



# Endoscopist deskilling risk after exposure to artificial intelligence in colonoscopy: a multicentre, observational study

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## Summary

**Background** It is not known if continuous exposure to artificial intelligence (AI) changes endoscopists' behaviour when conducting colonoscopy. We assessed how endoscopists who regularly used AI performed colonoscopy when AI was not in use.

**Methods** We conducted a retrospective, observational study at four endoscopy centres in Poland taking part in the ACCEPT (Artificial Intelligence in Colonoscopy for Cancer Prevention) trial. These centres introduced AI tools for polyp detection at the end of 2021, after which colonoscopies had been randomly assigned to be conducted with or without AI assistance according to the date of examination. We evaluated the quality of colonoscopy by comparing two different phases: 3 months before and 3 months after AI implementation. We included all diagnostic colonoscopies, excluding those involving intensive anticoagulant use, pregnancy, or a history of colorectal resection or inflammatory bowel disease. The primary outcome was change in adenoma detection rate (ADR) of standard, non-AI assisted colonoscopy before and after AI exposure. Multivariable logistic regression was done to identify independent factors affecting ADR.

**Findings** Between Sept 8, 2021, and March 9, 2022, 1443 patients underwent non-AI assisted colonoscopy before (n=795) and after (n=648) the introduction of AI (median age 61 years [IQR 45–70], 847 [58.7%] female, 596 [41.3%] male). The ADR of standard colonoscopy decreased significantly from 28.4% (226 of 795) before to 22.4% (145 of 648) after exposure to AI, corresponding with an absolute difference of –6.0% (95% CI –10.5 to –1.6; p=0.0089). In multivariable logistic regression analysis, exposure to AI (odds ratio 0.69 [95% CI 0.53–0.89]), male versus female patient sex (1.78 [1.38–2.30]), and patient age ≥60 years versus <60 years (3.60 [2.74–4.72]) were the independent factors significantly associated with ADR.

**Interpretation** Continuous exposure to AI might reduce the ADR of standard non-AI assisted colonoscopy, suggesting a negative effect on endoscopist behaviour.

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## Introduction

Colorectal cancer is a major health-care problem.<sup>1</sup> Colonoscopy enables detection and removal of precancerous lesions (ie, adenomas), leading to prevention of colorectal cancer.<sup>2</sup> Adenoma detection rate (ADR)—the proportion of colonoscopies in which one or more adenomas are detected—is a widely accepted indicator of endoscopist performance, with a higher ADR associated with a greater cancer prevention effect.<sup>3</sup> However, around a quarter of endoscopists do not achieve the recommended ADR, according to a large-scale, randomised trial.<sup>4</sup> Thus, maintaining a high ADR is considered an important goal for both endoscopists, health-care systems, and researchers.

Computer-assisted polyp detection systems introduced over the last decade might increase ADR regardless of

the expertise of the endoscopist; a meta-analysis of 20 randomised trials showed an absolute increase in ADR of 8.1% with the use of artificial intelligence (AI) during colonoscopy.<sup>5</sup> This AI-driven increase in ADR is expected to improve prevention of colorectal cancer.<sup>6</sup>

Despite its promise, it is not known whether continuous exposure to AI leads to a change in endoscopist performance during standard, non-AI assisted colonoscopy. This question is crucial because the adoption of AI in medicine is spreading rapidly. Psychological studies in non-medical fields suggest that ongoing exposure to AI might change behaviour in different ways: positively, by training clinicians, or negatively, through a deskilling effect, whereby automation use leads to a decay in cognitive skills.<sup>7</sup> To this end, we investigated changes in the quality of standard,

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