

Table S1 Database-specific search strategies

Database	Search strategy
PubMed/ MEDLINE	((“Colorectal Neoplasms”[Mesh] OR “Colon Neoplasms”[Mesh] OR colorectal cancer OR CRC OR colon cancer) AND (“Artificial Intelligence”[Mesh] OR “Machine Learning”[Mesh] OR “Deep Learning”[Mesh] OR “Algorithms”[Mesh] OR artificial intelligence OR machine learning OR deep learning OR AI OR ML) AND (“Microbiota”[Mesh] OR “Gastrointestinal Microbiome”[Mesh] OR microbiome OR gut microbiome OR intestinal microbiota) AND (“Early Detection of Cancer”[Mesh] OR “Mass Screening”[Mesh] OR screening OR detection OR diagnosis OR diagnostic accuracy OR AUC OR noninvasive OR non-invasive)) Filters applied: Humans; English; January 1, 2023 – November 1, 2025.
Embase (Ovid)	(‘colorectal cancer’/exp OR ‘colon cancer’/exp OR colorectal cancer OR CRC OR colon cancer) AND (‘artificial intelligence’/exp OR ‘machine learning’/exp OR ‘deep learning’/exp OR ‘algorithm’/exp OR artificial intelligence OR machine learning OR deep learning OR AI OR ML) AND (‘microbiota’/exp OR ‘gut microbiome’/exp OR microbiome OR intestinal microbiota OR fecal microbiota) AND (‘cancer screening’/exp OR ‘diagnostic accuracy’/exp OR screening OR detection OR diagnosis OR AUC OR noninvasive OR non-invasive) Limits: Human; English; 2023–2025.
<u>Embase.com</u>	Same conceptual search as Embase (Ovid) using Emtree subject headings and free-text keywords combined with Boolean operators (AND/OR); limited to Human studies, English language, January 1, 2023 – November 1, 2025.
Scopus	TITLE-ABS-KEY ((colorectal cancer OR CRC OR colon cancer) AND (artificial intelligence OR machine learning OR deep learning OR AI OR ML) AND (microbiome OR gut microbiome OR intestinal microbiota) AND (screening OR detection OR diagnosis OR diagnostic accuracy OR AUC OR noninvasive OR non-invasive)) AND (LIMIT-TO (PUBYEAR, 2023–2025)) AND (LIMIT-TO (LANGUAGE, “English”)).
Cochrane Library (CENTRAL)	(colorectal cancer OR CRC OR colon cancer) AND (artificial intelligence OR machine learning OR deep learning OR AI OR ML) AND (microbiome OR gut microbiome OR intestinal microbiota OR fecal microbiota) AND (screening OR detection OR diagnosis OR diagnostic accuracy) with publication date limits January 1, 2023 – November 1, 2025 and English language filter applied.