New low-cost dialysis system can make medical grade water in the home, next step to clinical trials

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Timing of Sample	Sample No.	Mean Total Organic Carbon (ppb)	Mean Conductivity (uS/cm)
Samples taken during first 100mls of distilled water	1	870 (+/- 56)	3.51 (+/- 0.01)
	2	712 (+/- 18)	3.40 (+/- 0.03)
	3	565 (+/-13)	2.64 (+/- 0.02)
	4	884 (+/- 6)	3.96 (+/- 0.00)
	5	326 (+/- 61)	3.10 (+/- 0.03)
	Mean	**671 (+/- 233)**	**3.32 (+/- 0.49)**
Samples taken during 1000-1200mls of distilled water	6	637 (+/- 18)	2.23 (+/- 0.00)
	7	487 (+/- 4)	2.29 (+/- 0.00)
	8	366 (+/- 7)	1.73 (+/- 0.01)
	9	248 (+/- 1)	2.03 (+/- 0.00)
	10	233 (+/- 1)	2.06 (+/- 0.00)
	Mean	**394 (+/- 170)**	**2.07 (+/- 0.22)**
Samples taken during 2000-2200mls of distilled water	11	309 (+/- 3)	1.72 (+/- 0.01)
	12	389 (+/- 15)	1.60 (+/- 0.00)
	13	331 (+/-5)	1.79 (+/- 0.01)
	14	418 (+/-1)	3.92 (+/- 0.00)
	15	239 (+/- 25)	2.43 (+/- 0.02)
	Mean	**337 (+/- 70)**	**2.29 (+/- 0.97)**

Table 1 – The results of total organic carbon and conductivity testing for samples taken during the first 100mls, between 1000-1200mls and between 2000-2200mls of distilled water. The mean of four measurements is reported for each sample for total organic carbon and conductivity. Total organic carbon measured in ppb (parts per billion) and conductivity in uS/cm.

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Findings from preliminary tests of a new dialysis system have confirmed its ability to make sterile, medical grade water to provide an affordable, accessible home-based treatment option for patients with kidney failure.

This means that the Ellen Medical Devices Point-of-Care dialysis system can create peritoneal dialysis fluid (a mix of sterile water, electrolytes, and glucose) affordably where treatment is most needed.

Presenting at the World Nephrology Congress during the Late Breaking Clinical Trial Session, Dr. Ben Talbot, clinical advisor for Ellen Medical Devices said: "The manufacture and transportation of peritoneal dialysis fluid can be both financially and environmentally costly. Creating the treatment fluid at the point-of-care offers a new low-cost solution to reach more individuals who need critical treatment for kidney failure around the world, particularly in the most resource-poor and remote environments."

Millions of people globally die unnecessarily every year because they cannot access treatment for kidney failure, with most of these preventable deaths occurring in China, India, Indonesia, Pakistan, and Nigeria. In 2010, 2.6 million people were receiving kidney replacement therapy for terminal kidney failure but as many as seven million could be missing out on life-saving treatment. These numbers are growing by 7% annually and are projected to increase dramatically to 5.4 million by 2030, with most of the increase in developing countries.

The research team tested the pure water distiller component of the dialysis system using tap water in a laboratory in Sydney, Australia. Distilled water produced by a patented small, portable pure water distiller was collected and tested for total organic carbon and conductivity levels to assess water purity. After an initial running in period, the distiller produced water which met the standards suitable for use in dialysis fluid.

The Ellen Medical Devices Point-of-Care system has been designed to sterilize water from any source to produce peritoneal dialysis fluid to help address the huge unmet need for dialysis globally.

Professor John Knight, managing director of Ellen Medical Devices said: "We will build on these encouraging initial results by conducting several clinical studies over the next year with the first starting in coming months. It will be so exciting to see kidney patients using our system to create peritoneal dialysis fluid in their own homes."

The findings are published in *Kidney International Report*.

More information: B. Talbot et al, POS-713 proof of concept for a point of care affordable dialysis system, *Kidney International Reports* (2022). DOI: 10.1016/j.ekir.2022.01.747

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