Journal Pre-proof

When AI Meets Expertise: Trust Calibration and Delegation in Computer-Aided Polyp Detection (CADe)

Alan Barkun, MD, MSc, Daniel Von Renteln, MD, Shadi Shuraida, PhD, Dragos Vieru, PhD

PII: S0016-5085(26)07130-1
DOI: https://doi.org/10.1053/j.gastro.2026.07.024
Reference: YGAST 67569

To appear in: *Gastroenterology*
Accepted Date: 28 July 2026

Please cite this article as: Barkun A, Von Renteln D, Shuraida S, Vieru D, When AI Meets Expertise: Trust Calibration and Delegation in Computer-Aided Polyp Detection (CADe), *Gastroenterology* (2026), doi: https://doi.org/10.1053/j.gastro.2026.07.024.

This is a PDF of an article that has undergone enhancements after acceptance, such as the addition of a cover page and metadata, and formatting for readability. This version will undergo additional copyediting, typesetting and review before it is published in its final form. As such, this version is no longer the Accepted Manuscript, but it is not yet the definitive Version of Record; we are providing this early version to give early visibility of the article. Please note that Elsevier's sharing policy for the Published Journal Article applies to this version, see: https://www.elsevier.com/about/policies-and-standards/sharing#4-published-journal-article. Please also note that, during the production process, errors may be discovered which could affect the content, and all legal disclaimers that apply to the journal pertain.

© 2026 Published by Elsevier Inc. on behalf of American Gastroenterological Association Institute.

Journal Pre-proof

When AI Meets Expertise: Trust Calibration and Delegation in Computer-Aided Polyp Detection (CADe)

Short Title: Role of expertise in CADe trust & delegation

Alan Barkun, MD, MSc[1]; Daniel Von Renteln, MD[2] ; Shadi Shuraida, PhD [3]; Dragos Vieru, PhD [3]

[1]McGill University Health Center, McGill University, Montreal, Canada
[2]Centre Universitaire de l'université de Montreal, Montreal University, Montreal, Canada
[3]School of Business Administration, TÉLUQ University, Montreal, Canada

Grant Support: No funding was received for this research.

Disclosures: The authors declare that the research was conducted in the absence of any commercial or financial relationships that could be construed as a potential conflict of interest.

Journal Pre-proof

Journal Pre-proof

Artificial intelligence (AI)–based computer-aided detection (CADe) systems have rapidly entered clinical endoscopy, promising to increase adenoma detection rate (ADR) and ultimately improve colorectal cancer prevention. Randomized controlled trials (RCTs) have demonstrated ADR gains with CADe under controlled conditions.[1, 2] Meta-analyses and tandem studies indicate that CADe can improve detection and reduce adenoma miss rates compared with standard colonoscopy.[3, 4] Yet implementation effectiveness studies report more variable effects [5, 6] and highlight integration challenges, including discretionary activation, concerns about false-positive signals, and distraction.[7, 8]

Despite the seeming contradiction where actual routine practice performance varies, endoscopist attitudes stay largely positive.[7] This indicates that conventional technology adoption models are insufficient. In this sense, CADe is not merely a tool added to practice; it is an agentic system that can generate autonomous signals that actively influence user attention and decision-making, i.e., it augments endoscopists in the core cognitive task of polyp detection. We thus argue that its use entails different levels of delegating detection work to an intelligent artifact.[9, 10] Following the completion of a triple-blind CADe implementation trial,[11] we conducted semi-structured interviews with a purposively selected group of 13 Canadian endoscopists with direct CADe experience representing early, mid, and late career stages. The semi-structured interviews lasted between 30 and 45 minutes and examined endoscopists' perspectives on the usefulness and limitations of using CADe, its integration into their clinical workflows, and their degree of trust in the technology. The qualitative data from the interviews were transcribed and coded, with analysis guided by inductive reasoning. The results suggest that the key to understanding CADe's real-world variability may lie in the interplay between endoscopists' expertise and their trust in AI output and function, which determine the level of detection authority delegated to the AI system. We propose that these factors shape how CADe is used, which may also explain the mixed outcomes observed between RCTs and real-world studies, and help direct further research in the field.

Trust as a gatekeeper for the level of delegation. Delegation depends on trust. When endoscopists lack confidence in an AI system's diagnostic ability, they tend to discount its recommendations and retain decision authority.[12] However, trust is not a unidimensional construct; for instance, Lee and Moray (1992) identify performance, process, and purpose as the factors that influence trust in automation, which evolves over time as users interact with the system.[13] Building on this literature, we identify in our data three interrelated dimensions of trust that influenced endoscopists' delegation behavior in adopting a CADe solution:

Journal Pre-proof

1. Performance trust. We define it as the endoscopist's belief that CADe can truly detect clinically significant polyps. While RCTs indicate that CADe can boost ADR [1, 2], and tandem studies or meta-analyses point to a lower adenoma miss rate [3, 4], our interviews reveal differing perceptions. Less experienced endoscopists often described CADe as providing 'extra eyes' to spot polyps they might miss. Conversely, more experienced endoscopists frequently questioned its added benefit, noting that many alerts did not correspond to truly significant findings and that the system rarely identified polyps they had previously overlooked. This divergence may reflect differences in baseline expertise and aligns with prior evidence showing heterogeneity in CADe benefit across operators.[1] In sum, we found that this skepticism limited delegation, with endoscopists using CADe signals selectively or not at all, rather than relying on them as primary evidence.

2. Process trust. We define operational trust as the endoscopist's belief regarding the extent to which CADe integrates effectively into their overall workflow. False-positive (FP) alerts directly affect this dimension. FPs are a recognized limitation of CADe and were identified as a key research priority on AI in colonoscopy.[14] In real-world analyses, false-positive rates vary and are recognized as a significant challenge, with some studies reporting substantial numbers of FP activations per colonoscopy – such as 26–27, most of which are transient and often caused by mucosal artifacts or bowel content.[15] Although brief, their frequency can distract endoscopists and increase cognitive load. CADe false positives may create 'noise' and visual distraction, potentially impacting attention and fatigue.[15, 16] This might partially explain CADe's negative effect on ADR in daily practice settings. In our study, endoscopists reported that false alarms reduced trust, increased mental effort, and sometimes led them to deactivate CADe.

3. *Prospective trust.* Although several interviewed endoscopists expressed skepticism regarding the current performance of CADe systems, they continued to use the technology, motivated by optimism about future advancements in future iterations. They viewed CADe as an early-stage innovation that could pave the way for more accurate and sophisticated systems, such as CADx, with enhanced specificity, reduced false-positive rates, and improved diagnostic granularity. This forward-looking trust supported their continued experimental engagement with CADe, even when they limited its practical delegation in clinical decision-making. Such prospective trust may be characteristic of agentic AI systems that evolve and learn through additional data.[9] At the same time, this optimism warrants cautious interpretation. It may reflect not only rational expectations about AI improvement but also a reluctance to appear resistant to technological progress. Future

Journal Pre-proof

research could examine whether such behavior represents genuine forward-looking trust or merely an acknowledgment that AI is an inevitable, if currently imperfect, addition to the endoscopy suite.

Together, these trust dimensions determine how much *authority* endoscopists are willing to delegate for polyp detection to CADe. More specifically, based on our findings, we suggest that delegation is calibrated dynamically at the intersection of perceived accuracy, workflow integration, and belief in future promise.

CADe use as delegated detection work

Building on these dimensions of trust, we conceptualize delegation not as a binary choice but as a continuum of detection authority granted to CADe systems. Detection of polyps during colonoscopy is a deeply refined professional skill. Endoscopists develop tacit visual processing strategies and refined judgments over years of practice. CADe systems are conceived to intervene in this domain by generating real-time visual cues and alerts that suggest possible polyp candidates. Rather than being a passive reference tool, CADe occupies cognitive space. It empowers endoscopists with algorithm-generated hypotheses, prompting immediate visual reassessment, augmenting human perception during detection.[17]

Journal Pre-proof

Baird and Maruping (2021) conceptualize delegation to agentic information systems as the transfer of task execution from humans to information systems. However, delegation is not binary; it exists along a continuum from minimal (e.g., the endoscopist retains full authority) to maximal (e.g., an AI system prescribes or acts).[9] Extrapolating these findings to the colonoscopy examination, we identified three empirically grounded delegation patterns along this continuum:

1. *Primary delegation*: Endoscopist responds directly and immediately to CADe alerts as the first evidence of a polyp.
2. *Supervisory delegation*: CADe acts as background monitoring while human detection remains primary. In this case, CADe serves purely as a “safety net” or a “second set of eyes.”
3. *Minimal/No delegation*: CADe remains idle or unused because the endoscopist distrusts or disengages from its signals.

While no endoscopists in our study relied solely on CADe for polyp detection (primary detection delegation), our interviews revealed that endoscopists with varying levels of experience occupy different positions along this continuum. Furthermore, the interviews suggest that delegation level is linked to trust calibration,[13] meaning the correspondence between users' trust in the technology and the technology's capabilities. In this case, endoscopists differentiated between *whether* and *how* they trusted CADe's performance and function.

Expertise as a moderator of delegation. Our study findings also suggest that clinical expertise predominantly shapes endoscopists' trust calibration and delegation choices.

Early-career endoscopists. They tend to rely more on CADe for detection, gaining confidence and reducing fear of missing polyps. They often respond to every AI alert, even for diminutive polyps in the rectosigmoid that may not be clinically significant. CADe serves as a cognitive scaffold, aiding decision-making and reducing uncertainty. This reliance mirrors that of less experienced practitioners, who use decision aids or heuristics. While high delegation improves detection sensitivity, it may overshadow independent pattern recognition. Furthermore, these endoscopists reported no difficulty integrating CADe into their existing clinical procedures and did not experience cognitive overload in response to the system's cues and alerts.

Mid-career endoscopists. They usually use CADe in a supervisory role, focusing on independent inspection and selectively consulting AI alerts, such as revisiting uncertain areas or relocating polyps. After a generally considerable period of adaptation to the system cues and alerts, they learn to ignore false positives and to use their own judgment to determine when CADe needed attention. This approach preserved endoscopist autonomy and allowed conditional delegation based on alert relevance and personal clinical judgment.

Late-career endoscopists. This group demonstrates limited trust in the system's capacity to accurately identify clinically significant polyps and experienced substantial cognitive load due to its cues and alerts that disrupted their workflow. Participants in this group reported that the frequent visual cues—triggered by false positives or polyps they considered clinically insignificant—were overwhelming and distracting, requiring attention before they could be dismissed. Considering the perceived limited benefit and increased cognitive load associated with incorporating CADe into routine practice, most late-career endoscopists elect to discontinue its use. Several participants reported periodically re-evaluating the system—approximately every few months—to determine whether its performance had improved to an acceptable standard; however, they continued to find it disruptive to their clinical workflow.

Journal Pre-proof

Journal Pre-proof

These observations suggest that expertise influences trust in CADe outputs by balancing acceptance and rejection. Figure 1 illustrates the relationship between endoscopist clinical expertise and CADe use in terms of delegation, with two exceptions. Participant 6 (P6) is primarily focused on research and integrating new techniques in endoscopy practice, while participant 12 (P12) is a full-time researcher who has used CADe solely within the context of a research project.

From controlled efficacy to real-world use. RCTs show CADe improves ADR under controlled conditions,[1, 18] while real-world evidence indicates CADe's benefits vary. We conjecture that several factors may explain this inconsistency. First, randomized trials and real-world data indicate variability in CADe's benefits across operators, with some evidence suggesting additional gains differ by endoscopist's initial skill level.[1, 7, 18] Second, real-world implementation studies indicate that activation patterns and workflow integration are not uniform, potentially influencing realized outcomes.[7] Indeed, false-positive alerts have been associated with increased cognitive load and distraction, which may affect endoscopist engagement with the system.[15] Finally, research on physician–AI collaboration shows that both clinical expertise and trust in system performance potentially shape reliance on algorithmic decision support.[12] Together, these findings suggest that CADe success depends not only on algorithmic accuracy but also on the configuration of human–AI interaction in practice.

Figure 2 presents our proposed conceptual model illustrating how endoscopist expertise influences trust calibration in CADe systems, shaping the degree of delegation and ultimately affecting clinical outcomes.

In sum, we suggest that RCT efficacy and real-world effectiveness represent different setups of human–AI interaction. In controlled settings with protocols that maintain steady engagement with CADe, delegation tends to be more consistent, potentially making the benefits more evident. In everyday practice, however, delegation can vary depending on the endoscopist's experience and trust calibration, leading to a range of outcomes. The above argument reframes the CADe challenge: it is not that CADe fails outside trials, but rather that *it is used differently* when endoscopists have autonomy over how they integrate it. Understanding and designing for specific delegation patterns may constitute the key to consistent effectiveness.

Implications for clinical practice. If our initial findings are confirmed in larger sample size studies, viewing CADe as a delegated detection partner rather than a passive tool has several implications. First, training should explicitly address trust calibration. This training would account for different trainee needs according to their level of expertise. For early-career endoscopists, structured exposure to detection tasks both with and without CADe may help them better understand when to rely on AI signals and when to prioritize independent judgment. Alternatively, training programs designed to reduce cognitive load[19] may be better suited for late-career endoscopists, whose reduced fluid cognitive abilities and extensive professional experience[20] can make integrating these systems more challenging. Second, implementation strategies must account for workflow integration. False-positive alerts and associated cognitive load should be actively monitored, as they directly influence trust and sustained use. Third, patterns of human-AI interaction should be tracked over time. Declining engagement may signal erosion of trust, whereas excessive reliance could indicate automation bias and potential deskilling. Monitoring these dynamics can support more effective and adaptive use of CADe in practice.

Conclusion. CADe signifies a crucial change in colonoscopy practice. It acts as an *agentic partner* in the endoscopy suite, providing autonomous prompts and guiding clinical focus rather than serving solely as a passive visual tool. Our findings suggest that the extent and quality of delegation are influenced by trust and endoscopist expertise, which could be key factors in determining how effectively CADe improves clinical outcomes. While our findings regarding career-stage differences are based on inferences intended to best explain the observed data, they are also consistent with prior literature on changing cognitive modes over time[20]. Nevertheless, these findings should be considered preliminary and serve as a basis for larger-scale studies to test, refine, and determine the generalizability of these career-stage use profiles. As clinical AI systems evolve, understanding and shaping the human–AI partnership will be essential. Our findings also suggest that trust and delegation evolve over time through repeated interaction with CADe systems. Endoscopists noted that they regularly evaluate system performance and adjust their engagement levels accordingly, highlighting that trust calibration and delegation are ongoing, iterative processes shaped by ongoing experience. By emphasizing the human-AI view, Gastroenterology can enhance the benefits of AI-augmented endoscopy while ensuring professional judgment and patient safety.

Journal Pre-proof

Figure 1. Expertise-CADe delegation relationship

Figure 2. Process model illustrating the expertise-trust-delegation relationship. It proposes that clinician expertise influences the extent to which diagnostic tasks are delegated to the system, highlighting trust in CADe systems as a key mediating factor linking clinician expertise with AI-assisted decision delegation.

Journal Pre-proof

References

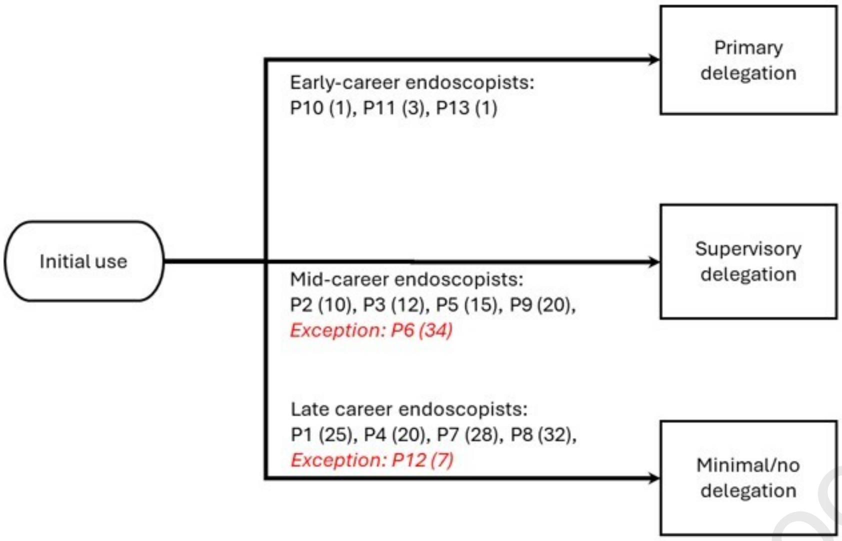
1. Repici A, Badalamenti M, Maselli R, et al. Efficacy of Real-Time Computer-Aided Detection of Colorectal Neoplasia in a Randomized Trial. Gastroenterology 2020;159:512-520 e7.
2. Shaukat A, Lichtenstein DR, Somers SC, et al. Computer-Aided Detection Improves Adenomas per Colonoscopy for Screening and Surveillance Colonoscopy: A Randomized Trial. Gastroenterology 2022;163:732-741.
3. Glissen Brown JR, Mansour NM, Wang P, et al. Deep Learning Computer-aided Polyp Detection Reduces Adenoma Miss Rate: A United States Multi-center Randomized Tandem Colonoscopy Study (CADeT-CS Trial). Clin Gastroenterol Hepatol 2022;20:1499-1507 e4.
4. Shah S, Park N, Chehade NEH, et al. Effect of computer-aided colonoscopy on adenoma miss rates and polyp detection: A systematic review and meta-analysis. J Gastroenterol Hepatol 2023;38:162-176.
5. Bretthauer M, Ahmed J, Antonelli G, et al. Use of computer-assisted detection (CADe) colonoscopy in colorectal cancer screening and surveillance: European Society of Gastrointestinal Endoscopy (ESGE) Position Statement. Endoscopy 2025;57:667-673.
6. Sultan S, Shung DL, Kolb JM, et al. AGA Living Clinical Practice Guideline on Computer-Aided Detection-Assisted Colonoscopy. Gastroenterology 2025;168:691-700.

7. Nehme F, Coronel E, Barringer DA, et al. Performance and attitudes toward real-time computer-aided polyp detection during colonoscopy in a large tertiary referral center in the United States. Gastrointest Endosc 2023;98:100-109 e6.
8. Park JB, Bae JH. Effectiveness of a novel artificial intelligence-assisted colonoscopy system for adenoma detection: a prospective, propensity score-matched, non-randomized controlled study in Korea. Clin Endosc 2025;58:112-120.
9. Baird AM, L.M. The next generation of research on IS use: A theoretical framework of delegation to and from agentic IS artifacts. MIS Quarterly 2021;45:315–341.
10. Jain H, Padmanabhan, B., Pavlou, P. A., Raghu, T. S. . Editorial for the Special Section on Humans, Algorithms, and Augmented Intelligence: The Future of Work, Organizations, and Society. Information Systems Research 2021;32:675-687.
11. von Renteln D, Menard, C., Michal, V., Wong, C.K., Djinbachian, R., Rex, D.K., Pohl, H., Rahme, E., Oleksiw, M., Barkun, A.N.,. Computer-Aided Adenoma Detection in Routine Colonoscopy: A Concealed Multicenter Randomized Trial. Gastrointestinal Endoscopy 2026;103:S-138.
12. Jussupow E, Spohrer, K., Heinzl, A., Gawlitza, J. . Augmenting medical diagnosis decisions? An investigation into physicians' decision-making process with artificial intelligence. Information Systems Research 2021;32:713-735.
13. Lee JD, See KA. Trust in automation: designing for appropriate reliance. Hum Factors 2004;46:50-80.
14. Ahmad OF, Mori Y, Misawa M, et al. Establishing key research questions for the implementation of artificial intelligence in colonoscopy: a modified Delphi method. Endoscopy 2021;53:893-901.
15. Hsieh YH, Tang CP, Tseng CW, et al. Computer-Aided Detection False Positives in Colonoscopy. Diagnostics (Basel) 2021;11.
16. Chung GE, Lee J, Lim SH, et al. A prospective comparison of two computer aided detection systems with different false positive rates in colonoscopy. NPJ Digit Med 2024;7:366.
17. Baer IW, L. Huysman, M. What Is Augmented? A Metanarrative Review of AI-Based Augmentation. Journal of the Association for Information Systems 2025;26:760.

Journal Pre-proof

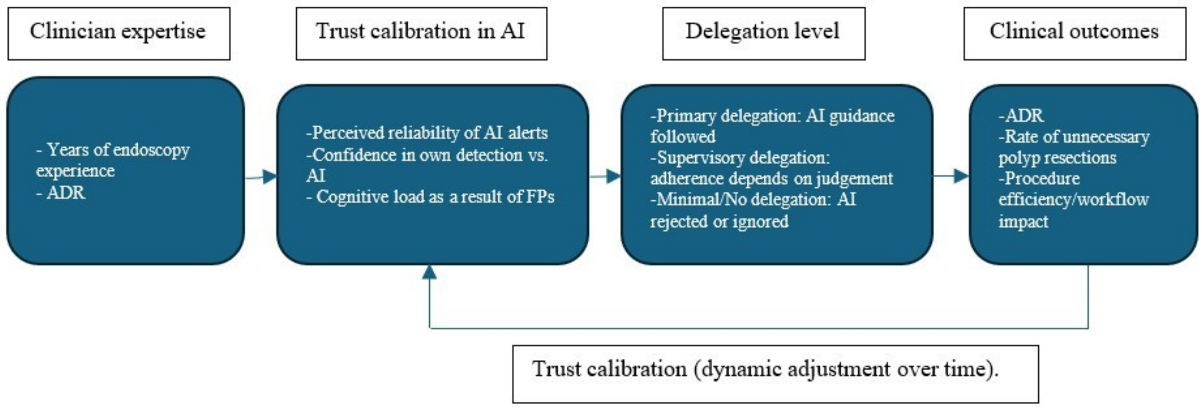
18. Wang P, Berzin TM, Glissen Brown JR, et al. Real-time automatic detection system increases colonoscopic polyp and adenoma detection rates: a prospective randomised controlled study. Gut 2019;68:1813-1819.
19. van Merrienboer JJ, & Sweller, J. . Cognitive load theory and complex learning: Recent developments and future directions. Educational Psychology Review 2005;17:147-177.
20. Spreng RN, Turner GR. From exploration to exploitation: a shifting mental mode in late life development. Trends Cogn Sci 2021;25:1058-1071.

Journal Pre-proof



Px (Y): x is participant number, and Y is number of years as endoscopist.

Journal Pre-proof



Journal Pre-proof