

Inflammatory Bowel Disease in Lithuania: Epidemiology, Immunological Insights, and Diagnostic Approaches

Gediminas Kiudelis

Lithuanian University of Health Sciences,
Kaunas

Inflammatory Bowel Disease (IBD)

- Inflammatory Bowel Disease (IBD) is a chronic, relapsing-remitting group of idiopathic disorders characterized by immune-mediated inflammation of the gastrointestinal (GI) tract. The two main forms are **Crohn's disease (CD)** and **ulcerative colitis (UC)**. Both conditions involve dysregulated immune responses to intestinal microbiota in genetically susceptible individuals, but they differ in their pathological and clinical presentation

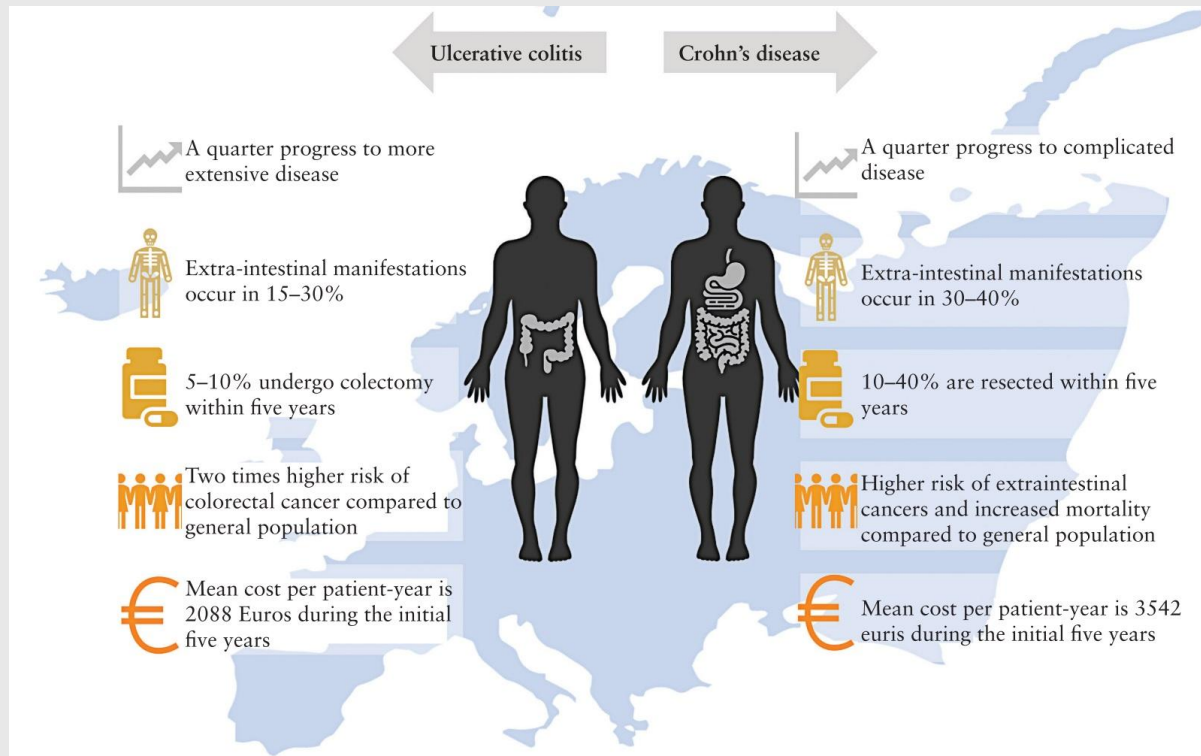
Global trends in IBD epidemiology

- The global burden of IBD, encompassing Crohn's disease (CD) and ulcerative colitis (UC), continues to rise, now affecting over **7 million individuals worldwide**, with increasing prevalence in Europe, North America, and Oceania.*
- European countries have among the **highest age-standardized incidence rates (ASIRs)** of IBD globally. While incidence in many Western European nations is plateauing or declining, disease burden remains high due to aging IBD populations and longer disease duration**
- Once considered rare, IBD is **increasing significantly in Asia**, driven by urbanization, dietary changes, and industrialization. Countries like China and India are witnessing rapid incidence growth as part of the global shift from West to East **

*Spiller, A. L. et al. (2025). *Nutrients*, 17(16), 2677.

**Yang, et al *BMC Public Health*, 25(1).

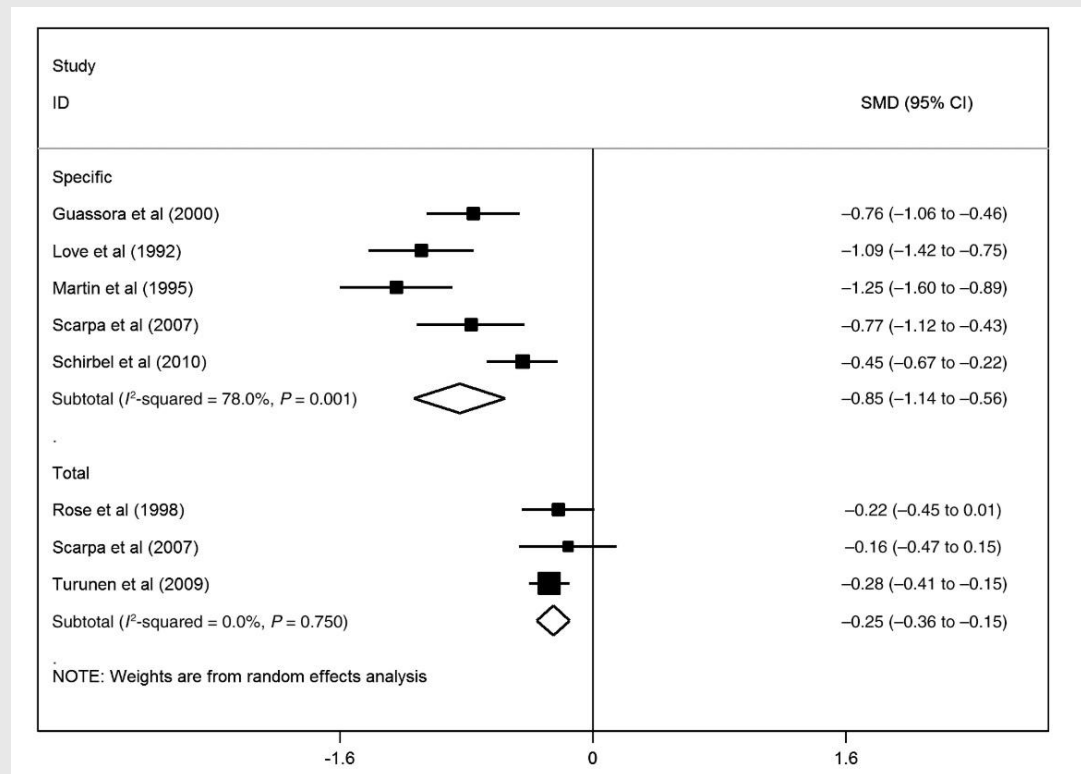
The burden of inflammatory bowel disease



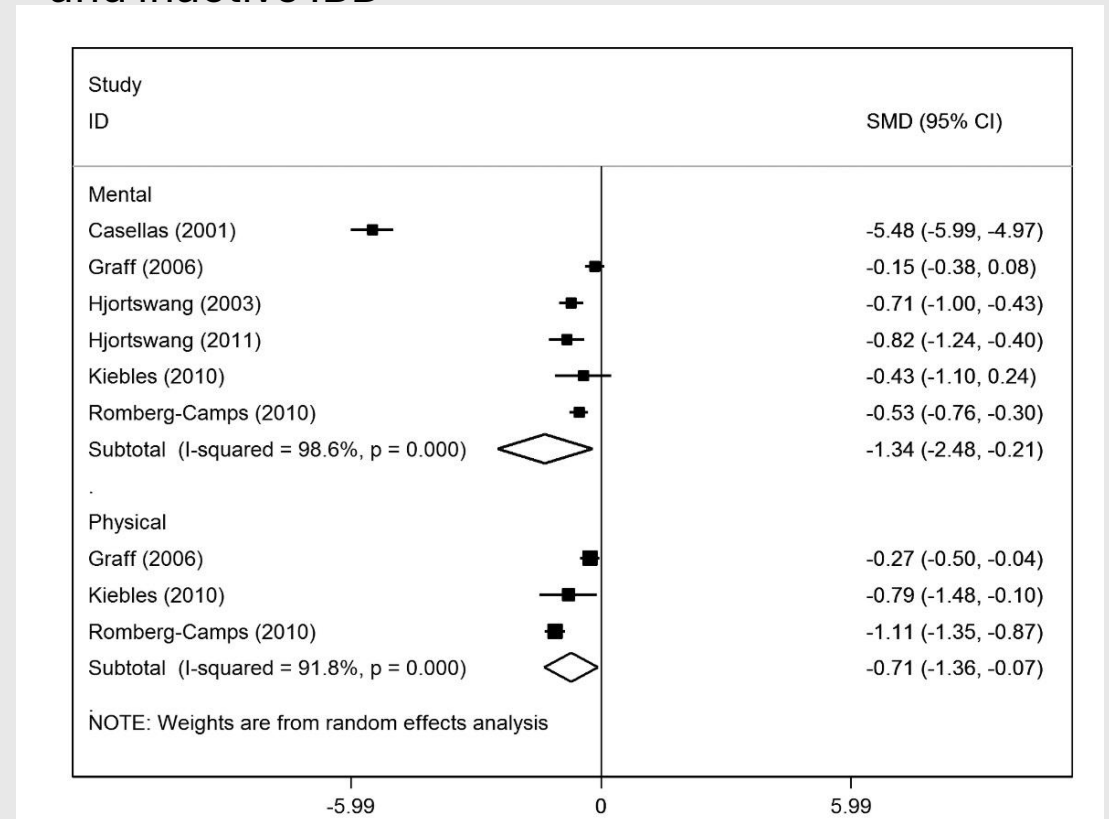
- 0.2% of the European population suffers from IBD
- 32% of UC patients require hospitalization within 10 years.
- A third of patients with UC experience a relapse within the first year, and up to 82% within 5 years.

Impact on quality of life

Comparison of quality of life between patients with IBD and healthy individuals



Comparison of quality of life in patients with active and inactive IBD



East–West gradient in the incidence of inflammatory bowel disease in Europe: the ECCO-EpiCom inception cohort

- **The overall aim of this study** is to investigate whether an East–West gradient exists in the incidence of IBD across European countries. Furthermore, it aims to determine whether any observed differences in IBD incidence are driven by environmental factors.
- **The classification of centres** as being situated in either Western or Eastern European countries was based on the socioeconomic status of that country before 1990
- **Study design:** A prospective, population-based inception cohort of IBD patients was established across 31 centers in 14 Western and 8 Eastern European countries. All patients were uniformly diagnosed, and the study covered a total background population of approximately 10.1 million people.

Western European centres

Cyprus, Nicosia
Denmark, Aarhus
Denmark, Amager
Denmark, Funen
Denmark, Herlev
Denmark, Herning
Denmark, Viborg
Faroe Islands
Finland, Pirkanmaa
Greece, Ioannina
Greenland
Iceland
Ireland, Adelaide and Meath
Israel, Beer Sheva
Italy, Northern Italy
Portugal, Vale de Sousa
Spain, Vigo
Sweden, Linköping
Sweden, Örebro
UK, Brent and Harrow
UK, Hull and East Yorkshire

Eastern European Centres

Croatia, Zagreb
Czech Republic, Prague
Czech Republic, South Bohemia
Estonia, Southern Estonia
Hungary, Veszprem province
Lithuania, Kaunas
Moldova, Chisinau
Romania, Timis
Russia, Moscow

Regional incidence rates	No of patients	IBD (95% CI)	CD (95% CI)	UC (95% CI)	IBDU (95% CI)
All Western European centres	1259	18.5 (17.5 to 19.5)*	6.3 (5.7 to 6.9)*	9.8 (9.1 to 10.6)*	2.4 (2.0 to 2.8)*
All Eastern European centres	256	8.1 (7.2 to 9.2)	3.3 (2.7 to 4.0)	4.6 (3.9 to 5.4)	0.2 (0.1 to 0.4)
All centres	1515	15.2 (14.4 to 16.0)	5.4 (4.9 to 5.8)	8.2 (7.6 to 8.7)	1.7 (1.4 to 1.9)

*Difference in incidence between the geographic regions $p < 0.01$.

CD, Crohn's disease; IBD, inflammatory bowel disease; IBDU, IBD unclassified; UC, ulcerative colitis.

Eastern European Centres

Croatia, Zagreb	12	6.3	6.6 (1.9)	3.1	3.3 (1.3)	3.1	3.3 (1.4)	0.0	0 (0)
Czech Republic, Prague	22	12.2	12.7 (2.8)	5.5	5.6 (1.8)	5.5	5.8 (1.9)	1.1	1.3 (0.9)
Czech Republic, South Bohemia	42	7.7	7.9 (1.2)	3.8	3.9 (0.9)	3.8	3.9 (0.9)	0.0	0 (0)
Estonia, Southern Estonia	30	10.3	11.0 (2.0)	5.2	5.4 (1.4)	5.2	5.7 (1.5)	0.0	0 (0)
Hungary, Veszprem province	58	23.0	24.0 (3.2)	11.5	12.0 (2.2)	10.3	10.7 (2.1)	1.2	1.3 (0.7)
Lithuania, Kaunas	32	8.5	9.1 (1.6)	2.4	2.6 (0.9)	6.1	6.5 (1.4)	0.0	0 (0)
Moldova, Chisinau	10	4.3	3.9 (1.2)	0.4	0.4 (0.4)	3.9	3.5 (1.2)	0.0	0 (0)
Romania, Timis	24	4.1	4.2 (0.9)	1.7	1.7 (0.5)	2.4	2.5 (0.7)	0.0	0 (0)
Russia, Moscow	26	5.1	5.3 (1.1)	0.8	0.9 (0.5)	4.1	4.2 (0.9)	0.2	0.2 (0.2)

Table 2 Incidence rates per 100 000 for inflammatory bowel disease, Crohn's disease, ulcerative colitis and inflammatory bowel disease unclassified in Europe for patients aged 15 years or older in 2010

	No of patients	IBD crude	IBD adjusted (SE)	CD crude	CD adjusted (SE)	UC crude	UC adjusted (SE)	IBDU crude	IBDU adjusted (SE)
Western European centres									
Cyprus, Nicosia	27	11.2	11.4 (2.2)	6.2	6.3 (1.6)	2.9	3.0 (1.1)	2.1	2.2 (1.0)
Denmark, Aarhus	55	21.2	20.7 (2.8)	8.5	8.2 (1.8)	10.8	10.6 (2.0)	1.9	1.8 (0.8)
Denmark, Amager	23	17.2	16.3 (3.4)	5.2	4.8 (1.8)	7.5	7.4 (2.4)	4.5	4.1 (1.7)
Denmark, Funen	123	30.7	33.4 (3.1)	10.7	11.4 (1.8)	18.7	20.1 (2.4)	1.2	1.4 (0.7)
Denmark, Herlev	48	22.4	24.4 (3.6)	6.5	7.0 (1.9)	7.5	8.3 (2.1)	8.4	9.2 (2.2)
Denmark, Herning	49	21.2	22.5 (3.3)	6.5	7.1 (1.9)	12.6	13.0 (2.5)	2.2	2.3 (1.1)
Denmark, Viborg	37	24.6	26.7 (4.5)	8.6	9.6 (2.7)	14.6	15.7 (3.4)	1.3	1.4 (1.0)
Faroe Islands	31	81.5	83.1 (15.0)	10.5	11.1 (5.6)	31.5	31.8 (9.3)	39.4	40.2 (10.5)
Finland, Pirkanmaa	107	26.2	27.7 (2.7)	4.4	5.0 (1.2)	17.1	18.0 (2.2)	4.7	4.7 (1.1)
Greece, Ioannina	15	9.2	10.2 (2.6)	3.1	3.5 (1.6)	5.5	6.0 (2.0)	0.6	0.7 (0.7)
Greenland	9	24.0	19.6 (6.6)	0.0	0 (0)	24.0	19.6 (6.6)	0.0	0 (0)
Iceland	72	28.7	28.5 (3.4)	5.6	5.6 (1.5)	17.9	17.8 (2.7)	5.2	5.1 (1.4)
Ireland, Adelaide and Meath	36	13.2	12.9 (2.2)	4.8	4.3 (1.2)	4.4	4.2 (1.2)	4.0	4.4 (1.4)
Israel, Beer Sheva	51	13.2	13.0 (1.9)	8.6	8.4 (1.5)	4.4	4.4 (1.1)	0.3	0.2 (0.2)
Italy, Northern Italy	182	10.9	11.6 (0.9)	3.9	4.3 (0.5)	6.1	6.4 (0.7)	0.8	0.9 (0.3)
Portugal, Vale de Sousa	31	11.1	10.8 (2.0)	7.2	7.0 (1.6)	3.9	3.8 (1.2)	0.0	0 (0)
Spain, Vigo	102	20.4	21.4 (2.1)	10.2	10.8 (1.5)	9.0	9.4 (1.4)	1.2	1.2 (0.5)
Sweden, Linköping	55	38.3	40.0 (5.4)	9.8	10.1 (2.7)	16.0	16.5 (3.5)	12.5	13.5 (3.2)
Sweden, Örebro	39	26.5	28.3 (4.6)	7.5	8.3 (2.5)	15.6	16.1 (3.4)	3.4	3.9 (1.8)
UK, Brent and Harrow	76	19.9	19.3 (2.2)	2.6	2.4 (0.8)	15.9	15.6 (2.0)	1.3	1.3 (0.6)
UK, Hull and East Yorkshire	91	18.1	18.6 (2.0)	8.4	8.9 (1.4)	8.2	8.3 (1.3)	1.6	1.4 (0.5)

East–West gradient in the incidence of inflammatory bowel disease in Europe: the ECCO-EpiCom inception cohort

- A West–East gradient of 2 in IBD incidence exists in Europe. The highest incidence in the world is found on the Faroe Islands.
- The patient populations in Eastern and Western Europe are identical in terms patient characteristics, disease extent and phenotype, smoking habits and diagnostic delay

- No geographic differences regarding smoking status, caffeine intake, use of oral contraceptives, or number of first-degree relatives with IBD were found
- Sugar intake was higher in CD and UC patients from Eastern Europe than in Western Europe while fibre intake was lower ($p < 0.01$)
- Daily consumption of fast food as well as appendectomy before the age of 20 was more frequent in Eastern European than in Western European UC patients ($p < 0.01$)
- Eastern European CD and UC patients had received more vaccinations and experienced fewer childhood infections than Western European patients ($p < 0.01$)
- *The observed differences could not explain the West–East gradient in IBD incidence in Europe, but Eastern European patients exhibited higher occurrences of suspected risk factors included in the Western lifestyle for IBD, which lends support to the theory of Westernisation of lifestyle having a main role in the recent increases in IBD incidence in Eastern Europe.*

East–West gradient in the incidence of inflammatory bowel disease in Europe: the ECCO-EpiCom inception cohort

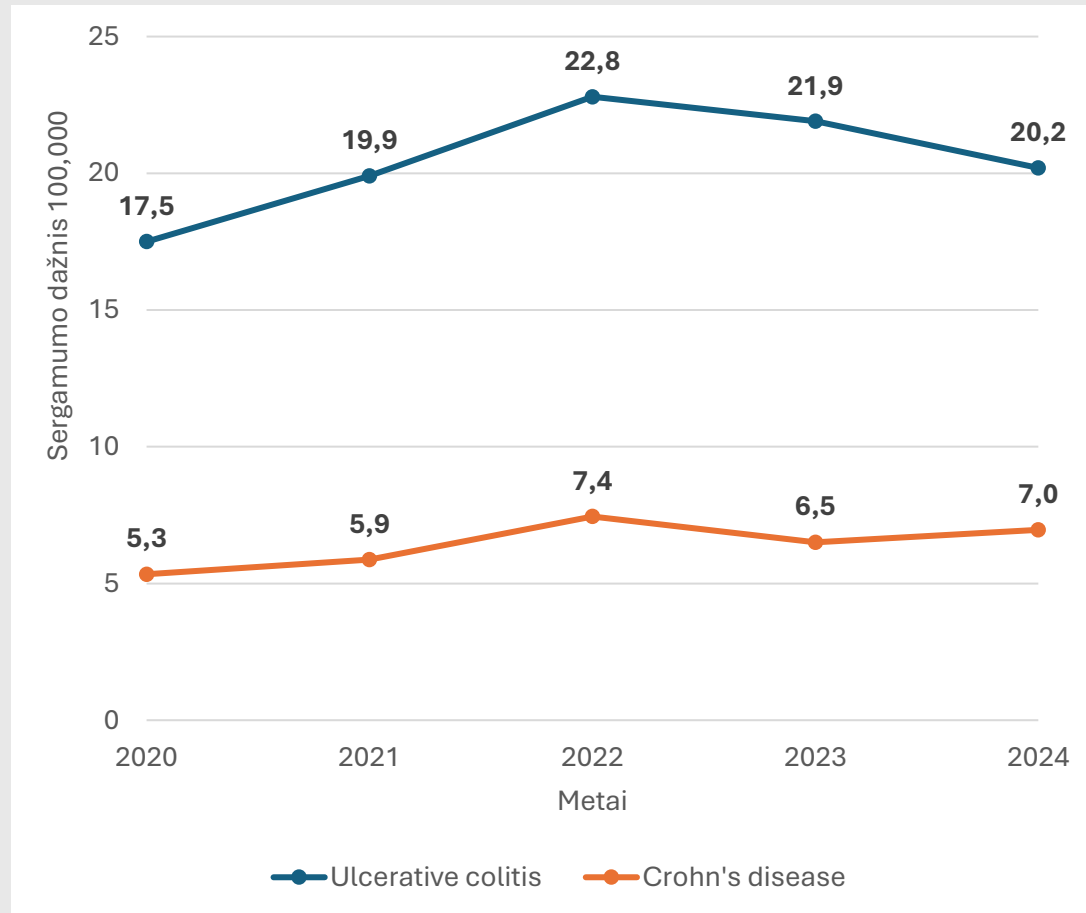
Table 1 (continued)

	Western European centres			Eastern European centres		
	CD	UC	IBDU	CD	UC	IBDU
B3p: B3 + perianal	16 (5%)		7 (7%)			
<i>Highest treatment step reached during follow-up</i>						
0: No treatment	7 (2%) *	3 (1%)	0 (0%)	0 (0%)	1 (1%)	0 (0%)
1: 5-ASA	37 (12%) *	214 (49%)	45 (47%)	27 (28%)	85 (62%)	4 (67%)
2: GCS	48 (16%) *	117 (27%)	27 (28%)	24 (25%)	33 (24%)	1 (17%)
3: Immunomodulators	104 (34%) *	69 (16%)	11 (11%)	31 (32%)	16 (12%)	1 (17%)
4: <u>Biological therapy</u>	63 (21%) *	21 (5%)	10 (10%)	5 (5%)	1 (1%)	0 (0%)
5: Surgery	46 (15%) *	13 (3%)	3 (3%)	10 (10%)	2 (1%)	0 (0%)

* Difference between geographic regions, $p < 0.05$.

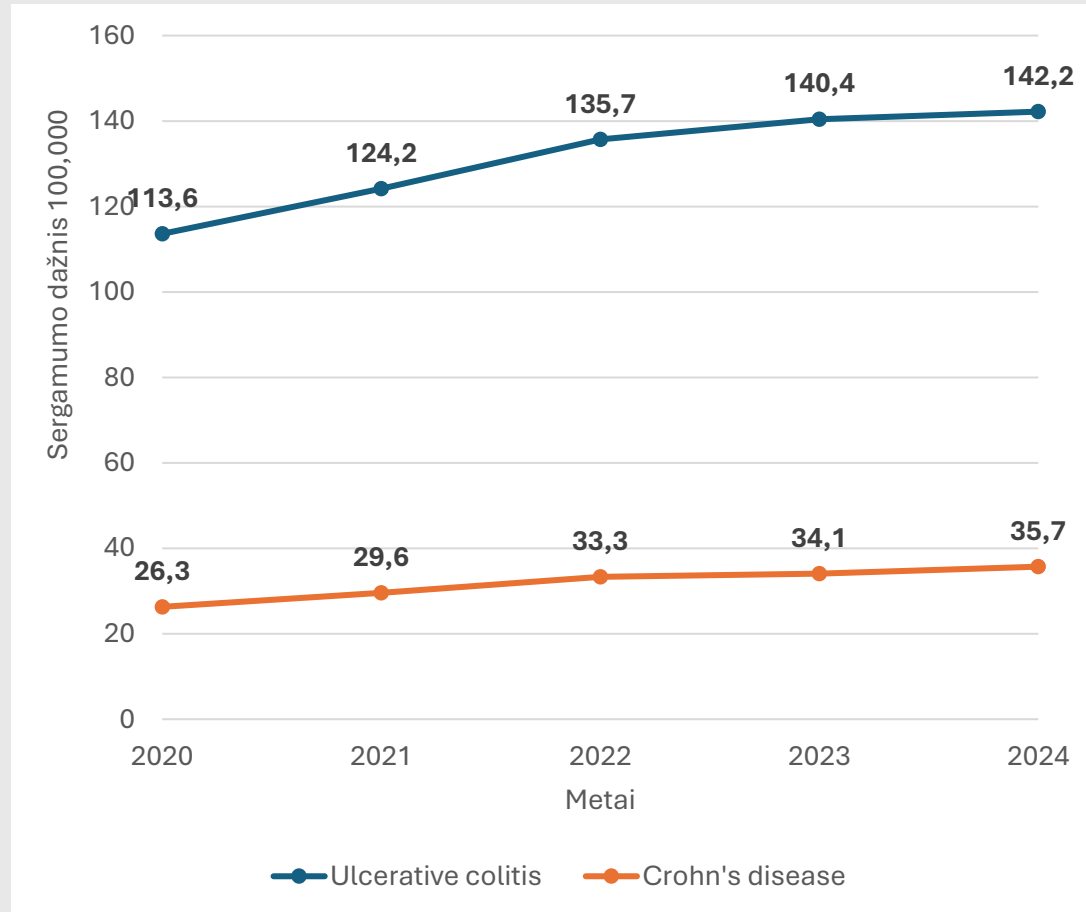
- An analysis of anonymized data on the treatment of inflammatory bowel diseases (Crohn's disease and ulcerative colitis), available on the State Data Re-use Platform, in Lithuania during the period 2020–2024.
- Access to data was granted by the State Data Agency, following permission to use information from the Electronic Health Services and Cooperation Infrastructure Information System and the Health Insurance Information System “*Sveidra*” administered by the National Health Insurance Fund.
- The analysis was performed using the tools of the State Health Data Re-use Platform and *Microsoft Excel*. The report summarizes statistical data on disease diagnoses, epidemiology, and prescription of medicines.

Incidence of IBD in Lithuania 2020-2024



- the average incidence of Ulcerative colitis in the sample of subjects with a revised diagnosis treated with prescription medications was 20.5 cases per 100,000 population.
- The average incidence of Crohn's disease in the sample of subjects with a revised diagnosis treated with prescription medications was 6.4 cases per 100,000 population.

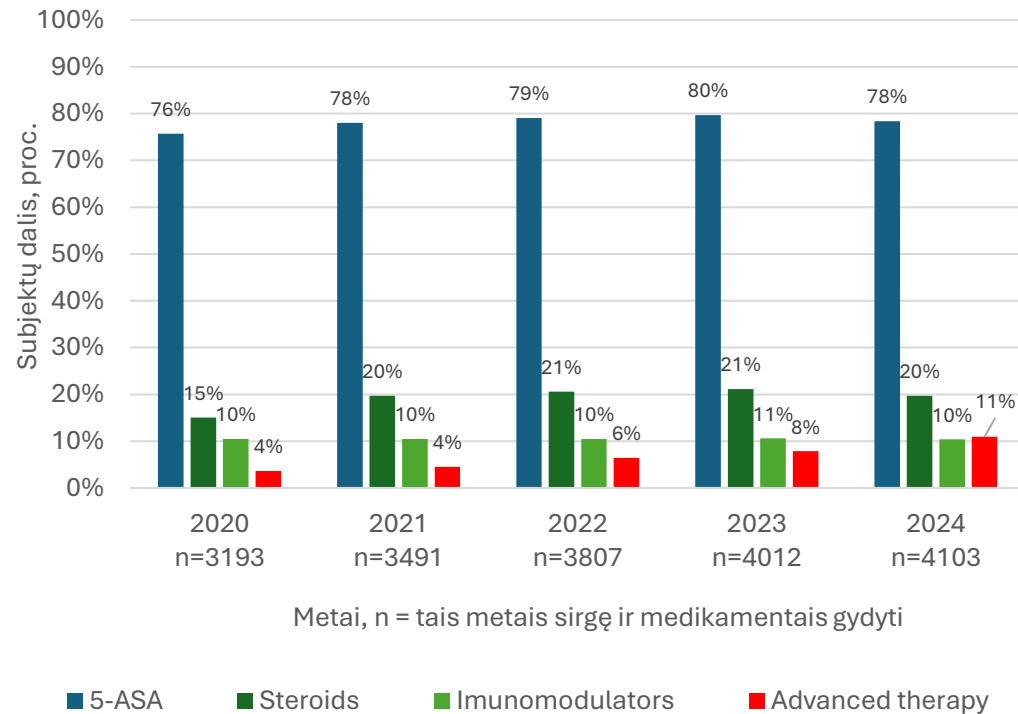
Prevalence of IBD in Lithuania 2020-2024



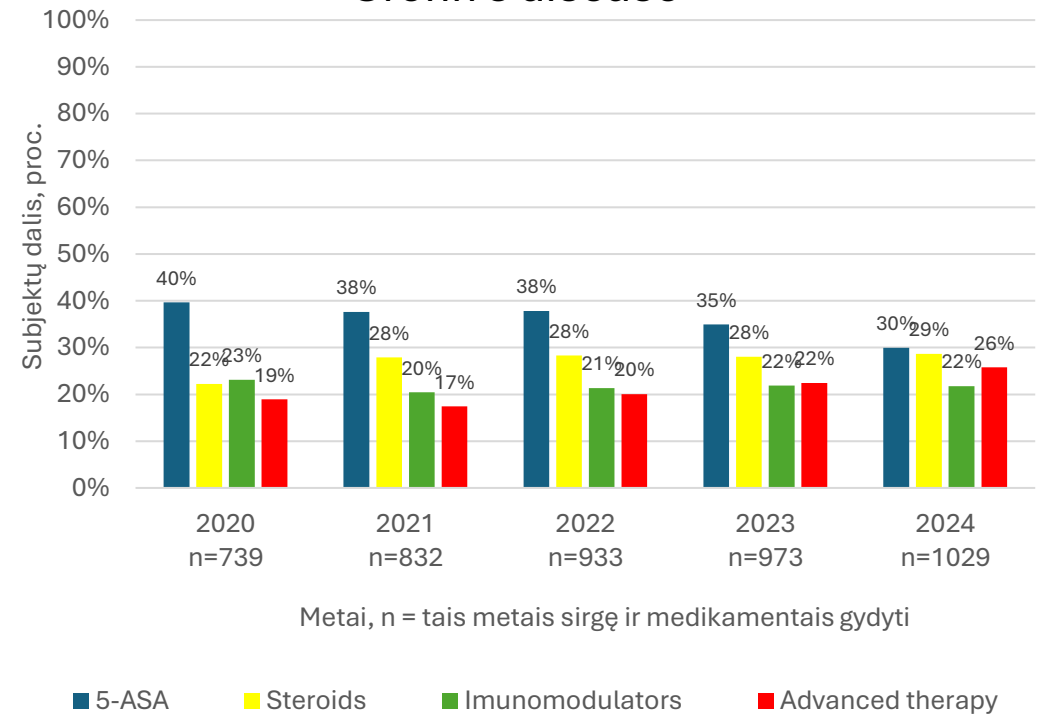
- The average prevalence of UC in the sample of subjects with a revised diagnosis treated with prescription medications (N = 5601) - 131.2 cases per 100,000 population colitis in Lithuania in 2020 - 2024.
- The average prevalence of Crohn's disease in the sample of subjects with a revised diagnosis treated with prescription medications was 31,8 cases per 100,000 population.

Treatment of subjects with IBD by drug group, analyzed by year 2020 - 2024

Ulcerative colitis

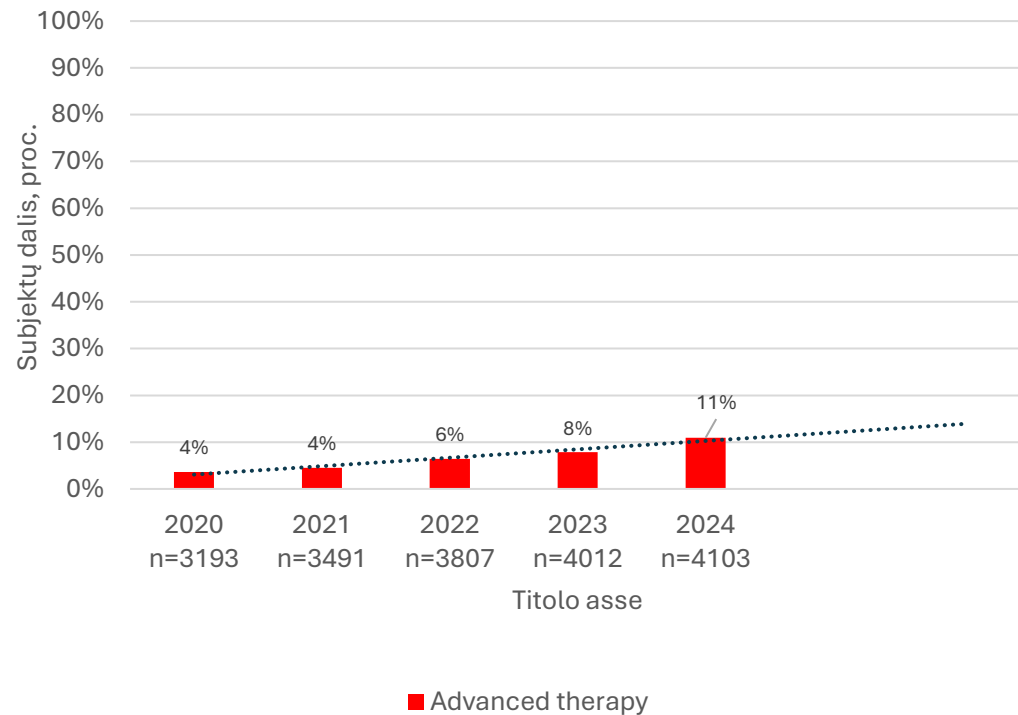


Crohn's disease

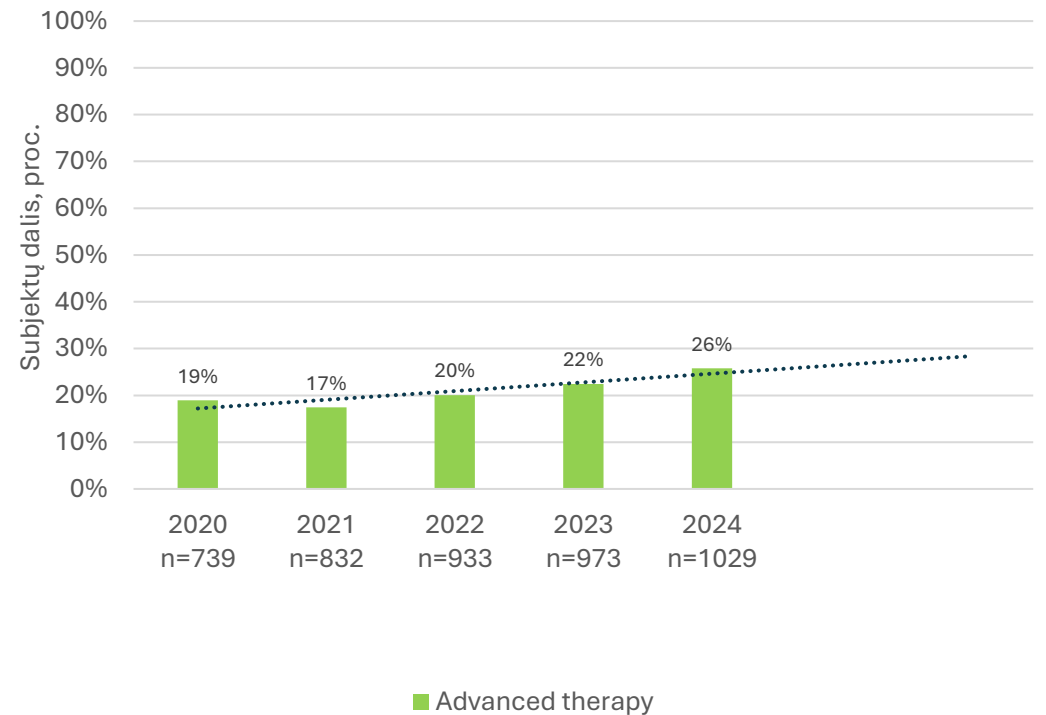


Advanced therapy in the treatment of IBD

Ulcerative colitis

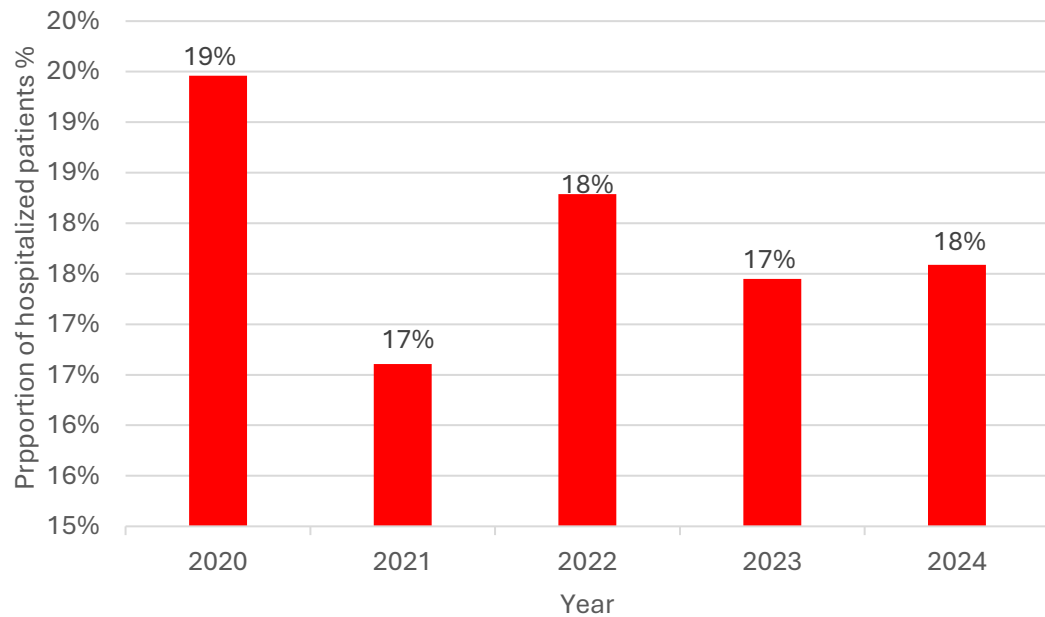


Crohn's disease



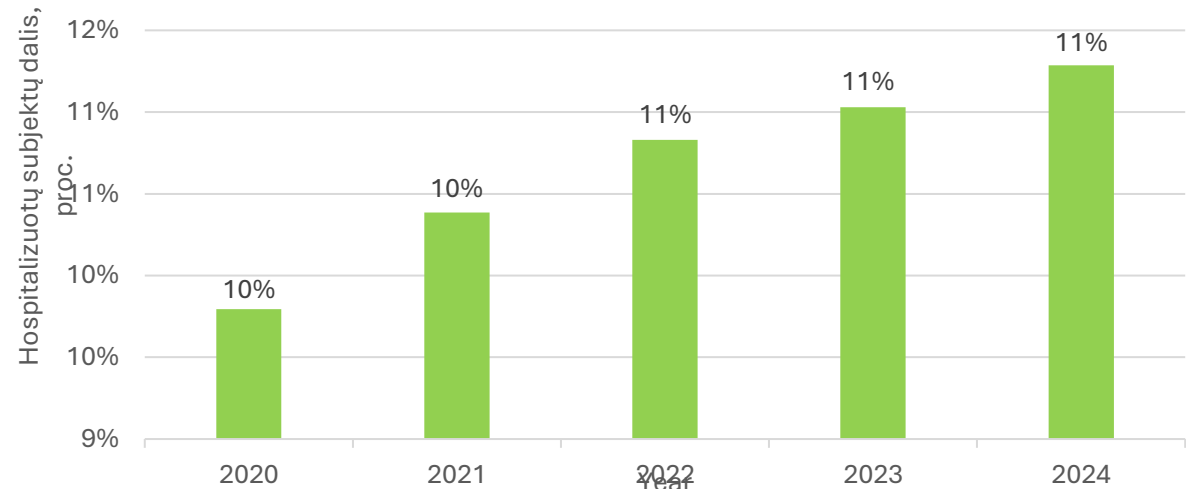
Hospitalization rates of subjects with IBD analyzed by year 2020 - 2024

Crohn's disease



Proportion (%) of subjects with Crohn's disease who were treated inpatient at least once due to the disease (during the calendar years 2020-2024), regardless of the number of hospitalizations, out of all subjects with Crohn's disease in that year

Ulcerative colitis



Proportion (%) of subjects with ulcerative colitis who were treated inpatient at least once due to the disease (during the calendar years 2020-2024), regardless of the number of hospitalizations, out of all subjects with ulcerative colitis in that year

Diagnostics: Copenhagen Criteria

Ulcerative colitis (All three criteria positive)

1. Diarrhea and/or rectal bleeding and pus for more than one week or recurrent episodes of these symptoms
2. Typical endoscopic appearance
3. Histopathology consistent with ulcerative colitis: neutrophils in the epithelial structure, cryptitis, crypt deformities, crypt abscesses.

Crohn's disease (at least two positive criteria)

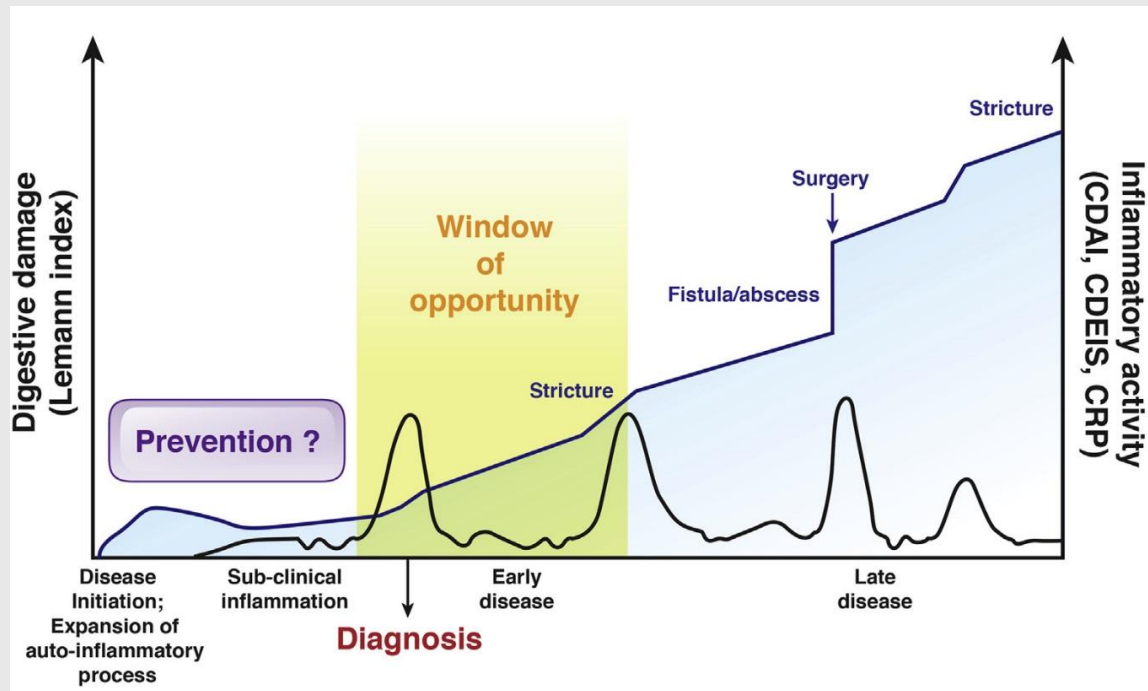
1. Abdominal pain, weight loss and/or diarrhoea lasting more than three months
2. Characteristic endoscopic findings: aphthae, aphthous ulcers, serpiginous, tortuous ulcers, “cobble stone” appearance or radiologically detectable strictures and “cobble stone” signs
3. Histopathology consistent with Crohn’s disease (Langerhans-type epithelioid granuloma, focal inflammation or transmural segmental inflammation)
4. Fistulas and/or abscesses associated with affected bowel segments

Munkholm P. Crohn’s disease – occurrence, course and prognosis. An epidemiologic cohort study. Dan Med Bull. 1997; 44: 287-302

Geboes K. Pathology of inflammatory bowel diseases (IBD): variability with time and treatment. Colorectal Dis 2001; 3(1): 2-12

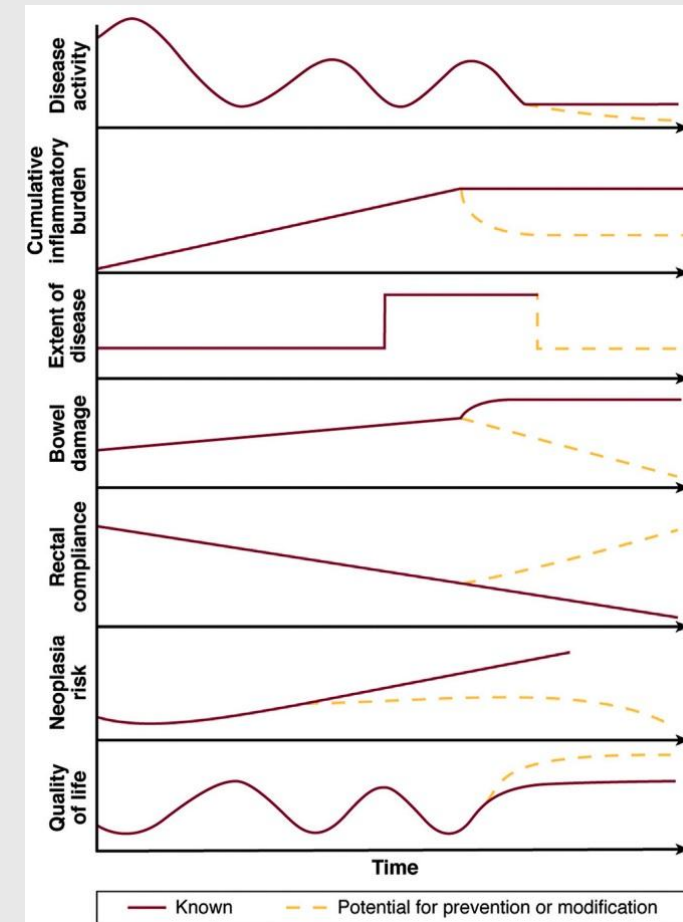
IBD – progressive diseases

Crohn's disease



Colombel JF et al. *Gastroenterology*. 2017;152:351-361.

Ulcerative colitis



Krugliak Cleveland N et al. *Gastroenterology*. 2022;162:1396–1408.

Natural disease course of Crohn's disease during the first 5 years after diagnosis in a European populationbased inception cohort: an Epi-IBD study

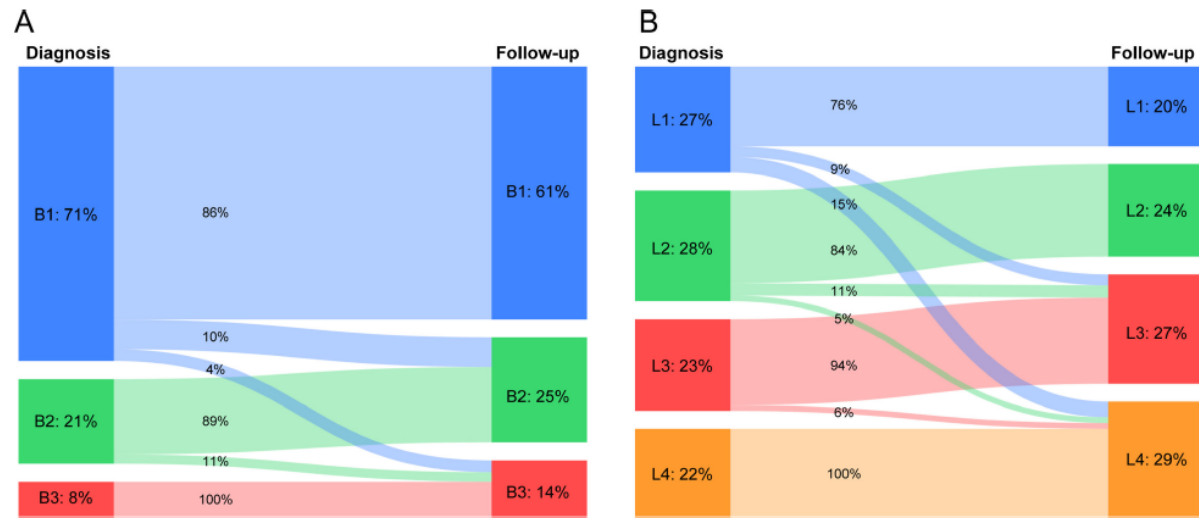
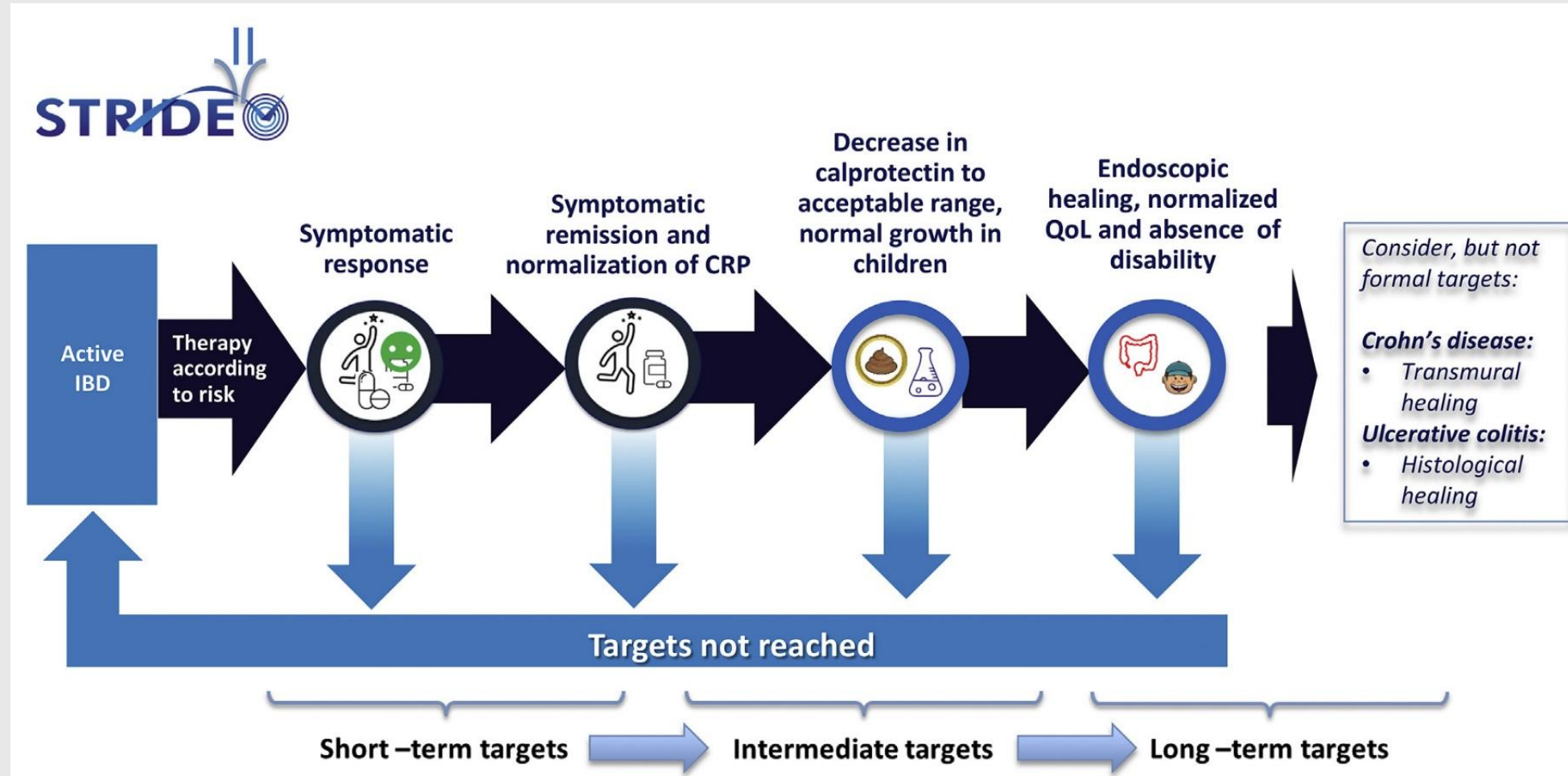


Figure 3 Changes in disease behaviour (A) and location (B) during 5 years of follow-up among patients with Crohn's disease. The central column represents the proportion of patients within each category that changed to one of the other categories. B1: non-stricturing, non-penetrating; B2: stricturing; B3: penetrating; L1: terminal ileum; L2: colon; L3: terminal ileum and colon; L4: upper GI tract (all patients with upper GI involvement).

- Western European patients were more likely to receive biological therapy (33%) and immunomodulators (66%) compared to Eastern European patients (14% and 54%, respectively).
- Eastern European patients were more likely to receive 5-aminosalicylates (90% vs. 56% in Western Europe).
- Despite these differences, the disease course and outcomes (surgery, hospitalization, phenotype progression) did not differ significantly between regions.

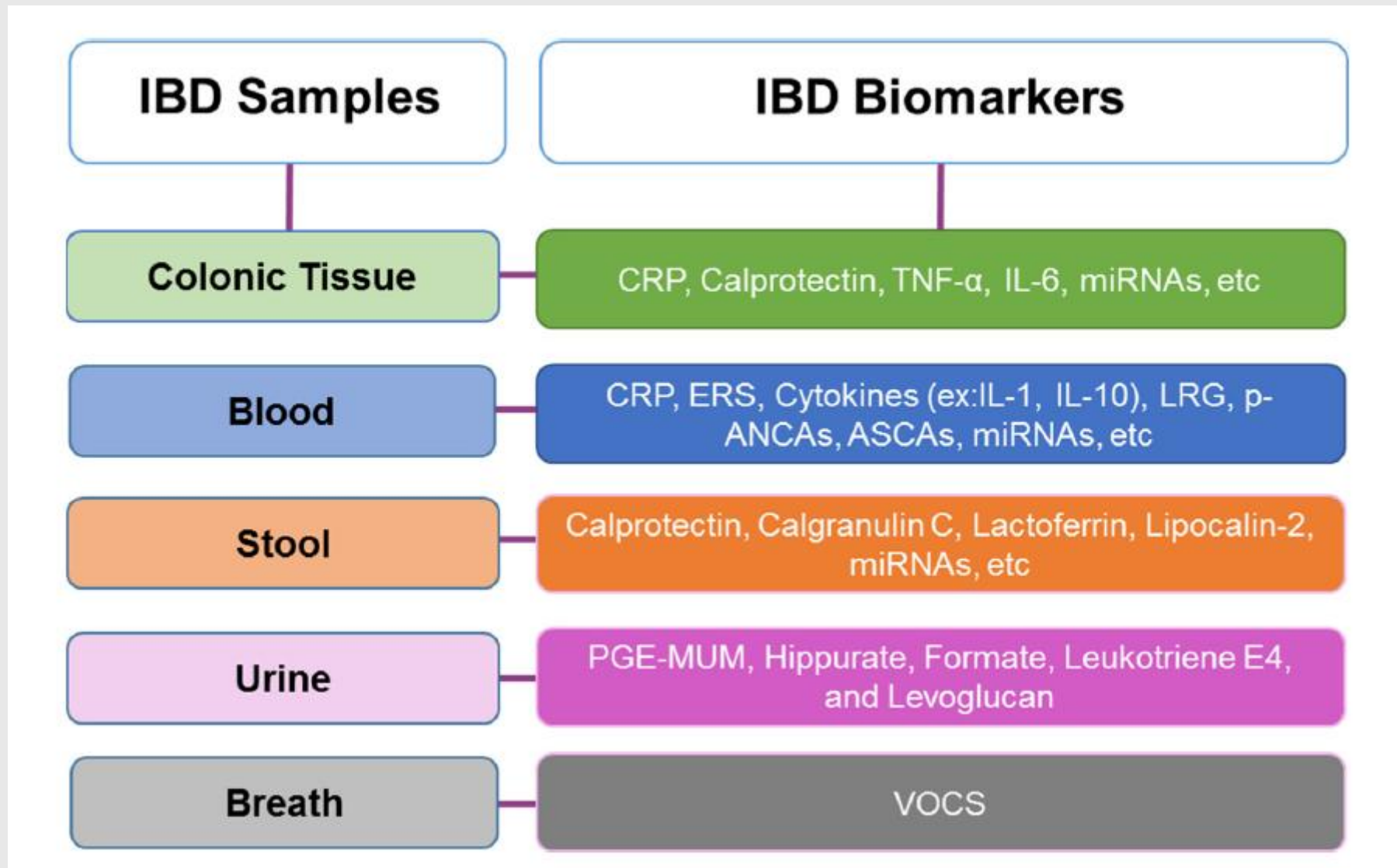
How to prevent the progression of the disease?



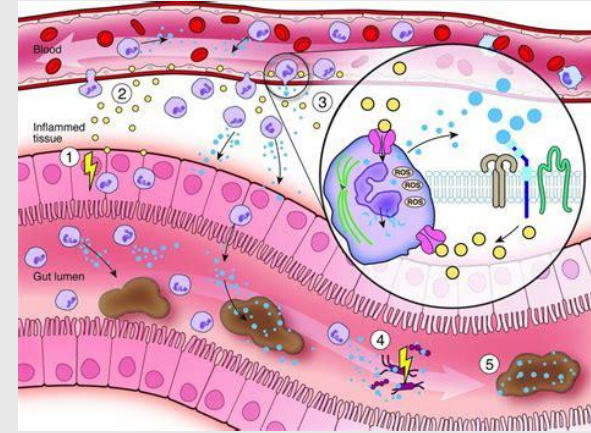
Biomarkers in IBD

Biomarkers—measurable biological indicators that can:

- **Diagnose** IBD early and accurately
- **Differentiate** between CD and UC
- **Monitor** disease activity, remission, and relapse risk
- **Predict** treatment response and long-term outcomes

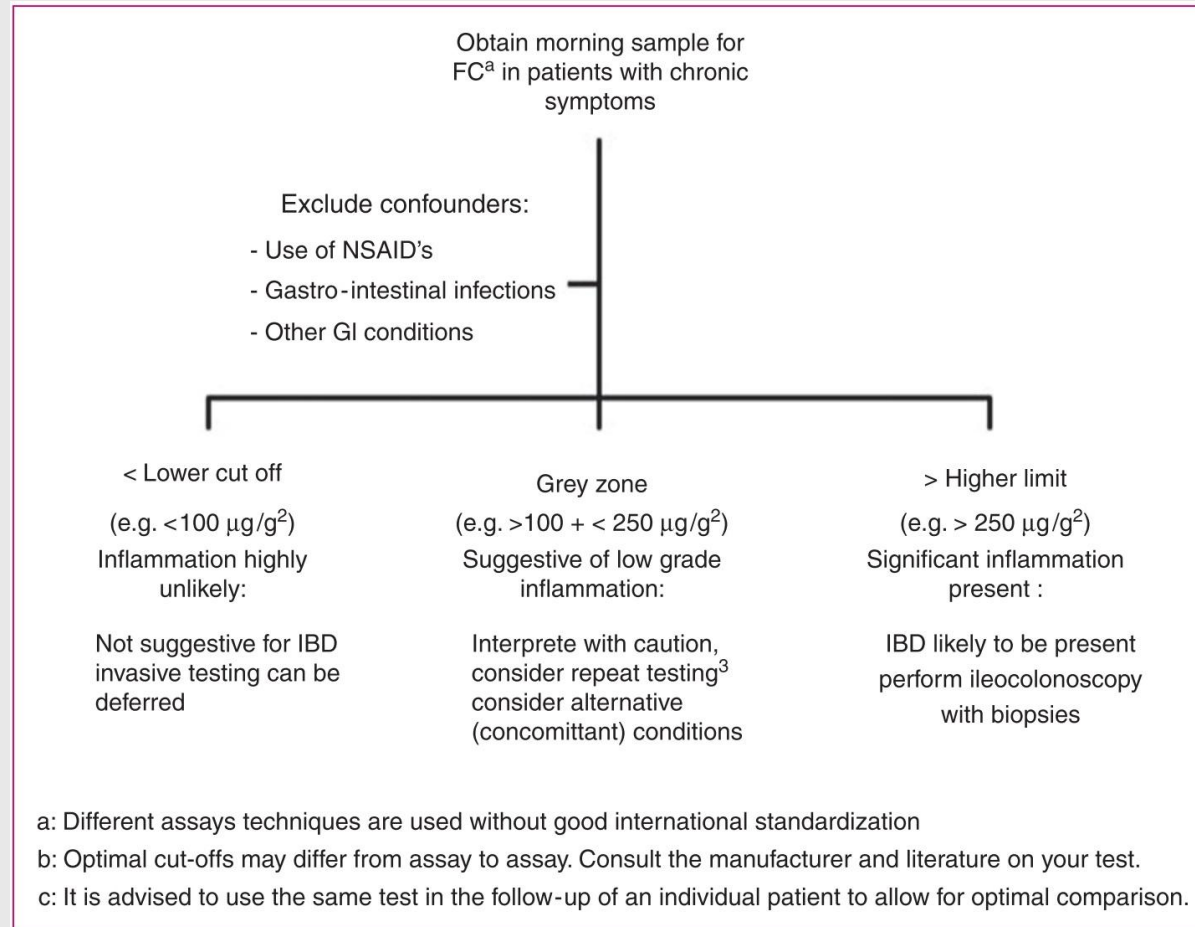


Calprotectin: A Fecal Biomarker of Intestinal Inflammation



- Calprotectin is a calcium- and zinc-binding protein complex (composed of S100A8 and S100A9 subunits) primarily released by neutrophils during inflammation. It is highly abundant in the cytosol of neutrophils and is also found in monocytes and activated macrophages. When neutrophils migrate into the intestinal lumen during mucosal inflammation, calprotectin is released and remains stable in feces, making **fecal calprotectin (FC)** a reliable, noninvasive biomarker of gastrointestinal inflammation

Calprotectin in the diagnosis of IBD



UNITED EUROPEAN GASTROENTEROLOGY

ueg journal

Review Article

Expert opinion for use of faecal calprotectin in diagnosis and monitoring of inflammatory bowel disease in daily clinical practice

Catherine Reenaers¹, Peter Bossuyt², Pieter Hindryckx³, Hilde Vanpoucke⁴, Anneline Cremer⁵ and Filip Baert⁶; on behalf of Belgian IBD Research and Development (BIRD)

United European Gastroenterology Journal
2018, Vol. 6(8) 1117–1125
© Author(s) 2018
Article reuse guidelines:
sagepub.com/journals-permissions
DOI: 10.1177/2050640618784046
journals.sagepub.com/home/ueg

SAGE

Calprotectin for diagnosis and monitoring of IBD

When patient have symptoms suggesting disease activity

Levels of FC¹

Low

High

Intestinal inflammation

<100 µg/g

100-250 µg/g

>250 µg/g

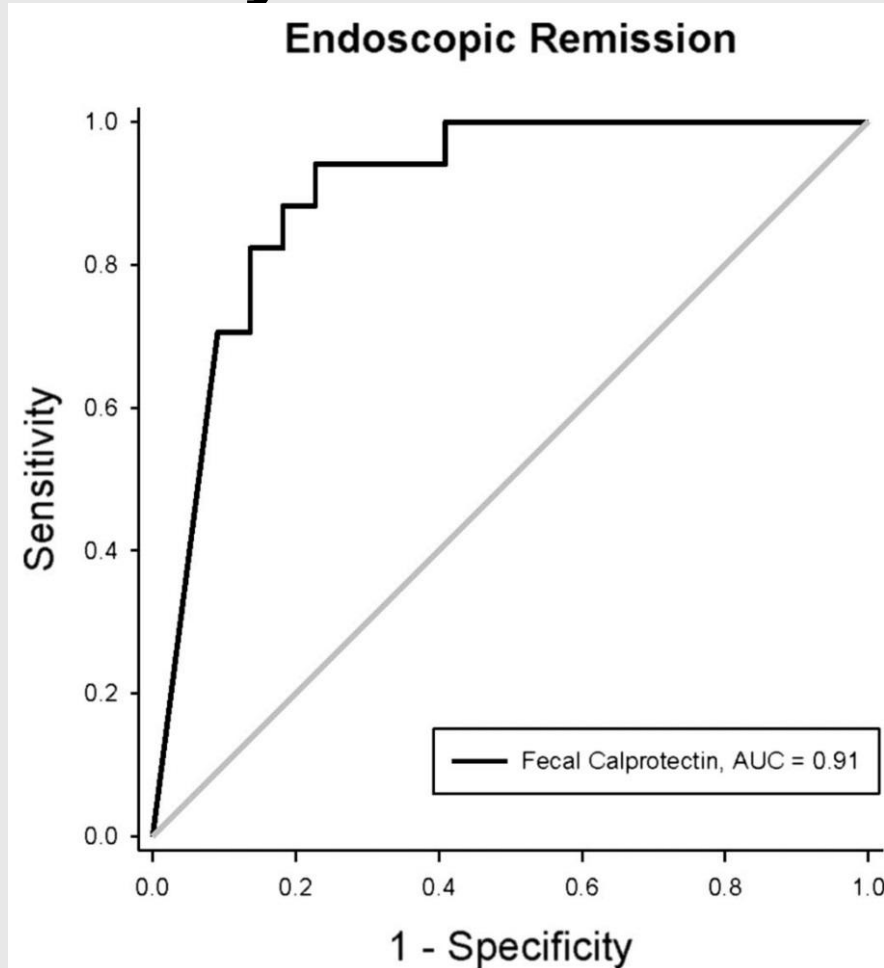
- Seek other causes than IBD flare

- Explore possible non-inflammatory IBD cause (stricture, obstruction, ...)
- Check FC after 3 to 6 months

- Discuss compliance with patient
- Consider changing treatment strategy
- Consider endoscopy or imaging to determine the extent of the lesions

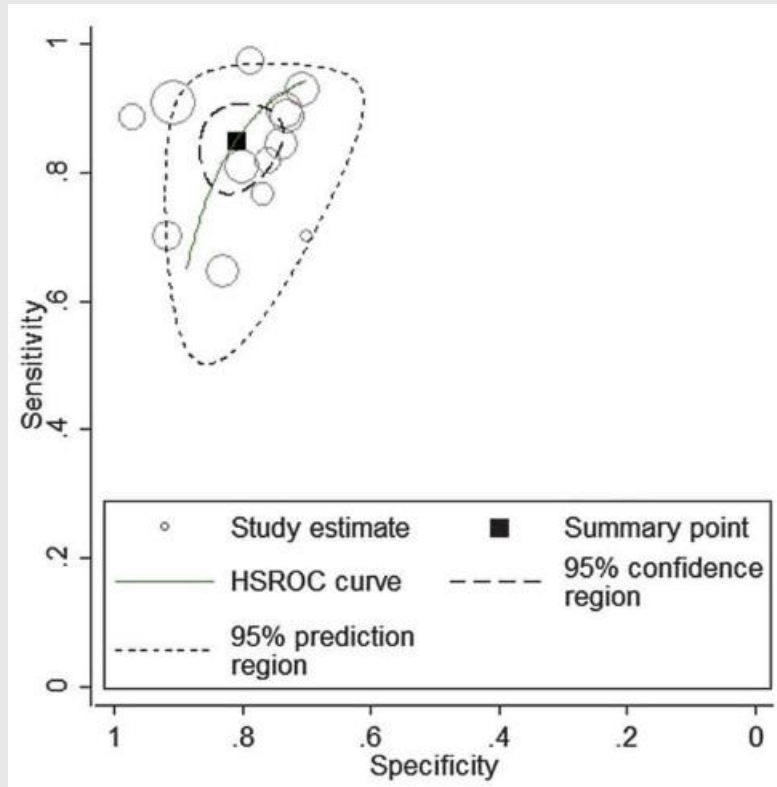
¹ Use prior FC value of a particular patient if available for comparison and for correlation with endoscopic disease activity.

Calprotectin correlates with endoscopic activity



- Calprotectin $<100 \mu\text{g/g}$: sensitivity 71%, specificity 91% for endoscopic remission of both ulcerative and Crohn's colitis.

Calprotectin correlates with endoscopic activity



- Meta-analysis
- 1471 patients
- 50 $\mu\text{g/g}$: sensitivity 92%, specificity 60%
- 100 $\mu\text{g/g}$: sensitivity 84%, specificity 66%
- 250 $\mu\text{g/g}$: sensitivity 80%, specificity 82%

Calprotectin for diagnosis and monitoring of IBD

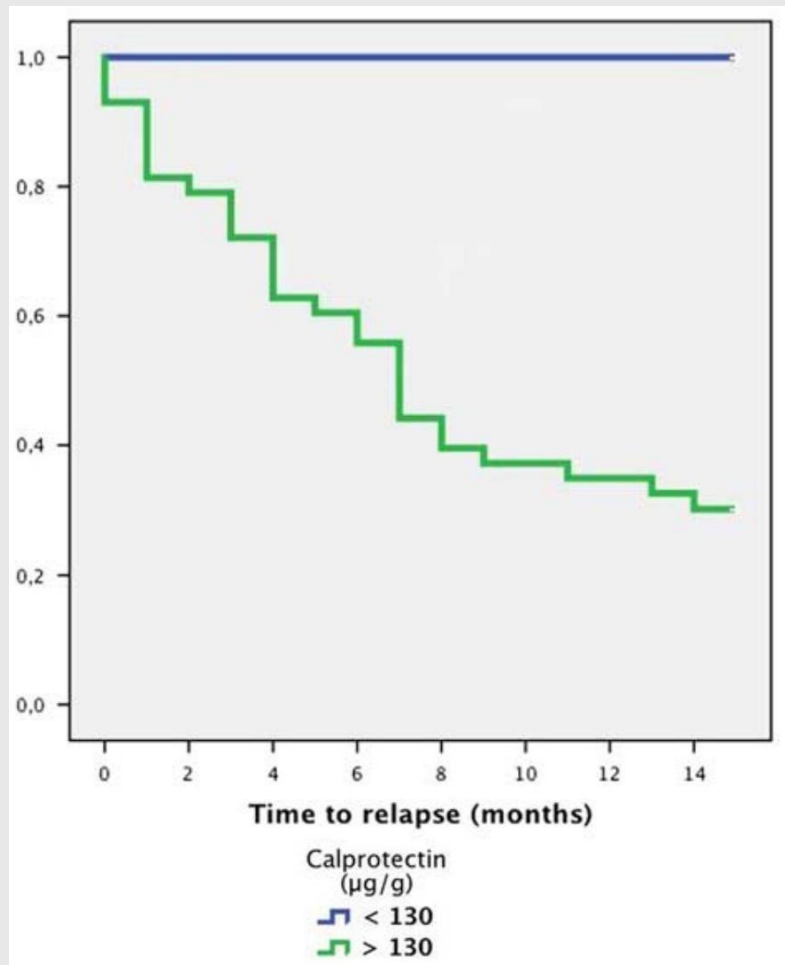
When a patient with IBD is in clinical remission..

FC <100 µg/g	FC 100-250 µg/g	FC > 250 µg/g*
Mucosal and histological remission is likely	Residual inflammation likely	Significant inflammation still present
Flare up very unlikely	Compare with previous value	Flare in the coming months is likely
Continue therapy or consider deescalation	Plan for retesting at regular interval (s)	Complications may occur without therapeutic change Consider morphologic assesement (endoscopy and/or MRI) and optimize/change therapy

*CD: Sensitivity 61%, specificity 80% ; UC: sensitivity 71%, specificity: 100%

1. Regular testing, e.g. at diagnosis, for monitoring, or at time of major therapeutic changes, will allow for comparison within an individual patient.

Can calprotectin help predict flare-ups?



- 95 anti-TNF-treated patients followed for 16 months
- <130 µg/g calprotectin indicated a high probability of maintaining remission
- >300 µg/g calprotectin indicated a high risk of relapse



ORIGINAL ARTICLE

A blood-based prognostic biomarker in IBD

Daniele Biasci,¹ James C Lee,^{1,2} Nurulamin M Noor,¹ Diana R Pombal,^{1,2} Monica Hou,³ Nina Lewis,⁴ Tariq Ahmad,⁵ Ailsa Hart,^{6,7} Miles Parkes,¹ Eoin F McKinney,^{1,2} Paul A Lyons,^{1,2} Kenneth G C Smith^{1,2}

A **whole blood biomarker** for IBD was developed by analyzing **gene expression signatures** directly from **unstimulated whole blood samples**. The goal was to identify a **non-invasive, clinically useful marker** that could **stratify patients based on their likely response to treatment**—specifically predicting which patients would require **escalation to biologic therapy** or surgery

•**Transcriptomic Profiling:**

- Researchers conducted **RNA sequencing** on whole blood samples.
- Focused on **baseline gene expression**—without requiring cell stimulation or separation.

•**Patient Cohorts:**

- Included patients newly diagnosed with IBD.
- Followed over time to track **disease course** and **treatment escalation**.

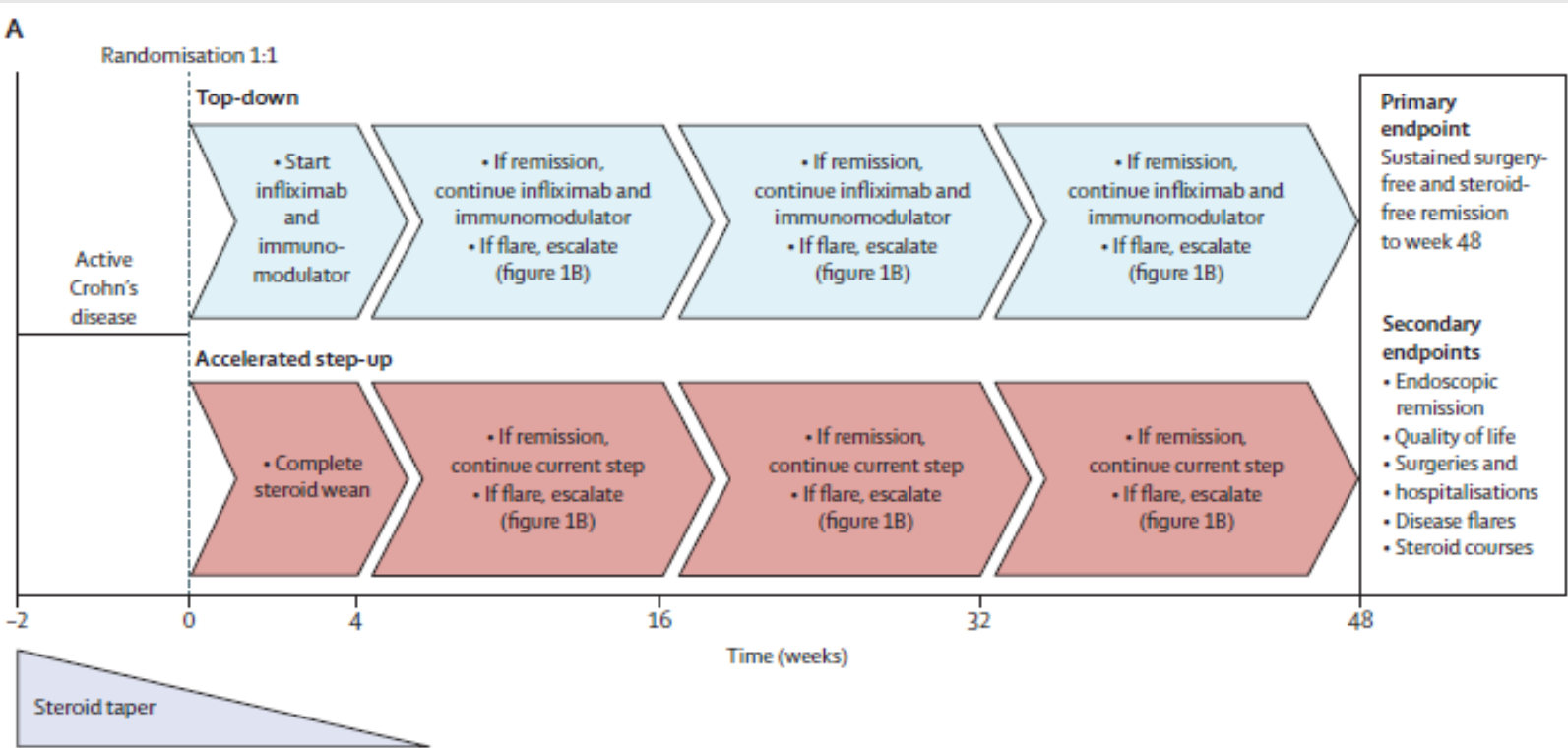
•**Machine Learning Models:**

- Used to identify a **gene expression signature** (i.e., a panel of predictive genes).
- The final model was able to **stratify patients into high- and low-risk groups**.

•**Validation:**

- The biomarker was validated in independent cohorts.
- It successfully predicted patients likely to experience a **severe disease course** requiring intensive therapy.

A biomarker-stratified comparison of top-down versus accelerated step-up treatment strategies for patients with newly diagnosed Crohn's disease (PROFILE): a multicentre, open-label randomised controlled trial



B

Trial visit	Accelerated step-up	Top-down
Week -2 (screening)	Start steroid induction for active Crohn's disease	Start steroid induction for active Crohn's disease
Week 0 (randomisation)	Following randomisation, continue steroid taper	Following randomisation, start infliximab and immunomodulator, and continue steroid taper
Week 4, 16, 32, 48 (after randomisation)	If in remission, continue on current step of treatment If flare 1, start steroids and immunomodulator If flare 2, start infliximab alongside immunomodulator	If in remission, continue infliximab and immunomodulator If flare 1, additional course of steroid medication If flare 2, consider non-response and trial withdrawal



Potential miRNAs as Diagnostic Biomarkers for Differentiating Disease States in Ulcerative Colitis

- Ulcerative colitis (UC) is a chronic inflammatory disease causing persistent inflammation and ulceration in the colon. Current standard diagnostic methods for UC, such as colonoscopy and non-specific inflammatory markers like C-reactive protein (CRP), are often **invasive, inconvenient, painful, or lack specificity**.
- MicroRNAs (miRNAs) are small non-coding RNAs (typically 22 nucleotides long) that regulate gene expression. They are seen as highly promising biomarkers because of their fundamental role in gene regulation and their **remarkable stability in biological fluids** (such as resistance to RNase degradation and temperature fluctuations), surpassing that of proteins and messenger RNAs.

Potential miRNAs as Diagnostic Biomarkers for Differentiating Disease States in Ulcerative Colitis

miRNA	Observed Trend in aUC vs. iUC/HCs	Key Findings & Fold Change	Mechanistic Relevance
miR-126	Highest Upregulation	Demonstrated a remarkable 18-fold increase in active UC tissue samples compared to healthy controls (HCs). No significant changes were noted in inactive UC.	Its established role in endothelial function and angiogenesis directly correlates with the vascular changes (like increased mucosal blood flow and endothelial dysfunction) characteristic of active UC flares.
miR-21	Most Consistent Upregulation	Consistently upregulated, with one study showing a 14.7-fold increase in aUC tissue compared to HCs.	Involved in the negative regulation of PDCD4 and RhoB; its overexpression may trigger oxidative stress-induced cellular damage contributing to UC pathogenesis. <i>Note: One study reported decreased miR-21 in aUC serum compared to iUC serum, highlighting the impact of sample type.</i>
miR-146b-5p	Consistent Upregulation in Serum	Significantly overexpressed in active UC serum samples compared to both inactive UC and HCs, suggesting systemic inflammatory activation .	Involved in regulating the NF-κB signaling pathway , a central coordinator of inflammatory responses in UC pathogenesis.
miR-223	Upregulation observed	miR-223-3p was upregulated in aUC fecal samples compared to iUC and HCs.	Elevated levels might contribute to UC pathogenesis by negatively regulating autophagy and inhibiting IKKα.

Closing remarks

- **Epidemiological studies in 2010 showed an East–West gradient in IBD incidence, but recent data from Lithuania reveal a significant rise, with rates now approaching those seen in Western Europe.**
- **Novel biomarkers for early diagnosis, disease activity monitoring, and prediction of treatment response are being intensively investigated, but so far, only fecal calprotectin has proven useful and valuable in clinical practice**
- **As the range of advanced therapies expands, IBD management has shifted toward earlier, more aggressive treatment and close monitoring.**