daily intake goal that is appropriate for everyone.

Your urine output is one factor that can help you tell if you are drinking enough for your specific needs. Producing a large volume of pale-colored urine each day means that your intake is appropriate to replace the water you lose plus to reduce the effort of the kidneys to concentrate your urine. While evidence is still preliminary, there is reason to believe that maintaining a high daily water intake and a high urine volume may reduce your risk for certain kidney and cardiometabolic diseases.

Our aim was to calculate a threshold for urine osmolality, a key measure of urine concentration. While lower urine concentration is considered better, there is little evidence for an actual cut-off value that would represent adequate intake.

Key findings: We found that a 24h urine osmolality of 500 mOsm/kg represented a total fluid intake that satisfied three criteria: 1) meeting European adequate intake
reference values; 2) reducing risk of chronic kidney disease and kidney stone recurrence; and 3) reducing circulating plasma vasopressin, the hormone responsible for water reabsorption in the kidney.

Relevance for healthy hydration – Monitoring urinary hydration biomarkers may be an easy way for health care providers, patients, and the general public to ensure they are drinking enough water to promote sustainable health. This paper provides a reasonable target for 24h urine osmolality that may represent individual adequate water intake.