Exploring the Potential of Artificial Intelligence to Design Multidisciplinary Care Programs for Metastatic Colorectal Cancer

Emily E. Witt, MD MSc[1,2], Gezzer Ortega, MD MPH[1], George Molina, MD MPH[1,3]

Author Affiliations:

1. Center for Surgery and Public Health, Mass General Brigham, Harvard School of Public Health, Boston, MA
2. Department of Surgery, Massachusetts General Hospital, Mass General Brigham, Boston, MA
3. Department of Surgery, Brigham and Women's Hospital, Mass General Brigham, Boston, MA

Corresponding Author: George Molina, MD, MPH, Division of Surgical Oncology, Brigham and Women's Hospital, 75 Francis Street, Boston, MA 02115, USA. gmolina@bwh.harvard.edu.

Running Head: AI CRC Multidisciplinary Care

Keywords: Multidisciplinary care; Artificial Intelligence; Colorectal cancer.

Word Count: 774

While multidisciplinary evaluation for patients with gastrointestinal (GI) malignancies is now standard of care at National Cancer Institute (NCI)–designated Comprehensive Cancer Centers and academic institutions—and is increasingly adopted in community settings—its operationalization remains variable, and many centers still lack the resources to implement these programs. This heterogeneity contributes to inconsistent application of clinical guidelines and disparate access to treatment options across cancer centers, with particularly important implications for advanced GI cancers that require complex therapeutic strategies, such as metastatic colorectal cancer.

An estimated 20-30% of patients with colorectal cancer (CRC) have metastatic disease at the time of diagnosis and an additional 25% will later develop distant metastases.[1] Management of metastatic CRC (mCRC) requires input from many different specialists because of the wide variety of therapies available to these patients, including systemic agents (chemo- and immunotherapy), radiation, directed chemotherapy in the form of hepatic arterial or heated intraperitoneal infusions, ablative procedures (e.g., radiofrequency, microwave, cryoablation, irreversible electroporation, and histotripsy), transarterial interventions (e.g., radioembolization and chemoembolization), surgical resection, and transplantation.[2] Coordination with ancillary services, such as palliative care, social work, and genetics, further adds to the resource intensity and complexity of care. Thus, it is unsurprising that the evidence shows patients with mCRC benefit from evaluation by a multidisciplinary team.[3,4]

With respect to patients with mCRC, specifically, institutions can adopt a wide range of approaches to multidisciplinary care. While prior work has shown that standardizing how colorectal cancer care is delivered can improve patient outcomes

and decrease costs, we do not know of any efforts to standardize how multidisciplinary care for mCRC is implemented.[5,6]

Given the complexity of organizing this care and the lack of a standardized approach, there is a novel opportunity to use artificial intelligence in designing care pathways that may optimize the resources of an institution in caring for patients with mCRC. There has been increasing interest in utilizing artificial intelligence (AI) for clinical care for patients with mCRC, though much of this has been with respect to clinical decision-making.[7] In contrast, our team wanted to explore how AI could be used to help improve practice efficiency, care coordination, equity, and disseminate models for multidisciplinary care. To do this, we asked ChatGPT (version GPT-4o), *"How can I build a multidisciplinary program that triages and manages patients with metastatic colorectal cancer?"* [8]

Initially, in response to this question, ChatGPT generated ten steps that spanned referral pathways, tumor boards, infrastructure for tracking patients, clinical trial integration, metric development, physician education, and leadership engagement (Table S1). After generating these steps, we asked ChatGPT to produce phased implementation guidelines (Table S2). These guidelines reflect a clear step-by-step plan to establish a multidisciplinary program for patients with mCRC over five phases: program generation and institutional buy-in, infrastructure development, care pathway creation, implementation and data capture, and quality improvement. The ChatGPT output not only grouped the broad steps from our initial question into phases, but it also included additional steps and outlined how to take action to complete each one. The final product in Table 1 is a combination of the original ChatGPT response (Table S2) and our revisions based on real-world experience. Although substantial editing was

required, the core aspect of each phase and step remains the same, which is a testament to the power of ChatGPT to create a realistic blueprint for building a new clinical care program.

While previous research and publicly available materials have discussed similar approaches,[9] the power of AI to rapidly generate a stepwise process for program development is notable. Although this is not a substitute for rigorous scientific inquiry, it has great potential to support idea generation, workflow mapping, metric identification, and preliminary pathway design (Figure S1). Thus, this prototype can provide an early framework in the development of a standardized model for multidisciplinary care in mCRC.

Though an impressive first step and a scaffold for future investigation, the AI-generated model lacks operational nuance to actually develop such a program. It does not address practical challenges, such as scheduling logistics, triage complexity, or variability in staffing models. Implementation must be tailored to each context and institutional resources, with lower-cost steps (e.g., refining triage and care pathways) preceding resource-intensive infrastructure changes (e.g., EMR integration). Finally, rather than serving as a systematic or scoping review that synthesizes current practice, this is a holistic summary of broadly accessible information. Rigorous comparative research is needed to refine and validate this framework.

Future research should evaluate existing mCRC programs to identify best practices and common implementation barriers. Comparative analyses could inform refinement of this prototype and guide broader dissemination. Ultimately, this work represents an initial step toward developing scalable multidisciplinary care models for mCRC.

TABLES

Phase	Step	Action	Details
Phase 1: Program Planning & Institutional Buy-In	1. Establish Leadership	Identify Program Lead	Typically, a medical, radiation, or surgeon oncologist who champions the initiative
		Form Oversight Group	Cancer center director, department chairs, nursing leadership, quality improvement officers
	2. Define Scope	Focus	Incorporate all patients with mCRC to ensure they are appropriately triaged and managed; learn from other existing gastrointestinal malignancies with well-established multidisciplinary programs
		Volume Target	Should be informed using preliminary internal data (i.e., from the past 3 years) and other applicable factors (e.g., available providers, hospital catchment area, etc.)
	3. Secure Support	Present Funding Case	Emphasize improved patient outcomes, care coordination, institutional reputation, clinical trial enrollment and increasing volume of new patients who will now be receiving care in the health care system
		Resource Requests	Patient navigator, protected tumor board time, administrative support
Phase 2: Build the Core MDT Infrastructure	1. Recruit Specialists	Specialist Involvement	Medical, Surgical (Colorectal, Hepatobiliary, Transplant, and Thoracic), Radiation Oncology, Radiology, Interventional Radiology, Pathology, Palliative Care, Genetics
		Meeting Frequency	Monthly or biweekly; virtual/hybrid models
	2. Launch Tumor Board	Intake & Presentation	Use standardized forms; Designate a person to prepare and present the details of each case

Phase	Step	Action	Details
		Documentation	Store decisions in electronic medical record (EMR) or tumor board database
Phase 3: Triage and Care Pathways	1. Referral & Triage Protocol	Centralized Form	EMR-based or paper referral form.
		Navigator Training	Screen cases, schedule tests and imaging, coordinate multidisciplinary team
	2. Develop Clinical Pathways	Standardization	Pathologic and molecular testing, surgical criteria for resection, systemic treatment algorithms, palliative care triggers
		Tools	Templates and flowcharts in EMR or PDFs
Phase 4: Implementation & Data Capture	1. EMR Integration	Documentation Tools	Smart phrases, flowsheets, flags/reminders
	2.Monitoring & Registry	Tracking Database	Use secure and HIPAA-compliant data capture software for case tracking, decisions, outcomes, and clinical trial enrollment
Phase 5: Quality Improvement & Growth	1. Measure Program Performance	Key Metrics	Percent of cases presented at tumor board, patient retention, time to treatment, molecular testing rates, surgical/palliative referrals, clinical trial accrual
	2. Expand Services	Growth Areas	Include early-stage and early-onset CRC, survivorship, second opinions

TABLE 1: ChatGPT[8]-Generated Phased Implementation Guidelines for a Multidisciplinary Program for Patients with Metastatic Colorectal Cancer (with Author Revisions)

References

1. Siegel RL, Wagle NS, Cercek A, Smith RA, Jemal A. Colorectal cancer statistics, 2023. *CA Cancer J Clin*. 2023;73(3):233-254.

2. Morris VK, Kennedy EB, Baxter NN, et al. Treatment of metastatic colorectal cancer: ASCO guideline. *J Clin Oncol*. 2023;41(3):678-700.

3. NCCN Clinical Practice Guidelines in Oncology: Colon Cancer, Version 04.2025. National Comprehensive Cancer Network (NCCN). June 27, 2025. Accessed July 14, 2025. https://www.nccn.org/guidelines/guidelines-detail?id=1428

4. Molina G, Ferrone CR, Qadan M. Failure to refer patients with colorectal liver metastases to a multidisciplinary oncology team should be a “never-event.” *J Natl Med Assoc*. 2020;112(5):553-555.

5. Adamina M, Kehlet H, Tomlinson GA, Senagore AJ, Delaney CP. Enhanced recovery pathways optimize health outcomes and resource utilization: a meta-analysis of randomized controlled trials in colorectal surgery. *Surgery*. 2011;149(6):830-840.

6. Lee L, Mata J, Ghitulescu GA, et al. Cost-effectiveness of enhanced recovery versus conventional perioperative management for colorectal surgery. *Ann Surg*. 2015;262(6):1026-1033.

7. Kemna R, Zeeuw JM, Ziesemer KA, et al. From development to implementation: A systematic review on the current maturity status of artificial intelligence models for patients with colorectal cancer liver metastases. *Oncology*. Published online May 26, 2025:1-10.

8. OpenAI. chatGPT. October 7, 2025. Accessed July 10, 2025. https://chatgpt.com/share/68463c06-7cf8-800c-9eba-57b583de5f1b

9. Meguid C, Ryan CE, Edil BH, et al. Establishing a framework for building multidisciplinary programs. *J Multidiscip Healthc*. 2015;8:519-526.