

Point-of-care creatinine tests to assess kidney function for outpatients requiring contrast-enhanced CT imaging: systematic reviews and economic evaluation

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Declared competing interests of authors: Martine Harris has received point-of-care creatinine devices and consumables for use in research studies from Nova Biomedical (Runcorn, UK), Abbott Laboratories (Chicago, IL, USA) and Radiometer Ltd (Crawley, UK). She has co-authored academic papers in this area from 2016 to present and contributed (from August 2017 to January 2018) as an expert commentator for the National Institute for Health and Care Excellence's Medtech innovation briefing number 136 (MIB136) entitled 'Point-of-care creatinine tests before contrast-enhanced imaging'. James Altunkaya is funded via a National Institute for Health Research Research Methods Fellowship. Sofia Dias has received Medical Research Council funding.

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Plain English summary

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Before computed tomography scans are done, a contrast agent is usually needed to improve the visibility of internal body structures. After receiving a contrast agent (through a vein), some patients' kidneys may be affected, especially if their kidneys already do not work well. A blood test can identify these patients before a computed tomography scan, to reduce the risk of kidney harm. The blood test measures creatinine, which is a marker of how well the kidneys work.

Before a contrast-enhanced computed tomography scan, some patients have a recent creatinine result from an earlier blood test. Blood tests are normally done in a central laboratory, and usually take at least 1 hour. Other patients do not have a recent creatinine result, so their computed tomography scan may be delayed or rearranged. Sometimes, to avoid risking kidney harm, patients may have scans without contrast. 'Point-of-care' (handheld, tabletop or portable) devices can quickly measure creatinine (usually in patients with risk factors), often from a finger-prick blood sample. Many point-of-care devices are available but they may not be as exact as laboratory tests, so their benefit is unclear.

This study reviewed all available evidence on the benefits and harms of point-of-care creatinine tests before computed tomography scans and assessed whether or not they are a cost-effective use of NHS resources. The study found that some devices [i.e. i-STAT (Abbott Point of Care, Inc., Princeton, NJ, USA) and ABL (Radiometer Ltd, Crawley, UK)] were more accurate than others [i.e. StatSensor® (Nova Biomedical, Runcorn, UK)]. There was insufficient evidence for other devices. The study found that, for outpatients, doing a point-of-care test in patients who are at a higher risk of kidney harm (according to a questionnaire) and then confirming this with a laboratory test appeared to be a cost-effective use of NHS resources. The study found that the risk of kidney harm as a result of contrast agents appears very low. The main benefit of point-of-care testing may be to reduce needless delays or rearranged computed tomography scan appointments.

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