

Should I be using an activity index? Scoring disease in UC and CD – is there utility.

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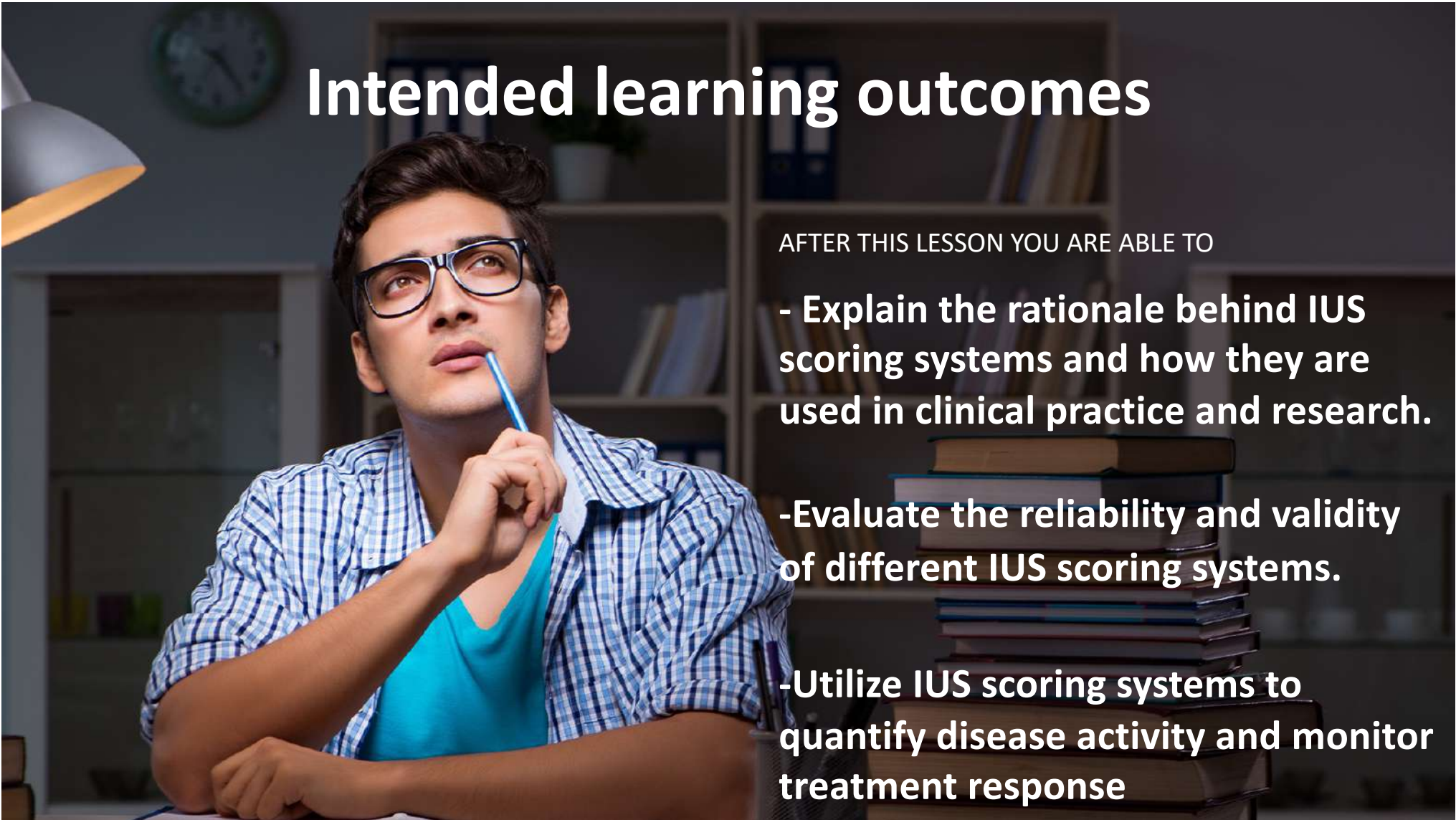
Calgary – April 10th, 2026

Disclosure

AbbVie / Takeda /
Janssen / Pfizer /
Nautilus Scientific (IBUS
Lead central reader)

IBUS Collaboration
Committee Chair





Intended learning outcomes

AFTER THIS LESSON YOU ARE ABLE TO

- Explain the rationale behind IUS scoring systems and how they are used in clinical practice and research.
- Evaluate the reliability and validity of different IUS scoring systems.
- Utilize IUS scoring systems to quantify disease activity and monitor treatment response



WANTS

NEEDS



Disease activity

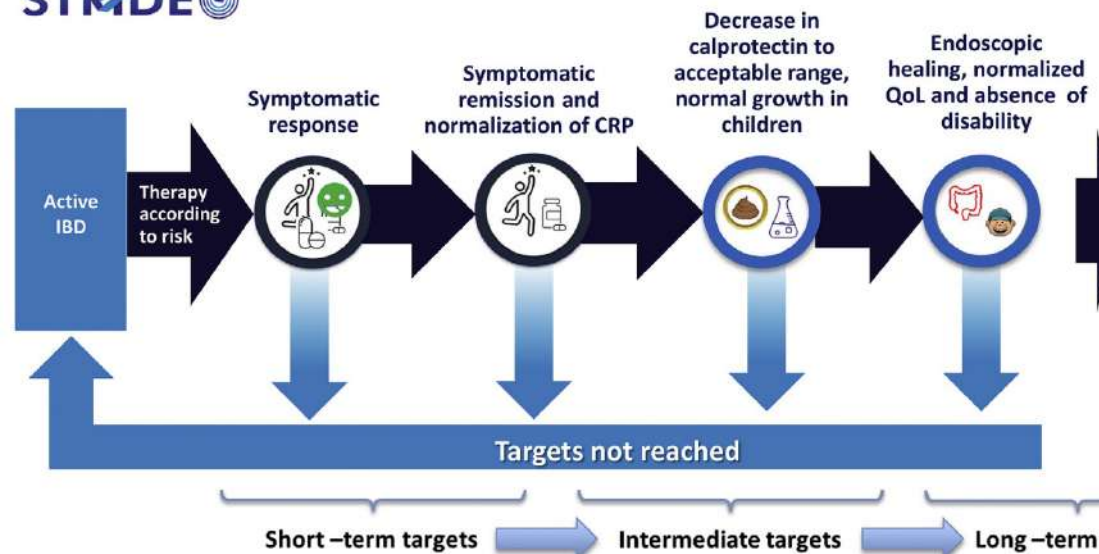


Figure 2. Treatment targets in CD and UC.



HBI
SCCAI
pMAYO
PRO-2



CRP



CALPRO



(s)MaRIA - MRE
LEWIS- WCE



SES-CD/CDEIS
UCEIS/Mayo



IBD-Q
SIBD-Q
IBD-DI
IBD-DISK

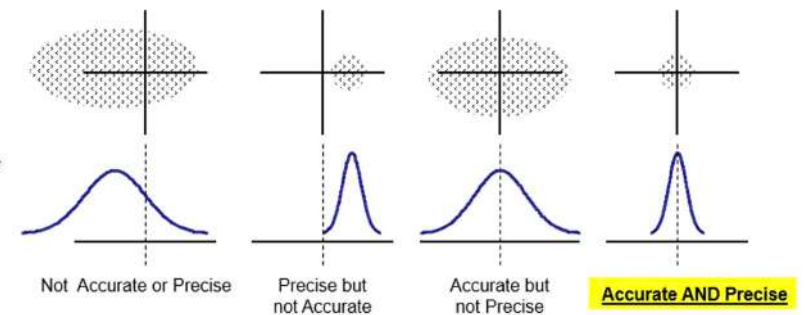


In 2 minutes - Discuss in groups of 2-4:
How is a "score" generated and validated

FDA's biomarker definition

48

BEST (Biomarkers, EndpointS, and other Tools) Resource



biomarker

A defined characteristic that is measured as an indicator of normal biological processes, pathogenic processes, or responses to an exposure or intervention, including therapeutic interventions. Molecular, histologic, radiographic, or physiologic characteristics are types of biomarkers. A biomarker is not an assessment of how an individual feels, functions, or survives. Categories of biomarkers include:

- susceptibility/risk biomarker
- diagnostic biomarker
- monitoring biomarker
- prognostic biomarker
- predictive biomarker
- pharmacodynamic/response biomarker
- safety biomarker

Variation = measurement uncertainty + inter-individual variation

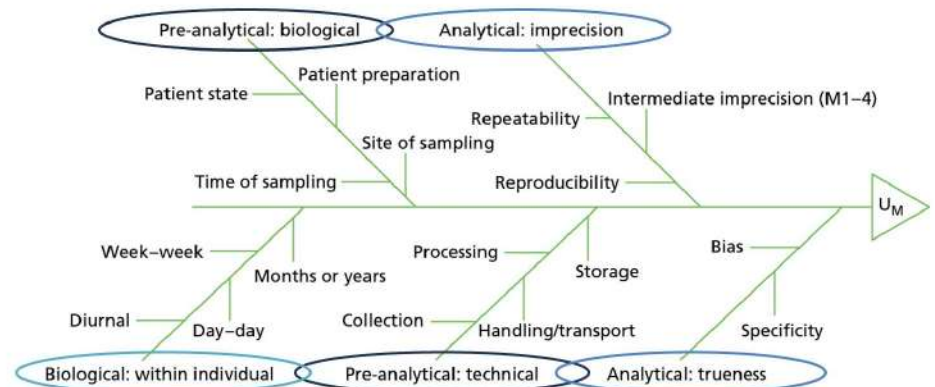
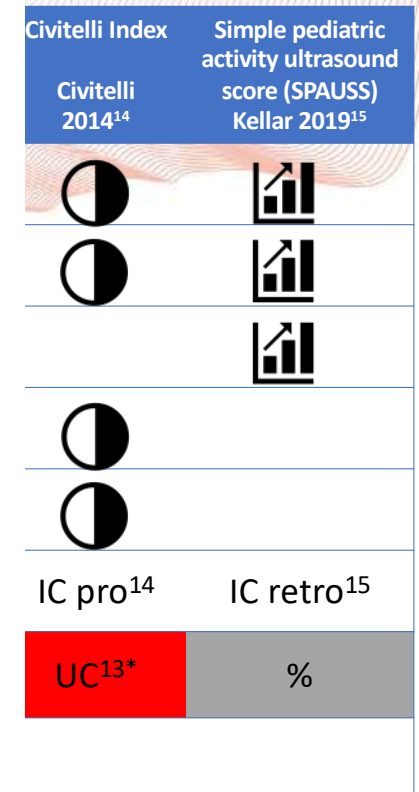
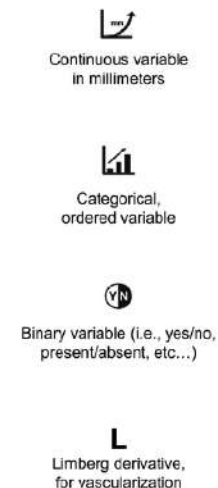


FIGURE 57 Feather diagram depicting biological, pre-analytical and analytical factors that may contribute to measurement uncertainty (U_M).

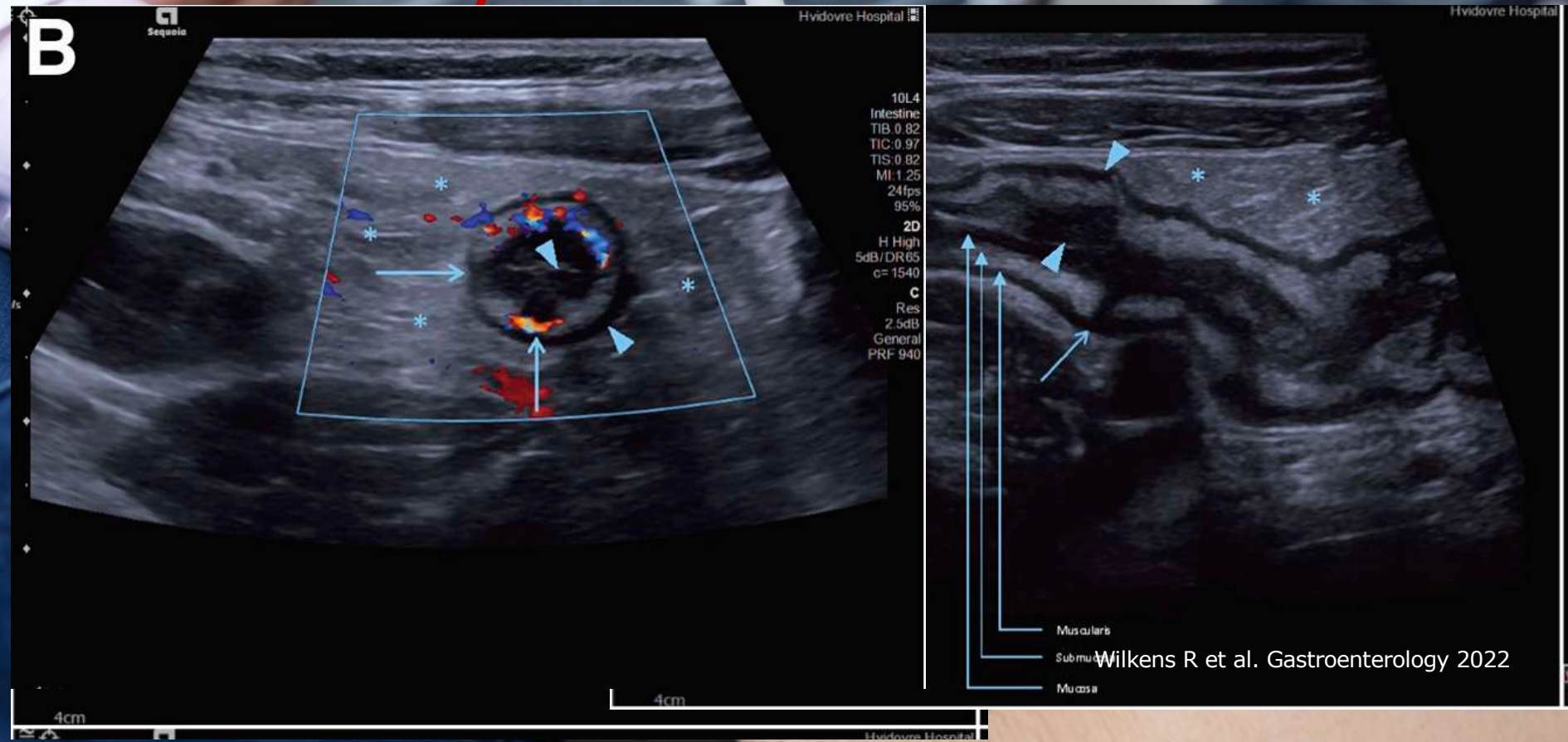
Study	Score name	Condition	Bowel wall thickness	Vascularization	Stratification	Inflammatory fat
Allocca 2018	MUC ^a	UC	 3 mm			
Allocca 2022	BUSS	CD	 3 mm			
Arienti 1996		UC	 unclear			
Bots 2021	UC-IUS index	UC	 2 mm			
Civitelli 2014	US Score	Ped UC	 3 mm			
Drews 2009	Modified Limberg score	CD	 3 mm	 L		
Futagami 1999	UICD	CD	 4 mm			
Kellar 2019	SPAUSS	Ped UC/CD	 4 mm			
Lenze 2012		CD	 4 mm	 L		
Liu 2020	UCS	CD	 3 mm	 L		
Livne 2021	MaRIA	CD	 3 mm			
Miyoshi 2022	KUC-UC	UC	 3 mm			
Neye 2004		CD	 5 mm			
Novak 2017	Simple Ultrasound Score	CD	 3 mm; 4 mm ^b	 L		
Novak 2021	IBUS-SAS	CD	 3 mm	 L		
Paredes 2010		CD	 3 mm			
Parente 2010	US Score	UC	 4 mm			
Pascu 2004	US Index	UC/CD	 3 mm			
Ripolles 2021	Simple US	CD	 3 mm	 L		
Rispo 2017	US-LI	CD	 3 mm			
Sævik 2020	SUS-CD	CD	 3 mm			
van Wassenae 2023	PCD-US Score	Ped CD	 1.6 mm; 2 mm ^c			
Zhou 2023		CD	 2 mm	 L		

Figure 1. Main score parameters. ^aOriginally Humanitas Ultrasound Criteria. ^b3 mm and 4 mm for the terminal ileum and the colon, respectively. ^c1.6 mm and 2 mm for the terminal ileum and the colon, respectively. BUSS, bowel ultrasound score; CD, Crohn's disease; IBUS-SAS, International Bowel Ultrasound Segmental Activity Score; IUS, intestinal ultrasound; KUC-UC, Kyorin Ultrasound Criterion for ulcerative colitis endoscopic improvement; LI, Lemann index; MaRIA, Magnetic Resonance Index of Activity; MUC, Milan Ultrasound Criteria; PCD-US, Pediatric Crohn's Disease Intestinal Ultrasound; Ped, pediatric; SPAUSS, Simple Pediatric Activity Ultrasound Score; SUS-CD, Simple Ultrasound Score for Crohn's Disease; UICD, ultrasonographic activity index for Crohn's disease; UC, ulcerative colitis; UCS, ultrasound consolidated score; US, ultrasound.



ness, I-FAT: Inflammatory fat,
r: adult UC, orange: adult +

Disease activity –intestinal ultrasound



Activity indices - reliability

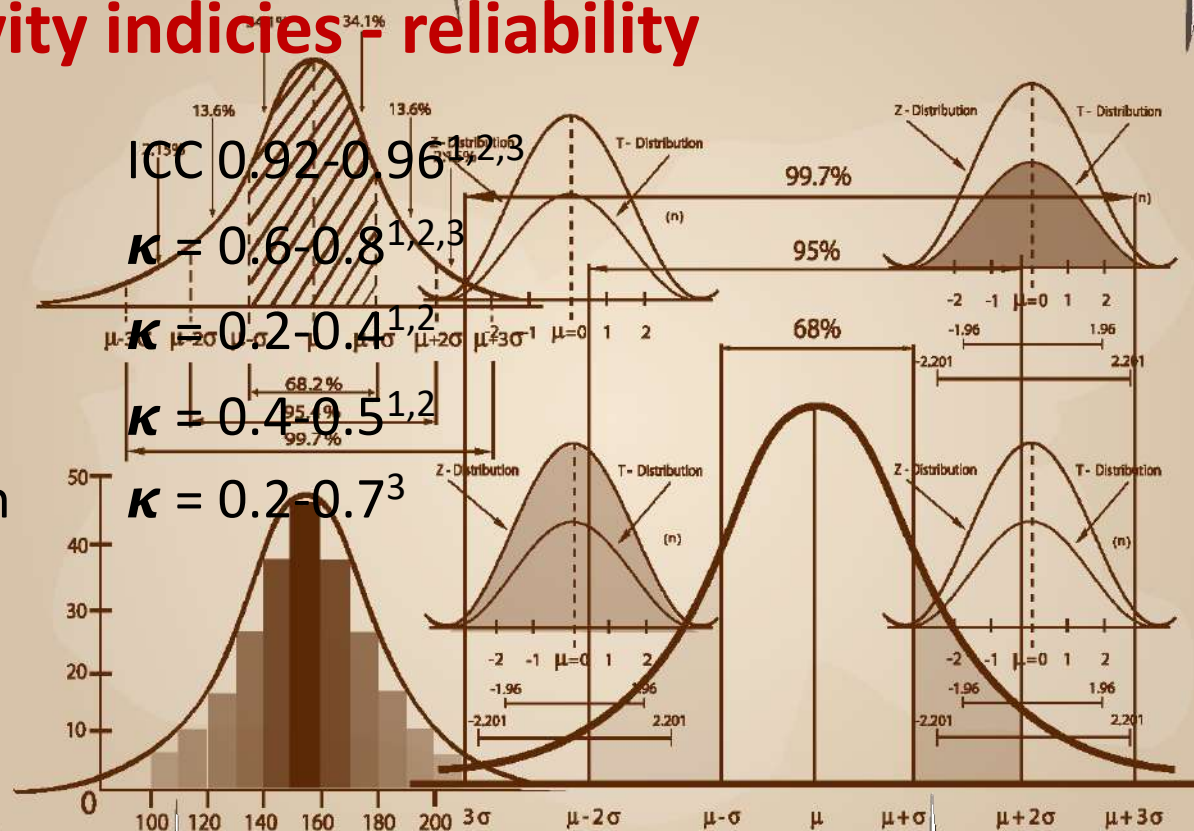
BWT

CDS

BWS

i-fat

Dehaustration



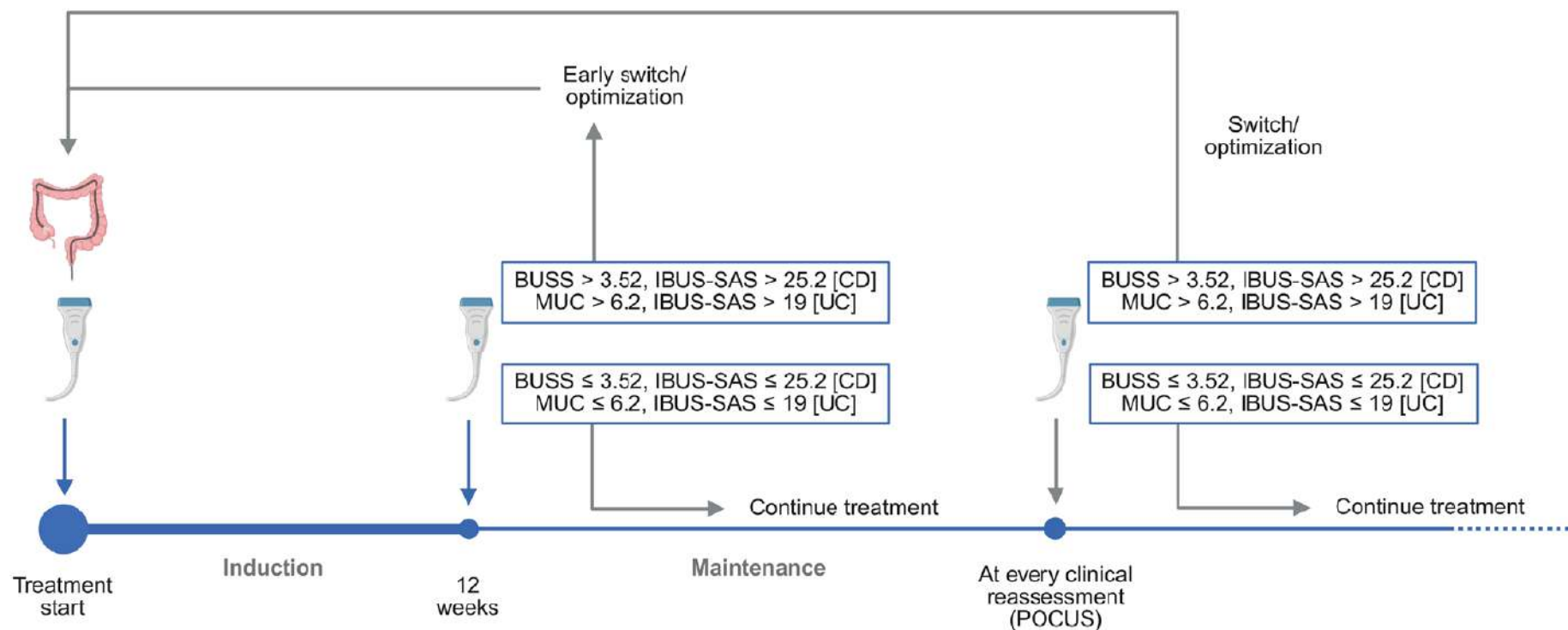


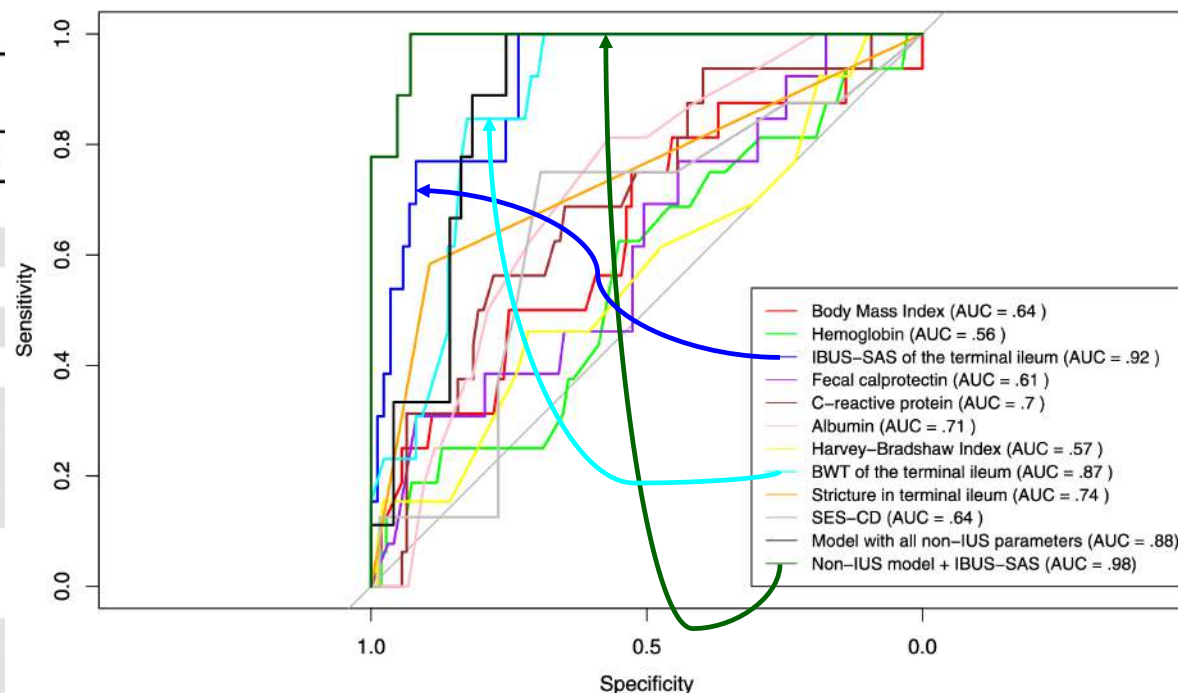
Figure 3. Proposed flowchart for intestinal ultrasound (IUS) score implementation into clinical practice. In patients starting an advanced treatment, IUS should be performed at baseline and at the end of induction (approximately 12 weeks). As ultrasound activity at week 12 predicts endoscopic activity at later reassessment, this should already be regarded as suboptimal disease control and an early optimization or switch to another medication should be considered. The same applies during maintenance point-of-care examinations. Cutoffs for ultrasound activity of the most used IUS scores (namely the bowel ultrasound score [BUSS], Milan Ultrasound Criteria [MUC], and International Bowel Ultrasound Segmental Activity Score [IBUS-SAS]) are reported. Ileocolonoscopy should always be considered before treatment switch. CD, Crohn's disease; POCUS, point-of-care ultrasound; UC, ulcerative colitis.

Supplementary Table 3. Baseline factors' association with the risk of ICR

	Univariable analyses		
	OR	95% CI	P-value
Age, years	0.99	0.96–1.02	.56
Sex; male	1.9	0.65–6.37	.26
Active smoker	1.02	0.30–3.03	.98
BMI, kg/m ²	0.85	0.72–0.98	.04
HBI	1.09	0.93–1.28	.30
Biomarkers			
Hemoglobin, mmol/L	0.82	0.55–1.25	.33
FC, mg/L	1.00	1.00–1.00	.23
CRP, mg/L	1.01	1.00–1.02	.15
Albumin, g/L	0.93	0.86–1.00	.05
Endoscopic findings			
Presence of an unpassable stricture	12	3.0–51	< .01
SES-CD sub-score (terminal ileum)	1.5	1.2–2.0	< .01
Sonographic findings in the terminal ileum			
BWT	2.2	1.5–3.6	< .01
Loss of BWS	4.2	2.0–11	< .01
CDS	2.8	1.4–6.7	< .01
i-fat	9.8	2.5–161	.02
IBUS-SAS	1.10	1.05–1.18	< .01

Note: Boldface P values indicate statistical significance.

BMI, body mass index; BWS, bowel wall stratification; BWT, bowel wall thickness; CDS, color Doppler signal; CI, confidence interval; CRP, C-reactive protein; FC, fecal calprotectin; HBI, Harvey-Bradshaw Index; IBUS-SAS, IBUS Segmental Activity Score; ICR, ileocecal resection; i-fat, inflammatory mesenteric fat; OR, odds ratio; SES-CD, Simple Endoscopic Score for Crohn's Disease.



Supplementary Figure 6. ROCAUC analysis of predictors of ICR.



Activity indices – transmural remission

BWT $\leq$ 3 mm

BWT $\leq$ 3 mm + CDS 0-1

BWT $\leq$ 3 mm + CDS 0 + no complications

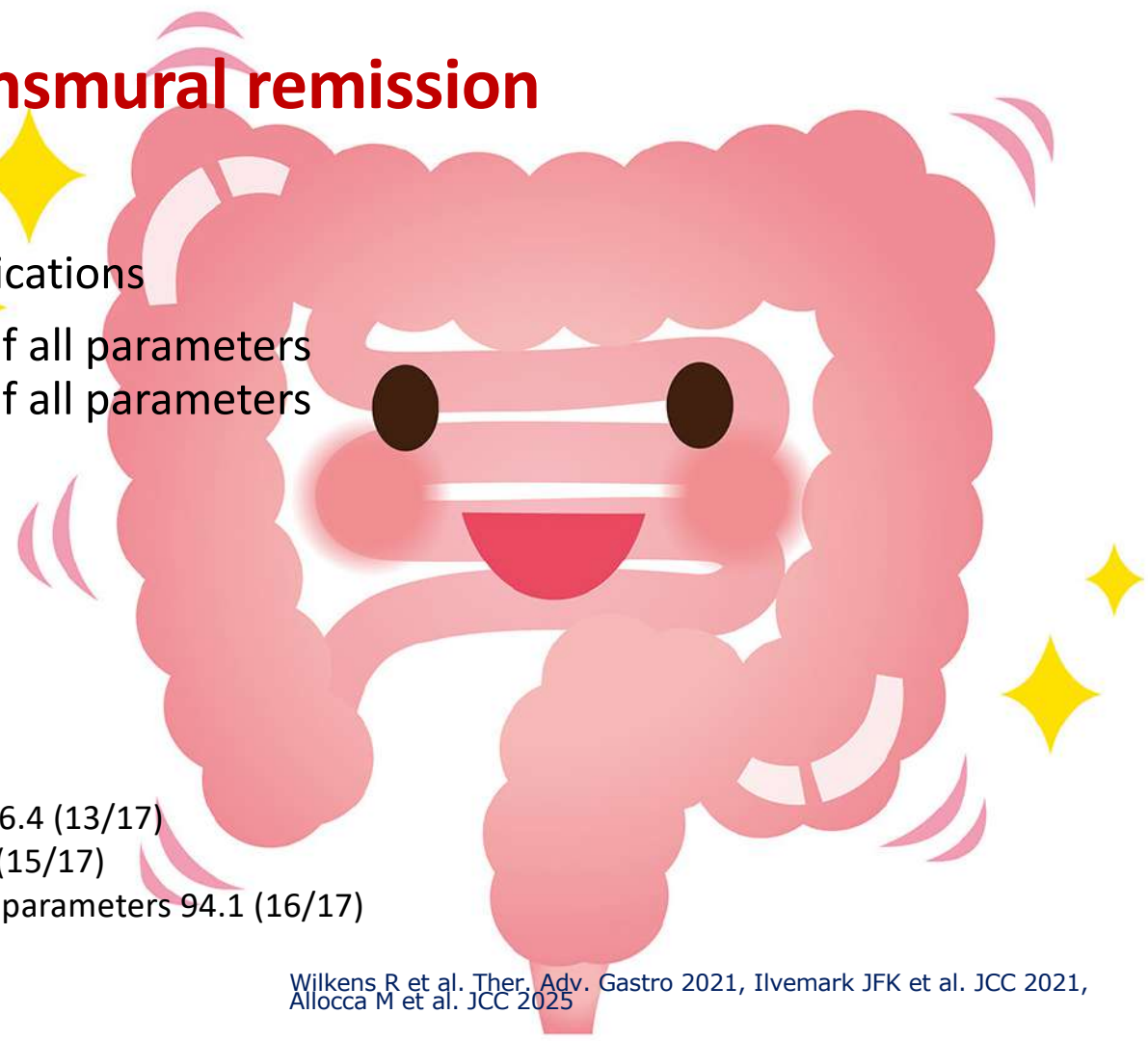
BWT $\leq$ 3/4 mm + normalization of all parameters

BWT $\leq$ 2/3 mm + normalization of all parameters

Consensus: BWT $\leq$ 3 mm + CDS 0

Ultrasound remission should be defined by

- 1) BWT $\leq$ 3 mm 88.2 (15/17)
- 2) BWT $\leq$ 3 mm AND normalization of CDS 76.4 (13/17)
- 3) Normalization of all IUS parameters 88.2 (15/17)
- 4) BWT $<$ 3 mm and normalization of all IUS parameters 94.1 (16/17)



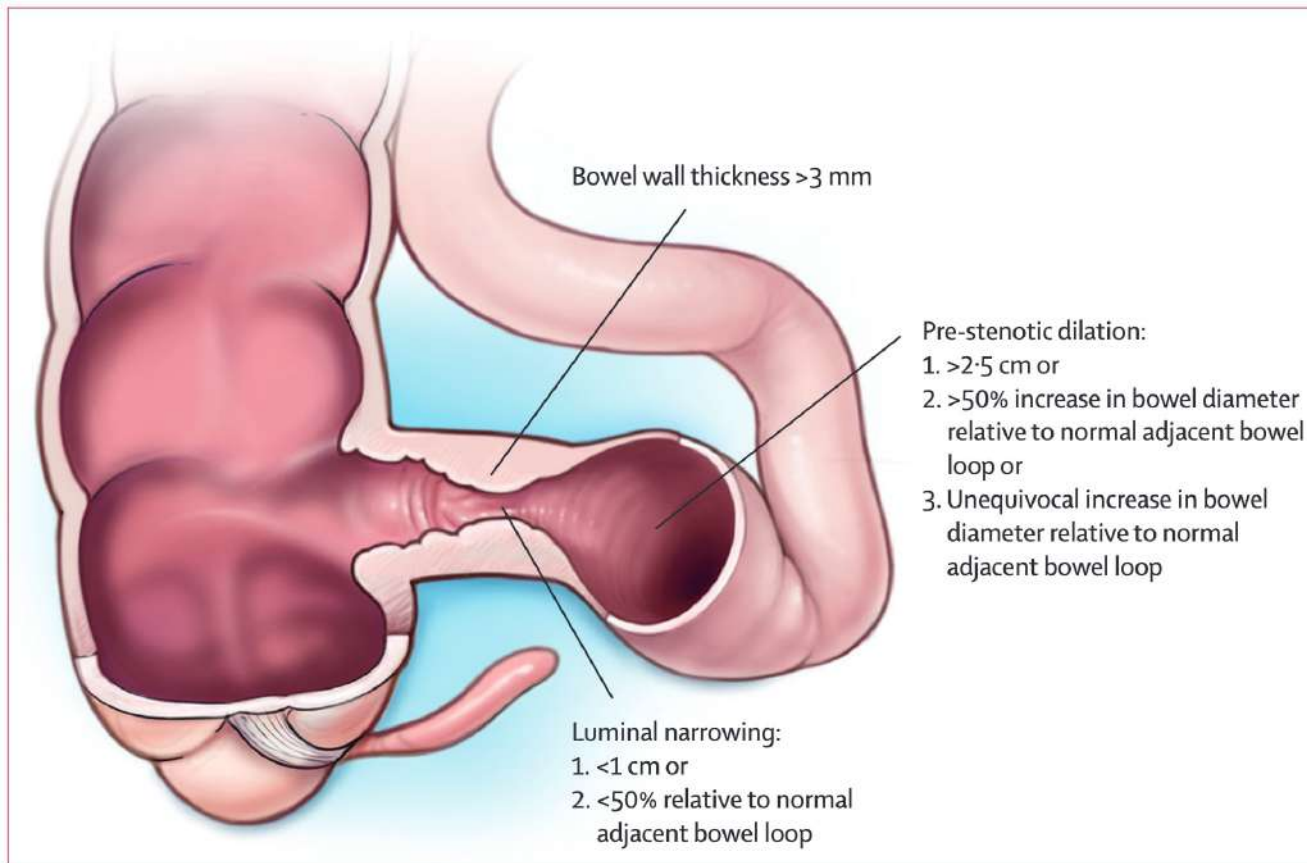


Figure 1: Anastomotic and naive small bowel Crohn's disease strictures on intestinal ultrasound defined by the combination of bowel wall, luminal narrowing, and pre-stenotic dilation
Items defining motility abnormalities are described in the Results and the appendix (p 7).

Table 2. Final List of Consensus Statements

IUS equivalent definitions for IUS-Lémann index	Agreement score %, (n)	Agreement round
Small bowel stricturing lesions in IUS		
1. The IUS equivalent for grade 2 small bowel stricturing lesion is wall thickening ≥ 3 mm, without prestenotic dilation.	86% (25/29)	Round 3
2. The IUS equivalent for grade 3 small bowel stricturing lesion is stricture with prestenotic dilation (V-shaped form).	93% (28/30)	Round 2
Colonic stricturing lesions in IUS		
3. The IUS equivalent for grade 2 colonic stricturing lesion is wall thickening ≥ 3 mm, without prestenotic dilation.	97% (28/29)	Round 3
4. The IUS equivalent for grade 3 colonic stricturing lesion is stricture with prestenotic dilation OR luminal narrowing $>50\%$ of the lumen (if total diameter of the lumen is assessable).	80% (24/30)	Round 2
Small bowel penetrating lesions in IUS		
5. There is no grade 1 small bowel penetrating lesion in IUS.	87% (26/30)	Round 2
6. The IUS equivalent for grade 2 small bowel penetrating lesion is transmural ulceration, defined as disruption of stratification transversely oriented within the thickened bowel wall (BWT ≥ 3 mm).	93% (28/30)	Round 2
7. The IUS equivalent for grade 3 small bowel penetrating lesion is an inflammatory mass, abscess, or any type of fistula.	100% (30/30)	Round 2
Colonic penetrating lesions in IUS		
8. There is no grade 1 colonic penetrating lesion in IUS.	93% (28/30)	Round 2
9. The IUS equivalent for grade 2 colonic penetrating lesion is transmural ulceration, defined as disruption of stratification transversely oriented within the thickened bowel wall (BWT ≥ 3 mm).	97% (29/30)	Round 2
10. The IUS equivalent for grade 3 colonic penetrating lesion is an inflammatory mass, abscess, or any type of fistula.	93% (28/30)	Round 2
Image acquisition		



SUMMARY



100% Sensitivity & Specificity: It never misses a case (no false negatives) and never

The IDEAL TEST?

The value of a biomarker lies not in its p-value or AUC, but in whether it helps a clinician make a better decision for a real person.

As decisions are dichotomous in nature, cut-offs remain among the top important features of any test.