

## Adenoma detection rate varies greatly during colonoscopy training

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**Background:** The adenoma detection rate (ADR) is considered the most important quality indicator for colonoscopy and varies widely among colonoscopists. It is unknown whether the ADR of gastroenterology consultants can already be predicted during their colonoscopy training.

**Objective:** To evaluate the ADR of fellows in gastroenterology and evaluate whether this predicts their ADR as gastroenterology consultants.

**Design:** Retrospective observational study.

**Setting:** Academic and regional centers.

**Patients:** Symptomatic patients undergoing colonoscopy.

**Main Outcome Measurements:** The variance in ADR among 7 gastroenterology fellows during their training (between May 2004 and March 2012) and of the same fellows after they registered as consultants (between October 2011 and April 2014) was evaluated. Multivariate logistic regression was performed to compare the highest detector (endoscopist with highest ADR) with the individual fellows and to evaluate whether an ADR of 20% or higher during the training was predictive of a high ADR as a consultant.

**Results:** During training, ADRs ranged from 14% to 36% ( $P < .001$ ). Compared with the highest detector, the OR for detecting an adenoma ranged from 0.64 (95% CI, 0.40-1.03) to 0.29 (95% CI, 0.17-0.48). After registration, ADR ranged from 19.8% to 40.2% ( $P = .066$ ). Compared with the highest detector during consultancy, the OR ranged from 0.64 (95% CI, 0.34-1.21) to 0.26 (95% CI, 0.13-0.52). Only 2 fellows significantly improved their ADR after completing their training. An ADR lower than 20% during training was associated with a lower ADR as a consultant (OR 0.51; 95% CI, 0.30-0.87).

**Limitations:** Retrospective study.

**Conclusions:** Variance in ADR is already present during the endoscopy training of gastroenterology fellows. Most fellows do not improve their ADR after completing their training. These findings suggest that the ADR can be predicted during colonoscopy training, and we suggest that feedback and benchmarking should be implemented early during training of fellows in an effort to improve ADR in future daily practice as a consultant. (Gastrointest Endosc 2015;82:122-9.)

Colorectal cancer (CRC) arises from precursor colorectal polyps. Detecting and resecting these lesions during colonoscopy decrease the CRC incidence.<sup>1</sup> At the same time, it is well known that polyps are missed during

colonoscopy, and this can result in interval cancers in the years after colonoscopy.<sup>2-7</sup> Although it is the ultimate quality indicator, the rate of interval cancers is a parameter that can only be used on a long-term basis and is therefore

*Abbreviations:* AMC, Academic Medical Center; ADR, adenoma detection rate; CI, confidence interval; CIR, cecal intubation rate; CRC, colorectal cancer; OR, odds ratio.

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not practical for monitoring quality in daily colonoscopy practice. Kaminski et al<sup>8</sup> showed that the adenoma detection rate (ADR) of individual colonoscopists, ie, the proportion of colonoscopies in which at least 1 histologically confirmed adenoma is detected, is associated with the risk of future interval carcinomas. Recently, Corley et al<sup>9</sup> confirmed the association reported by Kaminski et al and demonstrated that the ADR was inversely associated with death caused by interval colorectal cancer (CRC). Therefore, the ADR is considered an important quality indicator of colonoscopy, and current guidelines demand ADRs of at least 20% on screening colonoscopies.<sup>10-14</sup> In the current literature, a wide variation in ADRs among colonoscopists is reported.<sup>12,15-19</sup> Measurement and benchmarking of this quality indicator will perhaps improve awareness and training in an effort to continuously increase quality in colonoscopy.

During endoscopy training of gastroenterology fellows, the most important competency for colonoscopy is safe cecal intubation.<sup>20-22</sup> Only a few studies evaluated the effect of fellow participation in colonoscopy screening programs on ADR,<sup>23-28</sup> but the literature totally lacks information on the ADR of individual gastroenterology fellows during the years of their colonoscopy training. It is unknown whether a variation in ADR is already present during training and whether measurement and benchmarking of ADR would improve ADR during training and would give fellows a better start for daily practice. Possibly the ADR of a gastroenterologist consultant can already be predicted during training. If consultants have a high ADR during training and are already aware of the importance of adenoma detection, the colonoscopy training could form the basis for an adequate ADR in daily practice.

The aim of our study was to evaluate the variance in ADRs among gastroenterology fellows during the course of their colonoscopy training and to evaluate whether individual ADRs during training predict ADRs in later practice as a gastroenterology consultant.

## METHODS

### Study design and data collection

We conducted a retrospective study in gastroenterology fellows trained at the Academic Medical Center (AMC) in Amsterdam, the Netherlands. Permission of the research protocol by an institutional review board was not required per the agreement regarding medical research involving human subjects.

The endoscopy department of the AMC is a tertiary care facility and teaching hospital. In the Netherlands, gastroenterology fellows often perform part of their training at a teaching hospital in addition to a few years in one of the academic hospitals. At the AMC, gastroenterology fellows are randomly assigned to training at either the AMC or a teaching hospital. All gastroenterology fellows

who performed their entire endoscopy training in the AMC from May 2004 to March 2012 were included. Seven fellows fulfilled these criteria. For all 7 fellows, data on every colonoscopy that they performed were obtained from the colonoscopy database (version 11.0 of ENDOBASE, Olympus, Winter & Ibe GmbH) and reviewed. For all 7 fellows, reports of every colonoscopy that they performed during their training in the study period (May 2004-March 2012) were retrieved and reviewed from our colonoscopy database (ENDOBASE). Accompanying histopathology reports and electronic patient charts were also searched. All reports of colonoscopies performed during the study period 2004 to 2012 by 1 of the 7 fellows were reviewed.

Subsequently, data on consecutive colonoscopies that the fellows performed after they were registered as gastroenterology consultants and practicing were collected. These data were collected from October 2011 to April 2014.

### Colonoscopy procedure

Colonoscopies performed by fellows during training at the AMC were either high-definition or standard-definition white-light colonoscopies. Patients prepared by taking 4 L of a polyethylene glycol solution (Kleanprep; Norgine bv, Amsterdam, the Netherlands) or 2 L of a polyethylene glycol solution containing ascorbic acid (Moviprep; Norgine bv) with an additional 2 L of liquids. Procedures were performed with patients under conscious sedation with midazolam and/or fentanyl or under deeper sedation (propofol) when indicated. An Olympus 180 series colonoscope (Olympus Optical Co, Ltd, Tokyo, Japan) was used for the majority of procedures. For the colonoscopies performed as gastroenterology consultants, the colonoscope type, bowel preparation, and sedation use were unknown.

### Colonoscopy data

For each colonoscopy, demographic information on the patient was collected from the electronic patient chart: age, sex, previous CRC and/or colonic resection, and medical history regarding inflammatory bowel disease, polyposis, or Lynch syndrome. Data collected on each colonoscopy included indication for colonoscopy (screening, surveillance, or diagnostic), bowel preparation (if available with Boston Bowel Preparation score, otherwise scored as good, suboptimal, poor, or unknown), sedatives used, cecal intubation rate (CIR), and deepest point of colonoscopy insertion and reason for incomplete colonoscopy if the cecum was not reached. The number of detected and removed polyps was recorded, as were the location in the colon, polypectomy method, and histopathology result (adenomas: tubular, tubulovillous, or villous and grade of dysplasia: low or high; serrated polyps subdivided in hyperplastic polyps, sessile serrated polyps, and traditional serrated polyps; adenocarcinomas), if applicable.

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