



As Kidney Stones Increase, Researchers Turn to Technology for Answers

NIH-funded study investigates utility of smart water bottle to reduce the risk of kidney stones

DURHAM, N.C. (March 8, 2018)—Newly published research shows that kidney stones doubled in men and quadrupled in women between 1984 and 2012 (Kittanamongkolchai et al., 2018). As experts scramble for answers on how to quell this unwelcome spike, researchers with the [Prevention of Urinary Stones with Hydration \(PUSH\) study](#) have been testing their own hypothesis for several months; namely, that a high-tech water bottle might be one key to reducing the recurrence of the urinary stone disease, commonly referred to as kidney stones.

“If you have experienced kidney stones in the past, you’re at a high risk of getting them again,” said Dr. Charles Scales, associate professor at Duke Clinical Research Institute and one of the study’s principal investigators, who recently participated in an informative [video about PUSH](#). “Experts agree that one of the best ways to reduce your risk is to drink more water, but it’s not always easy to make changes to your regular lifestyle habits and maintain them over time. The PUSH study will investigate specific ways to encourage, motivate, and support people to achieve their fluid intake goals for the long term.”

Funded by the National Institutes of Health (NIH), the PUSH study is a randomized trial that will enroll 1,642 people, half in an intervention group and half in a control group. The study’s primary aim is to determine whether use of a “smart” water bottle to stay hydrated, along with a program of financial incentives and health coaching, will result in reduced risk of kidney stone recurrence over a two-year period. The trial is supported by the National Institute of Diabetes and Digestive and Kidney Diseases (NIDDK), a part of NIH.

“Urinary stone disease remains an important medical, scientific, and public health problem, and it is an extraordinarily painful one for those it affects,” said NIDDK Director Dr. Griffin P. Rodgers, M.D., M.A.C.P. “With this trial, we’re leaning on technology to find a solution to preventing urinary stones that can fit into people’s lifestyles.”

PUSH researchers will ensure participants are hydrating per the study’s guidance via a smart water bottle that monitors fluid consumption and connects to an app, allowing users to easily check their hydration progress throughout the day. Study participants in

both the intervention and control groups will receive these smart water bottles and will be asked to try to drink enough to expel 2.5 liters of urine per day—about 10.5 cups.

PUSH is currently enrolling at four clinical centers:

- University of Pennsylvania/Children's Hospital of Philadelphia
- University of Texas Southwestern Medical Center in Dallas
- University of Washington in Seattle
- Washington University in St. Louis

To join the PUSH study, participants must be 12 years of age or older, have had at least one symptomatic stone in the past three years, have a low urine output (measured over 24 hours), own a smartphone, and meet other eligibility criteria, as outlined in the trial's ClinicalTrials.gov page: [NCT03244189](https://clinicaltrials.gov/ct2/show/study/NCT03244189), under grant [DK110986](https://clinicaltrials.gov/ct2/show/study/DK110986).

About the PUSH Study and the Urinary Stone Disease Research Network

The PUSH study is being conducted through the Urinary Stone Disease Research Network (USDRN), which is funded by the National Institute of Diabetes and Digestive and Kidney Diseases, a part of the National Institutes of Health. USDRN includes a group of scientists and investigators designing and conducting research on urinary stones (kidney stones) in adults and children in order to learn more about who forms kidney stones, the best treatments, and how to prevent stones from forming. For more information, please visit <http://usdrn.org/>.

References:

Kittanamongkolchai, W., Vaughan, L., Enders, F., Dhondup, T., Mehta, R., Krambeck, A., McCollough, C., Vrtiska, T., Lieske, J. and Rule, A. (2018). The Changing Incidence and Presentation of Urinary Stones Over 3 Decades. Mayo Clinic Proceedings, 93(3), pp.291-299.