Tables PICO adequate bowel preparation surveillance

Author, Publication, Year	Study Design and Objectives	Intervention	Participants	Outcomes	Results	Level of evidence Conclusions
1.Restellini S, World J Gastroenterol 2017	Systematic review and meta-analysis	preparations with or without adjuvants, given in split and non-split dosing, and in high (> 3 L) or low-volume (2 L or less) regimens	4 trials (n = 449 IBD patients)	Bowel cleansing quality and willingness-to-repeat the procedure and side effects/complications.	PEG low-dose efficacy was not different to PEG high-dose; OR = 0.84 (0.37-1.92). A higher proportion of patients were willing to repeat low-volume preparations vs high-volume; OR = 5.11 (1.31-20.0).	PEG low-volume regimen seems not inferior to PEG high-volume to clean the colon, and yields improved willingness-to repeat
2. Iacucci et al, Lancet Gastro and Hepato 2019	Systematic review	Key performance indicators	57 manuscripts with a total of 12 714 patients	to improve quality control measures of surveillance colonoscopy	A successful surveillance colonoscopy requires optimal bowel preparation. Poor bowel preparation alongside inflammation or presence of pseudopolyps were the most frequent factors resulting in unsuccessful DCE	Minimal or absent mucosal inflammation and good bowel preparation are necessary for high-quality surveillance colonoscopy
3.Manes G Inflamm Bowel Dis 2015;	Multicenter, randomized, single-blind study.	2-L PEG plus bisacodyl or 4-L PEG.	221 UC patients 216 randomized	To compare the efficacy, safety, and tolerability of a 2-L PEG with a 4-L PEG solution	Preparation was adequate in 80% of the 211 patients without any differences between groups. As concern tolerability, 83% patients in 2-L PEG arm and 44.8% in 4-L PEG arm reported no or mild discomfort (P , 0.0001) and 94.3% and 61.9% expressed their	Low-volume PEG is not inferior to 4-L PEG for bowel cleansing in UC, but it is better tolerated and accepted.

					willingness to repeat the preparation (P , 0.001). Regardless of preparation, split dosage was associated with better cleansing Extension and severity of colitis did not influence quality of preparation.	
4.Kim ES Dig Dis Sci 2017	Prospective, randomized, and single-blinded	4L-PEG Vs 2L-PEG-Asc groups	27 patients with quiescent UC who underwent colonoscopy	To compare 4L PEG with 2L PEG plus ascorbic acid.	Successful cleansing (BBPSC6 points) was equally achieved in most patients from both groups (4L-PEG 96.2% vs. 2L-PEG-Asc92.9%,p=0.679). Mucosal inflammation, as assessed by the Mayo endo-scopic score, was not different between the groups	PEG-based regimens with different volumes are equally effective and safe in inactive UC patients. 2L-PEG-Asc is more acceptable in this population as indicated by the willingness for further usage
5. Mohsen W WJG 2021	Prospective single-blinded single-center randomized controlled trial	Patients were randomized to Prep Kit-C (Pc) or Moviprep (Mp) bowel preparation	IBD cohort (n = 125) Non-IBD cohort (n = 213)	To compare the tolerability, efficacy and safety of split protocols of Mp and Pc.	The mean tolerability score in the IBD group was lower than the non-IBD group (mean tolerability scores: IBD: 10.3 ± 5.1 and non-IBD: 12.0 ± 5.3; P = 0.01). IBD patients described more abdominal pain with Mp when compared with Pc; (Mp: 5.7 ± 4.4 vs Pc: 3.6 ± 2.6, P = 0.046).	Patients with IBD reported lower tolerability with both preparations. Specifically, IBD patients had more abdominal pain with Mp

6. Lazzaroni M, APT 1993	Randomized double-blind trial	PEG-ELS 4 L plus placebo, or PEG-ELS 4 L plus simethicone 120 mg	105 IBD patients	To assess the efficacy and tolerability of polyethylene glycol-electrolyte lavage solution (PEG-ELS), with and without simethicone	the efficacy of colonic lavage was found to be essentially comparable for the two preparations, although the addition of simethicone showed a significant reduction in the formation of bubble	The PEG-ELS solution represents an effective bowel cleansing method. The addition of simethicone to the traditional formulation is an acceptable development in terms of clinical efficacy and tolerability
7.Kato, GIE 2015	Single Center Randomized Controlled Trial	low volume PEG plus ascorbic acid vs. large volume PEG alone in patients	80 patients consisted of 20 active and 20 quiescent UC-patients, and 20 active and 20 quiescent CD-patient	To evaluate the safety and cleansing effects of MOVIPREP compared to Niflec® (NIF) in patients with IBD.	Cleansing efficacy of transverse, descending and sigmoid colon was significantly higher in MOV than NIF group (MOV vs NIF, 1.54 ±0.70 vs 1.52 ±0.73 in cecum and ascending colon, p=0.12;1.14 ± 0.55 vs 1.38 ±0.62 in transverse colon, p=0.00054; 1.14±0.55 vs 1.31±0.61 in descending colon, p=0.0026; 1.171±0.57 vs 1.172±0.47, in sigmoid colon, p=0.0042; 1.17±0.57 vs 1.14 ±0.44 in rectum, P=0.07). About acceptability, taste- and volume-acceptability were significantly higher in MOV than NIF group (MOV vs NIF, taste, 3.37±1.03 vs 2.47 ±0.99, p=0.0013; volume, 2.89±1.08 vs 2.26±0.99, p=0.046)	MOV has good cleansing effects than NIF in IBD patients. And also MOV could be safely used in IBD-patients as well as NIF because of no disturbance in blood osmotic pressure

8.Bessissow T ,JCC 2013	Prospective, case control study	1:1 matched case–control study comparing cases with IBD undergoing full IC with complete BC to controls without IBD.	IBD group n = 100),control (100)	To compare the quality and tolerance of bowel cleaning between IBD patients and matched non-IBD control	Disease activity was not associated with worse BBPS or nausea during Bowel cleansing while a higher HBI was associated with more pain during BC (P=0.0006).	Disease activity in IBD as well as endoscopic inflammation were not associated with inadequate bowel preparation or nausea during cleansing Higher gastrointestinal-specific anxiety and co-morbid anxiety are associated with increased pain and nausea during preparation
9.Megna B, Gastrointest Endosc 2019	prospective observational study	2-part questionnaire that was completed on the day of colonoscopy	88 IBD	To identify predictors of the ability to perform chromoendoscopy in IBD patients	The top reason why CE examination was not possible in these patients was poor bowel preparation (57% of cases). Procedural variables were not associated with the inability to undergo CE. The BBPS scores were significantly higher in the patient group that was able to undergo CE compared with the group that was not (right, 2.7 0.59 vs 1.64 0.84 [P < .0001]; transverse, 1.80 0.79 vs 2.7 0.59 [P < .0001]; left, 2.66 0.64 vs 1.91 0.68 [P < .0001]). Following a clear liquid diet the entire day before the procedure was highly predictive of the ability to perform CE.	The BBPS scores were significantly higher in the patient group that was able to undergo CE compared with the group that was not. 86% of patients who were able to undergo CE examination had BBPS score of at least 7, suggesting that "good" or "excellent" bowel preparation is perhaps needed for a successful CE examination.

10.Gould SR, Gastrointest Endosc 1982	Prospective trial	Castor oil or senna	340 patients with previously extensive ulcerative colitis in an inactive phase	To establish the true incidence and severity of any bowel disturbance in patients with inactive colitis	No difference was demonstrated between the two preparations, which gave "perfect" or "adequate" bowel preparation in 39 of 46 patients (85%). No patient with inactive colitis in either the retrospective series or the trial group had a serious exacerbation of colitis as a result of the bowel preparation	Both preparations to be equally safe and effective
11.Neri B, EJG 2021	prospective	1-L PEG-based bowel preparation divided into two 500-mL doses taken the evening before and the morning of the colonoscopy, each dose followed by at least another 500-mL of clear fluids.	103 IBD patients	To evaluate the efficacy and tolerability of a very low-volume (VLV) polyethylene glycol (PEG)-based solution in patients	The time interval between the end of bowel preparation and the beginning of colonoscopy and the disease activity significantly affected colon cleansing.	The VLV PEG-based bowel preparation is effective and well accepted by IBD patients
12. Briot , JCC 2019	Observational study	Standard high-volume polyethylene glycol [PEG] bowel preparations [PEG-4L] ; PEG-2L; sodium picosulfate [Pico],	278 patients	To evaluate the efficacy, tolerability, and safety of the various bowel preparations for patients with IBD, including low-volume preparations	The preparation did not reach the Boston's score efficacy outcome in the PEG-4L group in 51.2% of the patients [p = 0.0011]. The preparation intake was complete for 59.5% in the PEG-4L group, compared with 82.9% in the PEG-2L group and 93.8% in the	Preparations with PEG-2L and Pico were equally safe, with better efficacy and tolerability outcomes compared with PEG-4L preparations. The best efficacy/tolerance/safety profile was achieved with the Pico preparation.

					Pico group [p < 0.0001]. Tolerability, as assessed by the patients' VAS, was significantly better for both Pico and PEG-2L compared with PEG-4L, and better for Pico compared with PEG-2L [p = 0.008; p = 0.0003]. In multivariate analyses, low-volume preparations were independent factors of efficacy and tolerability.	
13. Friedman S, Inflamm Bowel Dis 2013;	cross-sectional observational study	questionnaire	378 patients	To explore factors that affect adherence to surveillance colonoscopy	The most frequently cited reason was difficulty with the bowel preparation (18 patients; 4.8%)	Significant categories of reasons for nonadherence included logistics, health perceptions, stress, and procedure problems.
14.Lucian Negreanu J Int Med Res 2020	Retrospective	no difference in preparation quality between patients with and without IBD	348 colonoscopies	To assess bowel preparation in patients with IBD and to determine the impact of disease-related factors on preparation efficacy.	There was no difference in bowel preparation between patients with endoscopic activity and patients with mucosal healing (median total Boston score 6). Disease- and patient-related parameters did not influence the quality of bowel preparation.	Disease extent, disease severity, and clinical activity did not influence the quality of bowel preparation in patients with UC. No difference in the quality of BP between patients with active disease and those with mucosal healing, suggesting that optimal preparation is possible even in patients with poor disease control.

15.Maida M, DLD 2021	Retrospetive	1 L PEG-ASC	185/411 (45%) were patients with IBD and 226/411 (55%) served as controls	To evaluate effectiveness and safety of 1 L PEG-ASC solution in patients with IBD compared to controls.	A significantly higher cleansing success was achieved in IBD patients (92.9% vs 85.4%, p = 0.02). The multiple regression model showed that presence of IBD (OR=2.514, 95%CI=1.165–5.426; P = 0.019), lower age (OR=0.981, 95%CI=0.967–0.996; P = 0.014), split preparation (OR=2.430, 95%CI=1.076–5.492; P = 0.033), absence of diabetes (OR=2.848, 95%CI=1.228–6.605; P = 0.015), and of chronic constipation (OR=3.350, 95%CI=1.429–7.852; P = 0.005), were independently associated with cleansing success.	Results from this study support the effectiveness and safety of 1 L PEG-ASC solution in IBD patients
16. Smith S, Digestive Endoscopy 2020;	Retrospective	Quality measures (bowel preparation, activity of inflammation, targeted biopsies, detection of lesions) pre- and post-August 2016. T	780 procedures	To identify performance in these key quality indicators in IBD surveillancee colonoscopy	Procedures not carried out with DCE as a result of bowel preparation decreased from 90.6% to 45.9% (P = 0.018) however, when combined with procedures not carried out due to both disease activity and bowel preparation, there was no significant difference as a result of bowel preparation (90.6% vs 64.9% P = 0.199). There was a significant increase in the proportion of procedures	Insufficient bowel preparation and persistent disease activity were the most common reasons for DCE not being carried out.

					carried out without DCE as a result of disease activity (6.3% vs 27.0% P = 0.037)	
17.Magro, JCC 2017	Guidelines					Colonoscopic surveillance is best performed when ulcerative colitis is in remission, because it is otherwise difficult to discriminate between dysplasia and inflammation on mucosal biopsies
18. Hassan et al, Endoscopy 2019 ESGE	Guidelines					ESGE recommends high volume or low volume PEG-based bowel preparation in patients with inflammatory bowel disease (IBD). Strong recommendation, high quality evidence

Tables Chromoendoscopy rate

Table 1. Dye-based chromoendoscopy and high-definition white light endoscopy.

Author, Publication, Year	Design	intervention	n	Outcomes	Results	Level of evidence
Iannone A. et al Clin Gastro Hep 2017	Systemic review of randomized trials	DCE vs other endoscopic techniques	1500 (10 RCT)	Dysplasia surveillance	Higher detection of dysplasia with DCE compared with other techniques (RR, 1.37; 95% CI, 1.04-1.79). Subgroup analyses confirmed this effect **only when comparing with SD-WLE.**	
Iacucci M. et al., AJG 2018	randomized non-inferiority trial	HD-WLE vs DCE VS VCE (i-SCAN)	270 (90 on each arm)	Neoplastic detection rate in IBD patients with long-standing colitis	**HD-WLE was no inferior to either DCE** or VCE. VCE was no inferior to DCE arm.	
Feuerstein JD et al., GIE 2019	Meta-analysis	DCE vs SD-WLE/HD-WLE.	10 Studies and 6 RCTs (3 HD-WLE and 3 SD-WLE)	WLE (SD-WLE/HD-WLE) vs DCE for dysplasia detection	When analyzed separately, DCE was more effective at identifying dysplasia than SD-WLE (RR, 2.12; 95% CI, 1.15-3.91), but **was not more effective compared with HD-WLE** (RR, 1.36; 95% CI, 0.84-2.18).	
Bessissow T et al., IBD 2018	network meta-analysis	DCE WLE (SD/HD), NBI.	8 parallel-RCTs (924 patients)	Dysplasia detection techniques	low-quality evidence supports DCE over SD-WLE (OR, 2.37; 95% [CrI], 0.81-6.94 **Very low-quality supports the use of DCE over HD-WLE (OR, 1.96; 95% CrI, 0.72-5.34)** or NBI (OR, 1.41; 95% CrI, 0.70-2.84) for any dysplasia detection. The number of patients with advanced neoplasia was very small, precluding meaningful analysis	Did not find any single technique to be superior, chromoendoscopy is probably more effective than SD-WLE for detecting any dysplasia, and there is low confidence in estimates supporting its use over HD-WLE or NBI

Resende RH, Endosc Int Open 2020	systematic review and meta-analysis	different endoscopic methods of surveillance for dysplasia	2,457 patients from 17 RCTs	surveillance of dysplasia in patients with colonic IBD.	There was superiority of DCE when compared to (SD-WLE). **When compared with HD-WLE, no difference was observed** in all outcomes (number of patients with dysplasia (RD 0.06; 95 % CI [-0.01, 0.13])).	Dye-spraying chromoendoscopy detected more patients and dysplastic lesions than SD-WLE. Although no difference was observed between DCE and HD-WLE or narrow-band imaging, the main outcomes favored numerically dye-spraying chromoendoscopy, except procedure time.
Jian Wan et al J Dig Dis 2019	Meta-analysis	DCE vs. WLE	meta-analysis of 6 RCTs and 5 prospective studies	To compare DCE and WLE for dysplasia surveillance in patients with IBD.	DCE detected more patients with dysplasia (RR 2.05, 95% [CI]: 1.62-2.61) and more dysplastic lesions (RR 2.04, 95% CI: 1.40-2.98) than WLE. D**CE also detected more patients with dysplasia than HD-WLE** (RR 1.60, 95% CI: 1.11-2.29). the incremental yield of CE for detecting patients with dysplasia was 9%. CE was superior to WLE in detecting non-polypoid dysplastic lesions (RR 1.38, 95% CI:1.02-1.88	DCE is superior to WLE in the surveillance of dysplasia in IBD patients. It is thus necessary to use CE in the surveillance of dysplasia

Carballal S. et al Gut 2017	Multicenter prospective cohort study	DCE vs WLE (SD and HD)	350 patients	We aimed to assess the effectiveness of CE for neoplasia detection and characterization Each colonic segment was evaluated with white light followed by 0.4% indigo carmine CE	Dysplasia miss rate with WLE was 40/94 (**57.4% incremental yield for CE**). CE-incremental detection yield for dysplasia was comparable between standard definition and high definition (51.5% vs 52.3%, p=0.30).	
Nayantara Coelho-Prabhu, IBD 2021	retrospective observational cohort	HD-WLE Vs DCE	808 colonoscopies of which 150 (18.6%) included DCE	outcome of all surveillance colonoscopies performed in IBD patients	Among patients who had chromoendoscopy and HDWLE, polypoid dysplasia was identified in 50 (33.0%) and 79 (12.0%) patients, respectively, P < 0.01. Dysplasia in random biopsies was found in 39 patients (4.8%): 15 (10%) who had chromoendoscopy and 24 (3.6%) who had HDWLE (P < 0.001).	Chromoendoscopy and HDWLE had a similar diagnostic yield for dysplasia detection in patients with chronic IBD-colitis
Joren R Ten Hove, Endoscopy 2017	Retrospective	DCE and WLE	1065 patients undergoing IBD surveillance, 159 patients underwent follow-up for LGD,	Risk of advanced neoplasia, a combined endpoint of HGD and CRC, during follow-up after detection of lesions containing LGD identified with either chromoendoscopy or WLE.	There were no significant differences in the incidence of advanced neoplasia between DCE-detected and WLE-detected LGD.	Advanced neoplasia was found to develop infrequently after detection of LGD in patients undergoing endoscopic surveillance for IBD. LGD lesions detected with either DCE or WLE carry similar risks of advanced neoplasia over time.
Alexandersson B. et al Clin Gastroenterol Hepatol. 2020	Single center prospective RCT	HD-CE vs HD-WLE	305 patients with colonic IBD.	To compare number of patients with dysplastic lesions per 10 min	The number of dysplastic lesions per 10 min of withdrawal time was 0.066 with HD-CE and 0.027 with HD-WLE (P [.056)	

Jang DH, AJG 2019	multicenter, prospective RCT	HDWLE with random biopsy (HDWLE-R) vs HD-CE with targeted biopsy (HDCE-T)	210 patients	to compare the dysplasia detection between both groups	There was **no significant difference in the CAD detection rate** between HDCE-T and HDWLE-R groups, P = 0.749). However, HDCE-T showed a trend toward improved colorectal neoplasia detection compared with HDWL-R (,20.6% vs 12.0%, P = 0.093). The median time for colonoscopy withdrawal between the 2 groups was similar The total number of biopsies was significantly larger in the HDWL-R group compared with the HDCE-T group (P < 0.001).	HDCE-T was not superior to HDWL-R for detecting CADs.

Table 2. High definition white light endoscopy and virtual chromoendoscopy.

Author, Publication, Year	Design	intervention	n	Outcomes	Results	Level of evidence
El-Dallal M et al Inflamm Bowel Dis. 2020	Systematic review.	Compare VCE vs HD-WLE VS DCE	1328 (11 RCT)	Primary outcomes were number of patients in whom dysplasia was identified and number of dysplastic lesions identified in these patients. We	Per patient analysis, **VCE was not different compared with DCE** (RR 0.77; 95% CI, 0.55-1.08) **or HDWLE** (RR 0.72; 95% CI, 0.45-1.15). However, per dysplasia analysis, **VCE (i-SCAN and NBI) was not statistically different compared with DCE** (RR 0.72; 95% CI, 0.47-1.11) and inferior compared with HD-WLE (RR 0.62; 95% CI, 0.44-0.88).	The quality of evidence was moderate in the HDWLE and low to moderate in the DCE studies.
Iacucci M. et al., AJG 2018	randomized non-inferiority trial	HD-WLE vs DCE VS VCE (i-SCAN)	270 (90 on each arm)	Neoplastic detection rate in IBD patients with long-standing colitis	**HD-WLE was no inferior to either DCE or VCE**. VCE was no inferior to DCE arm.	

Kandiah K. et al , Gut 2020	A multioperator RCT	i-SCAN (OE mode 2) vs HD-WLE.	188 IBD patients	Detection of neoplasia in IBD surveillance patients .	**No significant difference between HD-WLE and VCE** for neoplasia detection. The NDR was not significantly different for HD-WLE (24.2%) and VCE (14.9%) (p=0.14). All intraepithelial neoplasia (IEN) detected contained low-grade dysplasia only.	VCE and HD-WLE did not differ significantly in the detection of neoplasia

Table 3. Dye based chromoendoscopy versus virtual chromoendoscopy.

Author, Publication, Year	Design	intervention	n	Outcomes	Results	Level of evidence
Bisschops R. et al, Gut 2018	Multicentre prospective RCT	**DCE (methylene blue 0.1%) vs VCE (NBI)**	*131*	Detection of neoplastic lesions in long standing colitis.	**There was no significant difference between NBI and CE for neoplasia detection** 0.32 vs 0.47 respectively.	
El-Dallal M et al Inflamm Bowel Dis. 2020	Systematic review and meta analysis	Compare VCE (NBI and i-SCAN) vs HD-WLE VS DCE	1328 (11 RCT)		Per patient analysis, **VCE was not different compared with DCE** (RR 0.77; 95% CI, 0.55-1.08) or HDWLE (RR 0.72; 95% CI, 0.45-1.15). However, per dysplasia analysis, VCE was not statistically different compared with DCE (RR 0.72; 95% CI, 0.47-1.11) and inferior compared with HDWLE (RR 0.62; 95% CI, 0.44-0.88).	The quality of evidence was moderate in the HDWLE and low to moderate in the DCE studies.

Iacucci M. et al., AJG 2018	randomized non-inferiority trial	HD-WLE vs DCE VS VCE (i-SCAN)	270 (90 on each arm)	Neoplastic detection rate in IBD patients with long-standing colitis	HD-WLE was no inferior to either DCE or VCE. **VCE was no inferior to DCE arm.**	
López Serrano A. et al., Scandinavian Journal of Gastroenterology	Retrospective case control	DCE (indigo-carmine) vs. VCE (Iscan)	191	Dysplasia detection rate	A total of 44 dysplastic lesions were detected in 21 (11%) patients. **No differences** were found in the per lesion and the per patient analysis (dysplastic versus non-dysplastic)	
González-Bernardo O., IBD 2020	prospective, single-center, randomized study	DCE VS iSCAN	129 patients	detection of neoplastic lesions in IBD patients	**no differences** were found in the overall rate of detection of lesions (neoplastic or non-neoplastic; P = 1).	No differences occurred in the rate of detection of neoplastic lesions between CE and VC with

						iSCAN 1. The time spent on the technique with VCE is significantly less than that with DCE
Resende RH, Endosc Int Open 2020	systematic review and meta-analysis	different endoscopic methods of surveillance for dysplasia	2,457 patients from 17 RCTs	surveillance of dysplasia in patients with colonic IBD.	**No difference** was observed between **DCE and VCE - including NBI, i-SCAN** and FICE, in all outcomes except procedure time.	

Tables Targeted versus random biopsies surveillance

Author, Publication, Year	Study Design and Objectives	Intervention	Participants	Outcomes	Results	Level of evidence Conclusions
1.Subramanian V et al. APT 2011	Meta analysis	CE	Six studies involving 1277 patients	diagnostic yield of chromoendoscopy for detecting dysplasia	The difference in proportion of lesions detected by targeted biopsies was 44% (95% CI 28.6-59.1) and flat lesions was 27% (95% CI 11.2-41.9) in favour of chromoendoscopy	Even if CE would be preferable to standard WLE, there is still a need for random biopsies as CE was also shown to miss dysplastic lesions unless random biopsies are taken
2.Azizi S et al International Journal of Surgery, 2018	Meta analysis	WLE and random biopsies Vs targeted biopsies	2463 patients	Pick-up rates of dysplastic or cancerous lesions using white light endoscopy (WLE) and random/targeted biopsies, VS chromoendoscopy (CE)	The pooled overall pick-up rate of dysplastic/cancerous lesions on WLE random biopsies was 5.6% [Event rate 0.06 (0.01, 0.23), df = 4, I2 = 94%]. Using a combined random and targeted approach with WLE the incidence was 5.1% [Event rate 0.05 (0.03, 0.09), df = 4, I2 = 96%]. One study reported on CE and found a 7% pick-up rate for dysplastic lesions	WLE and random biopsies may pick-up a similar number of lesions to targeted biopsies, however the number of biopsies may need to be greater to achieve this equivalence
3.Kiesslich R et al. Gastroenterology 2003	Randomized controlled	CE	165 patients	Does chromoendoscopy (CE) facilitate early detection of intraepithelial neoplasias (IN) and CRC in UC	In the CE group, there was a significantly better correlation between the endoscopic assessment of degree (P = 0.0002) and extent (89% vs. 52%; P < 0.0001) of colonic inflammation and the histopathologic findings compared with the conventional colonoscopy group. More targeted biopsies were possible, and	CE with methylene blue during colonoscopy allows significantly more targeted biopsies and provides a new method for the early detection of lesions in patients with UC

					significantly more IN were detected in the CE group (32 vs. 10; P = 0.003).	
4.Kiesslich R et al. Gastroenterology 2007	Randomized controlled	CE, CLE	161 patients	assessed the value of combined chromoendoscopy and endomicroscopy for the diagnosis of intraepithelial neoplasias	By using chromoscopy with endomicroscopy, 4.75-fold more neoplasias could be detected (P = .005) than with conventional colonoscopy, although 50% fewer biopsy specimens (P = .008) were required. If only circumscribed lesions would have been biopsied in the first group, the total number of biopsy specimens could have been reduced by more than 90%	Endomicroscopy based on in vivo histology can determine if UC lesions identified by chromoscopy should undergo biopsy examination, thereby increasing the diagnostic yield and reducing the need for biopsy examinations.
5.Watanabe T et al., Gastroenterology 2016	randomized controlled trial	targeted biopies random biopsies	246 patients with UC	targeted vs random biopsies	The mean number of biopsies found to contain neoplastic tissue per colonoscopy was 0.211 (24 of 114) in the target group and 0.168 (18 of 107) in the random group (ratio of 1.251; 95% confidence interval, 0.679-2.306). The lower limit was above the non-inferiority margin of 0.65. Neoplasias were detected in 11.4% of patients in the target group and 9.3% of patients in the random group (P = .617). Larger numbers of biopsy samples per colonoscopy were collected in the random	targeted and random biopsies detect similar proportions of neoplasias. However, a targeted biopsy appears to be a more cost-effective method.

					group (34.8 vs 3.1 in the target group; P < .001), and the total examination time was longer (41.7 vs 26.6 minutes in the target group; P < .001). In the random group, all neoplastic tissues found in random biopsies were collected from areas of the mucosa with a history or presence of inflammation	
6.Jang DH, AJG 2019	multicenter, prospective randomized controlled trial	HDWL with random biopsy vs HDCE with targeted biopsy	210 patients	Dysplasia detection rate of high-definition white light endoscopy with random biopsy (HDWL-R) vs high-definition chromoendoscopy with targeted biopsy (HDCE-T)	There was no significant difference in the CAD detection rate between HDCE-T and HDWL-R groups (4/102, 3.9% vs 6/108, 5.6%, P = 0.749). However, HDCE-T showed a trend toward improved colorectal neoplasia detection compared with HDWL-R (21/102, 20.6% vs 13/108, 12.0%, P = 0.093). The total number of biopsies was significantly larger in the HDWL-R group (34 [12–72]) compared with the HDCE-T group (9 [1–20]; P < 0.001).	HDCE-T was not superior to HDWL-R for detecting CADs.
7. Kandiah et al, Gut 2020	Randomized controlled trial	HDV (i.scan OE), HDWLE, quadrantic non-targeted biopsies, Targeted biopsies	188 IBD	Additional yield of neoplasia detection with protocol- guided quadrantic but non- targeted colonic biopsies	The number of non- targeted quadrantic biopsies taken in the HDWL and HDV arm was 3373 and 3378, respectively. The mean number of biopsies taken per- patient was 35.9 in each arm. Only one neoplasia (low- grade dysplasia within a segment of active colitis in the HDWL	The yield of quadrantic non-targeted biopsies in detecting neoplasia is extremely low. A total of 6751 non- targeted colonic biopsies detected one neoplasia in this study

					arm) was detected on quadrantic non- targeted biopsies in this study, otherwise all neoplasias were detected on targeted biopsy	
8. E Mooiweer, AJG 2015	Randomized trial	chromoendoscopy Vs white light endoscopy with random biopsy sampling (WLE)	A total of 440 colonoscopies using chromoendoscopy in 401 patients and 1,802 colonoscopies in 772 patients using WLE.	Neoplasia detection rate of chromoendoscopy Vs WLE with random biopsies	Targeted biopsies yielded 59 dysplastic lesions in the chromoendoscopy group, comparable to the 211 dysplastic lesions detected in the WLE group (P=0.30).	Implementation of chromoendoscopy for IBD surveillance did not increase dysplasia detection compared with WLE with targeted and random biopsies.
9.Rutter MD et al. Gut 2004	Prospective back-to-back	CE, targeted, non-targeted biopsies	100 patients	Does pancolonic indigo carmine dye spraying improve the macroscopic detection of dysplasia and reduce the dependence on non-targeted biopsies	non-targeted biopsy protocol detected no dysplasia in 2904 biopsies. Forty three mucosal abnormalities (20 patients) were detected during the pre-dye spray colonoscopy of which two (two patients) were dysplastic: both were considered to be dysplasia associated lesions/masses. The targeted biopsy protocol detected dysplasia in significantly more patients than the non-targeted protocol (p = 0.02, paired exact test).	targeted biopsies of suspicious lesions may be a more effective surveillance methodology than taking multiple non-targeted biopsies
10. Marion JF et al. AJG 2008	prospective	CE targeted biopsies, WLE	115 patients	compared dye-spray technique using methylene blue to standard colonoscopic surveillance	Targeted biopsies with dye spray revealed significantly more dysplasia (16 patients with low grade and 1 patient with high grade) than random biopsies (3 patients with low-grade dysplasia) (P= 0.001) and more than	Colonoscopic surveillance of chronic colitis patients using methylene blue dye-spray targeted biopsies results in improved dysplasia yield compared to

					targeted non dye spray (8 patients with low-grade and 1 patient with high-grade dysplasia) (P= 0.057).	conventional random and targeted biopsy methods
11.Navaneethan U, JCC 2013	Prospective	Target Vs Random biopsies	98 patients with PSC–UC	To determine the yield of random biopsies for neoplasia.	A total of 14 random biopsies demonstrated neoplasia (10 flat LGD, and 4 HGD). Furthermore, 32 suspicious (target) lesions were detected of which 12/32 (37.5%) were neoplastic (6 LGD, 4 HGD and 2 with colon carcinoma). Overall, 26 neoplastic sites were found in this study of which 12 were detected by targeted biopsies only, 10 by random biopsies only and 4 by both random and target biopsies.	Random biopsies significantly increase the yield of dysplasia in patients with PSC and UC even in the absence of endoscopic features of prior inflammation and significantly impact clinical outcomes. Random biopsies increased the yield for dysplasia detection by 40%.
12.Moussata D et al., Gut 2018	Prospective multicenter study	CE, random biopsies	495 UC, 505 Crohn's colitis	Are random biopsies still useful for the detection of neoplasia	In 82 patients, neoplasia was detected from targeted biopsies or removed lesions, and among them dysplasia was detected also by random biopsies in 7 patients. Importantly, in 12 additional patients dysplasia was only detected by random biopsies. Overall, 140 neoplastic sites were found in 94 patients, 112 (80%) from targeted biopsies or removed lesions and 28 (20%) by random biopsies. The yield of neoplasia by random biopsies	Despite their low yield, random biopsies should be performed in association with CE in patients with IBD with a personal history of neoplasia, concomitant PSC or a tubular colon during colonoscopy

					only was 0.2% per-biopsy (68/31 865), 1.2% per-colonoscopy (12/1000) but 12.8% per-patient with neoplasia (12/94). Dysplasia detected by random biopsies was associated with a personal history of neoplasia, a tubular appearing colon and the presence of primary sclerosing cholangitis (PSC).	
13. Klepp, WJG 2018	Single cohort prospective study	CE, target and random biopsies	67 patients	Yield of non-targeted biopsies	The dysplasia detection yield was 20.8% (10/48) for targeted biopsies and 3.5% (11/318) for nontargeted biopsies. .	The yield of non-targeted biopsies is negligible.
14.Hurlstone DP et al. Endoscopy 2005	Cohort study	Magnification CE	350 UC patients and 350 disease duration− and disease extent−matched control patients	HMCC as an optical biopsy tool for the detection and characterisation of intraepithelial neoplasia	Twenty intraepithelial neoplastic lesions were detected from 12,850 non-targeted biopsies in the HMCC group (0.16%), while 49 intraepithelial neoplastic lesions were detected from the 644 targeted biopsies in the HMCC group (8%). From 12,482 non-targeted biopsies taken in the control group patients, 18 (0.14%) showed intraepithelial neoplasia. The yield of intraepithelial neoplastic lesions from targeted biopsies in the control group (i. e. without HMCC imaging), however, was only modestly improved at 1.6% (6/369).	HMCC permits the endoscopist to perform significantly more targeted biopsies and provides an improved method for the detection of intraepithelial neoplastic lesions in this high− risk group.

15.Gasia MF et al. Clin Gastro Hepat 2016	Cohort study	CE, HDWLE, virtual chromo	454 patients	To determined the rate of neoplasia detection among different surveillance endoscopic techniques in an analysis of random or targeted biopsies.	Neoplastic lesions were detected in 8.2% of the procedures performed in the random biopsy group (95% confidence interval, 5.6-11.7) and 19.1% of procedures in the targeted biopsy group (95% confidence interval, 13.4-26.5) ($P < .001$). Neoplasias were detected in similar proportions of patients by HD colonoscopy, VCE, or DCE, with targeted biopsy collection.	Targeted biopsies identified greater proportions of subjects with neoplasia than random biopsies. Targeted collection of biopsy specimens appears to be sufficient for detecting colonic neoplasia in patients undergoing HD colonoscopy, DCE, or VCE, but not WLE
16.Saraiva, GE Port J Gastroenterol. 2021	Cohort study	CE	162 patients	Yield of random biopsies for dysplasia	Dysplasia in random biopsies was present in 3 patients (LGD in all). The dysplasia yield of random biopsies was 1.85%/patient (3/162), 8.8%/patient with dysplasia (3/34), 1.75%/colonoscopy (6/342), and 0.25%/biopsy (9/3,637	CE and random biopsies help in the detection of colonic neoplastic lesions. So random biopsies should not be abandoned, but rather used selectively in certain groups of patients.
17.Günther U et al., Int J Colorectal Dis	Pilot study	Random quadrant biopsies (I); Chromoendoscopy with indigo carmine CE (II); confocal endomicroscopy (CEM) (III)	141 UC, 9 CD	compare three different endoscopic surveillance strategies in the detection of IEN	In group I (1531 biopsies), no IEN was detected by histology. In group II (1,811 biopsies), chromoendoscopy-guided biopsies revealed high-grade IEN in two patients (4% detection rate). In four patients of group III (1477 biopsies), areas with high-grade IEN were clearly visible by CEM and confirmed by histology (8% detection rate, $p < 0.05$).	Targeted biopsy protocols guided by either chromoendoscopy or CEM led to higher detection rates of IEN and are thus mandatory for surveillance colonoscopies in patients with long-standing UC

18.Hlavaty T et al. Eur J Gastroenterol 2011	Pilot study	CE, CLE, WLE	30 patients	Sensitivity of random and targeted biopsy sampling protocols for the detection of IEN	There were no IENs found on random biopsies versus six low-grade or high-grade IENs in four patients (two detected by WLE, four additional by CE) from targeted biopsies, P=0.02.	Targeted biopsies are superior to random biopsies in the screening of IEN in patients with IBD. CE increases the diagnostic yield of WLE
19. Van den Broek FJ et al., AJG 2014	Retrospective	Random biopises	167 patients and 466 colonoscopies	evaluate the yield and clinical impact of random biopsies taken during colonoscopic surveillance	Overall, neoplasia was detected in 88 colonoscopies (53 patients): in 75 colonoscopies (85%) by targeted biopsies only and in 8 (9.1%) by both targeted and random biopsies. Neoplasia was detected in random biopsies only in five (5.7%) colonoscopies in four (7.5%) patients. Two of these four patients with neoplasia detected only by random biopsies had visible neoplasia in previous colonoscopies.	The yield of random biopsies is low whereas UC-associated neoplasia is macroscopically visible in 94% of colonoscopies. During 10-year surveillance, neoplasia was detected in only random biopsies in four patients of whom only one had clinical consequences.
20.Anne B Hu, IBD 2021	Retrospective study	Random dysplasia; visible dysplasia	300 patients (203 UC, 97 CD with colonic involvement) contributing 442 colonoscopies	to determine the number of patients in whom neoplasia was detected by random biopsies as opposed to biopsies of visible lesions, (2) to assess the impact of neoplasia detected by random biopsies on subsequent treatment	362 colonoscopies (82%) had only visible dysplasia, 52 (12%) had only random dysplasia, and 28 (6%) had both visible and random dysplasia. Longer disease duration (odds ratio, 1.04; 95% CI, 1.01-1.07), active inflammation (odds ratio, 2.89; 95% CI, 1.26-6.67), and concomitant PSC (odds ratio, 3.66; 95% CI, 1.21-11.08) were associated with detecting dysplasia on random biopsies compared	Nearly one fifth of dysplasia detected in patients with IBD was found on random biopsies. Patients with high risk characteristics may benefit from continuing the practice of random biopsies during surveillance examinations

				including risk for colorectal cancer	with visible lesions. Patients with random dysplasia (21%) or both random and visible dysplasia (21%) were more likely to undergo surgical resection compared with those with only visible dysplasia (5%; P < 0.001) and have subsequent development of colorectal cancer (15%, 7%, 1%, respectively; P < 0.0001)	
21.Hata, J Clin Med 2020	Retrospective	Target and random biopsies	195 patients	the long-term effectiveness of targeted biopsy.	Invasive CRC was found in one patient in the random group, while advanced neoplasia was detected in two patients in the target group. In the target group, 11.0% developed neoplasia during the follow-up. One patient underwent colectomy. In the random group 12.5% patients developed neoplasia during the follow-up, and one underwent colectomy	Robustness of targeted biopsy in preventing death due to CRC. They recommend targeted biopsy rather than > 33 random biopsies.

Tables neoplasia detection rate

Author, Publication, Year	Study Design and Objectives	Intervention	Participants	Outcomes	Results	Level of evidence Conclusions
1. Iannone A, APT 2019	Systematic review with metanalysis	WLE, ISCAN, FICE	Eighteen trials (2638 participants) were included	To compare endoscopic techniques for dysplasia surveillance	WLE (OR 0.44, 95% CI 0.26-0.73; high certainty) and i-SCAN (OR 0.47, 95% CI 0.25-0.90; moderate certainty) had lower odds of detecting neoplasia than CE. Fujinon intelligent colour enhancement (FICE), WLE and i-SCAN had lower odds for this outcome than full spectrum WLE (ORs 0.02 to 0.15; low certainty). WLE had lower odds of detecting nonpolypoid neoplasia than full spectrum high definition white-light endoscopy, narrow band imaging, chromoendoscopy and high definition white-light endoscopy (ORs 0.01-0.14; moderate certainty). WLE had lower odds of detecting neoplasia by target biopsy (OR 0.27, 95% CI 0.08-0.91) than chromoendoscopy (moderate certainty)	Chromoendoscopy, HD-WLE, NBI, autofluorescence, FICE and full spectrum high definition white-light endoscopy may be comparable for dysplasia surveillance. Standard definition WLE and i-SCAN provide lower yields for neoplasia identification
2. Feuerstein JD et al., GIE 2019	Meta-analysis	DCE vs SD-WLE/HD-WLE.	10 Studies and 6 RCTs (3 HD-WLE and 3 SD-WLE)	WLE (SD-WLE/HD-WLE) vs DCE for dysplasia detection	DCE was more effective at identifying dysplasia than SD-WLE (RR, 2.12; 95% CI, 1.15-3.91), but was not more effective compared with HD-WLE (RR, 1.36; 95% CI, 0.84-2.18).	non-RCTs demonstrate a benefit of chromoendoscopy over SDWLE and HDWLE, whereas RCTs only show a small benefit of chromoendoscopy

						over SDWLE, but not over HDWLE.
2. Ofir Har-Noy, Dig Dis Sci 2017	Metanalysis	WLE, chromoendoscopy, NBI	Five studies	Diagnostic yield (DY) of WLE, chromoendoscopy, NBI for detection of neoplasia	Chromoendoscopy (n = 361) was superior to WLE (n = 358) with per-patient analysis OR 2.05 (95% CI 1.26, 3.35) and per-lesion analysis OR 2.79 (95% CI 2.08, 3.73). High-definition (HD) chromoendoscopy was superior to HD-WLE with per-lesion analysis OR 2.48 (95% CI 1.55, 3.97). In four studies comparing NBI to WLE (n = 305), no difference was found in per-patient analysis OR 0.97 (95% CI 0.62, 1.53) and per-lesion analysis OR 0.94 (95% CI 0.63, 1.4). In two studies comparing CE to NBI (n = 104), no difference was found in per-patient analysis OR 1.0 (95% CI 0.51, 1.95) and per-lesion analysis OR 1.29 (95% CI 0.69, 2.41)	Chromoendoscopy is superior to WLE for detection of dysplasia in IBD, even with HD endoscopy
3. Jian Wan et al J Dig Dis 2019	Meta-analysis	CE and WLE	meta-analysis of 6 randomized controlled trials (RCTs) and 5 prospective studies	To compare chromoendoscopy (CE) and white light endoscopy (WLE) for dysplasia surveillance	CE detected more patients with dysplasia (relative risk [RR] 2.05, 95% confidence interval [CI]: 1.62-2.61) and more dysplastic lesions (RR 2.04, 95% CI: 1.40-2.98) than WLE. CE also detected more patients with dysplasia than	CE is superior to WLE in the surveillance of dysplasia in IBD patients.

					high-definition WLE (RR 1.60, 95% CI: 1.11-2.29). Compared with WLE, the incremental yield of CE for detecting patients with dysplasia was 9%. CE was superior to WLE in detecting non-polypoid dysplastic lesions (RR 1.38, 95% CI:1.02-1.88). CE had no advantage for detecting polypoid dysplastic lesions compared with WLE.	
4. Ricardo Hannum Resende, Endosc Int Open 2020	Systematic review and meta-analysis	different endoscopic methods of surveillance for dysplasia	17 RCTs totaling 2,457 patients	To compare the efficacy of different endoscopic methods of surveillance for dysplasia	There was superiority of DCE when compared to standard(SD) WLE. When compared with HD-WLE, no difference was observed in all outcomes (number of patients with dysplasia (RD 0.06; 95 % CI [-0.01, 0.13])). Comparing other techniques, no difference was observed between DCE and virtual chromoendoscopy (VCE - including narrow-band imaging [NBI], i-SCAN and flexible spectral imaging color enhancement), in all outcomes	Dye-spraying chromoendoscopy detected more patients and dysplastic lesions than SD-WLE. Although no difference was observed between DCE and HD-WLE or narrow-band imaging, the main outcomes favored numerically dye-spraying chromoendoscopy, except procedure time.
Mohammed El-Dallal et al, IBD 2020	Systematic review	Virtual chromoendoscopy (VCE) vs high definition white light endoscopy (HDWLE) or dye-spraying	11 RCTs were included, with a total of 1328 patients	Number of patients in whom dysplasia was identified and number of dysplastic lesions	Per patient analysis, VCE was not statistically different compared with DCE (risk ratio [RR] 0.77; 95% CI, 0.55-1.08) or HDWLE (RR 0.72; 95% CI, 0.45-1.15). However, per dysplasia analysis, VCE	CE was as good as HDWLE and DCE in identifying dysplasia per patient analysis. However, per dysplasia analysis, VCE was inferior

		chromoendoscopy (DCE)			was not statistically different compared with DCE (RR 0.72; 95% CI, 0.47-1.11) and inferior compared with HDWLE (RR 0.62; 95% CI, 0.44-0.88)..	compared with HDWLE and no different from DCE. The quality of evidence was moderate in the HDWLE and low to moderate in the DCE studies
5.Kiesslich R et al. Gastroenterology 2003	Randomized, controlled trial	A) colonoscopy with CE using 0.1% methylene blue conventional colonoscopy or B) conventional colonoscopy or	236 patients with long standing UC	early detection of intraepithelial neoplasias (IN) and CRC in UC.	With the use of CE, significantly more intraepithelial neoplasias were diagnosed in group A compared with group B (P= 0.00315); in group A, 35 neoplastic lesions were found in 13 of the 84 patients , 32 of which were intraepithelial neoplasias (24 low grade and 8 high grade) and 3 invasive cancers	CE with methylene blue is a novel tool for the early detection of IN and CRC in patients with UC.
6.Van den Broek FJ et al., Gut 2008	Randomised comparative trial of tandem colonoscopies	Endoscopic tri-modal imaging (ETMI) incorporates white light endoscopy (WLE), autofluorescence imaging (AFI) and narrow-band imaging (NBI).	50 UC patients	To assess the value of ETMI for the detection and classification of neoplasia	Among patients assigned to inspection with AFI first (n = 25), 10 neoplastic lesions were primarily detected. Subsequent WLE detected no additional neoplasia. Among patients examined with WLE first (n = 25), three neoplastic lesions were detected; subsequent inspection with AFI added three neoplastic lesions. Neoplasia miss-rates for AFI and WLE were 0% and 50% (p = 0.036).	Autofluorescence imaging improves the detection of neoplasia in patients with UC

7.Van den Broek FJ et al., Endoscopy 2011	Randomized crossover trial	NBI, HDWLE	48 patients - HDE first (25) -NBI first (23)	To compare NBI to high-definition endoscopy (HDE) for the detection of neoplasia	Of 16 neoplastic lesions, 11 (69 %) were detected by HDE and 13 (81 %) by NBI (p = 0.727). Of 11 patients with neoplasia, 9 (82 %) were diagnosed by HDE and 8 (73 %) by NBI (p= 1.0).	NBI does not improve the detection of neoplasia in patients with UC compared to HDE.
8. Mohammed N, Gut 2015 (abstract)	Randomised controlled trial	Chromoendoscopy vs WLE	53 patients	Detection of dysplasia in patients with long standing UC with HD-WLE compared to HD-CE.	A total of 14 dysplastic lesions (1 with high grade and 13 with low grade dysplasia) were detected in 11 patients (22%) in the HD-CE arm and 6 dysplastic lesions (all low grade dysplasia) in 5 patients (9.4%) in the HD-WLE arm. HD-CE was significantly better (p =0.04) than HD-WLE on a per patient basis for the detection of endoscopically visible dysplastic lesions. HD-CE (0.26 ± 0.6) detected more dysplastic lesions per-patient than HD-WLE (0.12 ± 0.4).	HD-CE significantly improves the detection of dysplastic lesions
9. Iacucci M, AJG 2018	Randomized trial	HD , VCE , or DCE	270 patients	Detection of colonic neoplastic lesions by using HD, DCE, or VCE using iSCAN	Neoplastic lesion detection rates in the VCE arm was non-inferior to the DCE arm. HD was non-inferior to either DCE or VCE for detection of all neoplastic lesions.	VCE or HD-WLE is not inferior to dye spraying colonoscopy for detection of colonic neoplastic lesions

10. Vleugels JLA et al, J Crohns Colitis 2018	Multicentre, randomized controlled trial	Endoscopic trimodal imaging [ETMI] includes the combination of autofluorescence imaging [AFI], narrow band imaging [NBI] and white light endoscopy [WLE] and chromoendoscopy [CE]	210 patients	To assess ETMI and CE for their accuracy to characterize dysplastic lesions	sensitivity for real-time prediction of dysplasia was 76.9% (95% confidence interval [CI] 46.2-95.0) for ETMI, and 81.6% [95% CI 65.7-92.3] for CE. Overall negative predictive value [NPV] for ETMI was 96.9% [95% CI 92.0-98.8] and 94.7% [90.2-97.2] for CE	Sensitivity for endoscopic differentiation of dysplastic lesions detected during surveillance of patients with long-standing UC seems limited using ETMI and CE.
11. Bisschops, Gut 2018	Multicentre prospective randomised controlled trial.	CE with methylene blue 0.1% or VC with narrow band imaging (NBI)	31 patients with long-standing UC	Difference in total number of neoplastic lesions detected in CE and VC	There was no significant difference between NBI and CE for neoplasia detection. Mean number of neoplastic lesions per colonoscopy was 0.47 for CE and 0.32 for NBI (p=0.992). The neoplasia detection rate was not different between CE (21.2%) and NBI (21.5%) (OR 1.02 (95% CI 0.44 to 2.35, p=0.964). The per lesion neoplasia detection was 17.4% for CE and 16.3% for NBI (OR 1.09 (95% CI 0.59 to 1.99, p=0.793).	CE and NBI do not differ significantly for detection of colitis-associated neoplasia.
12. Oscar González-Bernardo, IBD 2020	Prospective, single-center, randomized study	Chromoendoscopy with dye and iSCAN 1	129 patients ; CE n = 67 and VC n = 62	To compare Chromoendoscopy (CE) and VC with the iSCAN 1 system in the detection of neoplastic lesions in IBD patients	A total of 19 neoplastic lesions (9 adenomas and 10 low-grade dysplasias [LGD]) was detected in 16 patients, 12 lesions in the CE group (17.9%), and 7 lesions in the VC group (11.3%; P = 0.2); no differences were found in the overall rate of detection of	No differences occurred in the rate of detection of neoplastic lesions between CE and VC with iSCAN 1.

					lesions (neoplastic or nonneoplastic; P = 1)	
13.Kandian , Gut 2020	Randomised controlled trial	i-scan OE mode 2; high-definition white light (HD-WL)	188 IBD patients	To compare the performance of HDV (i-scan OE mode 2) with HDWL for detection of neoplasia	There was no significant difference between HD-WL and HDV for neoplasia detection. The neoplasia detection rate (NDR) was not significantly different for HDWL (24.2%) and HDV (14.9%) (p=0.14). All intraepithelial neoplasia (IEN) detected contained low-grade dysplasia only.	HDV and HDWL did not differ significantly in the detection of neoplasia
14. Gulati et al, IBD 2019	Randomized crossover trial	CE with indigo carmine or VCE	48 patients	Conventional dye-based CE vs VCE for the detection of dysplasia	Eleven dysplastic lesions were detected in n = 7/48 (14.5%). VCE missed 1 lesion, and CE missed 2 lesions in n = 2 (for VCE dysplasia diagnostic accuracy: 93.94% [85.2%-98.32%] vs CE 76.9% [66.9%-98.2%];	VCE had dysplasia detection at least as good as that of CE,
15. Jang DH, AJG 2019	Multicenter, prospective randomized controlled trial	HD-WL with random biopsy vs HD-CE with targeted biopsy	210 patients	To compare the dysplasia detection rate of HDWL-R vs HDCE with targeted biopsy	There was no significant difference in the CAD detection rate between HDCE-T and HDWL-R groups (4/102, 3.9% vs 6/108, 5.6%, P = 0.749). However, HDCE-T showed a trend toward improved colorectal neoplasia detection compared with HDWL-R	HDCE-T was not superior to HDWL-R for detecting CADs.

					(21/102, 20.6% vs 13/108, 12.0%, P = 0.093).	
16. Pellise, GIE 2011	Prospective, randomized, crossover study.	CE and NBI	60	To compare NBI with CE for the detection of IN.	Thirteen patients had at least 1 IN lesion on 1 of the examinations. In the per-lesion analysis, NBI resulted in a significantly inferior false-positive biopsy rate (P = .001) and a similar true-positive rate. The percentage of missed IN lesions and patients was superior with NBI, albeit without reaching statistical significance.	NBI appears to be equally effective alternative to CE for the detection of IN
17. Sabela Carballal, Gut 2018	Multicentre, prospective cohort study	0.4% indigo carmine CE	350 patients	Detection of dysplasia with CE	Colonoscopies were performed with standard definition (41.5%) or high definition (58.5%). Dysplasia miss rate with white light was 40/94 (57.4% incremental yield for CE). CE-incremental detection yield for dysplasia was comparable between standard definition and high definition (51.5% vs 52.3%, p=0.30). Dysplasia detection rate was comparable between expert and non-expert (18.5% vs 13.1%, p=0.20).	CE presents a high diagnostic yield for neoplasia detection,

18. Picco, IBD 2013	Prospective study	WLE , CE with indigo carmine	75 UC patients	Dysplasia detection rates	Among the 75 patients enrolled, dysplasia was found in 9.3% with WLE compared with 21.3% with WLE and CE (P = 0.007).	CE for UC surveillance resulted in high polyp detection, and enhanced dysplasia detection
19.Matsumoto T et al., GIE 2007	Cross-sectional study	Magnification, NBI	46 patients, 296 sites	Does NBI colonoscopy identify dysplasia in UC patients?	The positive rate of dysplasia was higher in protrusions (2/20 sites, 10%) than in flat mucosa (3/276 sites, 1.1%, P = .038; however, correction for the multiple testing of data removes this significance). When the surface pattern was taken into account, the rate of positive dysplasia was higher in the tortuous pattern (4/50 sites, 8%) than in the honeycomb-like or villous patterns (1/246 sites, 0.4%, P = .003)	The tortuous pattern determined by NBI colonoscopy may be a clue for the identification of dysplasia during surveillance for UC
20.Hlavaty T EJGH 2011	Cohort study	WLE and CE and CLE	30 patients	whether chromoendoscopy improves the detection rate	There was a statistically significant difference between the number of patients with IEN detected by random biopsies (0 of 45) versus targeted biopsies in WLE (four of 45, P = 0.04) and combined targeted by WLE and CE (seven of 30, P = 0.002).	CE increases the diagnostic yield of WLE

21.Hurlstone DP et al. Endoscopy 2005	Cohort study	Magnification CE (HMCC)	350 UC patients and 350 disease duration− and disease extent−matched control patients	HMCC for the detection and characterisation of intraepithelial neoplasia	Significantly more intraepithelial neoplastic lesions were detected in the HMCC compared with controls (69 vs. 24, P<0.0001). Intraepithelial neoplasia was observed in 67 lesions, of which 53 (79%) were detected using magnification chromoscopy alone. Chromoscopy increased the number of flat lesions with intraepithelial neoplasia detected compared with controls (P<0.001).	Magnification chromoscopy improves the detection of intraepithelial neoplasia
22. Efthymiou M,IBD 2013	Cohort study	Dye spray chromoendoscopy and NBI	44	To compare CE and NBI in colitis surveillance with respect to lesion detection.	Overall, CE identified more lesions than NBI (131 versus 102, P < 0.001); however, most were nondysplastic. CE detected 23 neoplastic (dysplastic or indefinite for dysplasia) lesions in 11 patients and NBI 20 lesions in 10 patients, P = 0.180.	NBI detected fewer lesions than CE in chronic colitis
23.Sugimoto S et al., GIE 2017	Retrospective study	WLE, CE, magnification	62 patients	Morphology of dysplasia	0 (0%), 6 (15.4%), 19 (48.7%), 12 (30.8%), and 2 (5.1%) lesions with HGD were classified as pedunculated, sessile, superficial elevated, flat, and depressed, respectively.	endoscopists should recognize that HGD is frequently associated with a flat/superficial elevated area and red discoloration and should inspect particularly carefully in the rectum and sigmoid colon.

24. Nayantara Coelho-Prabhu, IBD 2021	Retrospective observational cohort	White light endoscopy (HD-WLE) Vs chromoendoscopy	Chromoendoscopy (n = 150) HD-WLE (n = 658)	a 1-year outcome of surveillance colonoscopies	Among patients who had chromoendoscopy and HDWLE, polypoid dysplasia was identified in 50 (33.0%) and 79 (12.0%) patients, respectively, P < 0.01. Dysplasia in random biopsies was found in 39 patients (4.8%): 15 (10%) who had chromoendoscopy and 24 (3.6%) who had HDWLE (P < 0.001).	Chromoendoscopy and HDWLE had a similar diagnostic yield for dysplasia detection
25. Sekra et al, N Z Med J 2018	Retrospective cohort study	WLE to CE	110 IBD patients	To compare standard WLE to CE with targeted biopsies for detecting nonpolypoid dysplasia	Dysplasia pick up rate was significantly higher in the CE group with a risk difference of 11.8%, 95% confidence interval (0.93, 22.59), p=0.008. Dysplasia detection rate per patient was also significantly higher in the CE group with a rate difference of 20.6 lesions per 100 patients, 95% confidence interval (5.3, 35.8), p=0.0003.	CE with targeted biopsy is associated with a significantly increased nonpolypoid dysplasia detection rate when compared to WLE