

Original Article

# Perception of Cancer Risk and Management Practice for Colitis-associated Dysplasia Is Influenced by Colonoscopy Experience and Workplace Affiliation: Results of an International Clinician Survey

Misha Kabir,<sup>a,b,✉</sup> Siwan Thomas-Gibson,<sup>b,c</sup> Ailsa L. Hart,<sup>c,d</sup> Ana Wilson<sup>a,b</sup>

<sup>a</sup>Department of Surgery and Cancer, Imperial College London, London, UK <sup>b</sup>Wolfson Endoscopy Unit, St Mark's Hospital, London, UK <sup>c</sup>Department of Inflammatory Bowel Diseases, St Mark's Hospital, London, UK <sup>d</sup>Department of Inflammatory Bowel Diseases, St Mark's Hospital, London, UK

Corresponding author: Dr Misha Kabir, MBBS, MA (cantab), MRCP, Wolfson Endoscopy Unit, St Mark's Hospital, Watford Road, Middlesex HA1 3UJ, UK. Tel.: +44 020 8864 3232; email: [misha.kabir1@nhs.net](mailto:misha.kabir1@nhs.net)

## Abstract

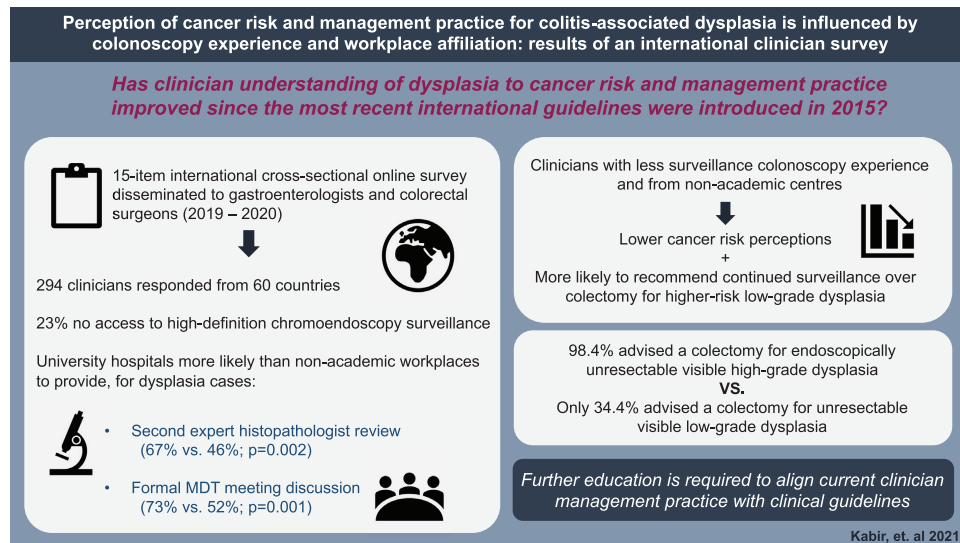
**Background and Aims:** A successful colitis cancer surveillance programme requires effective action to be taken when dysplasia is detected. This is the first international cross-sectional study to evaluate clinician understanding of dysplasia-cancer risk and management practice since the most recent international guidelines were introduced in 2015.

**Methods:** A 15-item international online survey was disseminated to gastroenterologists and colorectal surgeons.

**Results:** A total of 294 clinicians [93.5% gastroenterologists] from 60 countries responded; 23% did not have access to high-definition chromoendoscopy. University hospitals were more likely than non-academic workplaces to provide second expert histopathologist review [67% vs 46%;  $p=0.002$ ] and formal multidisciplinary team meeting discussion [73% vs 52%;  $p=0.001$ ] of dysplasia cases. Perceptions of 5-year cancer risk associated with endoscopically unresectable low-grade dysplasia varied between 0% and 100%. Non-academic hospital affiliation was predictive of lower perceived cancer risks. Although most [98.4%] respondents advised a colectomy for endoscopically unresectable visible high-grade dysplasia, only 34.4% advised a colectomy for unresectable visible low-grade dysplasia. Respondents from university hospitals were more likely to consider colectomy for multifocal low-grade dysplasia (odds ratio [OR] 2.17). If invisible unifocal low-grade dysplasia was detected, continued surveillance over colectomy was the preferred management among clinicians working mainly in private clinics [OR 9.4] and least preferred in those who had performed more than 50 surveillance colonoscopies [OR 0.41].

**Conclusions:** Clinicians with less surveillance colonoscopy experience and from non-academic centres appear to have lower cancer risk perceptions and are less likely to advocate colectomy for higher-risk low-grade dysplasia. Further education may align current management practice with clinical guidelines.

## Graphical Abstract



**Key Words:** Dysplasia; surveillance; colorectal cancer

## 1. Introduction

In the past decade, advances in colonoscopic surveillance imaging, including the use of high-definition endoscopes and chromoendoscopy, have increased the identification of pre-cancerous colonic dysplastic lesions in patients with inflammatory bowel disease [IBD].<sup>1</sup> International society consensus groups have provided evidence-based guidelines to attempt to standardise the management of dysplasia.<sup>2-6</sup> The long-term natural history and prognosis of non-polypoid and invisible low-grade dysplasia [LGD] remains uncertain, however.<sup>7</sup> In the case of invisible dysplasia, the European Crohn's and Colitis Organisation [ECCO] advise that a repeat endoscopy with dye spray be performed by an endoscopist with specialist expertise in IBD surveillance.<sup>2</sup> ECCO<sup>2</sup> and SCENIC<sup>3</sup> [Surveillance for Colorectal Endoscopic Neoplasia Detection and Management in IBD Patients: International Consensus] guidelines also recommend that the management of these patients be individualised to the patient after discussion of the risks and benefits of colectomy versus entering an enhanced surveillance programme [colonoscopy after 3–6 months and then annually]. However, since the advent of these guidelines we lack data on whether clinician knowledge of a patient's colorectal cancer risk with histologically proven colonic dysplasia truly allows individualised discussion, and whether dysplasia management practice complies with these guidelines. The aims of this international cross-sectional study are therefore to obtain these data as well as to evaluate clinician access to guideline-recommended services and clinician judgement of what competencies they expect an 'expert' IBD surveillance endoscopist to have acquired.

## 2. Methods

### 2.1. Study design and participant selection

This was an international prospective cross-sectional study. Gastroenterologist and colorectal surgeon members of ECCO and British Society of Gastroenterology [BSG] IBD section were purposively recruited to complete an online survey. The survey was designed

by the study investigators and a pilot 20-item online survey was first distributed to BSG members of the IBD section via one electronic newsletter in June 2019. The survey was modified with removal of five items after peer review by the Young ECCO [Y-ECCO] and ECCO Clinical Research [ClinCom] committees, resulting in a shortened 15-item survey to increase response rates [see [Supplementary material, available as Supplementary data at ECCO-JCC online](#)]. The survey weblink was then advertised to members via five ECCO conference electronic newsletters and the ECCO Congress App in February 2020. The questionnaire assessed the respondents' clinical experience and access to guideline-recommended services such as high-definition imaging chromoendoscopy. They were also given hypothetical clinical scenarios involving IBD patients diagnosed with dysplasia, and were questioned about their surveillance and dysplasia management practices and what risk of developing cancer they believed the patient had, i.e. their dysplasia cancer risk perceptions.

### 2.2. Ethical considerations

This research study was approved by the South Central-Berkshire Research ethics committee [REC reference no. 18/SC/0466] and the Health Research Authority [HRA]. Completion of the anonymous voluntary questionnaire was deemed to imply consent.

### 2.3. Data analysis

Only the results of the same 15 questions disseminated to both the ECCO and BSG IBD section members have been analysed. SPSS statistical software [version 25, IBM, Armonk, NY] was used for all analyses. Continuous variables that are non-parametric in distribution have been reported as medians with interquartile ranges [IQRs], or ranges and statistically significant differences between groups have been tested using a Mann-Whitney U test. Parametric continuous variables have been reported as means with standard error, and statistically significant differences between groups have been tested using a two-sample t test. Categorical variables have been described

as raw numbers or percentages, and comparisons of groups have been made using a chi square test. Multivariable binomial logistic regression analyses were performed to determine independent variables predictive of dysplasia risk perception and management practice. These are expressed as odds ratios [ORs] with 95% confidence intervals [CIs];  $p$ -values less than 0.05 signify statistical significance. Cases with missing data for at least one of the variables being analysed were excluded from the multivariable analyses.

### 3. Results

#### 3.1. Respondent characteristics

In total there were 294 survey respondents from 60 different countries [Supplementary Figure 1, available as Supplementary data at [ECCO-JCC online](#)]. There were 246 responses to the ECCO survey invitations sent out to 2610 registered clinician members. However, an undetermined proportion of ECCO members are physicians from specialties not eligible to complete the survey, e.g. radiology and histopathology, and therefore the true response rate cannot be evaluated. There were 48 responses to the BSG survey invitations sent out to 650 IBD section members. The majority of the total respondents were gastroenterologists [93.5%], working within Europe [78.2%] and had performed at least one IBD surveillance colonoscopy in their career [89.4%]; see Table 1 for a breakdown of further respondent demographics. In all, 77% reported having access to high-definition chromoendoscopy, 57% reported that all dysplasia cases were confirmed by a second expert gastrointestinal histopathologist review, and 63% reported that dysplasia cases were discussed at a multidisciplinary team [MDT] meeting with at least a gastroenterologist, a colorectal surgeon, and a radiologist present in their centre. University hospitals were more likely than non-academic centres to provide second histopathologist review [67.2% vs 46.4%;  $p = 0.002$ ] and formal MDT meeting discussion [73.5% vs 52.4%;  $p = 0.001$ ] of dysplasia cases, but access to high-definition chromoendoscopy was not significantly different.

#### 3.2. Dysplasia cancer risk perceptions

##### 3.2.1. High-grade dysplasia

Self-reported perceived risk of a synchronous cancer existing in a patient with an endoscopically unresectable high-grade dysplasia [HGD] lesion was widely disparate among the clinicians [Figure 1]. Clinical role [specialty or training level] had no impact on risk perceptions, but colonoscopy experience and workplace affiliation were associated with risk perceptions. A greater proportion of respondents who had performed more than 100 surveillance colonoscopies in their lifetime [36.8%;  $n = 43/117$ ] believed that the synchronous cancer risk was 50% or higher compared with those with less endoscopy experience [21.8%;  $n = 26/119$ ] ( $\chi^2[1, n = 236] = 6.3, p = 0.012$ ). Respondents from the American continent [52.6%;  $n = 10/19$ ] were also more likely than those from non-American continents to believe that the risk was 50% or higher [27.2%;  $n = 59/217$ ] ( $\chi^2[1, n = 236] = 5.5; p = 0.019$ ). However, as more American respondents proportionately worked in private clinics compared with respondents from other continents, after adjusting for this in the multivariable logistic regression analysis, continent of workplace was no longer predictive [Table 2]. Experience exceeding 100 surveillance colonoscopies was still predictive of a higher cancer risk perception for HGD, however [OR 1.89; 95% CI 1.03, 3.47;  $p = 0.004$ ]. Working at a general [secondary care] hospital was predictive of a lower cancer risk perception for HGD [OR 0.4; 95% CI 0.23, 0.95;  $p = 0.037$ ].

##### 3.2.2. Low-grade dysplasia

There was also a wide variation in perceived 5-year cancer risk associated with low-grade dysplasia [LGD]. The respondents believed that a patient had a median 20% risk [range 0–70%] of progressing to a cancer within 5 years if they had an endoscopically unresectable visible LGD lesion and no colectomy was performed. If a unifocal and invisible LGD lesion was instead detected after a chromoendoscopic examination [i.e. detected histologically on random biopsy without any macroscopically visible mucosal changes], they believed that the patient had a median 25% [range 0–100%] 5-year cancer risk. Respondents who worked in Asia or Australasia believed patients with unresectable visible LGD had a lower 5-year cancer risk than did those who worked in other continents [15% cancer risk vs 25% cancer risk; Mann-Whitney  $U = 1550; p = 0.014$ ]. This may be secondary to the fact that more of the Asian/Australasian respondents [48.5%;  $n = 16/33$ ] came from non-academic general hospitals compared with respondents from other continents [30.4%;  $n = 79/260$ ] [ $=\chi^2[1, n = 293] = 4.4; p = 0.036$ ]. More participants from general hospitals [62.9%;  $n = 44/70$ ] also believed that the 5-year cancer risk of unresectable LGD was less than 20%, compared with participants from university hospitals or private clinics [48.3%;  $n = 69/143$ ] ( $\chi^2[1, n = 213] = 4.0; p = 0.045$ ). Clinical role and surveillance colonoscopy experience volume did not reveal statistically significant influences on LGD risk perceptions in both scenarios.

#### 3.3. Dysplasia management practice

Participants were asked three multiple-choice questions based on hypothetical scenarios involving patients with minimal comorbidities, and to indicate what management they would recommend.

##### 3.3.1. Endoscopically unresected dysplasia

If the patient had a visible 1-cm non-polypoid dysplastic lesion that could not be endoscopically resected, 69.8% [ $n = 139/199$ ] indicated that they would refer to a specialist advanced polypectomy endoscopist in the region to assess resectability. Of these respondents who would seek a specialist endoscopist opinion, 40% [ $n = 56/139$ ] additionally advocated advising a colectomy if the unresectable dysplasia was HGD, but only 10.8% [ $n = 15/139$ ] would also advise a colectomy if it was LGD. Some respondents [30.2%;  $n = 60/199$ ] would not refer for a specialist endoscopist opinion. Most [90.0%;  $n = 54/60$ ] of these respondents would instead advise a colectomy if the unresectable lesion was HGD, but again a smaller proportion would advise the same if it was LGD [21.7%;  $n = 13/60$ ]. Although the survey question indicated that multiple answers could be chosen, respondents may not have acknowledged this and unknowingly selected a single best-choice answer. For this reason, we performed a subanalysis including only the respondents who selected more than one answer. Of these 64 respondents, 89.1% [ $n = 57$ ] would refer to a regional specialist endoscopist and 98.4% [ $n = 63$ ] would advise a colectomy for unresectable HGD, but still only 34.4% [ $n = 22$ ] would also advise a colectomy for unresectable LGD.

On univariable logistic regression analysis, respondents who were at a trainee level or had reported a lower perception of the cancer risk posed by unifocal invisible LGD, were all more likely than other respondents to recommend referral to a regional specialist endoscopist if a non-polypoid lesion was not resected at endoscopy. On multivariable analysis [Supplementary Table 1, available as Supplementary data at [ECCO-JCC online](#)], only trainee status remained significantly predictive of a referral to a regional specialist [OR 2.97; 95% CI 1.24, 7.14;  $p = 0.015$ ]. Trainee status remained associated with a referral after performing a subanalysis

**Table 1.** Survey respondent demographics and access to inflammatory bowel disease surveillance and dysplasia management services, categorised by continent of workplace.

Respondent experience and workplace services, <i>n</i> [%]	Continent of respondent workplace*			$\chi^2$ test [df = 3] <sup>b</sup> <i>p</i> -value	Total <sup>a</sup> <i>n</i> = 294
	Europe <i>n</i> = 230	Americas <i>n</i> = 28	Asia & Australasia <i>n</i> = 33		
Clinical specialty:	229	27	32	0.132	291
Gastroenterology	217 [94.8%]	23 [85.2%]	29 [90.6%]		272 [93.5%]
Colorectal surgeon	12 [5.2%]	4 [14.8%]	3 [9.4%]		19 [6.5%]
Trainee level	229	27	33	0.035	291
	69 [30.1%]	3 [11.1%]	5 [15.6%]		78 [26.8%]
Place of work:	[229]	[28]	[33]	<0.001	[293]
University hospital/tertiary centre	137 [59.6%]	10 [37.0%]	12 [36.4%]		162 [55.3%]
General hospital/secondary centre	72 [31.3%]	7 [25.9%]	16 [48.5%]		95 [32.4%]
Private clinic	21 [9.1%]	10 [37.0%]	5 [15.2%]		36 [12.3%]
No. of IBD surveillance colonoscopies performed:	229	28	33		293
None	26 [11.4%]	2 [7.1%]	3 [9.1%]		31 [10.6%]
1–50	63 [27.5%]	4 [14.3%]	13 [39.4%]		81 [27.6%]
50–100	32 [14.0%]	4 [14.3%]	5 [15.2%]		41 [14.0%]
More than 100	108 [47.2%]	18 [64.3%]	12 [36.4%]	0.090	140 [47.8%]
Has access to high-definition chromoendoscopy in their endoscopy unit	[226]	[27]	[33]	0.280	[289]
	180 [79.6%]	19 [70.4%]	23 [69.7%]		223 [77.2%]
All dysplasia diagnoses are confirmed by a second gastrointestinal histopathologist	168	25	31	0.083	226
	103 [61.3%]	12 [46.2%]	13 [41.9%]		129 [57.1%]
Dysplasia cases are discussed in a multidisciplinary team meeting [with a gastroenterologist, surgeon, and radiologist present]	164	22	30	0.852	218
	103 [62.8%]	13 [59.1%]	20 [66.7%]		138 [63.3%]
Health professional to normally counsel a patient about dysplasia management:	161	21	28		212
„Gastroenterologist and surgeon jointly	81 [50.3%]	13 [61.9%]	16 [57.1%]		110 [51.9%]
„Colorectal surgeon	0 [0.0%]	3 [14.3%]	1 [3.6%]		4 [1.9%]
„Gastroenterology physician	79 [49.1%]	5 [23.8%]	10 [35.7%]		96 [45.3%]
„Specialist nurse	1 [0.6%]	0 [0.0%]	1 [3.6%]		2 [0.9%]

<sup>a</sup>There was one respondent who did not indicate their country and only two respondents from Africa, so these have not been analysed separately but have been included in the Total column only.

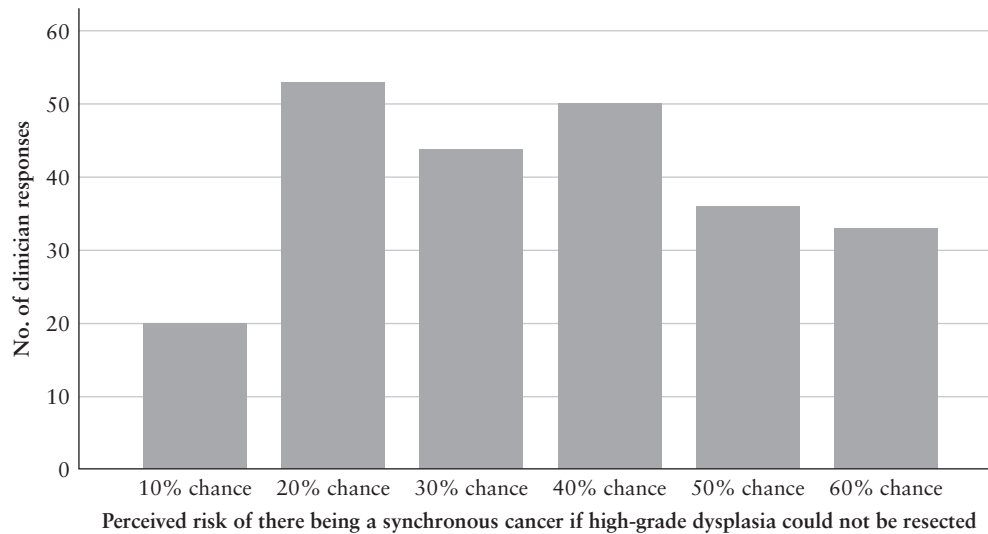
<sup>b</sup>Chi square test assessing significant differences between three continent categories [Europe, Americas, and Asia/Australasia], i.e. three degrees of freedom [DF] on analysis; *p*-value <0.05 signifies statistical significance.

on the participants who selected multiple answers (100% vs 82.1%;  $\chi^2[1, n = 64] = 5.0$ ; *p* = 0.025). When comparing respondents working in the three continent categories, respondents from the Americas [25.0%] were less likely than those working in Asia/Australasia [60.0%] or Europe [57.8%] to indicate that patients with unresectable non-polypoid HGD should be referred for colectomy ( $\chi^2[2, n = 197] = 6.5$ ; *p* = 0.038). The difference did not remain statistically significant after performing a subanalysis on the participants who selected multiple answers. As no other predictive variables, other than geographical location, for colectomy recommendation for either low- or high-grade dysplasia were found,

multivariable analyses were not performed [Supplementary Table 2, available as Supplementary data at ECCO-JCC online].

### 3.3.2. Unifocal invisible dysplasia

If a patient had unifocal invisible LGD, 10.2% [*n* = 19/186] stated that a colectomy was preferred over enhanced surveillance [repeat colonoscopy in 3–6 months and then annually if negative], 72.0% [*n* = 134/186] stated that enhanced surveillance was preferred over colectomy, and 17.7% [*n* = 33/186] stated that neither colectomy nor surveillance was preferred over the other and that the management should therefore be down to patient choice. This was a



**Figure 1.** Clinician-reported perceived risk of a patient having incidental synchronous cancer if they have unresectable high-grade dysplasia detected at endoscopy [*n* = 236].

**Table 2.** Univariate and multivariate regression analysis evaluating variables predictive of clinicians who perceive a greater than 50% synchronous cancer risk with unresectable high-grade dysplasia.

Variables	Univariate analysis		Multivariate analysis	
	OR [95% CI]	<i>p</i> -value	OR [95% CI]	<i>p</i> -value
Clinical specialty [ <i>n</i> = 235]:				
Gastroenterology	1.00			
Colorectal surgery	0.67 [0.21, 2.11]	0.491		
Trainee level [ <i>n</i> = 235]:				
Non-training	1.00			
Trainee	1.33			
Lifetime surveillance colonoscopy experience [ <i>n</i> = 236]:				
Performed <100	1.00		1.00	
Performed >100	2.08 [1.17, 3.69]	0.013	1.89 [1.03, 3.47]	0.040
Workplace [ <i>n</i> = 236]:				
University/tertiary care hospital	1.00		1.00	
General/secondary care hospital	0.51 [0.26, 1.01]	0.055	0.47 [0.23, 0.95]	0.037
Private clinic	2.07 [0.92, 4.69]	0.080	1.55 [0.66, 3.68]	0.317
Continent of workplace [ <i>n</i> = 234]:				
Europe	1.00		1.00	
Americas	3.15 [1.21, 8.21]	0.019	2.44 [0.89, 6.68]	0.082
Asia & Australasia	1.42 [0.60, 3.37]	0.428	1.65 [0.66, 4.10]	0.281

OR, odds ratio; CI, confidence interval.

single best-answer question. The respondents who had performed more than 50 surveillance colonoscopies in their lifetime were less likely than less experienced respondents to prefer enhanced surveillance over colectomy for the management of unifocal invisible LGD (66.1% vs 81.4%;  $\chi^2[1, n = 185] = 5.1; p = 0.024$ ). On multivariable logistic regression analysis [Table 3], surveillance endoscopy experience remained negatively predictive for preference for continued surveillance management over colectomy [OR 0.41; CI 0.20, 0.84; *p* = 0.015] and working in a private clinic was positively predictive for surveillance preference [OR 9.4; 95% CI 1.19, 74.1; *p* = 0.033]. A greater perceived 5-year cancer risk with unifocal invisible LGD positively predicted preference for colectomy over surveillance management on univariable logistic regression analysis [OR 1.03; CI 1.01, 1.05; *p* = 0.015]. As no other variables were predictive for colectomy preference, multivariable analysis was not performed

[Supplementary Table 3, available as Supplementary data at ECCO-JCC online].

### 3.3.3. Multifocal dysplasia

In the final hypothetical scenario, the patient had a visible LGD lesion fully resected by an expert IBD surveillance endoscopist performing chromoendoscopy, but a further focus of invisible LGD was detected distally on random biopsy taken during the same procedure, i.e. multifocal LGD had been diagnosed. Respondents recommended a repeat surveillance colonoscopy after 3–6 months [68.1%; *n* = 124/182] or 1 year later [11.5%; *n* = 21/182] and 41.8% [*n* = 76/182] indicated that colectomy surgery should be discussed with the patient. Respondents who worked in university hospitals were more likely to recommend that colectomy be discussed

**Table 3.** Univariable and multivariable logistic regression analysis: variables predictive of preference for continued surveillance over colectomy management for unifocal invisible low-grade dysplasia.

Variables	Univariable analysis		Multivariable analysis	
	OR [95% CI]	<i>p</i> -value	OR [95% CI]	<i>p</i> -value
Clinical specialty [ <i>n</i> = 185]:				
Gastroenterology	1.00	0.246		
Colorectal surgery	2.48 [0.54, 11.5]			
Trainee level [ <i>n</i> = 185]:				
Non-training	1.00			
Trainee	0.91			
Lifetime surveillance colonoscopy experience [ <i>n</i> = 185]:				
Performed less than 50	1.00		1.00	
Performed more than 50	0.44 [0.22, 0.91]	0.026	0.41 [0.20 - 0.84]	0.015
Access to high-definition chromoendoscopy [ <i>n</i> = 183]	0.97 [0.45, 2.07]	0.933		
Access to multidisciplinary meeting	1.04 [0.48, 2.28]	0.917		
Workplace [ <i>n</i> = 186]:				
University/tertiary care hospital	1.00		1.00	
General/secondary care hospital	1.08 [0.54, 2.15]	0.826	1.07 [0.53 - 2.16]	0.847
Private clinic	8.14 [1.04, 63.5]	0.046	9.40 [1.19 - 74.1]	0.033
Country of workplace [ <i>n</i> = 186]:				
Other countries	1.00			
UK	0.52 [0.25, 1.08]	0.079		
Germany	1.69 [0.35, 8.24]	0.517		
Spain	1.86 [0.39, 8.96]	0.440		
Italy	0.90 [0.22, 3.66]	0.884		
Continent of workplace [ <i>n</i> = 184]:				
Europe	1.00			
Americas	0.79 [0.25, 2.43]	0.675		
Asia & Australasia	1.57 [0.50, 4.97]	0.443		
Perceived 5-year cancer risk with unresectable low-grade dysplasia [ <i>n</i> = 183]	1.00 [0.99, 1.02]	0.637		
Perceived 5-year cancer risk with unifocal invisible low-grade dysplasia [ <i>n</i> = 183]	0.99 [0.07, 1.01]	0.298		
Perceived synchronous cancer risk as 50% or more with unresectable non-polypoid high-grade dysplasia [ <i>n</i> = 184]	0.68 [0.34, 1.36]	0.274		

with the patient in this scenario compared with those who mainly worked at general hospitals and private clinics [OR 2.17; CI 0.14, 1.29; *p* = 0.014]. As no other variables were predictive for colectomy referral on univariable analysis, multivariable analysis was not performed [Supplementary Table 4, available as Supplementary data at *ECCO-JCC* online]. This was another multiple-choice question which may not have been acknowledged by all the participants. In a subanalysis including only the 38 respondents who selected more than one management option, 94.7% [*n* = 36] would repeat surveillance colonoscopy after 3–6 months, 18.4% [*n* = 7] would repeat it in 1 year and 89.5% [*n* = 34] would additionally advise that colectomy be discussed as a management option. On subanalysis of the multiple-choice responders [*n* = 38], mainly working at a private clinic was predictive of not recommending colectomy [OR 0.06; 95% CI 0.01, 0.71; *p* = 0.025].

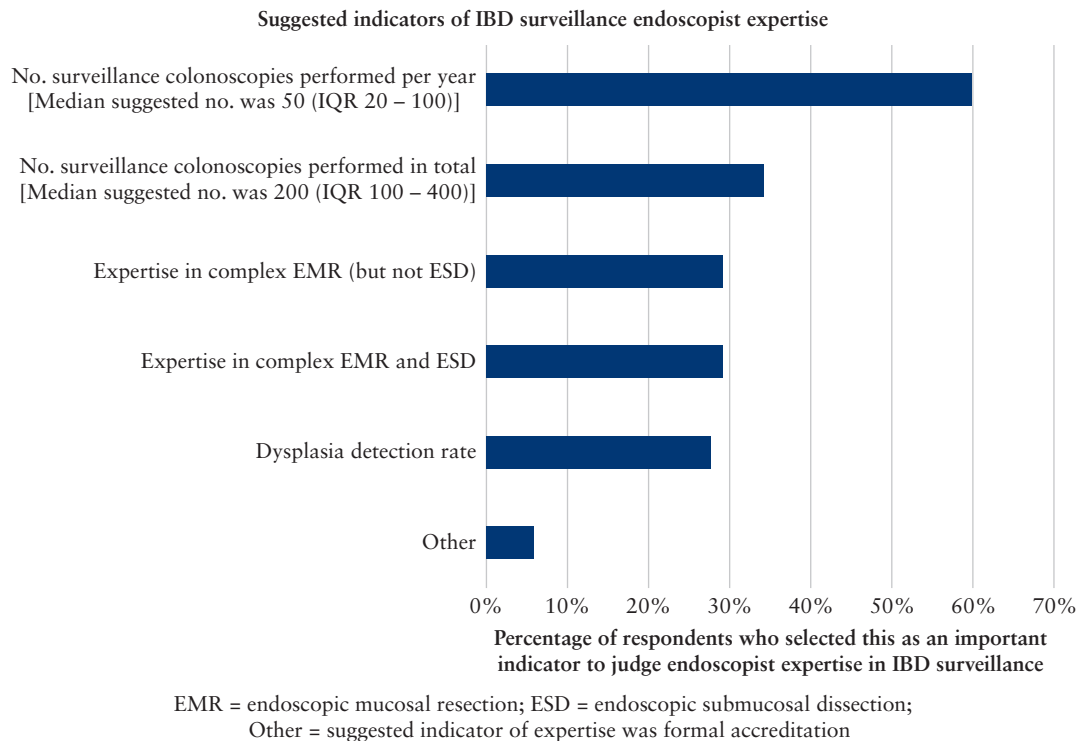
### 3.4. Indicators of specialist expertise in IBD surveillance

ECCO guidelines<sup>2</sup> advise that patients with invisible dysplasia should have a subsequent colonoscopy performed by an endoscopist with ‘expertise’ in IBD surveillance. Respondents were asked to select what they believed were indicators of such expertise in an endoscopist. The results are presented in Figure 2. Number of performed surveillance colonoscopies suggested to denote expertise were median 200 in total (interquartile range [IQR] 100–400) or 50 per year [IQR 20–100]. Respondents who had performed more than 50 surveillance colonoscopies in their lifetime were more likely

to indicate that an indicator of expertise was if they were able to perform endoscopic submucosal dissection (36.3% vs 19.6%;  $\chi^2[1, n = 136] = 4.4; p = 0.036$ ).

## 4. Discussion

We report the findings of the largest international survey, comprising mainly European clinicians, to evaluate adherence to consensus guideline-recommended IBD colonic dysplasia management practices since their first publication in 2010 [updated in 2019] by the British Society of Gastroenterology [BSG],<sup>4,5</sup> in 2013 [updated in 2017] by ECCO,<sup>2,6</sup> and in 2015 by SCENIC.<sup>3</sup> Mainly gastroenterologists with a specialist interest in IBD and who had experience with performing IBD surveillance participated in this survey study, spanning 60 different countries. A significant proportion indicated not having access to guideline-recommended services such as high-definition chromoendoscopy [23%], a second expert gastrointestinal histopathologist review of all dysplasia cases [43%], or access to a multidisciplinary team [MDT] meeting [37%]. Although a formal MDT meeting for discussion of all dysplasia cases has not been specifically stipulated in the most current BSG, ECCO, and SCENIC guidelines,<sup>2,3,5</sup> weekly IBD MDT meetings have been advocated by expert consensus-derived standards of care for IBD in the UK and Europe.<sup>8,9</sup> In order for clinicians to effectively communicate dysplasia-cancer risks and counsel their patients about the safest management, they need to retain a clear and evidence-based understanding of the risks themselves.



**Figure 2.** Suggested indicators of IBD surveillance endoscopist expertise presented with the percentage of respondents who selected that indicator as important for judging if an endoscopist has expertise [ $n = 137$ ]. IBD, inflammatory bowel disease; EMR, endoscopic mucosal resection; ESD, endoscopic submucosal dissection; Other, suggested indicator of expertise was formal accreditation.

The findings of this survey are reassuring, in that most clinician respondents [98%] would recommend colectomy for endoscopically unresectable visible HGD, but they have also revealed wide variations in colorectal cancer risk perceptions and LGD management practices which do not always adhere to current international guidance.<sup>2,3,5</sup> This is likely influenced by the fact that many of the prognostic data on cancer incidence after a dysplasia diagnosis, particularly for invisible and large non-polypoid dysplasia, are of low quality and derived from retrospective and heterogeneous observational studies which do not always reflect recent advances in endoscopic image quality and resection techniques.<sup>7</sup> The perceived synchronous cancer rate associated with unresectable visible HGD ranged between 10% to 60%; the perceived 5-year cancer risks associated with unresectable visible LGD and with invisible LGD ranged between 0% and 70% [median 20%] and 0% and 100% [median 25%], respectively. The concern is that misperceptions may lead to contradictory and inaccurate advice to patients about their long-term cancer risk and recommended management. Comparisons with previous clinician survey studies from 15 years ago reveal that perceptions of HGD synchronous cancer risk appear to have not changed significantly over this time period,<sup>10,11</sup> whereas for LGD there has been a shift in perceptions. A study in 2005 demonstrated that British gastroenterologists believed that visible raised LGD [previously known as a dysplasia-associated mass lesion] possessed a higher cancer progression risk compared with invisible LGD,<sup>10</sup> which was converse to our survey findings.

Additional novel findings from our study are that IBD surveillance colonoscopy experience and workplace affiliation of the clinician appear to be associated with altered risk perceptions. Experienced endoscopists who had performed more than 100 surveillance colonoscopies associated a greater synchronous cancer risk with endoscopically unresectable visible HGD. Conversely,

respondents from non-academic general hospitals had lower cancer risk perceptions with unresectable visible HGD or LGD compared with clinicians from university hospitals. Clinicians with greater personal exposure to patients with high-risk unresectable IBD dysplasia who subsequently develop cancers, either through a greater surveillance endoscopy volume or through working in an IBD specialist unit may therefore acquire a bias towards associating a higher risk of cancer with IBD dysplasia. Clinicians with low exposure to such cases may therefore be biased towards associating a lower risk of cancer with IBD dysplasia. In the field of risk judgement and decision making, this is known as representativeness bias.<sup>12</sup> Respondents who had a lifetime experience of more than 50 surveillance colonoscopies were 2.5 times less likely to prefer continued enhanced surveillance over colectomy for the management of unifocal invisible LGD than those with less endoscopy experience. Conversely, clinicians who predominately worked in private clinics were nine times more likely than those from university hospitals to prefer continued surveillance over colectomy for the same scenario.

Overall, seven times more respondents recommended continued surveillance for invisible LGD rather than colectomy. Most recognised that current guidelines<sup>2,3,5</sup> recommend repeat surveillance colonoscopy to confirm an invisible LGD diagnosis. However, these guidelines have also acknowledged low-quality evidence informing whether surveillance or colectomy is best for cancer prevention in the context of invisible LGD and that individualised discussion with the patient should take place. Only a minority [18%] of the respondents selected the option recognising the uncertainty in the evidence and that the management should be influenced by patient informed choice. Those mainly working in university hospitals were more likely to discuss colectomy compared with those from non-academic centres. This is in keeping with previous US-based studies, published

more than a decade ago, which have suggested a similar reluctance for colectomy referral for multifocal or invisible LGD diagnoses among gastroenterologists working in the community, often in private clinics, compared with academic IBD specialist centres.<sup>13–15</sup> Our study is the first to look at workplace affiliation influence on colectomy advocacy amongst gastroenterologists outside the USA. It suggests that more than 10 years on, colectomy recommendation by those from non-academic workplaces for multifocal and invisible LGD still appears to be lower than those from academic centres. It is important to note that non-academic workplaces were less likely to have access to a second expert histopathologist review and MDT meeting discussion of dysplasia cases. It could be postulated that a lack of access to these services may lead to lower clinician confidence in their patients' dysplasia diagnoses, hence a reliance on repeated surveillance.

This study demonstrates that clinicians do adhere to international guidelines<sup>2,3,5</sup> that recommend that all visible dysplasia be endoscopically resected when possible. Most of the respondents would refer a patient to a regional specialist therapeutic endoscopist if a visible dysplastic lesion was detected but could not be resected at colonoscopy. This suggests that most respondents do have access to a regional expert endoscopist to perform advanced endoscopic resection and continue surveillance. This complies with ECCO guidance<sup>2</sup> that a repeat endoscopy with dye spray be performed by an endoscopist with specialist expertise in IBD surveillance when prognosis is unclear, particularly when invisible dysplasia is suspected. This has likely contributed to trainees expressing a greater preference for referral for a regional specialist opinion. Most respondents who would not refer the case to a regional specialist endoscopist, presumably either because they do not have access to one or they are confident in their own polypectomy expertise, would instead appropriately recommend that the patient have a colectomy if the lesion was HGD. However, only a minority would also recommend a colectomy for unresectable visible LGD. This suggests that clinicians remain unclear about the cancer risk posed by unresectable LGD and are reluctant to advise life-changing cancer prevention surgery despite the guidelines<sup>2,3,5</sup> recommending so.

Table 4 summarises previous survey studies to date which have assessed clinician management practices in single-nation or single-centre surveys. Similar to our more international study findings, these surveys have highlighted a wide variation in dysplasia risk perception and thresholds for colectomy referral. However, only four of these studies have been published in the past decade,<sup>13,16–18</sup> and none since the introduction of the most recent international guidelines on dysplasia management from 2015 onwards.<sup>2,3,5</sup> Our study of mainly European gastroenterologists with a specialist interest in IBD suggests that management practices for LGD remain divergent despite recent guidance. An effective surveillance programme must be able to not only detect cancers but to prevent them as well. Failure to take appropriate action when dysplasia is found would therefore be a major limitation of any surveillance programme. This study suggests that further education is required to align current management practice with clinical guidelines.<sup>2,3,5</sup>

To improve the quality of surveillance delivered to IBD patients, guidelines<sup>2,3,5</sup> advocate that repeat surveillance should be performed by an endoscopist with 'expertise' in IBD surveillance if invisible dysplasia is detected on random biopsies. There is, however, no agreed definition as to what experience or competencies an 'expert' in IBD surveillance should possess. The most popular indicator of surveillance expertise nominated by the respondents to our survey was the number of surveillance colonoscopies the endoscopist performed per year [experts were considered to perform at least 50 surveillance

colonoscopies per year on average]. There are limited data supporting colonoscopy volume as a key performance indicator for high-quality IBD surveillance.<sup>19</sup> Those with the most surveillance endoscopy experience in our study were more likely to advocate competency in advanced polypectomy as an indicator of IBD surveillance 'expertise'.

We acknowledge a number of limitations with this study. As with any survey study that requires voluntary completion and has a low response rate, self-selection of the participants may generate a bias in the responses received. We were unable to capture detailed data to compare the characteristics of the non-responder group with the responder group. There was a disproportionately small sample of colorectal surgeons [ $n = 19$ ] who responded to the survey. In a New Zealand study<sup>11</sup> published in 2004, colorectal surgeons were more likely to advocate colectomy compared with gastroenterologists for LGD [63% vs 18%] and for HGD [78% vs 63%]. Conversely, we found that the 19 surgeon respondents in this study were much more conservative and less inclined than the gastroenterologists to recommend colectomy in the three hypothetical scenarios, although this trend was not significant. It should be noted that in general there were small numbers of respondents from each country and the non-European continents, and therefore care must be taken not to interpret their responses as generalisable to all clinicians working in that country/continent. Small numbers in certain categories have also resulted in wide confidence intervals in some of the regression analyses.

This survey was disseminated to members of the IBD section of the British Society of Gastroenterology [BSG] and the European Crohn's and Colitis Organisation [ECCO]. As such this limited the responses we received in terms of volume and generalisability to clinicians without a declared subspecialist interest in IBD. Targeting multiple national gastroenterology organisations to complete the survey would have allowed a more comprehensive assessment of general clinical practice between different nationality groups. However, in order not to over-burden their members with numerous survey completion requests, societies like the BSG do restrict which subsection members can be invited to complete the survey and also the number of questions that can be included. The latter certainly constrained more detailed analysis of the individual respondents' surveillance clinical practice, e.g. how often they actually used dye spray and their confidence with this technique. Survey questions requiring multiple choice answers may have been misinterpreted as single best-answer questions by some of the clinicians, thus leading to inaccurate interpretations of their management practice. We have attempted to mitigate this possibility by performing subanalyses on those who did select multiple answers for these specific questions. However, respondents who had understood that multiple answers could be chosen, but still believed only one management option was correct, could not be specifically identified.

This study sought to assess clinical decisionmaking in IBD patients diagnosed with colonic dysplasia and to assess guideline adherence. However, the hypothetical clinical scenarios and the tick-box responses required from this study would not have reflected the real-life nuances of decision making. Much of the data informing guidelines on dysplasia management are of low quality and, since a majority of the respondents were tertiary centre gastroenterologists with an interest in IBD, we could postulate that it is in fact the clinicians' reliance on experience-driven decision making rather than a lack of guideline knowledge which has resulted in our findings of non-adherence to the guidelines. This is supported by the representativeness bias observed in influencing dysplasia risk perceptions in this study. Further qualitative studies with more detailed clinical scenarios would allow a more in-depth understanding of the factors that influence clinician decision



**Table 4.** Previous clinician survey studies evaluating dysplasia management practices and colectomy recommendation for unresectable dysplasia.

Study	Survey setting	Participant no. and clinical role	Proportion of survey respondents [ <i>n</i> ] who advocate colectomy for:			
			Visible HGD	Invisible HGD	Visible LGD	Invisible LGD
Gearry 2004 <sup>11</sup>	New Zealand nationwide	120 endoscopists [gastroenterologists and surgeons]	-	92% [110]	-	18% [22]
Thomas 2005 <sup>10</sup>	UK nationwide	255 gastroenterologists	86% [219] not specified if resected	77% [197]	53% [134] not specified if resected	11% [27]
Farraye 2007 <sup>14</sup>	USA nationwide	65 gastroenterologists	51% [33] if resected and no surrounding dysplasia	-	86% [56] if resected but surrounding LGD; 100% if 'expert'; 71% if from private clinic	-
Rodriguez 2007 <sup>15</sup>	USA nationwide	312 gastroenterologists	-	85% [264/310]	68% [209/308] if resected but surrounding LGD	32% [100/311]
Spiegel 2009 <sup>13</sup>	USA nationwide	192 gastroenterologists ['experts' from academic centres and 'non-experts' from community practice]	-	-	-	Unifocal: 75% if 'expert'; 47.5% if 'non-expert' [ <i>p</i> = 0.02]. Multifocal: 100% 'expert'; 77% if 'non-expert' [ <i>p</i> = 0.003]. 31% [46]
Van Rijn 2009 <sup>16</sup>	Netherlands nationwide	148 gastroenterologists	-	68% [101]	-	31% [46]
Verschuren 2014 <sup>18</sup>	Australia, single centre	28 gastroenterologists	-	83% [29]	-	Unifocal: 0%
Leong 2015 <sup>17</sup>	Australia nationwide	218 gastroenterologists 46 colorectal surgeons	-	65% [157/241]	-	Multifocal: 35% 4% [11/245]
Pooled analysis			78.8% [252/320]	77.4% [858/1109]	63.5% [399/628]	19.1% [206/1079]

HGD, high-grade dysplasia; LGD, low-grade dysplasia.

making, but it would be limited by the small sample sizes that are achieved in interview studies. The benefit of this survey study therefore is that we have been able to access a large group of IBD-interested clinicians internationally and assess their clinical practice.

In conclusion, in this study of mainly European gastroenterologists with an interest in IBD, dysplasia cancer risk perceptions are widely disparate and management practices for colonic dysplasia do not always adhere to recent international clinical guidance. Most do recognise the benefits of endoscopic resection of all visible dysplasia, including referral to a specialist therapeutic endoscopist if needed. However, there remains a disinclination to advise colectomy for unresectable LGD, with a preference to continue surveillance. Clinicians with less IBD surveillance colonoscopy experience and from non-academic centres appear to have lower cancer risk perceptions and are less likely to advocate colectomy over continued surveillance for unresectable or multifocal LGD. It is unknown whether their decision making has been influenced by less exposure to high-risk dysplasia, uncertainty in IBD dysplasia prognosis due to the low quality of evidence available, patient adversity to surgery, or lack of access to expert histopathologist review and formalised multidisciplinary team discussions. A successful surveillance programme requires that appropriate action be taken when dysplasia is detected, including recommending colectomy for high-risk dysplasia to prevent cancer progression. This study highlights the need for

further education and uptake of guideline recommendations. Formal discussion of IBD dysplasia cases in multidisciplinary team meetings may help reduce disparities in clinical practice. Further large prospective studies of dysplasia prognosis, reflecting a more modern era of endoscopic surveillance imaging and polyp resection, will also improve the quality of data available to better inform decision making.

## Funding Statement

MK is supported by funding from Guts UK/Dr Falk [grant number FSpR2018-06]. AH is supported by the NIHR Imperial Biomedical Research Centre.

## Conflict of Interest

None declared.

## Author Contributions

MK contributed to the concept and design of the study, acquisition, analysis and interpretation of the data, and drafting and revising the article. STG, AW, and AH contributed to the concept and design of the study, acquisition and interpretation of the data, revising the article critically for important intellectual content, and approving the final version of the article to be published. All authors agree to be accountable for all aspects of the work, and MK holds overall responsibility for the content and integrity of the paper.

## Acknowledgements

The authors would like to thank the British Society of Gastroenterology and European Crohn's and Colitis Organisation offices for their roles in distributing the survey to their clinician members. We would particularly like to thank Dr Mark Samaan and Dr Gianluca Pellino from the Young ECCO [Y-ECCO] committee, and Professor Shaji Sebastian from the ECCO Clinical Research [ClinCom] committee, for their peer review and improvement of the final survey distributed to ECCO members.

## Supplementary Data

Supplementary data are available at *ECCO-JCC* online.

## References

- Choi CH, Ignjatovic-Wilson A, Askari A, et al. Low-grade dysplasia in ulcerative colitis: risk factors for developing high-grade dysplasia or colorectal cancer. *Am J Gastroenterol* 2015;110:1461–71; quiz 1472.
- Magro F, Gionchetti P, Eliakim R, et al.; European Crohn's and Colitis Organisation [ECCO]. Third European evidence-based consensus on diagnosis and management of ulcerative colitis. Part 1: definitions, diagnosis, extra-intestinal manifestations, pregnancy, cancer surveillance, surgery, and ileo-anal pouch disorders. *J Crohns Colitis* 2017;11:649–70.
- Laine L, Kaltenbach T, Barkun A, McQuaid KR, Subramanian V, Soetikno R; SCENIC Guideline Development Panel. SCENIC international consensus statement on surveillance and management of dysplasia in inflammatory bowel disease. *Gastroenterology* 2015;148:639–51.e28.
- Cairns SR, Scholefield JH, Steele RJ, et al. Guidelines for colorectal cancer screening and surveillance in moderate and high risk groups [update from 2002]. *Gut* 2010;59:666–89.
- Lamb CA, Kennedy NA, Raine T, et al.; IBD guidelines eDelphi consensus group. British Society of Gastroenterology consensus guidelines on the management of inflammatory bowel disease in adults. *Gut* 2019. doi:10.1136/gutjnl-2019-318484.
- Annese V, Daperno M, Rutter MD, et al.; European Crohn's and Colitis Organisation. European evidence-based consensus for endoscopy in inflammatory bowel disease. *J Crohns Colitis* 2013;7:982–1018.
- Kabir M, Fofaria R, Arebi N, et al. Systematic review with meta-analysis: IBD-associated colonic dysplasia prognosis in the videoendoscopic era [1990 to present]. *Aliment Pharmacol Ther* 2020;52:5–9.
- Kapasi R, Glatter J, Lamb CA, et al. Consensus standards of healthcare for adults and children with inflammatory bowel disease in the UK. *Frontline Gastroenterol* 2020;11:178–87.
- Louis E, Dotan I, Ghosh S, et al. Optimising the inflammatory bowel disease unit to improve quality of care: expert recommendations. *J Crohns Colitis* 2015;9:685–91.
- Thomas T, Nair P, Dronfield MW, Mayberry JF. Management of low and high-grade dysplasia in inflammatory bowel disease: the gastroenterologists' perspective and current practice in the United Kingdom. *Eur J Gastroenterol Hepatol* 2005;17:1317–24.
- Gearry RB, Wakeman CJ, Barclay ML, et al. Surveillance for dysplasia in patients with inflammatory bowel disease: a national survey of colonoscopic practice in New Zealand. *Dis Colon Rectum* 2004;47:314–22.
- Kahneman D. *Thinking, Fast and Slow*. New York, NY: Farrar, Straus and Giroux; 2011.
- Spiegel BM, Ho W, Esrailian E, et al. Controversies in ulcerative colitis: a survey comparing decision making of experts versus community gastroenterologists. *Clin Gastroenterol Hepatol* 2009;7:168–74, 174.e1.
- Farraye FA, Waye JD, Moschandrew M, Heeren TC, Odze RD. Variability in the diagnosis and management of adenoma-like and non-adenoma-like dysplasia-associated lesions or masses in inflammatory bowel disease: an Internet-based study. *Gastrointest Endosc* 2007;66:519–29.
- Rodriguez SA, Collins JM, Knigge KL, Eisen GM. Surveillance and management of dysplasia in ulcerative colitis. *Gastrointest Endosc* 2007;65:432–9.
- van Rijn AF, Fockens P, Siersema PD, Oldenburg B. Adherence to surveillance guidelines for dysplasia and colorectal carcinoma in ulcerative and Crohn's colitis patients in the Netherlands. *World J Gastroenterol* 2009;15:226–30.
- Leong RW, Perry J, Campbell B, et al. Knowledge and predictors of dysplasia surveillance performance in inflammatory bowel diseases in Australia. *Gastrointest Endosc* 2015;82:708–14.e4.
- Verschuren EC, Ong DE, Kamm MA, Desmond PV, Lust M. Inflammatory bowel disease cancer surveillance in a tertiary referral hospital: attitudes and practice. *Intern Med J* 2014;44:40–9.
- Carballal S, Maisterra S, López-Serrano A, et al.; EndoCAR group of the Spanish Gastroenterological Association and Spanish Digestive Endoscopy Society. Real-life chromoendoscopy for neoplasia detection and characterisation in long-standing IBD. *Gut* 2018;67:70–8.