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Establishing funding rates for colonoscopy and gastroscopy procedures in Ontario

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ABSTRACT

Introduction This paper describes the funding rates established in Ontario to reflect best practices in hospital-based care delivery for these endoscopic procedures: colonoscopy, colonoscopy biopsy, gastroscopy, gastroscopy biopsy, and colonoscopy combined with gastroscopy.

Methods The funding rates are based on direct costs and were established using a micro-costing approach after receipt of inputs from 3 working groups and a review of the administrative data and literature, where applicable. The first group advised on nursing activities, time, and staffing ratios along the patient pathway for each of the procedures. The second group provided recommendations about the duration for each procedure, and the third group provided information about supplies and equipment, their use, and costs.

Results The resulting funding rates are $161.18 for colonoscopy and $151.08 for gastroscopy (without accompanying interventions), $16.06 for colonoscopy biopsy and $8.22 for gastroscopy biopsy (added to the respective procedures), and $207.26 for combined colonoscopy and gastroscopy. Detailed costs for each component embedded in the rates are also provided.

Conclusions The rates came into effect in April 2018. The process and outcomes described here allowed for a transparent pricing mechanism in which funding follows the patient, clinical expert consensus is the basis for practice, and providers and payers both understand the components.

Key Words Colonoscopy costs, gastroscopy costs, micro-costing, funding rates

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INTRODUCTION

Before fiscal year 2014–2015, almost all colonoscopy and gastroscopy procedures performed in Ontario hospitals were funded by the Ministry of Health and Long-Term Care through global budgets in which payment is not tied to specific procedures. With implementation of the Health System Funding Reform[1], 92% of colonoscopy and gastroscopy procedures performed in hospitals are now funded per case by Cancer Care Ontario through quality-based procedure funding[2–5]. As of fiscal year 2018–2019, the funding rates have been revised to best-practice prices, reflecting clinical expert consensus for practice and efficient hospital operations. The best-practice price is not based on a minimum standard of care, but rather on the cost of caring for a typical ("average") patient, including all necessary resources to perform the procedures safely and effectively, while not providing funding for overprovision of care or inefficient hospital practices. The funding rates for the procedures that follow (subsequently referred to as "select procedures") were revised to reflect best-practice prices:

- Colonoscopy
- Colonoscopy biopsy
- Gastroscopy
- Gastroscopy biopsy
- Colonoscopy combined with gastroscopy

Here, we describe how the funding rates were established[4].

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Rates include direct costs only. The following costs are excluded:

- Physician costs
- Costs outside of the endoscopy unit (laboratory and pathology, pharmacy, imaging, and so on)
- Overhead costs (equipment reprocessing, hospital administration, and so on)[a]

Few studies published in the last 10 years have addressed the costs of colonoscopy or gastroscopy procedures; those that did focused mostly on system-level costs[6–9] or the cost-effectiveness of alternative procedures[10–14]. Those studies took the procedure cost as an input and did not break it down into cost components. The reported cost for colonoscopy varied from €50 in Romania[6] to more than US$1,300 in the United States[7] and, for gastroscopy, from €38.96[12] to US$259.88[10], based on varying parameters and cost sources. No costing study has been published for the Canadian setting (locales for prior studies were Germany, Spain, the United States, the United Kingdom, and Romania).

One study from Spain estimated the cost per procedure using approach similar to micro-costing[15]. Direct costs of endoscopic procedures were compared with their surgical alternatives, concluding that, in most cases, endoscopic procedures are more cost-efficient. Given the study focus (complex endoscopic procedures), the costs of colonoscopy and gastroscopy alone were not reported.

METHODS

As a first step, "best practice" for performing the select procedures was defined by a provincial committee of clinical experts. Costs associated with the defined best practice were then determined using a micro-costing approach supported by hospital financial and administrative data, and input from 3 working groups. Micro-costing is a bottom-up approach that calculates costs by disaggregating and estimating each clinical pathway step and cost component (as opposed to a top-down approach such as dividing the total cost by the number of procedures)[16]. These were the costs estimated:

- Nursing workload
- Management and operational support workload
- Supplies, including drugs
- Equipment
- Sundries

To define the patient pathway and to advise on nursing activities, time, and staffing ratios required for each step, purposive sampling was used to convene a working group of 11 endoscopy unit nurses, ensuring representation from academic and non-academic centres, and small- and large-volume hospitals across Ontario. The group met 3 times.

A separate working group of 4 endoscopists convened 6 times to interpret results and reach consensus on procedure duration. A literature review and data from fiscal years 2014–2015 to 2015–2016 about procedure duration from the Discharge Abstract Database (DAD) and the National Ambulatory Care Reporting System (NACRS) were analyzed. For the duration analysis, 85,600 colonoscopy cases (with or without biopsy), 37,387 gastroscopy cases (with or without biopsy), and 26,017 combined colonoscopy and gastroscopy cases (with or without biopsy) were identified from NACRS and DAD. Procedure duration is interpreted as "door to door" (captured as the time from a patient's entry into, until their exit from, the operating or procedure room to undergo the intervention[17,18]). Duration data were examined separately for cases with and without biopsy and for cases involving inpatients and outpatients. Cases associated with other procedures (polyp removal, dilatation, control of bleeding) were excluded.

Procedure durations and staffing ratios were then used to calculate nursing workload in minutes per case, with an adjustment of 20% to account for non-patient facing time (for example, meetings, documentation). The Ministry of Health and Long-Term Care's Health Information Tool (https://www.ontario.ca/data/healthcare-indicator-tool-hit-datasets) was used to obtain provincial average endoscopy unit values for nursing hourly rates, benefit hours, and management and operational support cost. To illustrate, for a procedure time of 20 minutes, with a 1.5 nurse-to-patient ratio at a nursing hourly rate of $55 per hour and 15% benefit hours, the nursing workload cost would be [(20 × 1.5 × 1.2 × 1.15) / 60 min] × $55.

A third working group of 15 hospital endoscopy unit administrators (purposively sampled to ensure broad representation) provided information from their organizations about costs of equipment in the endoscopy suite (for example, scopes); medical supplies, including drugs (for example, gloves, tubes, oxygen, suction); and sundries (for example, printing, linens) for each procedure. The group met 5 times to reach consensus about the list of items required by procedure type, and the average cost per case for each item, factoring in utilization and quantity. For example, a $10.00 item used for 10% of cases would add $1.00 to the rate. Reusable equipment costs were divided over the expected life of the equipment. For example, a $25,000 item with an expected lifespan of 2500 cases would be costed at $10 per case. Equipment maintenance was included in costs.

RESULTS

Figure 1 illustrates the patient pathway developed by the nursing working group.

Table I summarizes the procedure durations embedded in the rates. Based on DAD and NACRS data, the median procedure durations for colonoscopy alone were 21 minutes for outpatients and 25 minutes for inpatients. Biopsies were found to add an additional 4 minutes for outpatients and 2 minutes for inpatients to colonoscopy procedures, but no additional time for gastroscopy procedures (few gastroscopy procedures were performed alone). Combined colonoscopy and gastroscopy procedures (with or without gastroscopy biopsy) had a median duration of 29

[a] On average, overhead costs constitute about 23%–25% of hospital budgets.

minutes, with an additional 3 minutes if performed with a colonoscopy biopsy (analysis on outpatients only). See the supplementary material for detailed duration results.

The working group of endoscopy unit administrators reached consensus about the average use and cost for supplies, sundries, and equipment required to perform the select procedures. Table II summarizes the average cost for supplies, sundries, and equipment. Detailed results can be found in supplemental Table 1.

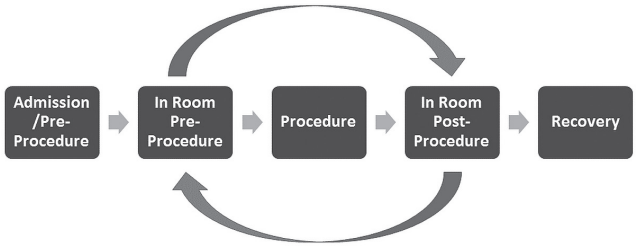

FIGURE 1 Patient flow diagram.

Based on information from the working groups and the procedure duration analysis, the funding rates, summarized in Table II, were generated. The resulting funding rates were $161.18 for colonoscopy and $151.08 for gastroscopy (without accompanying interventions), $16.06 for colonoscopy biopsy and $8.22 for gastroscopy biopsy (added to the respective procedures), and $207.26 for combined colonoscopy and gastroscopy.

DISCUSSION

The funding rates described in this paper have been in effect since April 2018 and are now used to fund colonoscopies and gastroscopies in Ontario hospitals. Although administrative data were crucial in decision-making, they reflect current practice and cost structures, regardless of best practice. Relying on current average costs could result in either overfunding (if hospitals are not operating efficiently) or underfunding (if best practice would entail higher resource use—for example, higher staff-to-patient ratios). For those reasons, micro-costing was the preferred

TABLE I Procedure durations

Procedure	Patient type	Duration (minutes)		
		Admission or pre-procedure	In-room booking[a] procedure time, plus room turnover	Recovery[b]
Colonoscopy	Outpatient	15	21+4	30
	Inpatient	15–20	26+4	60
Colonoscopy biopsy[c]	Outpatient or inpatient	Not applicable[c]	+4 +2	Not applicable[c]
Gastroscopy	Outpatient	15	15+4	30
	Inpatient	15–20	18+4	60
Gastroscopy biopsy[c]	Outpatient or inpatient	Not applicable[c]	+0	Not applicable[c]
Combined colonoscopy and gastroscopy	Outpatient	15	29+5	30
	Inpatient	15–20	37+5	60

[a] Each procedure required a 1.5 nursing full-time equivalent (FTE) and 1 FTE for room turnover. The time value for the procedure duration must therefore be multiplied by 1.5.
[b] Patient-to-nurse ratio during recovery is 3:1 for outpatients and 6:1 for inpatients. The time value for recovery must therefore be divided by those numbers of patients.
[c] Biopsy is an add-on to the main procedure (colonoscopy or gastroscopy), and so only incremental price implications are captured.

TABLE II Summary of 2018–2019 funding rates and cost components

Component	Cost (2015 Canadian dollars)				
	Colonoscopy	Colonoscopy biopsy	Gastroscopy	Gastroscopy biopsy	Combined colonoscopy and gastroscopy
Total nursing cost	74.77	7.84	66.11	No additional cost	91.55
Total MOS cost	12.62	No additional cost	12.62	No additional cost	12.62
Medical supplies and drugs	23.79	8.22	23.76	8.22	28.96
Sundry	5.96	No additional cost	5.96	No additional cost	5.96
Equipment					
Scope	25.54	No additional cost	24.13	No additional cost	49.67
Other	18.50	No additional cost	18.50	No additional cost	18.50
TOTAL	161.18	16.06	151.08	8.22	207.26

MOS = management and operational support.

strategy for establishing funding rates. That approach also brings transparency to funding by outlining specific funded components and their costs—information that was shared with hospitals to allow them to understand the funding rates and potentially to highlight areas in which they could improve their cost efficiency.

As with any other approach, micro-costing has limitations. First, it relies on relatively small sample sizes, given that each hospital's information represents a single data point. That issue was exacerbated when not all hospitals submitted information or when data were not directly comparable (reusable vs. disposable supplies, for instance). Second, unlike DAD and NACRS data, which rely on national standards and rigorous quality checks, information submitted by hospitals through the working group was investigated only if it was an outlier. Finally, any gaps in the understood patient pathway would not be factored into micro-costing, resulting in underestimation of costs.

To address the foregoing limitations, the working groups were designed to achieve balance in regional representation and interprofessional roles, and multiple follow-ups were undertaken to increase response rates. Finally, an essential principle was to reach consensus on each question.

Although labour-intensive and granular, the process described here created a transparent pricing mechanism in which funding follows the patient, clinical expert consensus is the basis for practice, and providers and payers both understand the components.

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CONFLICT OF INTEREST DISCLOSURES

We have read and understood *Current Oncology*'s policy on disclosing conflicts of interest, and we declare that we have none.

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