

Quality in colonoscopy: preparation, endoscopy, biopsy policy, …

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Quality in colonoscopy




Bowel Cancer
Bowel Preparation
Screening Programme
Colonoscopy
ESGE guideline
Biopsy policy

Bowel Cancer

Colorectal Cancer

Mortality



How many people **died** of colorectal cancer in Belgium in 2021?

2419 [1]

i.e. almost
7-8 per day!

1. Colorectal or bowel cancer | Foundation Against Cancer

Bowel Cancer

Colorectal Cancer

Incidence



How many **new cases** of colorectal cancer in Belgium in 2023?

7837 [1]

i.e. almost
22 per day!







1. Colorectal or bowel cancer | Foundation Against Cancer

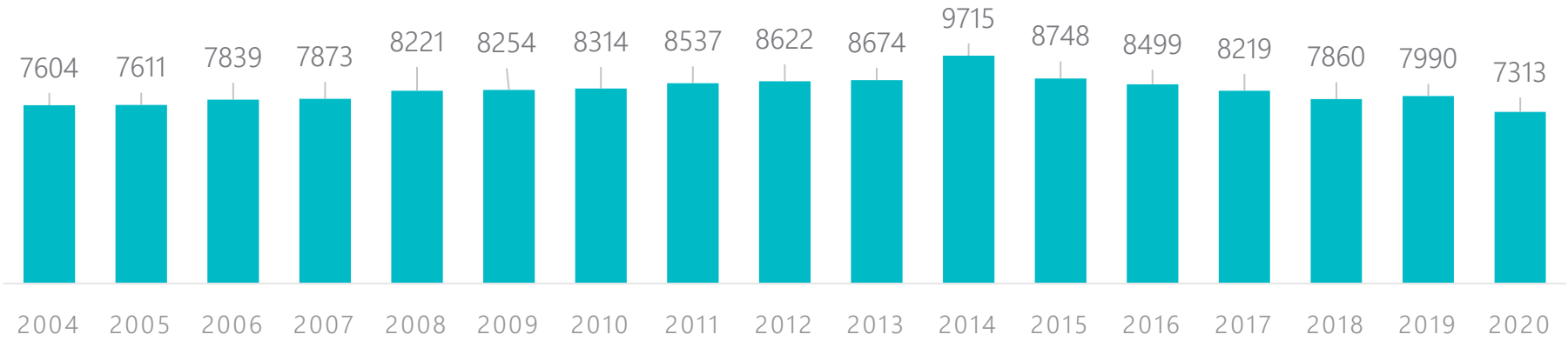
Bowel Cancer

Colorectal Cancer

Incidence and etiology



- It is the 4th most common type of cancer in Belgium[1]
- Incidence appears stable, following an initial decline



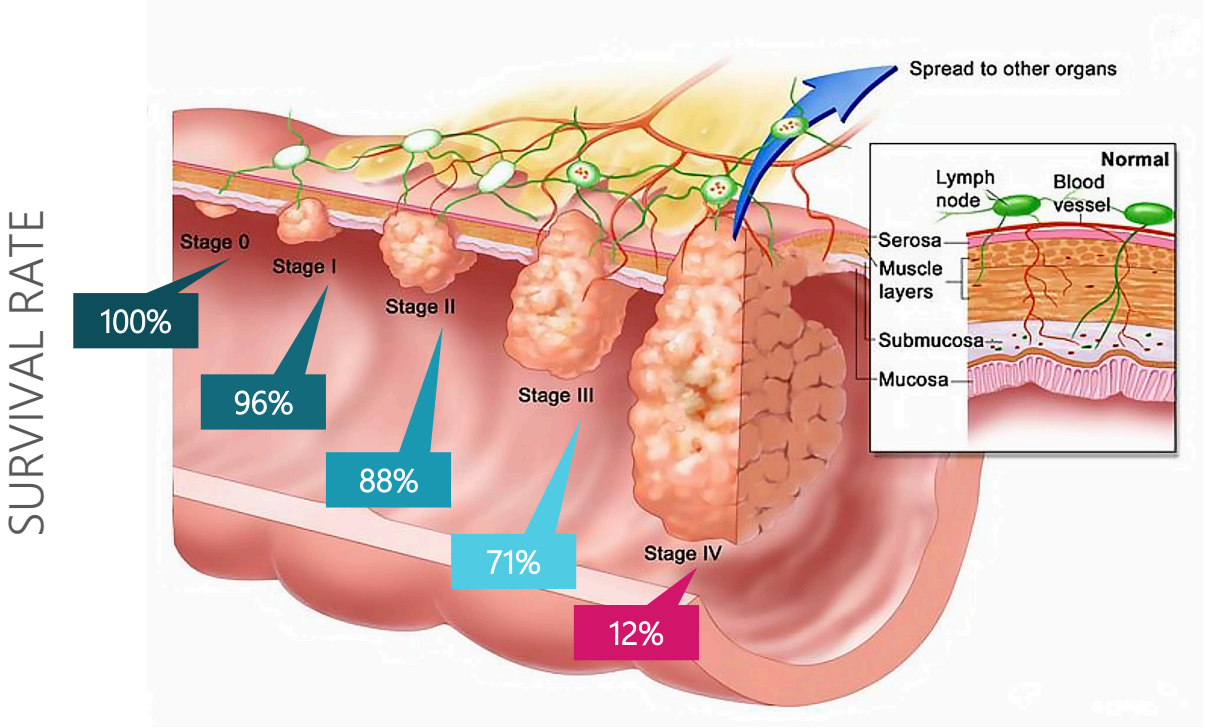
1. Colorectal or bowel cancer | Foundation Against Cancer
2. Tran, T.N. et al, Int. J. Environ. Res. Public Health 2023, 20

Bowel Cancer

Colorectal Cancer

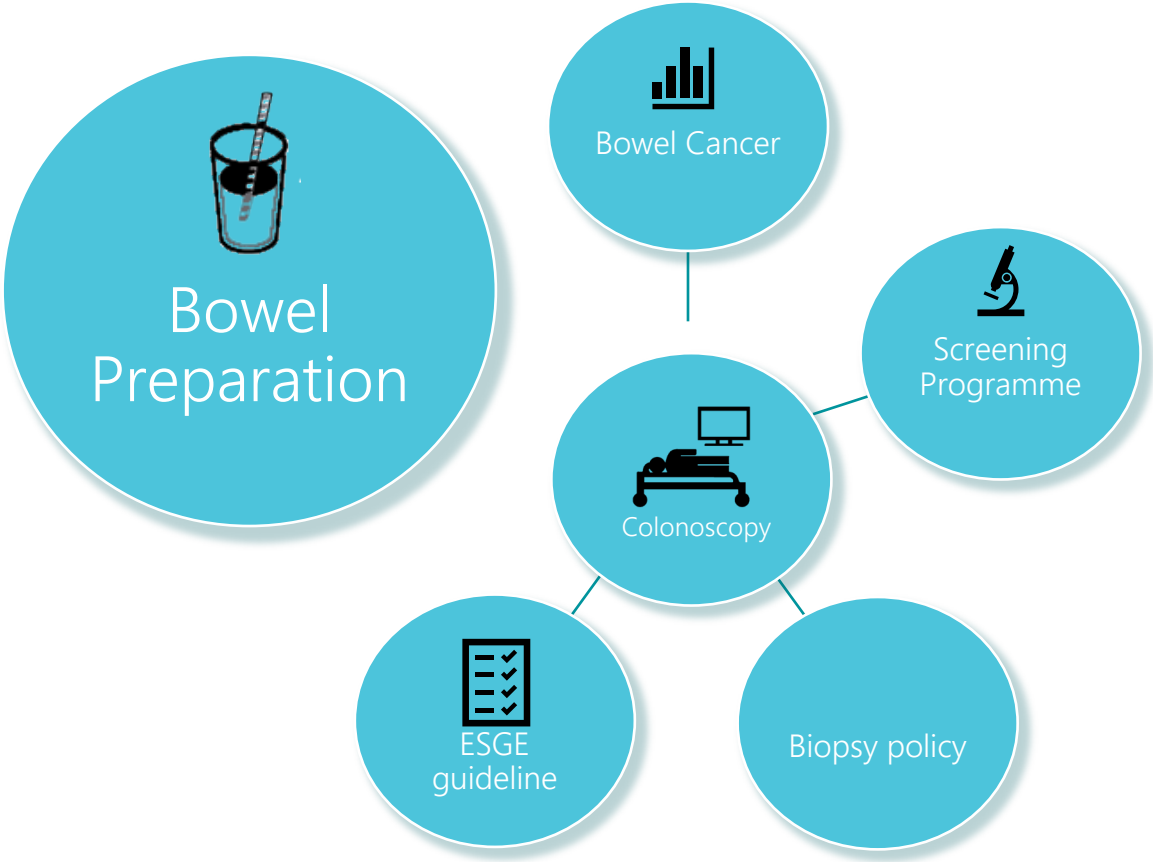
Survival related to early diagnosis[1,2]

- Early detection gives a +/-90% chance of cure



1. https://www.kanker.be/alles-over-kanker/alle-types-kanker/colorectale-dikkedarmkanker/onderzoeken
2. Can you be cured of colorectal cancer? | Colorectal Cancer (bevolkingsonderzoek.be)

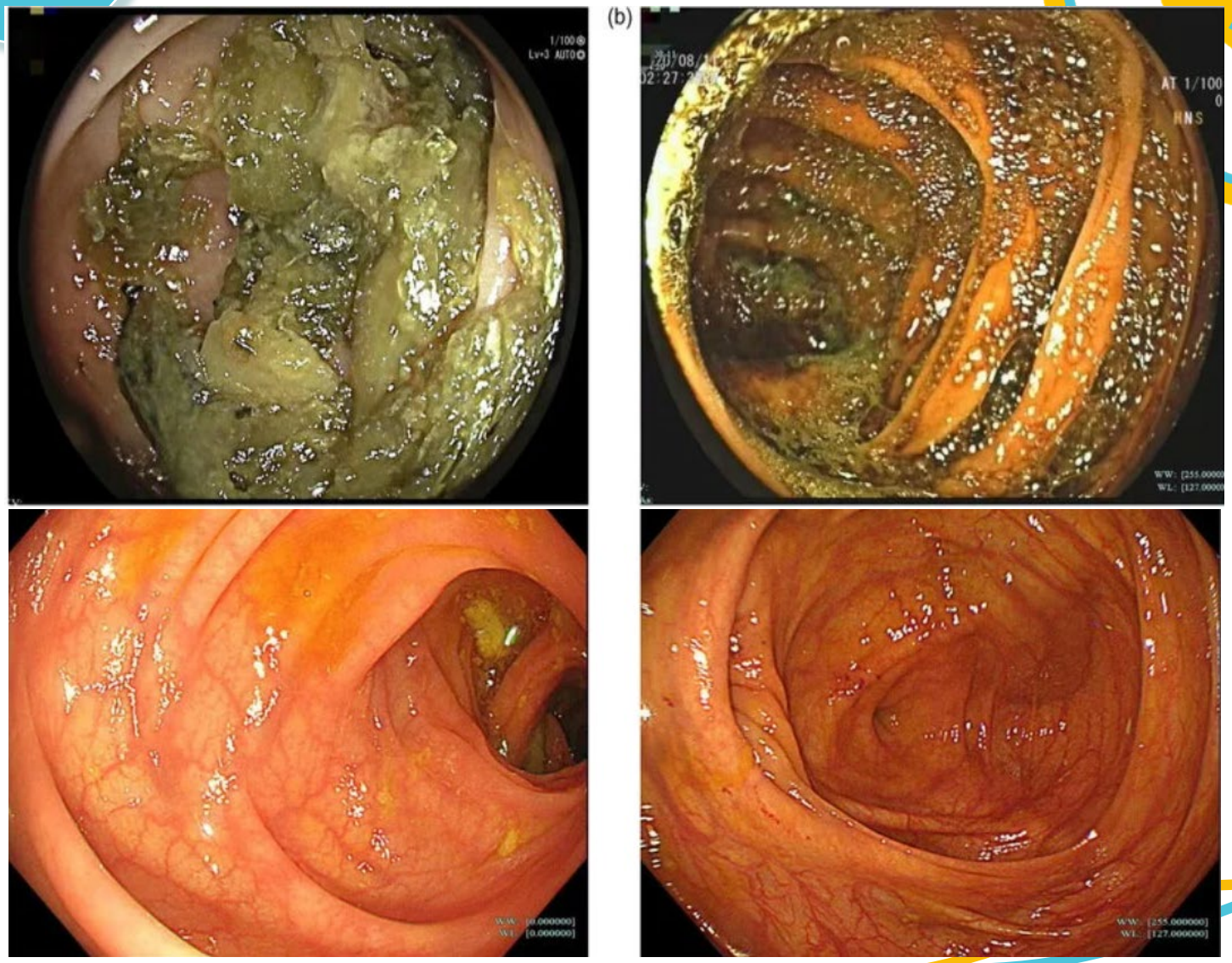



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Colonoscopy

Scoring cleansing quality

BBPS[1,2]



Colonoscopy

Scoring cleansing quality

BBPS[1,2]



Boston Bowel Preparation Scale[3]	SCORE 0	SCORE 1	SCORE 2	SCORE 3
	Niet voorbereid segment van het colon; het slijmvlies kan niet worden beoordeeld vanwege vaste ontlasting die niet kan worden verwijderd	Een gedeelte van het slijmvlies van het segment wordt gezien, maar andere delen niet als gevolg van achtergebleven ontlasting en/of ondoorzichtige vloeistof	Kleine hoeveelheid achtergebleven ontlasting en/of ondoorzichtige vloeistof, maar het slijmvlies van het segment is goed te beoordelen	Volledige slijmvlies van het segment is goed te zien, zonder residuele ontlasting en/of ondoorzichtige vloeistof

Adapted from Bisschops R, *et al.* 2019[1]

Hoogwaardige darmreiniging[#]

Adequate darmreiniging

- Each colon segment receives a score of 0-3. The segment scores are then added up. The BBPS therefore always lies between 0 & 9.[2]
- For adequate bowel preparation, each colon segment must score at least 2.[1]

1. Bisschops R. et al., Endoscopy. 2019 Jan; 51(1): 60-72.
2. Lai EJ, et al. Gastrointest Endosc 2009; 69(3 Pt 2): 620-625.
score 3 [good] i.e. fully visualized mucosa without additional cleansing/rinsing during colonoscopy

Colonoscopy

Bowel Preparation

Impact of preparation on colonoscopy



- Relationship between inadequate preparation and quality indicators of colonoscopy:
  1. Lower ADR and higher Adenoma Miss Rate[1,3]
  2. Lower Cecal Intubation Rate (CIR) and higher Cecal Intubation Time (CIT)[1,3]

- Impact on patient and healthcare:
  1. More patient discomfort during colonoscopy[1]
  2. Missed lesions and incomplete diagnosis[2,3]
  3. Incomplete scope/no reliable result: more repeat procedures & longer hospital stay → higher capacity utilisation and healthcare costs[1]

1. Hassan, et al., ESGE guideline Endoscopy 2019 Aug;51(8):775-794
2. Froehlich F. et al. GI Endoscopy 2005; 61(3): 378-384
3. Lebwohl B. et al. GI Endoscopy 2011; 73(6): 1207-1214



Bowel Preparation Agent

Laxative for preparation



Classification of bowel preparation agents

- PEG-containing bowel preparations:
  - 4L PEG*: KLEAN-PREP® / Colofort®
  - 2L PEG +ASC*: MOVIPREP®
  - 1L PEG +ASC*: PLENVU®
- Contact bowel preparations:
  - NaPic + MgCit: Picoprep® / Citrafleet®
- Sulfate bowel preparations:
  - Trisulfate: Eziclen®
- Phosphate bowel preparations:
  - Phosphate Colowash® / Cleen phospho soda®

* Also contain electrolytes for an optimal safety profile and sodium sulfate (Na_2SO_4) which enhances the laxative effect through an osmotic effect

ESGE guideline

ESGE Bowel Preparation Guideline

Update 2019; Hassan et al.[1]

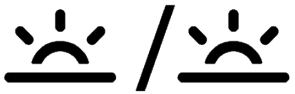


Dosing schedule recommendations:

- Split-dose dosing schedule is strongly recommended
  (strong recommendation, high quality evidence)



- A one-day schedule on the day of the colonoscopy is an acceptable alternative for patients scheduled in the afternoon
  (strong recommendation, high quality evidence)



- Preparation may be started at most 5 hours before the colonoscopy with the intake of the last dose of the bowel preparation
  (strong recommendation, moderate quality evidence)
- At least 2 hours before the start of the colonoscopy, intake of the bowel preparation must be completed
  (strong recommendation, moderate quality evidence)



1. Hassan C. et al., ESGE guideline Endoscopy 2019 Aug;51(8):775-794

Bowel Preparation

PLENVU®

Indication

PLENVU® is indicated for use in adults, for cleansing the bowel prior to any procedure requiring a clean bowel.



PLENVU®

PLENVU®
studies



PLENVU® compared with other preparations : an example

PLENVU®
studies

Colon cleansing efficacy and safety with 1 L NER1006 versus 2 L polyethylene glycol + ascorbate: a randomized phase 3 trial

Authors
Raf Bisschops[1], Jonathan Manning[2], Lucy B. Clayton[3], Richard Ng Kwet Shing[3], Marco Álvarez-González[4], on behalf of the MORA Study Group

- MORA study
- PLENVU® vs. MOVIPREP ®
- NON-INFERIORITY STUDY



Original article

Thieme

Colon cleansing efficacy and safety with 1 L NER1006 versus 2 L polyethylene glycol + ascorbate: a randomized phase 3 trial

Authors
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Bibliography
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Table e1–e3, Table e5, Table e7, Fig. e5 and Fig. e6 This supplementary material can be found at the end of the article

ABSTRACT

Background Polyethylene glycol (PEG)-based bowel preparations are effective cleansers but many require high-volume intake. This phase 3, randomized, blinded, multicenter, parallel-group, central reader-assessed study assessed the 1L PEG NER1006 bowel preparation vs. standard 2 L PEG with ascorbate (2LPEG).

Methods Patients undergoing colonoscopy were randomized (1:1:1) to receive NER1006, as an evening/morning (N2D) or morning-only (N1D) regimen, or evening/morning 2LPEG. Cleansing was assessed using the Harefield Cleansing Scale (HCS) and the Boston Bowel Preparation Scale (BBPS). Primary end points were overall bowel cleansing success and high-quality cleansing in the right colon. Modified full analysis set (mFAS) and per protocol (PP) analyses were performed. Mean cleansing scores were analyzed post hoc.

Results Of 849 randomized patients, efficacy was analyzed in the following patient numbers (mFAS/PP): total n = 822/670; N2D n = 275/220; N1D n = 275/218; 2LPEG n = 272/232. mFAS established noninferiority. PP showed superiority for N2D on overall success (97.3 % vs. 92.2 %, $P = 0.014$), and for N2D and N1D on right colon high-quality cleansing (N2D 32.3 % vs. 15.9 %, $P < 0.001$; N1D 34.4 % vs. 15.9 %, $P < 0.001$) vs. 2LPEG. Using HCS, N2D and N1D attained superior segmental high-quality cleansing ($P \leq 0.003$ per segment). N2D showed superior mean segmental HCS scores ($P \leq 0.007$ per segment). Both N2D and N1D achieved superior mean overall ($P < 0.001$ and $P = 0.006$) and right colon BBPS scores ($P < 0.001$ and $P = 0.013$). N2D demonstrated superior right colon polyp detection ($P = 0.024$). Adherence, tolerability, and safety were comparable between treatments.

Conclusions NER1006 is the first low-volume preparation to demonstrate superior colon cleansing efficacy vs. standard 2LPEG with ascorbate, with comparable safety and tolerability.

European Clinical Trials Database (EudraCT)
2014-002185-78
TRIAL REGISTRATION: Multicenter, randomized, parallel group, phase 3 trial 2014-002185-78 at https://eudract.ema.europa.eu/

Clinical.Trials.gov
NCT02273167
TRIAL REGISTRATION: Multicenter, randomized, parallel group, phase 3 trial NCT02273167 at clinicaltrials.gov

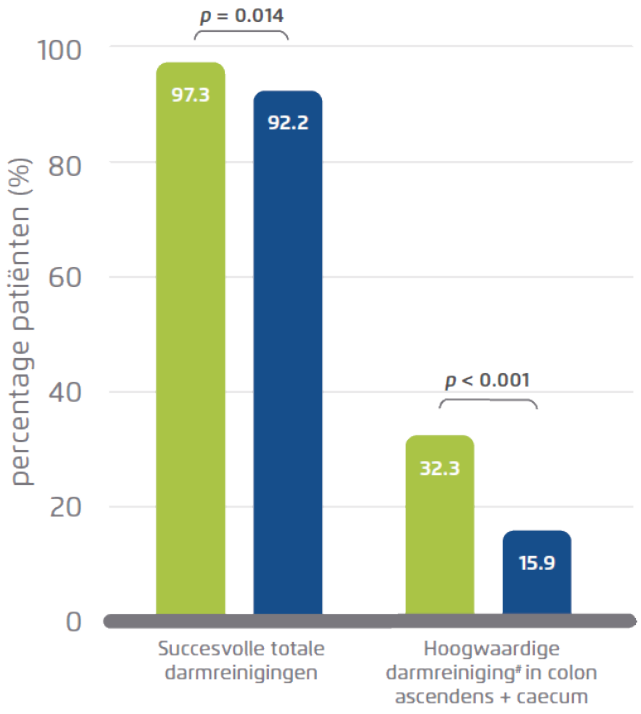
Bisschops Raf et al. Colon cleansing efficacy… Endoscopy

1. Bisschops R. et al., Endoscopy. 2019 Jan; 51(1): 60-72..

PLENVU® studies

MORA study

Results – efficacy[1]



PLENVU® in two-day split-dose regimen (n=220)

MOVIPREP ® in two-day split-dose regimen (n=232)

1. Bisschops R. et al., Endoscopy. 2019 Jan; 51(1): 60-72.
score 4 [excellent] plus score 3 [good] on the HCS, i.e. fully visualized mucosa without additional cleansing/rinsing during colonoscopy.

Bowel Preparation

PLENVU® intake tips

When taking laxatives for bowel cleansing with relatively low volumes, patients often tend to drink them as quickly as possible, which can lead to a feeling of fullness, nausea or even vomiting.

It is generally advised to drink bowel preparations slowly.





❶ **Drink PLENVU® slowly – take your time**
Take **at least one hour** for each dose of PLENVU® (500ml) together with the clear fluid* (at least 500 ml). If necessary, you can briefly pause drinking PLENVU® and resume once the feeling of fullness/any nausea has passed.



❷ **Start with a cup of warm tea** before **taking the second dose of** PLENVU® solution. Again take sufficient time for intake (see tip 1).



❸ **Drink PLENVU® in small sips;** you can optionally use a bottle with a closable drinking spout to prevent drinking the liquid too quickly.

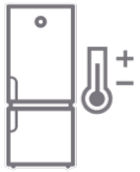


❹ **Clearly inform** your patient

EXTRA TIPS TO IMPROVE TASTE EXPERIENCE:



❺ Drinking PLENVU® becomes easier when you **add (extra) clear fluid*** to the solution **or alternate with small sips** of this clear fluid during PLENVU® intake.



❻ **Drink PLENVU® preferably chilled** for a better taste.



❼ **Drink PLENVU®** optionally **with a straw**, so that the liquid goes further back in the mouth.



❽ **Use** sorbitol-free **gum** to get a different taste in the mouth.

*** e.g. water, clear soup, fruit juice without pulp, soft drinks, (iced) tea and/or coffee without milk**


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ESGE guideline

ESGE Performance Measures

Lower GI endoscopy; Kaminski et al.[1]



7 domains across the patient pathway, each with 1 key performance measure and a **minimum** and **target** standard

1	2	3	4	5	6	7
Pre-procedure	Completeness	Identification	Management	Complications	Patient experience	Post-procedure
Adequate bowel preparation	Cecal intubation rate	Adenoma detection rate	Appropriate polypectomy technique	Complication rate	Validated patient-experience survey	Correct surveillance advice

Minimum standard

The threshold every endoscopist and every unit must reach

Target standard

The level high-performing services should aim for

1. Kaminski MF, et al. Performance measures for lower gastrointestinal endoscopy: an ESGE quality improvement initiative. Endoscopy 2017;49:378-397

ESGE guideline

Pre-procedure

Domain 1: adequate bowel preparation[1]



≥ 90%
minimum standard

≥ 95%
target

Key measure: share of colonoscopies with adequate bowel preparation

What counts as "adequate"?

BBPS ≥ 6 (Ottawa ≤ 7; Aronchick excellent/good/fair)

Always score with a validated scale in the report

Minor: appropriate indication

≥ 85% minimum, ≥ 95% target (ASGE / EPAGE II criteria)

Minor: time slot per colonoscopy

30 min for clinical and primary screening colonoscopy

45 min after a positive faecal occult blood test

1. Kaminski MF, et al. Performance measures for lower gastrointestinal endoscopy: an ESGE quality improvement initiative. Endoscopy 2017;49:378-397

ESGE guideline

Completeness

Domain 2: cecal intubation rate[1]



≥ 90%

minimum standard

≥ 95%

target standard

Cecal intubation must be documented in writing **and** with a photo or video of the landmarks:

1

Appendiceal orifice

Photo of the appendix opening

2

Ileocecal valve

Photo of the valve, ideally en face

+

Terminal ileum

When intubated: extra proof of completeness

1. Kaminski MF, et al. Performance measures for lower gastrointestinal endoscopy: an ESGE quality improvement initiative. Endoscopy 2017;49:378-397

ESGE guideline

Identification

Domain 3: adenoma detection rate[1]



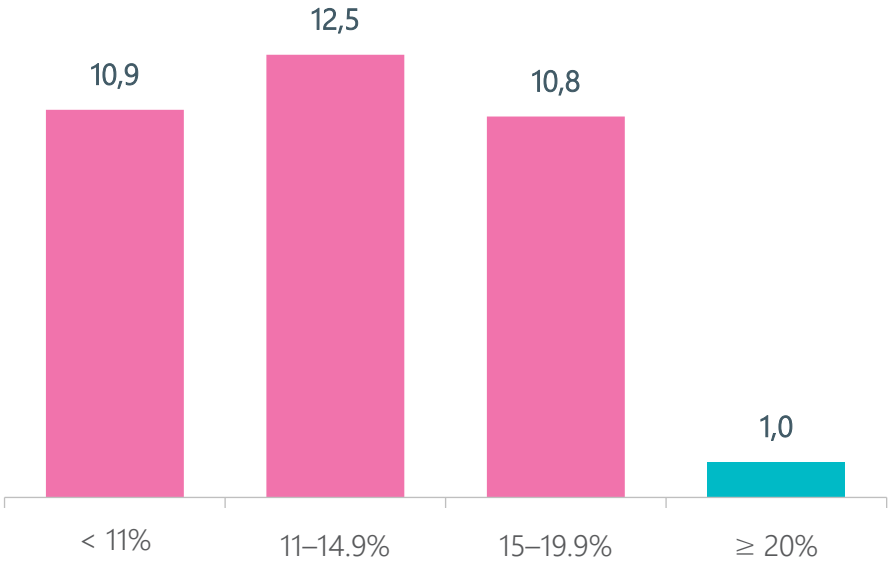
≥ 25%
ADR minimum

Share of colonoscopies in patients ≥ 50 years with at least one **histologically confirmed adenoma**

Minor measures

- Withdrawal time ≥ 6 min (target 10)
- PDR ≥ 40% if no histology

Interval-cancer risk by endoscopist ADR (hazard ratio)



Every +1% ADR

≈ 3% less interval colorectal cancer

Corley, NEJM 2014

1. Kaminski MF, et al. Performance measures for lower gastrointestinal endoscopy: an ESGE quality improvement initiative. Endoscopy 2017;49:378-397
2. Kaminski MF, et al. Quality indicators for colonoscopy and the risk of interval cancer. N Engl J Med 2010;362:1795-1803
3. Corley DA, et al. Adenoma detection rate and risk of colorectal cancer and death. N Engl J Med 2014;370:1298-1306

ESGE guideline

Management

Domain 4: polypectomy & lesions[1]



1 key and 4 minor measures: remove it correctly, **retrieve** it, **describe** it and **mark** it

Measure	Minimum	Target
Appropriate polypectomy technique (KEY)	≥ 80%	≥ 90%
Retrieval of polyps > 5 mm for histology	≥ 90%	≥ 95%
Tattoo after resection: non-pedunculated ≥ 20 mm or suspicious	–	100%
Morphology described with Paris classification	–	100%
Advanced imaging for suspicious features (depressed, LST-NG)	–	100%

1. Kaminski MF, et al. Performance measures for lower gastrointestinal endoscopy: an ESGE quality improvement initiative. Endoscopy 2017;49:378-397

ESGE guideline

Polypectomy update

ESGE guideline 2024; Ferlitsch et al.[1]



Cold snare is now the standard for every polyp below 10 mm

≤ 5 mm

Cold snare polypectomy

With a 1–2 mm margin of normal tissue

Strong rec., high-quality evidence

6–9 mm

Cold snare polypectomy

With a 1–2 mm margin of normal tissue

Strong rec., high-quality evidence

×

No cold biopsy forceps

High rate of incomplete resection

Strong rec., moderate evidence

T

Tattoo 3–5 cm distal (anal side) of lesions that may need to be found again at surgery, or where cancer is suspected

1. Ferlitsch M, et al. Colorectal polypectomy and endoscopic mucosal resection: ESGE guideline update 2024. Endoscopy 2024;56:516-545

ESGE guideline

Safety & experience

Domains 5 & 6: complications, patients[1]



Quality does not stop at the end of the procedure: follow up what happens afterwards and how the patient experienced it

Complications

≤ 0.5% 7-day readmission (minimum)

- Record early complications: perforation, bleeding, need for intervention
- Monitor 30-day mortality

Patient experience

≥ 90% satisfied patients (target)

- Measure with a validated tool, e.g. Global Rating Scale or Gastronet
- Includes comfort, information and waiting time

1. Kaminski MF, et al. Performance measures for lower gastrointestinal endoscopy: an ESGE quality improvement initiative. Endoscopy 2017;49:378-397

ESGE guideline

Post-procedure

Domain 7: surveillance advice[1]



Target: ≥ 95% of reports give a guideline-based surveillance recommendation

After polypectomy

3–6 mo

Piecemeal resection ≥ 20 mm

Site check, then a second check after 12 months

3 yrs

High risk

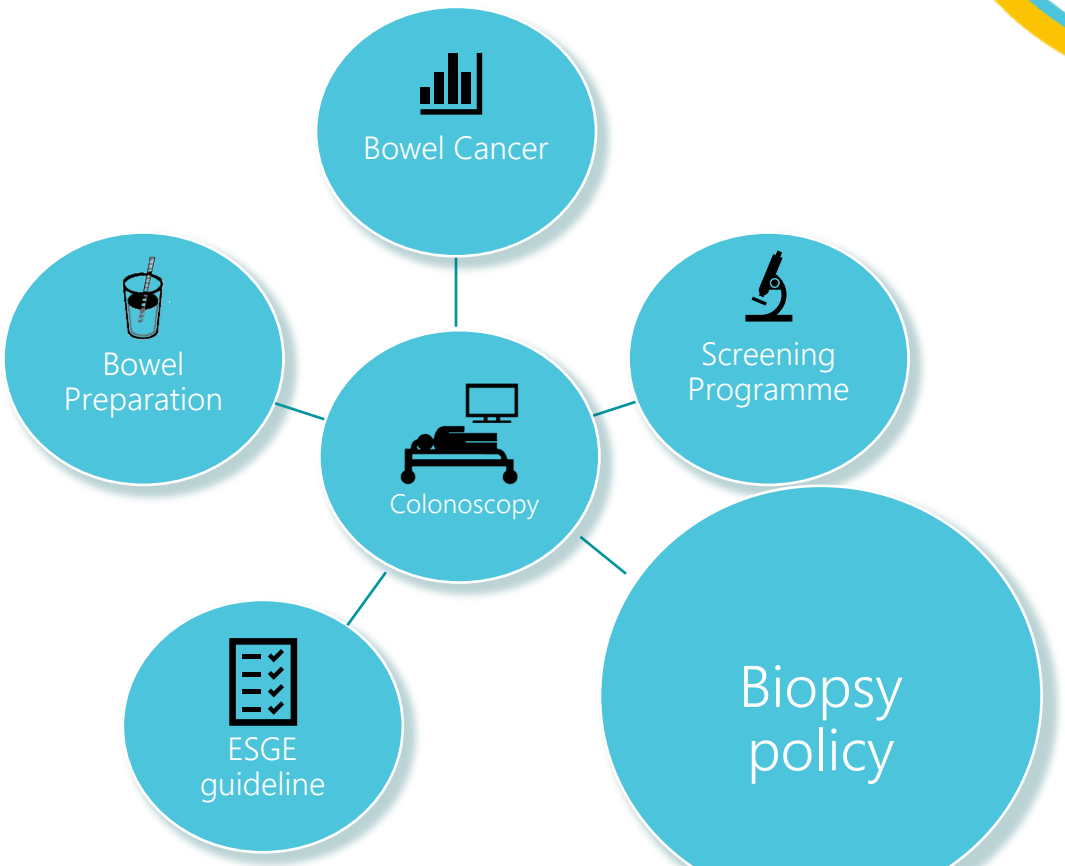
≥ 5 adenomas · adenoma ≥ 10 mm or HGD · serrated polyp ≥ 10 mm or with dysplasia

No surv.

Low risk

1–4 adenomas < 10 mm without HGD · serrated polyp < 10 mm without dysplasia → back to screening

1. Kaminski MF, et al. Performance measures for lower gastrointestinal endoscopy: an ESGE quality improvement initiative. Endoscopy 2017;49:378-397
2. Hassan C, et al. Post-polypectomy colonoscopy surveillance: ESGE guideline update 2020. Endoscopy 2020;52:687-700


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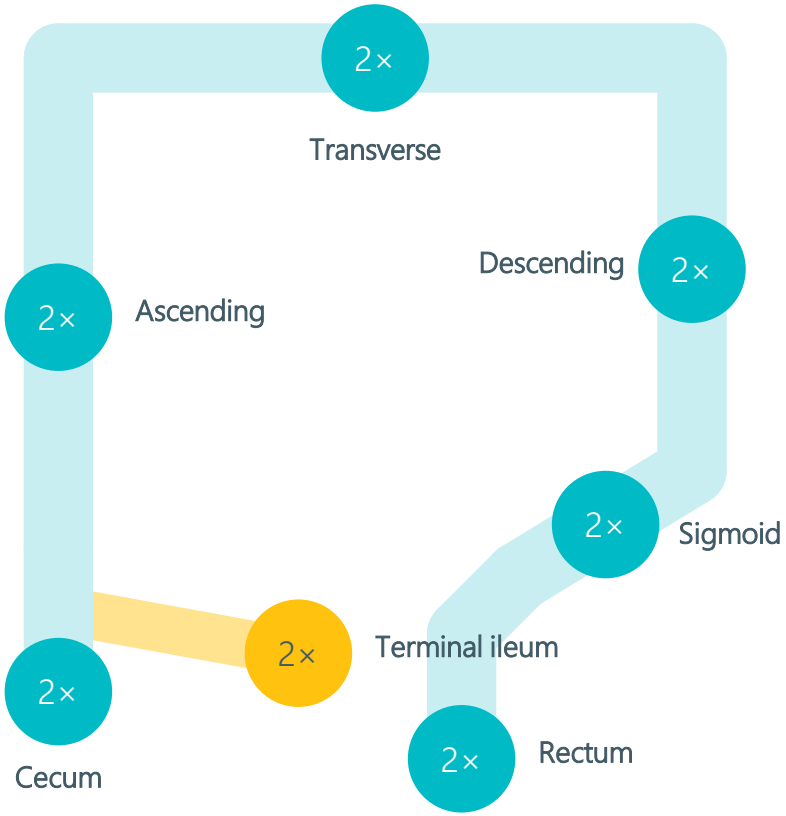
Biopsy policy

Suspected colitis

Segmental biopsies, including the ileum[1]



At least 2 biopsies per segment, each segment in its own pot



Terminal ileum

Intubate it: ≥ 80% of colonoscopies for suspected IBD (target ≥ 90%)

Even if it looks normal

≥ 2 ileal biopsies, in a separate pot

Inform the pathologist

Endoscopic findings + clinical data

1. Pouw RE, et al. Endoscopic tissue sampling - Part 2: Lower gastrointestinal tract. ESGE Guideline. Endoscopy 2021;53:1261-1273
2. Dekker E, et al. Performance measures for colonoscopy in IBD patients: ESGE Quality Improvement Initiative. Endoscopy 2022

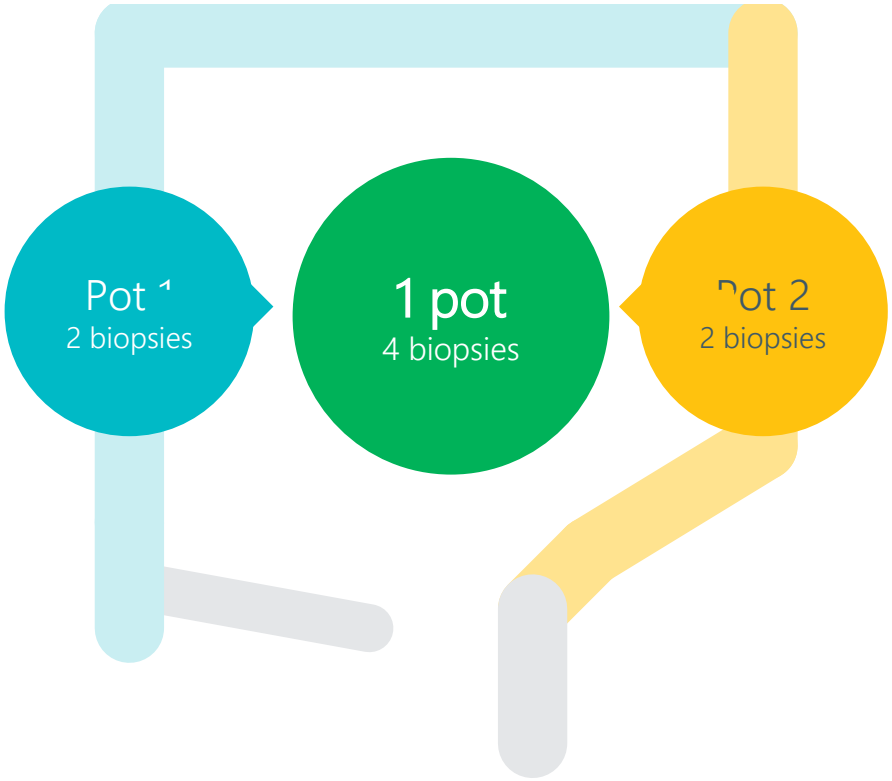
Biopsy policy

Microscopic colitis

Watery diarrhoea, normal mucosa[1]



Alternative: all 4 biopsies in **1 pot**



Why 1 pot may be enough

- Separate pots: expert consensus, **low-quality evidence**
- No study shows that separate pots improve diagnostic yield
- The right colon is key: 100% diagnostic vs 92% for the left colon (n = 228)
- Every extra pot = ecological impact

Caveat: single-centre retrospective data; the ESGE recommendation itself has not changed

1. Pouw RE, et al. Endoscopic tissue sampling - Part 2: Lower gastrointestinal tract. ESGE Guideline. Endoscopy 2021;53:1261-1273
2. Leung E, McNamara D, et al. Right biopsy protocol for microscopic colitis. World J Gastrointest Pharmacol Ther 2026

Biopsy policy

Known IBD

Biopsies to assess disease activity[1]



Biopsy only when the result changes management

≥ 2

UC, visible inflammation

At least 2 biopsies from the worst affected area: activity and CMV

Strong rec., low-quality evidence

HD

UC, no visible inflammation

Advanced imaging to target biopsies for histologic remission, if it changes therapy

Strong rec., low-quality evidence

×

Crohn's disease

Don't biopsy inflamed or normal mucosa just to assess activity

Weak rec., low-quality evidence

≥90%

Always report an endoscopic score: Mayo or UCEIS in UC (target ≥ 95%); SES-CD in Crohn's when feasible

1. Pouw RE, et al. Endoscopic tissue sampling - Part 2: Lower gastrointestinal tract. ESGE Guideline. Endoscopy 2021;53:1261-1273
2. Dekker E, et al. Performance measures for colonoscopy in IBD patients: ESGE Quality Improvement Initiative. Endoscopy 2022

Biopsy policy

IBD surveillance

Look first, then take targeted biopsies[1]



≥ 90%

High definition

minimum standard

≥ 70%

Chromoendoscopy

minimum standard

All

Every surveillance colonoscopy

Pancolonic dye-based or virtual chromoendoscopy + targeted biopsies of every visible lesion

Strong rec., moderate evidence

\+

High risk: PSC, prior neoplasia, tubular colon, strictures, refractory inflammation

Targeted biopsies may be combined with 4-quadrant random biopsies every 10 cm

Weak rec., low evidence

4

Pouch surveillance

Biopsy visible lesions + ≥ 2 each from afferent loop, efferent blind loop, pouch and anorectal cuff

Strong rec., low evidence

1. Pouw RE, et al. Endoscopic tissue sampling - Part 2: Lower gastrointestinal tract. ESGE Guideline. Endoscopy 2021;53:1261-1273
2. Dekker E, et al. Performance measures for colonoscopy in IBD patients: ESGE Quality Improvement Initiative. Endoscopy 2022

Biopsy policy

Polyps & cancer

Resect, don't biopsy, except in irresectable tumours [1]



A biopsy of a resectable lesion causes fibrosis and makes later resection harder (?)

0 biopsies

Premalignant polyp

Assess carefully, then excise completely; no biopsy

0 biopsies

Possibly malignant, resectable

Resect en bloc. Not confident? Take photos, no biopsies, and refer to an expert centre

6 biopsies

Deep invasion, not resectable

6 carefully targeted biopsies from the suspected cancer focus

1. Pouw RE, et al. Endoscopic tissue sampling - Part 2: Lower gastrointestinal tract. ESGE Guideline. Endoscopy 2021;53:1261-1273