

## KQUIP Hub: Pro forma for measurements and tools, relevant for use in the renal setting

<b>Name of measurement / tool</b>	Bioimpedance aka Body Composition Monitor (BCM)
<b>Variable to be measured</b>	Fluid status / overhydration of people
<b>Brief description of the measure / tool</b>	Bioimpedance is commonly used to measure body composition. The test introduces a small electric current into the body through sticky pads (electrodes) on the skin and measures the opposition to the flow of current. Because electric current is conducted through the water in the body, the measurement can be used to estimate fluid status.
<b>Relevance to the renal community</b>	Most bioimpedance devices are based on an assumption of normal fluid status, making them unsuitable for use in renal patients. However, the BCM was designed specifically for patients with renal failure and it accounts for altered fluid status.
<b>Relevance for a renal related QI project</b> Describe how the measure / tool could be used in a renal QI project. This may not be exhaustive but may inspire others.	BCM is an objective measure of fluid status. This could be useful for projects assessing interventions related to fluid status or management (e.g. fluid restrictions, dietary advice).
<b>Accreditation (e.g. endorsed by a recognised organisation)</b>	NICE are currently evaluating the technology (1)
<b>Validation (e.g. scientific and/or clinical validation)</b>	There is no accepted gold standard measure of fluid status making validation difficult. However, the fluid volumes used to estimate fluid status have been well validated (2) and there is extensive clinical validation of the estimate of fluid status (2), including the effectiveness of using the BCM to guide fluid management (3-5).

<p><b>Impact upon the patient pathway</b></p> <p>Is this part of patient’s normal care or in addition to this? How much will it alter the patient’s care?</p>	<p>The BCM is a small, portable device and the measurements are non-invasive, painless and harmless. Measurements can be made in any location, providing patients can be positioned supine, and typically take about 5-10 minutes.</p>	
<p><b>Expertise / Skill / Professional Registration required to use the measurement / tool</b></p>	<p>Basic training is recommended for BCM users although no specific expertise is needed.</p>	
<p><b>Resources needed</b></p> <p>E.g. Medicines, devices, healthcare professionals</p>	<p>Equipment and Consumables</p>	<p>The BCM device is a one-off purchase. Each measurement requires disposable electrodes which also need to be purchased..</p>
	<p>Time</p>	<p>Each measurement takes between 5 and 15 minutes.</p>
	<p>Training</p>	<p>Basic training is recommended for BCM users although no specific expertise is needed.</p>
	<p>Licenses</p>	<p>None required</p>
<p><b>How to access the measurement / tool</b></p>	<p>The BCM can be purchased from Fresenius Medical Care. Currently, this is the only device that produces an assessment of fluid status that has sufficient validation in renal patients, although other manufacturers may produce alternatives in the future.</p>	
<p><b>Main strengths of the measurement / tool</b></p>	<p>The measurement is relatively cheap, simple to perform, well tolerated and has good clinical validity.</p>	
<p><b>Main limitations of the measurement / tool</b></p>	<p>Measurement artefacts are not uncommon and can lead to results with significant errors. Some degree of training and technical support to be able to identify measurement artefacts is recommended.</p>	
<p><b>References</b></p>	<p>(1) <a href="https://www.nice.org.uk/guidance/indevelopment/gid-dg10008">https://www.nice.org.uk/guidance/indevelopment/gid-dg10008</a>  (2) Wabel P, Chamney P, Moissl U, Jirka T. Importance of whole-body bioimpedance spectroscopy for the management of fluid balance. Blood Purif. 2009;27(1):75-80.  (3) Moissl U, Arias-Guillén M, Wabel P, et al. Bioimpedance-guided fluid management in hemodialysis patients. Clin J Am Soc. Nephrol. 2013 Sep;8(9):1575-82.  (4) Onofriescu M, Mardare NG, Segall L, et al. Randomized trial of bioelectrical impedance analysis versus clinical criteria for guiding ultrafiltration in hemodialysis patients: effects on blood pressure, hydration</p>	

	<p>status, and arterial stiffness. <i>Int Urol Nephrol</i>. 2012 Apr;44(2):583-91.</p> <p>(5) Hur E, Usta M, Toz H, et al. Effect of fluid management guided by bioimpedance spectroscopy on cardiovascular parameters in hemodialysis patients: a randomized controlled trial. <i>Am J Kidney Dis</i>. 2013 Jun;61(6):957-65.</p>
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