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# Optimizing adenoma detection rates: equipment, experience or education?

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**Title:** Factors determining the quality of screening colonoscopy: a prospective study on adenoma detection rates, from 12,134 examinations (Berlin colonoscopy project 3, BECOP-3).

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## Summary

Screening colonoscopies reduce colon cancer incidence and mortality through the detection and complete removal of adenomatous precursor lesions [1]. Adenoma detection rates (ADRs) therefore have emerged as a major quality indicator. The American Society of Gastrointestinal Endoscopy (ASGE) suggests ADRs of 15% in women and 25% in men as a threshold number for quality assurance in screening colonoscopies [2]. However, newer studies show that much higher ADRs can be achieved under optimal circumstances. ADRs of >60% have been described in expert hands under study conditions, almost thrice the number suggested by the ASGE [3]. On first glance, these ADRs might seem unrealistic to the busy clinician, who performs 10 or more colonoscopies in one morning session. However, before we accept that we are never able to achieve such "expert results" in routine practice, we might want to reconsider: there could be a few simple steps to improve our performance.

In a large prospective study, Adler *et al* analyzed 12,134 consecutive screening colonoscopies performed by 21 gastroenterologists in 18 non-academic, private practices in Berlin (Germany) [4]. The main outcome parameter was the ADR, defined as the percentage of exams with detection of at least 1 adenoma. The aim was to determine, whether patient factors, colonoscopist factors or endoscope factors were most important for achieving a high ADR. Patient factors included age, sex, non-steroidal anti-inflammatory drug (NSAID) use, and the quality of the preparation. Colonoscopist factors included annual case volume, the lifetime number of colonoscopies and established quality measures, such as cecal intubation rate or withdrawal times (only those colonoscopies without polypectomies were examined as a surrogate marker). Interestingly, the authors also included continuing medical education (CME) activity as a possible influencing factor in their analysis. Finally, they examined whether the type of endoscope influenced the ADR. The authors defined 3 categories of endoscopes (I. the latest generation available at the time of the study; II. endoscopes from a generation before the study; and III. endoscopes from 2 generations before the study). The sophisticated statistical analysis allowed for an estimation of the extent of each factor's contribution to the primary outcome.

The ADRs of the 21 gastroenterologists showed a broad range between 7.5% and 33.3%, the mean being 21.7%. The average withdrawal times (8.7 min) and cecal intubation rates (98%) met accepted quality standards. The following factors significantly influenced the ADR. As in previous studies, patient age, sex and bowel preparation influenced the primary outcome, with the highest ADRs in older, male patients with good preparation. Although there was no significant difference between the latest generation of colonoscopes and the generation before that, there was a significantly lower ADR in those colonoscopies which were performed with the oldest instruments. Finally, and perhaps most surprisingly, annual case volume, withdrawal time and lifetime experience did not correlate with the ADR. In contrast, the number of CME credits did show a correlation with the ADR. In the statistical model 41.4% of the heterogeneity in adenoma detection was explained by colonoscopist- and instrument-characteristics, although the cause for the substantial heterogeneity between the colonoscopists in the study remains unknown. The authors concluded that the quality of screening colonoscopies is mainly influenced by colonoscopist factors (e.g. CME activity) and instrument quality.

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## Opinion

Prevention of colorectal cancer by detection and removal of adenomas is the goal of screening colonoscopies. The ADR must therefore be considered as the primary quality measure. However, there appears to be a substantial variation between ADRs among practicing gastroenterologists [5]. One study divided colonoscopists into 3 groups, depending on their respective ADRs: Low detectors (ADR ≤ 20%); moderate detectors (ADR 20-40%) or high detectors (ADR>40%) [6]. Although a number of factors might theoretically be responsible for such variations, it remains unclear how colonoscopists can best advance from a "low detector" status to being a "high detector". However, based on the current literature and the study under discussion, there might be a number of helpful measures to improve anyone's ADR.

First, patient factors might play a role. Advanced age and male sex of the patient have been shown to correlate with higher ADRs and this was also confirmed by the study under discussion [4,5]. However, such factors are mainly based on the practice setting and are not really modifiable. In contrast, patient preparation has been associated with better ADRs and a split dose preparation (e.g. 3 L of polyethylene glycol on the day prior to the exam and 1 L on the morning of the exam) or same day preparation for afternoon colonoscopies are a simple measure to improve results [7,8].

Second, the type of equipment might improve ADRs. Here, the take home message is that the latest generation high resolution endoscopes might be better than older instruments, whereas virtual chromoendoscopy, such as narrow band imaging (NBI) or Fuji intelligent chromoendoscopy (FICE) do not have much of an effect on ADRs [9-11]. However, the improvement in ADR with the latest generation high-definition endoscopes appears to be more prominent in "low-detectors" [11] than "high-detectors" [12] and is moderate at best. In addition, for financial reasons, it might not be possible for every GI unit to always be equipped with the latest generation of instruments. However, for those endoscopists who work with slightly older instruments, there is good news. Adler *et al* were able to show that a significant difference was only present when the latest equipment was compared to the oldest equipment in the study.

Finally, the technique and skills of the endoscopist are likely to play a key role in achieving optimal ADRs. The simple observation that a rapid withdrawal leads to poor ADR has lead to the recommendation that at least 6-7 min should be spent for inspection during the withdrawal phase [13,14]. Although a minimum withdrawal time makes sense, it has been challenged that merely increasing the duration of withdrawal will do the trick [15]. Its effect most likely results from a meticulous technique of looking behind folds, cleansing of adherent mucous or stool and re-inspection of segments which cannot be easily visualized (e.g. angulations and flexures) [16]. But which of these factors are most important and what can we do to improve our own performance? Intuitively, it seems that the most experienced endoscopists will have the best results, similar to what is known from surgical procedures [17]. However, Adler *et al* were able to show that neither annual case volume, nor life-time experience correlated with higher ADRs, but the number of CME credits did. Although a large case volume should lead to a lot of experience, Adler *et al* speculate that it might impair ADRs because busy clinicians might need to "speed up". However, the authors also showed that withdrawal times met accepted standards and were not directly related to the ADR in their study. Therefore, it is more likely that endoscopists develop a technique during their initial fellowship training, which sticks with them most of their lives, unless active educational efforts for further improvement are taken. The finding that CME credits are related to higher ADRs could represent an epiphenomenon that reflects an active interest in medical education, which may be a key factor. Recent studies have shown that simple educational efforts, such as report cards or video analysis can lead to a significant improvement in ADRs, even in those who are already "high detectors" [18-20].

The study by Adler *et al* gives food for thought, as it points out that experience alone will not define the best colonoscopist. Although the latest equipment and good bowel preparation are important factors for improving ADRs, they cannot always be modified by the physician. In contrast, active educational efforts or a simple focus on our own performance might result in better ADRs with a direct benefit to our patients:

*"The hardest conviction to get in the mind of a beginner is that the education upon which he is engaged is not …a medical course, but a life course, for which the work of a few years under teachers is but a preparation" (Sir William Osler- The Student of Medicine)* [21].

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