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		<p>6. Soedamah-Muthu SS, Fuller JH, Mulnier HE, Raleigh VS, Lawrenson RA, Colhoun HM. High Risk of Cardiovascular Disease in Patients With Type 1 Diabetes in the U.K. <i>Diabetes Care</i>. 2006;29(4):798-804. doi:10.2337/diacare.29.04.06.dc05-1433</p> <p>7. Yuan C, Mitsumori LM, Beach KW, Maravilla KR. Carotid atherosclerotic plaque: Noninvasive MR characterization and identification of vulnerable lesions. <i>Radiology</i>. 2001;221(2). doi:10.1148/radiol.2212001612</p> <p>8. Fayad ZA, Fuster V. Clinical imaging of the high-risk or vulnerable atherosclerotic plaque. <i>Circulation Research</i>. 2001;89(4). doi:10.1161/hh1601.095596</p> <p>9. Botnar RM, Kim WY, Brnert P, Stuber M, Spuentrup E, Manning WJ. 3D coronary vessel wall imaging utilizing a local inversion technique with spiral image acquisition. <i>Magnetic Resonance in Medicine</i>. 2001;46(5). doi:10.1002/mrm.1268</p> <p>10. Roes SD, Westenberg JJM, Doornbos J, et al. Aortic vessel wall magnetic resonance imaging at 3.0 tesla: A reproducibility study of respiratory navigator gated free-breathing 3D black blood magnetic resonance imaging. <i>Magnetic Resonance in Medicine</i>. 2009;61(1). doi:10.1002/mrm.21798</p> <p>11. Zhang Z, Fan Z, Carroll TJ, et al. Three-dimensional T2-weighted MRI of the human femoral arterial vessel wall at 3.0 Tesla. <i>Invest Radiol</i>. 2009;44(9). doi:10.1097/rli.0b013e3181b4c218</p> <p>12. Swartz RH, Bhuta SS, Farb RI, et al. Intracranial arterial wall imaging using high-resolution 3-tesla contrast-enhanced MRI. <i>Neurology</i>. 2009;72(7). doi:10.1212/01.wnl.0000342470.69739.b3</p>	
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		<p>13. Gupta A, Baradaran H, Schweitzer AD, et al. Carotid plaque MRI and stroke risk: A systematic review and meta-analysis. <i>Stroke</i>. 2013;44(11). doi:10.1161/STROKEAHA.113.002551</p> <p>14. Marnane M, Prendeville S, McDonnell C, et al. Plaque inflammation and unstable morphology are associated with early stroke recurrence in symptomatic carotid stenosis. <i>Stroke</i>. 2014;45(3). doi:10.1161/STROKEAHA.113.003657</p> <p>15. Gulsin GS, Swarbrick DJ, Hunt WH, et al. Relation of aortic stiffness to left ventricular remodeling in younger adults with type 2 diabetes. <i>Diabetes</i>. 2018;67(7). doi:10.2337/db18-0112</p> <p>16. Zhang Y, Guallar E, Malhotra S, et al. Carotid artery wall thickness and incident cardiovascular events: A comparison between US and MRI in the multi-ethnic study of atherosclerosis (MESA). <i>Radiology</i>. 2018;289(3). doi:10.1148/radiol.2018173069</p> <p>17. Messroghli DR, Moon JC, Ferreira VM, et al. Clinical recommendations for cardiovascular magnetic resonance mapping of T1, T2, T2 and extracellular volume: A consensus statement by the Society for Cardiovascular Magnetic Resonance (SCMR) endorsed by the European Association for Cardiovascular Imaging (EACVI). <i>Journal of Cardiovascular Magnetic Resonance</i>. 2017;19(1). doi:10.1186/s12968-017-0389-8</p> <p>18. Ferreira VM, Piechnik SK, Robson MD, Neubauer S, Karamitsos TD. Myocardial tissue characterization by magnetic resonance imaging: Novel applications of T1 and T2 mapping. In: <i>Journal of Thoracic Imaging</i>. Vol 29. ; 2014. doi:10.1097/RTI.000000000000077</p> <p>19. Ferreira VM, Schulz-Menger J, Holmvang G, et al. Cardiovascular Magnetic Resonance in Nonischemic Myocardial Inflammation: Expert</p>	
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	<p>Recommendations. J Am Coll Cardiol. 2018;72(24). doi:10.1016/j.jacc.2018.09.072</p> <p>20. Piechnik SK, Ferreira VM, Dall'Armellina E, et al. Shortened Modified Look-Locker Inversion recovery (ShMOLLI) for clinical myocardial T1-mapping at 1.5 and 3 T within a 9 heartbeat breathhold. Journal of Cardiovascular Magnetic Resonance. 2010;12(1). doi:10.1186/1532-429X-12-69</p> <p>21. Dall'Armellina E, Piechnik SK, Ferreira VM, et al. Cardiovascular magnetic resonance by non contrast T1-mapping allows assessment of severity of injury in acute myocardial infarction. Journal of Cardiovascular Magnetic Resonance. 2012;14(1). doi:10.1186/1532-429X-14-15</p> <p>22. Puntmann VO, Voigt T, Chen Z, et al. Native T1 mapping in differentiation of normal myocardium from diffuse disease in hypertrophic and dilated cardiomyopathy. JACC: Cardiovascular Imaging. 2013;6(4). doi:10.1016/j.jcmg.2012.08.019</p> <p>23. Ntusi NAB, Piechnik SK, Francis JM, et al. Diffuse myocardial fibrosis and inflammation in rheumatoid arthritis: Insights from CMR T1 Mapping. JACC: Cardiovascular Imaging. 2015;8(5). doi:10.1016/j.jcmg.2014.12.025</p> <p>24. Ntusi NA, Piechnik SK, Francis JM, et al. Subclinical myocardial inflammation and diffuse fibrosis are common in systemic sclerosis - A clinical study using myocardial T1-mapping and extracellular volume quantification. Journal of Cardiovascular Magnetic Resonance. 2014;16(1). doi:10.1186/1532-429X-16-21</p>	
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		<p>25. Rapoport S, Sostman HD, Pope C, Camputarò CM, Holcomb W, Gore JC. Venous clots: Evaluation with MR imaging. <i>Radiology</i>. 1987;162(2). doi:10.1148/radiology.162.2.3797668</p> <p>26. Ferreira VM, Holloway CJ, Piechnik SK, Karamitsos TD, Neubauer S. Is it really fat? Ask a T1-map. <i>European Heart Journal Cardiovascular Imaging</i>. 2013;14(11). doi:10.1093/ehjci/jet095</p> <p>27. Ferreira VM, Piechnik SK, Dall'Armellina E, et al. Native T1-mapping detects the location, extent and patterns of acute myocarditis without the need for gadolinium contrast agents. <i>Journal of Cardiovascular Magnetic Resonance</i>. 2014;16(1). doi:10.1186/1532-429X-16-36</p> <p>28. Ferreira VM, Piechnik SK, Dallarmellina E, et al. Non-contrast T1-mapping detects acute myocardial edema with high diagnostic accuracy: A comparison to T2-weighted cardiovascular magnetic resonance. <i>Journal of Cardiovascular Magnetic Resonance</i>. 2012;14(1). doi:10.1186/1532-429X-14-42</p> <p>29. Fontana M, Banypersad SM, Treibel TA, et al. Native T1 mapping in ATTR cardiac amyloidosis - comparison with AL cardiac amyloidosis - a 200 patient study. <i>Journal of Cardiovascular Magnetic Resonance</i>. 2014;16(S1). doi:10.1186/1532-429x-16-s1-o4</p> <p>30. Dass S, Suttie JJ, Piechnik SK, et al. Myocardial tissue characterization using magnetic resonance noncontrast T1 mapping in hypertrophic and dilated cardiomyopathy. <i>Circulation: Cardiovascular Imaging</i>. 2012;5(6). doi:10.1161/CIRCIMAGING.112.976738</p>	
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	<p>31. Everett RJ, Treibel TA, Fukui M, et al. Extracellular Myocardial Volume in Patients With Aortic Stenosis. <i>J Am Coll Cardiol.</i> 2020;75(3). doi:10.1016/j.jacc.2019.11.032</p> <p>32. Hovind P, Tarnow L, Rossing K, et al. Decreasing incidence of severe diabetic microangiopathy in type 1 diabetes. <i>Diabetes Care.</i> 2003;26(4). doi:10.2337/diacare.26.4.1258</p> <p>33. Pambianco G, Costacou T, Ellis D, Becker DJ, Klein R, Orchard TJ. The 30-year natural history of type 1 diabetes complications: The Pittsburgh epidemiology of diabetes complications study experience. <i>Diabetes.</i> 2006;55(5). doi:10.2337/db05-1423</p> <p>34. Krolewski AS, Warram JH, Christlieb AR, Busick EJ, Kahn CR. The changing natural history of nephropathy in type I Diabetes. <i>The American Journal of Medicine.</i> 1985;78(5). doi:10.1016/0002-9343(85)90284-0</p> <p>35. Rossing P, Rossing K, Jacobsen P, Parving HH. Unchanged incidence of diabetic nephropathy in IDDM patients. <i>Diabetes.</i> 1995;44(7). doi:10.2337/diab.44.7.739</p> <p>36. Unsworth R, Wallace S, Oliver NS, et al. New-onset type 1 diabetes in children during COVID-19: Multicenter regional findings in the U.K. <i>Diabetes Care.</i> 2020;43(11). doi:10.2337/dc20-1551</p> <p>37. McGlacken-Byrne SM, Drew SEV, Turner K, Peters C, Amin R. The SARS-CoV-2 pandemic is associated with increased severity of presentation of childhood onset type 1 diabetes mellitus: A multi-centre study of the first COVID-19 wave. <i>Diabetic Medicine.</i> 2021;38(9). doi:10.1111/dme.14640</p> <p>38. Qeadan F, Tingey B, Egbert J, et al. The associations between COVID-19 diagnosis, type 1 diabetes, and the risk of diabetic ketoacidosis:</p>	
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	<p>A nationwide cohort from the US using the Cerner Real-World Data. PLOS ONE. 2022;17(4):e0266809. doi:10.1371/journal.pone.0266809</p> <p>39. Coppelli A, Giannarelli R, Aragona M, et al. Hyperglycemia at hospital admission is associated with severity of the prognosis in patients hospitalized for COVID-19: The pisa COVID-19 study. Diabetes Care. 2020;43(10). doi:10.2337/dc20-1380</p> <p>40. Bornstein SR, Rubino F, Khunti K, et al. Practical recommendations for the management of diabetes in patients with COVID-19. The Lancet Diabetes and Endocrinology. 2020;8(6). doi:10.1016/S2213-8587(20)30152-2</p> <p>41. Wu L, Girgis CM, Cheung NW. COVID-19 and diabetes: Insulin requirements parallel illness severity in critically unwell patients. Clinical Endocrinology. 2020;93(4). doi:10.1111/cen.14288</p> <p>42. Bradley CR, Cox EF, Scott RA, et al. Multi-organ assessment of compensated cirrhosis patients using quantitative magnetic resonance imaging. Journal of Hepatology. 2018;69(5). doi:10.1016/j.jhep.2018.05.037</p> <p>43. Chouhan MD, Taylor SA, Mookerjee RP. Multi-organ quantitative MRI for the assessment of liver disease – A whole much more than the sum of its parts. Journal of Hepatology. 2018;69(5). doi:10.1016/j.jhep.2018.09.004</p> <p>44. Ayoubkhani D, Khunti K, Nafilyan V, et al. Post-covid syndrome in individuals admitted to hospital with covid-19: Retrospective cohort study. The BMJ. 2021;372. doi:10.1136/bmj.n693</p> <p>45. Dennis A, Wamil M, Alberts J, et al. Multiorgan impairment in low-risk individuals with post-COVID-19 syndrome: A prospective,</p>	
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		<p>community-based study. <i>BMJ Open</i>. 2021;11(3). doi:10.1136/bmjopen-2020-048391</p> <p>46. Raman B, Cassar MP, Tunnicliffe EM, et al. Medium-term effects of SARS-CoV-2 infection on multiple vital organs, exercise capacity, cognition, quality of life and mental health, post-hospital discharge. <i>EClinicalMedicine</i>. 2021;31. doi:10.1016/j.eclinm.2020.100683</p> <p>47. Tang X, Uhl S, Zhang T, et al. SARS-CoV-2 infection induces beta cell transdifferentiation. <i>Cell Metabolism</i>. 2021;33(8):1577-1591.e7. doi:10.1016/j.cmet.2021.05.015</p> <p>48. Wu CT, Lidsky P v., Xiao Y, et al. SARS-CoV-2 infects human pancreatic <math>\beta</math> cells and elicits <math>\beta</math> cell impairment. <i>Cell Metabolism</i>. 2021;33(8):1565-1576.e5. doi:10.1016/j.cmet.2021.05.013</p> <p>49. Rubino F, Amiel SA, Zimmet P, et al. New-Onset Diabetes in Covid-19. <i>New England Journal of Medicine</i>. 2020;383(8):789-790. doi:10.1056/NEJMc2018688</p> <p>50. Dennis A, Cuthbertson D, Wootton D, et al. Multi-organ impairment and Long COVID: a 1-year prospective, longitudinal cohort study. <i>medRxiv</i>. Published online 2022.</p> <p>51. Tirkes T, Lin C, Fogel EL, Sherman SS, Wang Q, Sandrasegaran K. T1 mapping for diagnosis of mild chronic pancreatitis. <i>Journal of Magnetic Resonance Imaging</i>. 2017;45(4). doi:10.1002/jmri.25428</p> <p>52. Wang L, Gaddam S, Wang N, et al. Multiparametric Mapping Magnetic Resonance Imaging of Pancreatic Disease. <i>Frontiers in Physiology</i>. 2020;11. doi:10.3389/fphys.2020.00008</p> <p>53. Berchtold L, Friedli I, Crowe LA, et al. Validation of the corticomedullary difference in magnetic resonance imaging-derived</p>	
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		<p>apparent diffusion coefficient for kidney fibrosis detection: A cross-sectional study. <i>Nephrology Dialysis Transplantation</i>. 2020;35(6). doi:10.1093/ndt/gfy389</p> <p>54. Buchanan CE, Mahmoud H, Cox EF, et al. Quantitative assessment of renal structural and functional changes in chronic kidney disease using multi-parametric magnetic resonance imaging. <i>Nephrology Dialysis Transplantation</i>. 2020;35(6). doi:10.1093/ndt/gfz129</p> <p>55. Gillis KA, McComb C, Patel RK, et al. Non-Contrast Renal Magnetic Resonance Imaging to Assess Perfusion and Corticomedullary Differentiation in Health and Chronic Kidney Disease. <i>Nephron</i>. 2016;133(3). doi:10.1159/000447601</p> <p>56. Peperhove M, Vo Chieu VD, Jang MS, et al. Assessment of acute kidney injury with T1 mapping MRI following solid organ transplantation. <i>European Radiology</i>. 2018;28(1). doi:10.1007/s00330-017-4943-4</p>	
Healthy.io	Yes	<p>Regarding recommendation 1.13.8, NICE should include within the recommendation that clinicians may consider semi-quantitative ACR, as well as the quantitative ACR test currently detailed. The NHS National Diabetes Audit shows that completion of ACR tests for people with type 1 diabetes is the lowest performing of all eight care processes in England. In 2021, only 52.8% of type 1 diabetes patients had an ACR test. This presents a challenge for clinicians in complying with recommendation 1.13.8. Expanding the recommendation so that clinicians can consider alternative approaches, such as home-based testing, can support increased adherence of ACR testing and in turn can support compliance with this recommendation.</p>	<p>Thank you for your comment. Neither the type 1 diabetes NICE guideline nor the chronic kidney disease NICE guideline found sufficient evidence of semi-quantitative ACR and thus no recommendations were made for this. We do note that NICE already has a Medtech Innovation briefing on <a href="#">Healthy.io test for home testing of urine albumin to creatinine ratio</a> (MIB221). However, we will note this issue for future surveillance of the guideline.</p>

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Royal College of Nursing	No Comment	We do not have comments on this consultation. Thank you for the opportunity to contribute.	Thank you for responding.
Royal College of Physicians	No comment	We have liaised with our experts in diabetes and have no concerns.	Thank you for responding.
Royal College of General Practitioners	No	No	Thank you for responding.

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