

Implementing an Integrated Practice Unit for Colon Cancer Treatment: The Vinmec Central Park Experience

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Backgrounds: Colorectal cancer remains a significant public health challenge in Vietnam, ranking as the fourth most common cancer with high mortality rates. In response to the need for structured, value-based care, Vinmec Central Park International Hospital established its first Integrated Practice Unit (IPU) for gastrointestinal malignancy, focusing on colon cancer, in 2024. This model aimed to improve patient outcomes through interdisciplinary collaboration, evidence-based pathways, and patient-centered care programs.

Methods: The IPU was developed through a phased approach involving key professionals, such as digestive surgeons, medical oncologists, clinical gastroenterologists, non-medical staff, and administrative leadership. The framework prioritized interprofessional care, standardized clinical protocols, and patient engagement. Regular multidisciplinary tumor board meetings were conducted to ensure consistent decision-making and individualized treatment plans. Data collection focused on clinical outcomes, patient-reported measures, and economic metrics.

Results: Since its implementation, the colon cancer IPU has shown significant improvements in clinical outcomes, including zero anastomotic leaks, surgical site infections, and 90-day post-operative mortality in 32 subsequent colorectal cancer surgeries. Patient satisfaction with coordinated care and communication increased, with over 90% of surveyed patients expressing positive experiences. Treatment timelines from diagnosis to therapy initiation were reduced by 15%, and six-month post-treatment follow-up adherence improved comparing to the previous year. Additionally, operational efficiency increased, with patient volume and service utilization outcomes showing marked growth, particularly in the first quarter of 2025.

Conclusion: The IPU model at Vinmec Central Park demonstrated that structured, patient-oriented approaches can significantly enhance both clinical outcomes and operational efficiency in colon cancer care. Addressing challenges related to cultural adaptation, interdisciplinary collaboration, and financial sustainability was crucial for successful implementation. The experience gathered provides a valuable framework for expanding the model to other gastrointestinal cancers and private healthcare settings in developing countries.

Keywords: Colorectal neoplasms; Integrated practice units; Patient-centered care; Value-based healthcare; Multidisciplinary approach.

Introduction

Colorectal cancer represents a growing public health concern in Vietnam. According to GLOBOCAN 2022, the country recorded approximately 180,480 new cancer cases and 120,184 cancer-related deaths^[1]. Among these, colorectal cancer ranked as the fourth most commonly diagnosed malignancy, accounting for 16,835 new cases (9.7% of all cancers) and 10,700 deaths, making it the fifth leading cause of cancer-related mortality. Notably, the majority of cases occurred in individuals over the age of 40, with a nearly equal distribution between males (53%) and females (47%)^[2]. These statistics emphasize the need for structured strategies to improve outcomes and quality of care for cancer patients in Vietnam.

In recent years, value-based healthcare models have emerged as a transformative approach to enhancing cancer care, emphasizing patient outcomes relative to costs rather than volume of services provided^[3]. Integrated Practice Units (IPUs), as conceptualized by Porter and Teisberg, are central to this paradigm shift, focusing on interprofessional, disease-specific workforces that deliver comprehensive care across the full cycle of a patient's condition^[4]. IPUs aim to improve clinical results, optimize resource utilization, and enhance patient experiences by breaking down traditional departmental silos and promoting coordinated care^[5].

In 2024, Vinmec Central Park International Hospital (VMCP) launched its first Integrated Practice Unit (IPU) within the Gastrointestinal Center, with an initial focus on colon cancer. This initiative aimed to deliver integrated, patient-led treatment while establishing a replicable framework for broader oncological care within Vietnam's private healthcare sector. This article describes the methods used to structure and implement the colon cancer IPU, the challenges encountered, early clinical and organizational outcomes, and plans for future expansion to other cancer types. Although early clinical and service performance data are presented, they should be interpreted as preliminary. A more

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detailed evaluation with larger patient cohorts and longer follow-up is ongoing and will be shared in future publications. By reporting on this foundational phase, we aim to contribute actionable insights to the growing literature on value-based care implementation in low- and middle-income settings.

Methods

The establishment of the colon cancer Integrated Practice Unit at Vinmec Central Park was guided by several essential pillars designed to optimize clinical outcomes, patient experience, and operational efficiency.

Multidisciplinary Care Teams

Central to the IPU structure is the integration of surgical oncologists, medical oncologists, radiologists, pathologists, gastroenterologists, nursing staff, and allied health professionals. These specialists collaborate closely to formulate individualized treatment plans, improving care coordination, reducing delays, and enhancing communication across all stages of the care continuum. In VMCP a multidisciplinary tumor board (MTB) meeting is conducted regularly on a week-basis in order to follow up patient care in every step of the way. A patient's case is taken to the meeting by anyone of the IPU members, for internal discussion and team-decision making, whenever treatment plan needs review, and any challenges are faced in patient's status, such as disease progression.

Evidence-Based Clinical Pathways

Standardized clinical protocols grounded in the latest evidence were developed to ensure consistency and adherence to best practices. These pathways support high-quality care delivery, minimize treatment variations, and enable systematic quality improvement through continuous outcomes monitoring and protocol refinement^[6]. ERAS[®] protocol (Enhancing Recovery After Surgery)^[7] has been adopted throughout Vinmec Healthcare System since 2022, and it is strictly followed in VMCP, accounting for the Quality Indicator Set established in the IPU (see [Supplementary Material 1](#)). All surgical procedures within the IPU were performed using a laparoscopic approach.

Patient Engagement and Education

Empowering patients through education about their diagnosis, therapeutic options, and potential side effects is fundamental to this model. Patients and their families are actively involved in shared decision-making processes, supported by comprehensive counseling sessions and educational resources. This approach fosters treatment adherence, enhances satisfaction, and contributes to improved long-term health outcomes^[3]. Patient navigation through the system is surveyed using PROM (patient-reported outcome measures), in which satisfaction is assessed in terms of treatment plan, treatment efficacy (considered after surgery, during chemotherapy, and mental status after treatment), and overall customer experience^[8]. See [Supplementary Material 2](#) for the complete form.

Advanced Technology and Data Integration

A robust digital infrastructure, including an integrated electronic medical record (EMR) system and real-time analytics, supports efficient care coordination, treatment monitoring, and early detection of complications. Data-driven decision-making enables dynamic treatment adjustments, ensuring that interventions remain personalized and evidence-based^[5].

Focus on Value-Based Care

The IPU model at Vinmec Central Park emphasizes outcomes over volume, encouraging resource-efficient, high-value interventions. Each patient's case is uniquely assessed, with all diagnostic findings and therapeutic decisions discussed in detail through MTB meetings at every key juncture of the care process. This rigorous, individualized approach ensures that treatment plans align closely with both medical needs and patient preferences, enhancing both clinical and experiential outcomes^[3].

Implementation Strategies for the IPU

The Integrated Practice Unit was developed through a phased approach initiated in 2023. Key stakeholders – including surgical oncologists, medical oncologists, gastroenterologists, non-medical, and administrative leadership – conducted a needs assessment to identify gaps in existing care pathways and benchmarked best practices from established IPU models worldwide^[3]. Following this evaluation, a detailed operational framework was designed, defining team composition, clinical objectives, and quality metrics. Multiprofessional collaboration were structured to deliver comprehensive care across the full cycle of colon cancer management, from diagnosis through treatment and survivorship (see the complete patient flow at the [Supplementary Material 3](#)). This included medical and non-medical staff, such as nurses, nutritionist, physical therapist, and psychologist. Regular MTB meetings were instituted to align decision-making across specialties, and clinical protocols were standardized based on evidence-based guidelines^[6].

To support care coordination, a dedicated care navigator role was introduced, acting as a liaison between patients and healthcare providers. Technology infrastructure regarding EMR was optimized to enable real-time communication and outcomes tracking. Staff underwent targeted training programs focused on value-based healthcare principles, interdisciplinary collaboration, and patient engagement^[5].

The IPU model was launched officially in January 2024, with a phased implementation scheme allowing continuous evaluation. Real-time performance monitoring through defined key performance indicators guided ongoing refinements in workflow, resource allocation, and patient care processes. Quality of treatment outcomes was assessed quarterly after implementation through a Quality Indicator Set ([Supplementary Material 1](#)), focusing in three phases of care were: diagnosis, surgery, and post-operative follow-up. It was set a target for each indicator, with a reason for rating and defining the numerator and denominator.

Patient-Centered Approaches

Central to the IPU design was the commitment to patient care, focusing on the holistic needs of individuals diagnosed with colon

cancer. Personalized treatment plans were developed by collaboratively panels, taking into account not only clinical characteristics but also patient preferences, family input, comorbidities, psychosocial factors, and quality of life goals^[9]. A formal multidisciplinary tumor board was convened for each case, enabling comprehensive discussions among surgeons, oncologists, radiologists, and support teams to devise optimal treatment. Thorough assessment during MTB meetings ensured that management plans were customized according to each patient's specific clinical situation, personal wishes, and social context.

Recognizing the critical role of families in the cancer journey, the IPU actively involved both patients and their caregivers during decision-making processes. Shared decision-making frameworks were employed, offering detailed counseling regarding diagnostic findings, therapeutic options, expected outcomes, and potential side effects. Family participation was encouraged to facilitate emotional support, enhance understanding of complex treatment pathways, and reinforce adherence to care plans.

PROMs were systematically collected at defined intervals to capture information on functional status, symptom burden, emotional well-being, and treatment satisfaction. To ensure unbiased responses, all measures were self-administered by patients without interference from hospital staff or care providers, minimizing the potential for external influence and enhancing data reliability. A structured survey, developed by the multidisciplinary team, was administered at discharge and during outpatient follow-ups at 1, 3, and 6 months. It included 17 questions across three domains: treatment planning, treatment-related symptoms (including surgery- and chemotherapy-related effects), and overall care experience. The instrument employed 4- and 5-point Likert scales, with higher scores reflecting better perceived outcomes. Although not externally validated, the survey was adapted from domains used in EORTC QLQ-C30 and CR29 questionnaires to suit the local context. The specific set of questions is presented in [Supplementary Material 2](#). This systematic collection enabled care panels to track patient experiences over time and adjust interventions accordingly. Education and empowerment policies remained a cornerstone throughout the patient journey. Patients and families received individualized counseling sessions, accessible

educational resources, and digital communication tools to support shared decision-making and ongoing engagement.

Results

Clinical Outcomes and Impacts

Since the launch of the colon cancer IPU in January 2024, Vinmec Central Park has observed meaningful improvements across several key domains of patient care. Interprofessional collaboration has significantly enhanced clinical decision-making and treatment planning. All colon cancer cases were systematically discussed within formal MTB meetings at diagnosis, at major treatment milestones, and at the point of transition to survivorship or palliative care. This structured, case-by-case evaluation process allowed for more individualized therapeutic strategies and improved treatment coordination across specialties.

PROM assessment collected during the first year of implementation revealed substantial improvements in patient satisfaction related to communication, shared decision-making, and overall confidence in care delivery. Over 90% of surveyed patients reported a positive experience with the coordination and personalization of their treatment pathways. Initial analyses showed improved scores in domains related to physical functioning and emotional support, although longer follow-up periods are needed to validate sustained impacts.

In parallel, clinical quality indicators demonstrated positive trends. Treatment timelines from diagnosis to initiation of therapy were reduced by approximately 15% compared to baseline metrics from 2023. Follow-up adherence rates at six-months post-treatment increased, suggesting stronger patient engagement and continuity of care. Moreover, complication rates associated with surgical and chemotherapeutic interventions remained low, reflecting adherence to evidence-based care pathways, such as 100% compliance to ERAS[®] protocol. No anastomotic leaks were observed in this initial cohort of 32 sequential colorectal cancer surgeries since the implementation of this IPU, neither surgical site infections or mortality after surgery (assessed at 90 days post-operative), as summarized in [Table 1](#). The hospital readmission

Table 1. Results compiled from the Quality Indicator Set.

		Indicator	Q1.2024	Q2.2024	Q3.2024	Q4.2024	Q1.2025
Diagnosis	1	Rate of colon cancer diagnosed through colonoscopy	100%	100%	100%	100%	100%
	2	Compliance rate for colon cancer surgery using ERAS [®]	100%	100%	100%	100%	100%
	3	Rate of anastomotic leak after surgery	0%	0%	0%	0%	0%
	4	Mortality* rate after surgery	0%	0%	0%	0%	0%
Surgery	5	Rate of surgical wound infection after colon cancer resection surgery	0%	0%	0%	0%	0%
	6	Hospital readmission rate within 30 days after discharge from surgery	0%	20%	0%	0%	16.6%
	7	Percentage stage III colon cancer patients receiving adjuvant treatment within 8 weeks after surgery	100%	67%	100%	100%	100%
Follow-up	8	Overall survival rate after 5 years for patients with stage III colon cancer	100%	100%	100%	100%	100%
	9	Patient improvement rate in quality of life after colon cancer treatment	100%	100%	100%	100%	100%
Number of patients in the IPU, per quarter			5	6	7	7	8

Results compiled from the Quality Indicator Set, utilized to assess the efficacy of the IPU and allow comparisons across quarters, from 2024 to the first quarter 2025; indicators were separated into 3 groups, and the total number of patients enrolled in the IPU, per quarter, is displayed in the bottom line. *Note: indicator 8 is based on early follow-up data only; although the survival rate is currently 100%, full 5-year surveillance has not yet been completed.* * Mortality indicator was considered at 90 days after surgery.

rate within 30 days after discharge was null in most quarters, except for Q2.2024 (20%; 1 case out of 5 operated patients) and Q1.2025 (16.6%; 1 case out of 6 operated patients), indicating occasional challenges in post-surgical care.

The percentage of stage III colon cancer patients (staged following the AJCC 8th Edition) receiving adjuvant treatment within 8 weeks' post-surgery remained at 100% in all quarters except Q2.2024 (67%). This was one exceptional case out of 3 patients with indication for chemotherapy, and the main reason was related to age (81 years-old), refusing to undergo systemic treatment after surgery. The overall survival rate after 5 years for stage III is still 100%, but we have been following those patients up for only over a year, therefore we didn't achieve 5 years' surveillance yet in order to thoroughly assess this indicator. The median follow-up duration of the cohort stands at 11.5 months (range: 4–17 months) from the date of surgery.

Economic Outcomes

In addition to clinical gains, the IPU implementation has contributed to improvements in operational efficiency and financial sustainability. Preliminary internal analyses indicate an increase in patient volume by the Gastrointestinal Center during the first quarter of 2025 compared to the same period in 2024, as it can be seen in Table 1. These positive trends are attributed to more streamlined care pathways, enhanced patient experiences, and increased referral rates stemming from higher satisfaction levels.

A detailed breakdown of the clinical features and financial impact is shown in Table 2. It is divided by quarter and month of each patient enrollment. Metrics such as age, gender and clinical stage are displayed, as well as an indication whether the patient was operated in VMCP. It also indicates the number of patients referred to palliative care, which is an additional service inaugurated in 2024, as part of the comprehensive oncologic care demanded by the IPU. The average length of stay (LOS) has increased over the year 2024 but reduced in the first quarter of 2025, due to the increasing experience of the gastrointestinal group in handling patients admitted for treatment. Table 2 also shows that most patients were diagnosed in advanced stages (III and IV) with a small number found in early stages (*is/I/II*), reflecting a trend for treating more complex cases. Also the proportion of patients undergoing surgery in VMCP was variable with a tendency for increasing in 2025.

Accumulated cost-related services over the year are presented in Table 2 as United States Dollars (USD), using a conversion rate of 1 USD = 25,500 Vietnamese Dong (VND). Service refers primarily to hospital-related procedures, such as surgery, imaging, laboratory tests, endoscopy, inpatient care, and consumables (e.g., surgical devices and disposables), which also encompasses professional fees for both physicians and allied health professionals involved. Medicine includes costs associated with chemotherapy, anesthetics, supportive drugs, and all medications administered during hospitalization or outpatient treatment. Total revenue represents the combined sum of service and medicine expenditures. A clear fluctuation was observed throughout the quarters, with elevation in periods when more complex cases were managed or patients required longer hospital stays. These peaks were typically associated with higher service costs. Importantly, the figures reflect not only medical interventions but the compre-

hensive approach embedded in the IPU model – where each patient's care pathway involved joint evaluation, supportive care, and decision-making by medical and non-medical staff. This integrated structure, inherent to the IPU, contributed to income by aligning various clinical services under a single, value-based treatment continuum.

Fig. 1 is a graphical description of the financial performance during 2024, in which the evolution of economic sustainability indicators is presented, considering each quarter as the enrollment period of patients. A consistent growth is seen, reaching a peak in the 3rd quarter, contemplating the expansion of the IPU. A considerable portion of it can be attributed to services, emphasizing the impact of comprehensive care and surgical interventions within the integrated framework.

Discussion

Challenges and Solutions

The implementation of an Integrated Practice Unit for colon cancer at Vinmec Central Park presented multiple operational, cultural, and financial challenges, many of which are consistent with barriers reported in previous international experiences^[3,5].

One major challenge was transitioning from a traditionally siloed, department-centered healthcare model to an integrated, patient-centered framework. This shift required a substantial cultural adjustment among healthcare providers, who were accustomed to working independently within their specialties. To address this, interdisciplinary education sessions and team-based initiatives were introduced in the planning phase, highlighting the benefits of collaborative care delivery and the importance of shared patient outcomes over departmental performance. Communication gaps between disciplines also emerged during the initial stages. The introduction of standardized communication protocols, shared electronic platforms, and regular meetings enabled greater transparency and reduced care fragmentation. MTB discussions became a central mechanism for aligning clinical perspectives and building consensus around individualized patient care plans.

Resource allocation posed additional difficulties. Balancing the time demands of interdisciplinary coordination with high clinical workloads strained staffing and scheduling systems. The full adoption of previous established clinical pathways in Vinmec Healthcare System, the addition of patient navigators, and the use of digital communication tools contributed to improving workflow efficiency without compromising patient-centeredness. Financial investment in infrastructure, technology, and staff training represented a further challenge, particularly in the context of a private healthcare model where immediate returns are usually prioritized over long term results. Engaging leadership through value-based care education, supported by preliminary financial modeling that projected future operational benefits, was essential to securing institutional commitment^[10].

Resistance to change among some healthcare providers was another marked barrier. Involving key clinical leaders from the structuring phase, continuous communication of patient outcome improvements, and the recognition of their contributions to the IPU model helped to gradually strengthen engagement across specialties. Addressing professional concerns openly and adapt-

Table 2. Quarterly healthcare resource generation throughout the year for service and medicine for Colon Cancer IPU patients.

	IPU Enrollment	Patient Code	Age	Gender	Stage**	Surgery in VMCP	Palliative Care	LOS	Total Revenue (USD)	Service Revenue (USD)	Medicine Revenue (USD)
Q1 2025	Mar	Q1.25-8	72	Male	IIIC	x	N	8	61,941	32,429	29,511
	Mar	Q1.25-7	80	Female	IVB	x	Y	10			
	Feb	Q1.25-6	40	Male	IVA	x	N	9			
	Feb	Q1.25-5	53	Female	IIIC		N	0			
	Feb	Q1.25-4	60	Male	IVB		Y	0			
	Feb	Q1.25-3	48	Male	I	x	N	4			
	Feb	Q1.25-2	92	Man	0/is	x	N	4			
	Feb	Q1.25-1	42	Male	IVC	x	Y	5			
	8 cases						3 cases	6.66*			
Q4 2024	Dec	Q4.24-7	42	Female	IVB	x	N	7	96,018	49,687	46,330
	Nov	Q4.24-6	61	Male	IVA		Y	0			
	Nov	Q4.24-5	55	Female	IVB		Y	0			
	Oct	Q4.24-4	70	Male	IVB	x	N	10			
	Oct	Q4.24-3	56	Female	IIA	x	N	7			
	Oct	Q4.24-2	87	Female	IVB		Y	0			
	Oct	Q4.24-1	59	Female	IIIC	x	N	9			
	7 cases						3 cases	8.25*			
Q3 2024	Sep	Q3.24-7	60	Male	IIIB	x	N	7	108,671	48,223	60,448
	Aug	Q3.24-6	48	Female	IVB		N	1			
	Jul	Q3.24-5	50	Female	IIIB		N	2			
	Jul	Q3.24-4	63	Male	I		N	0			
	Jul	Q3.24-3	56	Male	IVB		Y	1			
	Jul	Q3.24-2	73	Male	IIA		N	0			
	Jul	Q3.24-1	76	Male	IVC	x	Y	25			
	7 cases						2 cases	7.2*			
Q2 2024	Jun	Q2.24-6	61	Male	I	x	N	6	59,135	42,689	16,446
	Jun	Q2.24-5	45	Male	IIIB	x	N	9			
	Jun	Q2.24-4	81	Female	IIIC	x	N	10			
	Jun	Q2.24-3	64	Female	IIIB	x	N	9			
	May	Q2.24-2	58	Female	I	x	N	12			
	Apr	Q2.24-1	59	Male	IVA		Y	0			
	6 cases						1 case	9.2*			
Q1 2024	Mar	Q1.24-5	70	Female	I	x	N	7	80,210	32,172	48,038
	Feb	Q1.24-4	58	Male	IVC		N	1			
	Feb	Q1.24-3	61	Male	IVA		Y	0			
	Jan	Q1.24-2	56	Male	IIIB		N	2			
	Jan	Q1.24-1	60	Male	IIIC		N	0			
	5 cases						1 case	3.3*			

Quarterly healthcare resource generation, in United States Dollars – USD, currency conversion used: 1 USD = 25,500 Vietnamese Dong (VND); Q1 to Q4 refer to calendar quarters within the same year; demographic (gender, age) and oncologic features (clinical stage, palliative care, and LOS – length of stay) are also displayed; * indicates the average LOS in number of days; ** staging according to AJCC (American Joint Committee on Cancer) 8th Edition; Y = yes; N = no; *is* = *in situ*.

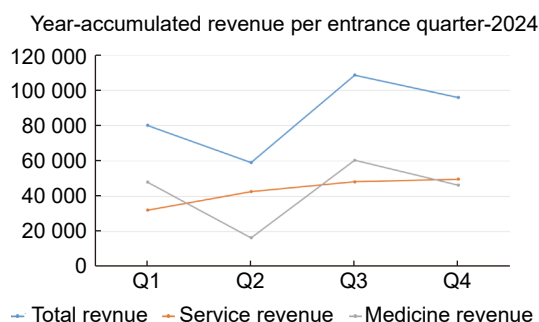


Fig. 1. Quarterly trend of service-related and medicine-related revenue generated from patients enrolled in the Colon Cancer IPU during 2024.

A consistent contribution is observed, with service-related earnings notably predominant; financial figures are expressed in USD (United States Dollars); Q1 to Q4 represent the four calendar quarters of the year.

ing implementation in response to feedback promoted broader acceptance of the integrated care framework. Overall, overcoming such challenges demonstrated the importance of planning actions, interdisciplinary alignment, adaptive leaders, and demonstration of measurable improvements in facilitating the successful transition to a novel model of care.

Clinical Outcomes and Patient-Centered Gains

The initial implementation phase produced several indicators of success, both in clinical care processes and in organizational development. Clinically, the establishment of standardized board reviews at all major treatment decision points led to improved care coordination and more individualized treatment plans. Patients reported a greater understanding of their care pathways and expressed higher levels of satisfaction regarding communication clarity and involvement in decision-making. These observations align with international experiences demonstrating that a multi-professional view is associated with enhanced patient experiences, improved clinical outcomes, and more coordinated oncology care delivery^[11].

Operationally, the introduction of clear clinical pathways and structured workflows reduced treatment initiation times and minimized delays typically associated with fragmented service delivery. We have observed personnel compliance and direct improvements in interdisciplinary communication, decision-making efficiency, and perceived quality of care. These observations are consistent with literature, suggesting that the development of IPUs through lean-based approaches can improve operational value and staff engagement^[12].

The integration of PROM into routine practice proved particularly valuable in guiding early adaptations to service delivery. Internally, it provided actionable insight into patient experience, functional recovery, and symptom burden throughout treatment. Although based on internationally validated EORTC QLQ domains, the tool developed for this IPU has not yet undergone formal external validation. Nevertheless, its pilot use during the IPU rollout demonstrated strong feasibility and acceptability among patients. Survey data revealed early improvements in physiological function and symptom management, helping the care team monitor quality indicators and implement responsive changes in care protocols. The value of systematic symptom

monitoring has also been supported by randomized controlled trials, which show that proactive patient surveys enhance communication and may contribute to improved survival during cancer treatment^[13]. Additionally, feedback collected through patient satisfaction surveys identified areas for service refinement – particularly the need to expand navigation services and strengthen psychosocial support. Incorporating this input into regular multidisciplinary review panels enabled timely and patient-centered modifications to the care model.

From a service quality perspective, it is important to note that although long-term oncological outcomes are not the primary aim of this study, we included mortality rates after surgery and stage-based survival monitoring as part of our internal performance monitoring. Specifically, we included a survival indicator focused on Stage III disease because this group represents a potentially curable population for whom timely and guideline-adherent treatment is crucial. Monitoring this cohort aligns with internal standards for quality assurance and enables benchmarking against external references. We recognize that the proportion of Stage III patients in our 2024 dataset was relatively small (18.8%), and that a range of disease stages were treated, including early (I–II) and advanced (IVa–IVc) cases. Nonetheless, focusing on Stage III survival performance is a strategic decision that facilitates targeted improvement tracking within a value-based care framework. As patient volumes grow and data matures, broader stage-specific indicators may be incorporated in future assessments.

Furthermore, to enhance transparency regarding outcome reporting, we clarify that no postoperative mortality occurred at all among patients who underwent surgical treatment within the IPU during 2024. Although the median follow-up of 11.5 months after surgery remains relatively short for long-term survival analyses, it is considered adequate to confirm early safety outcomes and it provides a preliminary benchmark for subsequent updates as the program matures.

Key lessons emerging from the early implementation phase included the critical role of leadership involvement, identification of service gaps, and the establishment of continuous education and feedback mechanisms for both patients and staff. Maintaining operational flexibility without deviating from the patient-core principles of IPU was essential for sustaining gains, improving care quality and organizational performance within a private hospital setting.

Economic Impact and Service Performance

The IPU model yielded positive early signals of economic viability and institutional performance. Quarterly financial data (Table 2 and Fig. 1) showed variability linked to clinical complexity and treatment volume. Periods marked by higher hospitalization rates and more frequent surgical interventions, particularly those involving advance-stages cases, coincided with increases in cost-related service metrics.

From a structural standpoint, “service revenue” included costs related to clinical procedures, diagnostic tests, consumables, and professional fees; “medicine revenue” accounted for medications, chemotherapy, anesthesia, and other drug-related costs. The total revenue reflects the financial return generated through program activities, including services provided by allied health profession-

als, nursing, counseling, and nutrition, all of which are integral components of the care pathway.

Thus, although healthcare resource generation streams were not tracked separately for each IPU function, the observed increase in overall hospital income is strongly associated with the program's comprehensive, high-value approach. This financial performance reinforces the broader argument that IPUs, even in a private hospital context, can simultaneously improve care quality and operational sustainability.

Moreover, repeated implementation of standardized care processes across similar patient profiles has improved operational efficiency, reduced hospital length of stay, and enabled greater case throughput over time, ultimately lowering average per-patient costs. From a societal perspective, these efficiencies may facilitate earlier patient reintegration into productive life. This pattern is consistent with findings in gastric cancer care, where centers with higher procedural volume and structured clinical pathways were linked to improved outcomes, reduced strain on healthcare systems, and enhanced economic sustainability^[14].

Future directions in IPU-model development

The experience gained with the colon cancer IPU has laid foundation for the development of integrated models across other gastrointestinal malignancies. In 2025, the Gastrointestinal Center plans to establish two additional IPUs focused on rectal cancer and gastric cancer. These expansions will incorporate lessons learned until now while addressing disease-specific complexities. For rectal cancer, the multidisciplinary team will integrate surgical, medical, and radiation oncology services more tightly, considering the need for neoadjuvant therapy and sphincter-preserving surgery. For gastric cancer, comprehensive nutritional support, and early palliative care integration will be prioritized, recognizing the high symptom burden and impact on quality of life caused by this malignancy, currently the third cause of death by cancer in Vietnam^[1,15].

Technological innovation will play a central role in the next phase of IPU development. Enhanced use of electronic medical records with predictive analytics, the deployment of patient portals for real-time symptom reporting, and expanded telemedicine services are planned to further optimize patient engagement and care coordination^[16]. Financial sustainability will be addressed through closer collaboration with insurance companies and the introduction of value-based reimbursement models. Bundled payments for groups of services and performance-linked contracts are actions being explored to align incentives with quality outcomes while increasing patient volume^[17].

Ongoing personnel development remains a cornerstone of future growth. Structured interdisciplinary education programs, workshops for continuing medical and nurse education, and updates on clinical guidelines will be implemented to sustain excellence and cohesion. Building a resilient, learning-oriented culture is essential to maintaining the adaptability and effectiveness of the IPU model as it scales. Its expansion within VMCP thus represents not merely an increase in service scope but a broader institutional commitment to redefining cancer care delivery in Vietnam's private healthcare sector.

As a limitation of this study, we acknowledge that it represents an early-phase implementation report of the colon cancer

IPU at Vinmec Central Park and must be interpreted within the context of a real-world, evolving care model. The clinical outcomes presented are based on an initial cohort of 32 patients, and do not aim to establish definitive oncological benchmarks. Rather, these early data serve to demonstrate feasibility, highlight initial trends, and guide iterative improvements in clinical pathways, workflow design, and interdisciplinary coordination. While the follow-up period remains too short to assess long-term survival or recurrence rates, the results support the viability of integrated, patient-centered care within a private hospital framework.

Conclusions

The implementation of an Integrated Practice Unit for colon cancer at Vinmec Central Park represents a significant advancement toward patient-centered, multidisciplinary care delivery in Vietnam's private healthcare sector. Our results demonstrated improvements in clinical outcomes, patient satisfaction, leadership coordination, and operational efficiency. Addressing challenges related to cultural change, communication, and financial sustainability has been fundamental in the successful adoption of the model. Building on these achievements, the expansion of the IPU framework to rectal and gastric cancers is planned, supported by further technological integration and value-based initiatives. We understand that sharing the experience acquired so far provides practical insights for healthcare institutions seeking to enhance the quality, and efficiency of cancer care delivery.

Abbreviations

AJCC, American Joint Committee on Cancer; ERAS[®], Enhancing Recovery After Surgery; GLOBOCAN, Global Cancer Observatory; IPU, Integrated Practice Unit; LOS, length of stay; MTB, multidisciplinary tumor board; PROM, patient-reported outcome measures; USD, United States Dollars; VMCP, Vinmec Central Park International Hospital; VND, Vietnamese Dong.

Ethical approval and consent to participate

This study did not require approval from an institutional ethics committee, as it involved retrospective analysis of anonymized patient data collected as part of standard clinical care. No interventions outside standard practice were conducted, and no identifiable personal information was used. Therefore, patient consent to participate was not required.

Conflicts of Interest

Authors report no conflict of interest for this study.

Authors' contributions

WAC: conceptualization, methodology, interpretation and analysis of data, writing the original manuscript; BMT and NVN: inter-

pretation of data, prepared tables and figures, manuscript revision.

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