Correspondence
www.thelancet.com/gastrohep **3**

Authors' reply

We thank Kerri Novak and colleagues for their interest in the METRIC study.1 Novak and colleagues rightly acknowledge an established gold standard is problematic for studies in patients with small bowel Crohn's disease, suggesting that these methodological limitations might introduce incorporation bias. However, it is unclear how this bias might be avoided. Diagnostic test accuracy studies in the absence of a robust independent reference are difficult, but that should not prevent such studies being done. The optimal approach is to use a construct reference standard, and our rationale for using this approach was described in our Article. The maximum time between index tests and the third arbiter test in our study was 8 weeks, although the time between these tests was frequently shorter. The construct reference standard necessarily considered treatment effects, and indeed, this is a strength knowledge of treatment response is highly informative when assessing the accuracy of tests, upon which treatment decisions are based. We gave radiologists general guidance on criteria for disease activity (provided in the appendix of the Article) but were deliberately not prescriptive; in this regard, magnetic resonance enterography (MRE) and ultrasound were treated equally. METRIC was a pragmatic trial designed to define real-world test accuracy; tests were interpreted just as would happen in daily practice. To stipulate a fixed set of activity criteria, while expected in explanatory trials (and all too common in the existing literature), is antithesis to a pragmatic trial, especially as both MRE and ultrasound are already widely used. Mural thickness is just one of many imaging signs of activity and, as Novak and colleagues point out, precise diagnostic thresholds are undefined and controversial. We defined the terminal ileum as the terminal 10 cm of the small bowel (as stated in the protocol). The terminal ileum was not always fully intubated by ileocolonoscopy, as one would expect in a real-world study. Such observations mandate a construct reference standard panel whereby all available information is considered, mirroring daily practice. The authors mention cost: we will present costeffectiveness data in an upcoming
We disagree with Novak and colleagues' conclusion that ultrasound has equivalent sensitivity to MRE for the ileum. The METRIC study shows clearly that it does not, and this nonequivalence applies to sensitivity across all three outcomes of disease extent, disease presence, and disease activity. We fully agree with Novak and colleagues that ultrasound is an accurate and useful test. The primary interpretation of our work must be that both ultrasound and MRE have considerable clinical utility. Training is crucial, and the choice of which to use is secondary. The performance characteristics of ultrasound might be similar to those of MRE, especially in specialised high-volume units, of which there are many. However, most patients are treated elsewhere, and our data show clearly that findings from MRE are generally more robust at present.

SAT, SH, SM, DT, AG, AH, AS, IZ, and PW received research grant support from the funder of the METRIC study (National Institute of Health and Research Health Technology Assessment).
SAT reports personal fees from Robarts plc.
SH reports non-financial support from iCAD.
All other authors declare no competing interests.
Stuart A Taylor, Steve Halligan,

Gauraang Bhatnagar, Arun Gupta,
Antony Higginson, Andrew Slater,
Damian Tolan, Peter Wylie, Ian Zealley,
Susan Mallett
stuart.taylor1@nhs.net

Centre for Medical Imaging, University College London, London W1W 7TS, UK (SAT, SH, GB); Intestinal Imaging Centre, St Mark's Hospital, London North West University Healthcare National Health Service (NHS) Trust, Harrow, UK (AG); Department of Radiology, Portsmouth Hospitals NHS Trust, Portsmouth, UK (AH); Department of Radiology, Oxford University Hospitals NHS Trust, Oxford, UK (AS); Department of Radiology, St James's University Hospital, Leeds Teaching Hospitals NHS Trust, Leeds, UK (DT); Department of Radiology, Royal Free London NHS Foundation Trust, London, UK (PW); Department of Radiology, Ninewells Hospital, Dundee, UK (IZ); Institute of Applied Health Research, National Institute of Health and Research Birmingham Biomedical Research Centre, College of Medical and Dental Sciences, University of Birmingham, Birmingham, UK (SM)

1 Taylor SA, Mallett S, Bhatnagar G, et al. Diagnostic accuracy of magnetic resonance enterography and small bowel ultrasound for the extent and activity of newly diagnosed and relapsed Crohn's disease (METRIC): a multicentre trial. *Lancet Gastroenterol Hepatol* 2018; **3:** 548–58.

2 Taylor S, Mallett S, Bhatnagar G, et al. METRIC (MREnterography or ulTRasound in Crohn's disease): a study protocol for a multicentre, non-randomised, single-arm, prospective comparison study of magnetic resonance enterography and small bowel ultrasound compared to a reference standard in those aged 16 and over. *BMC Gastroenterol* 2014; **14:** 142.