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# Outpatient Cancer Visit Groups: A Preliminary Report on Work in Progress in Ontario, Canada

By Harold Wodinsky, MHS., CHE, Joanna Lion, Ph.D., and James Elliott, CA

**P**ublicly funded, universal and accessible health care is a fundamental entitlement of all Canadians. However, as in the United States, medical care expenditures are increasing at an alarming rate. In an attempt to control an average annual increase for health care of more than 10 percent, policymakers in Ontario, Canada's most affluent and, with 9.8 million inhabitants, most populous province, looked to experience in the United States with prospective payment.

Initial research in Ontario on inpatient groups began in the early 1980s, and the first version of case mix groups (CMGs) became available in 1983. While distinct from DRGs, Ontario inpatient CMGs share some common features. Recently, relative resource weights for these inpatient CMGs have been added. The number of inpatient cases has declined over the past few years and, as in the United States, explosive growth has occurred in the volume of outpatient services. As this was recognized, Ontario policymakers began to provide incentive funding to facilitate research into alternative outpatient activity measurement groups. One area of particular interest is cancer care rendered on an outpatient basis.

## Ambulatory Groups

The responsibility for outpatient cancer care in Ontario is predominantly that of a single provider, the Ontario Cancer Treatment and

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Research Foundation (OCTRF). The OCTRF was established in 1948 to act as a coordinating force for the emerging technology of radiation therapy and for cancer research. Over time, and especially with the advent of systemic therapy, OCTRF has taken on additional responsibilities. Coordinated, comprehensive outpatient treatment services are available through a network of eight freestanding Regional Cancer Centres (RCCs) strategically located throughout the province.

All radiation therapy is provided by the OCTRF and one provincial cancer hospital. There are no proprietary, freestanding, or other hospital-based radiation therapy units. Because the provincial health insurance plan does not reimburse physicians for chemotherapy drug costs or administration costs in their office practices, outpatient intravenous chemotherapy is performed in three locations: OCTRF RCCs, the provincial cancer hospital, and hospital outpatient departments. As a result of these regulatory barriers, the OCTRF provides approximately 80 percent of all radiation therapy and about 50 percent of all intravenous chemotherapy in Ontario. Patient care outcomes in Ontario, as measured by five year relative survival, are equivalent to the U.S. experience.<sup>1,2</sup>

The OCTRF employs approximately 1,500 staff including 60 radiation oncologists and 55 medical oncologists/hematologists. The OCTRF budget (130 million Canadian dollars in 1991-1992), including operating costs and new capital funds or depreciation, is annually negotiated with the government. OCTRF physicians are full-time staff and their reimbursement is included in the cancer centre's budget. Even though some billings for professional fees are allowed by the provincial health insurance plan, an annual ceiling is set for physician earnings.

In the mid-1980s, OCTRF developed a common Oncology Patient Information System (OPIS), which is linked to the provincial population-based cancer registry. This common activity level reporting methodology made the construction of ambulatory visit groups for outpatient cancer care possible. The organization of cancer care in Ontario, and the reduction of competitive pressures due to legislative imperatives, provides a unique opportunity to review all relevant information pertaining to ambulatory oncology practice.

## Methodology

The OCTRF received an incentive fund grant from the province of Ontario to develop outpatient cancer visit groups (CVGs). CVGs are different from other proposed outpatient activity clusters because they are disease specific, rather than body system specific. The development criteria for CVGs are that the categories make sense clinically, be from routinely collected data sources, consist of a manageable number of groups, and be statistically coherent.

The OCTRF established a steering committee of senior staff from several institutions and agencies, and two subcommittees (costing and clinical) to facilitate the development process. The preliminary evaluation of potential outpatient CVGs began with a review of the applicability of the second generation ambulatory visit groups proposed by Yale University researchers and third generation ambulatory patient groups (APGs) developed by 3M/HIS. These groups have been modified based on Ontario data for cancer care visits.

The incentive fund grant allowed the evaluation of a case mix costing model which allocated general ledger expenses to various activity pools, either directly or through cost assignment factors. Activity pool costs were eventually assigned to case

mix categories. Professional billing revenue and physician earnings were excluded from the analysis of radiation treatment and chemotherapy treatment because this is not what physicians "do," but what they order. Physician time is placed entirely in their own physician-specific encounter or assessment groups and, proportionately, into the procedure categories.

This is a departure from APGs, which exclude physician reimbursement entirely. Physician reimbursement is handled under the Resource Based Relative Value Scale (RBRVS) system developed by Harvard University. The Harvard RBRVS relied on current billing practices in forming its weighting factors. In Ontario, actual costs are to be a surrogate in the eventual development of a relative value intensity weighting system. Under the single payer provincial health insurance scheme, there are no bills generated for the technical component of outpatient oncology services, and the option of using a billing-based approach to develop CVG resource weights did not exist.

OPIS is a user friendly, menu driven, relational (4GL) database written by the OCTRIF on Oracle software. Each RCC operates the program on Digital Equipment Company minicomputers. Data from all RCC medical records are collected and include appropriate demographic, ICD-0 patient classification and treatment activity information. The data are electronically consolidated on the corporate level and downloaded to end user computing tools for comparative analysis. The OCTRIF's general ledger operates from micro-computers and uses a common brand of proprietary software. Corporate office expenses are allocated to a cancer centre's operations when such costs are related to the provision of treatment services.

The data to be discussed were collected in the OPIS database from RCCs in

**TABLE 1. Types of Visits 1991-1992**

Outpatient Assessment Activity		<b>372,158</b>
New Patient	25,768	3.6%
Follow Up on Established Patient	271,048	37.6
Radiation Therapy Weekly Reviews	55,254	7.7
Follow Up on Patients in Hospital	20,088	2.8
Chemotherapy Activity		<b>79,722</b>
Infusion/Injection <31 min.	51,022	7.1%
Infusion 31-60 min.	15,147	2.1
Infusion 61-180 min.	5,581	0.8
Infusion >180 min.	7,972	1.1
Radiation Therapy Activity		<b>252,571</b>
Radiation Therapy Treatment: Cobalt	71,974	10.0%
Radiation Treatment: Linac	126,511	17.5
Superficial/Orthovoltage Treatment	3,468	0.5
Brachytherapy Treatment	1,819	0.3
Simulators	15,892	2.2
Mould Room Visit	8,854	1.2
Other Radiation Therapy Treatment	735	0.1
Dosimetry Visit	23,318	3.2
Invasive Procedure Activity		<b>16,925</b>
Diagnostic	4,925	0.7%
Skin Biopsy	2,471	
Bone Marrow	762	
Other Biopsy	254	
Lumbar Puncture	237	
Laryngoscope	1,100	
Other Scopes	102	
Therapeutic	3,559	0.5
Transfusion	2,386	
Para/Thoracentesis	406	
Other Procedures	766	
Other Procedures	8,441	1.2
<b>Total Visits</b>		<b>721,376</b>

Ontario. The data include information on all cases and visits by adult and pediatric cancer patients from April 1, 1991, to March 31, 1992. A total of 68,904 cancer patients having 721,376 visits were recorded. To date, a randomly defined subset of one month of utilization data from five RCCs and financial data (1990-1991) from one RCC have been analyzed in detail.

### Distribution of Visits

Table 1 shows the distribution of the 721,376 oncology visits into various activity categories. The most common group was outpatient follow-up encounters on established patients (37.6 percent), followed by the major therapeutic categories: radiation therapy via linear accelerator (17.5 percent);

chemotherapy (11.1 percent); and radiation therapy via Cobalt<sup>60</sup> (10 percent).

The OCTRIF operated 21 linear accelerators and 13 Cobalt<sup>60</sup> teletherapy units in 1991-1992. They provided an average of 5,839 treatment visits per therapy unit per annum (a range of 3,771 to 7,116). Intravenous chemotherapy products were administered more than three times more frequently than oral or injectable agents (132,214 vs. 41,609), averaging 1.7 intravenous products per administration (a range of 1.4 to 2.1).

Visits for chemotherapy administration averaged 6.5 per case (a range of 4.1 to 9.7). Radiation therapy weekly review clinics constituted the next most frequent visits to RCCs (7.7 percent). New patient assessments (3.6 percent), follow-up visits on patients in the hospital (2.8 percent), and invasive procedures for diagnostic or therapeutic purposes (2.3 percent), all represented a relatively small percentage of total activity. Various biopsies, endoscopies, and blood product transfusions made up the majority of outpatient invasive procedures.

Although outpatient activity is heavily weighted toward treatment,<sup>3,4</sup> more than half of all visits lack a significant procedure. Diagnostic imaging for patients in RCCs is performed in associated hospitals and is not the OCTRIF's direct financial responsibility. Laboratory procedures are usually completed in small satellite laboratories operated by these associated hospitals in space provided free of charge by an RCC.

### Outpatient Case Mix

The proposed outpatient CVGs are not diagnosis specific, but based on procedures performed on the patient once a cancer diagnosis has been established. Yale and Brandeis University researchers have independently reviewed the validity of using the cancer diagnosis to explain variances in

**Table 2. Treated Cases 1991-1992**

Site	RADIATION ONCOLOGY			MEDICAL ONCOLOGY		
	Cases	%Total	Rank	Cases	%Total	Rank
Breast	3,644	25.1	1	4,575	37.3	1
Lung	2,796	19.3	2	826	6.8	3
Prostate	1,574	10.9	3	398	3.2	9
Rectum	598	4.1	4	607	5.0	4
Brain	392	2.7	5	152	1.2	
Skin	356	2.5	6	199	1.6	
Uterus	319	2.2	7	151	1.2	
Cervix	293	2.0	8	111	0.9	
Lymphosarcoma	292	2.0	9	577	4.7	5
Pharynx & Tonsil	275	1.9	10	51	0.4	
Other Lymphomas	238	1.6		502	4.1	6
Bladder	227	1.6		139	1.1	
Esophagus	226	1.6		91	0.8	
Intestine	203	1.4		827	6.8	2
Hodgkin's Disease	170	1.1		225	1.8	
Melanoma	140	1.0		244	2.0	10
Leukemia	103	0.7		485	4.0	8
Ovary	101	0.7		486	4.0	7
Stomach	98	0.7		136	1.1	
Other Sites	2,450	16.9		1,475	12.0	
<b>TOTAL</b>	<b>14,495</b>			<b>12,257</b>		

procedure groups, but without success.

Table 2 shows the distribution of leading case diagnoses for the two major treatment categories. Breast cancer is the leading diagnosis in both categories, with lung and rectal cancers sharing a position in the top four diagnoses. However, while patients benefit from a multidisciplinary consultation, not all patients with cancer benefit from multiple modality treatment. Historically, at OCFRF cancer centres, only about 15 percent of all treated cases receive radiation and chemotherapy in the same year. Nor do all cancers require treatments available exclusively in RCCs. For example, it is expected that only half of all new cancer patients require treatment in an RCC. The OCFRF's case mix is consistent with current clinical trends in the radical, adjuvant, or palliative treatment of patients with either radiation therapy, chemotherapy or multiple modality treatment.

**Outpatient CVGs**

Table 3 provides preliminary details on outpatient CVGs. As with DRGs and the latest proposed APGs, many activities integral to the care of cancer patients were included as overhead; that is, bundled into assessment or treatment encounters.

Assessment and evaluation constitute four CVGs: new consult, follow-up visit,

radiation therapy review clinic, and inpatient visit. The clinical subcommittee has requested an additional visit group, reassessment, to recognize the intensity of certain follow-up encounters.

There are five major radiation therapy groups which divide into 11 subgroups. The clinical subcommittee agreed that treatment fields should be a proxy for intensity weighting in radiation therapy treatment. As a result, one, two, and more than two fields will be used as divisions. This level of detail is already available through OPIS, which uses a standard nomenclature established by the Federal government for radiation therapy (National Hospital Productivity Improvement Project).

In 1991 and 1992, the average course of radiation therapy consisted of 13.7 treatments per case (a range of 9.9 to 16). This is significantly less than the average course of treatment recommended in U.S. radiation therapy facility planning (21 treatments), but consistent with Canadian practice patterns. Patients receiving treatment with radiation therapy had an average 1.1 simulation, 61 percent received custom moulds, and all were seen by a radiation oncologist on average at least once per week during the course of their therapy. Single encounter dosimetry occurred 1.4 times as frequently as multiple dosimetry

encounters. However, multiple mould room encounters occurred 3.9 times more frequently than single mould room visits. Special treatment encounters, such as hyperthermia, photodynamic therapy, and stereotactic radiosurgery are coded, but were not analyzed at this point in the study.

Chemotherapy activity presented the greatest challenge in the development of outpatient CVGs. While it was relatively simple to identify administration of chemotherapy as an activity, the intensity factors for defining chemotherapy CVGs are complex. The two most appropriate factors identified were the cost of agents and the time for infusion. Nursing hours are the most expensive element in chemotherapy administration provider time, but OPIS does not capture this information. However, based on existing research, nursing hours appear to be highly correlated with infusion time; a category of information that OPIS captures through its appointment scheduling system.

Upon evaluation and greater scrutiny of these data, and after discussion by the clinical subcommittee, four discrete subsets of both infusion time and cost of the drugs infused, or otherwise administered during the visit, were proposed. Drugs were subdivided into four cost groups using the lowest wholesale price available to all OCFRF RCCs. Each RCC has an appropriately equipped chemotherapy pharmacy. Drug costs excluded pharmacy dispensing fees; rather they are included, at present, in infusion time. Infusion time in minutes is used to define four "time" subsets. Sixteen combinations are possible in chemotherapy relative value weighting. For example, the combinations could range from fluorouracil in short infusion of less than 30 minutes to carboplatin in extra long infusion averaging 4.5 hours. Most infusions (64 percent) are of short duration (30 minutes or less). Extra long chemotherapy infusions (more than 181 minutes) accounted for 10 percent of the total chemotherapy infusion in RCCs.

Invasive and other procedure coding is not unique to outpatient CVGs. The Hospital Medical Records Institute, a Canadian organization which maintains most provinces' hospital discharge data, has undertaken an evaluation of options for outpatient surgical procedures that has a direct bearing on the development of outpatient CVGs. Both projects use national activity coding standards (Canadian Classification of Procedures).

Three major categories of invasive procedures were identified in RCCs: biopsies and aspirations, excisions, and endoscopes. A fourth "other" category also exists, including blood component transfusion, paracentesis, and thoracentesis. Outpatient facilities (both hospital-based and freestanding) are working to develop standard nomenclature and consistent weighting for these procedures.

**Case Mix Weighting Model**

The initial indication of the financial weighting factors for the defined activities is illustrated in Table 4. The values are for fiscal year 1990-1991 and were taken from the general ledger of a large, University-affiliated RCC with an annual operating budget and allocated corporate expenses of more than \$17 million. The costing subcommittee reviewed the preliminary allocation of general ledger accounts to particular activities, but will reassess these as additional data from other RCCs are received and analyzed.

Costs were determined using a modified step-down approach. Overhead and indirect costs amounted to one-third of total RCC expenses and were divided into four broad categories: clinical sustaining (56 percent); general patient (26 percent); employee supporting (4 percent); and occupancy costs (14 percent). Clinic sustaining costs are general overhead costs—such as finance, administration, and information systems (both at the RCC and the head office level)—that are required to sustain RCC operations. The costs are then allocated to functional groupings based on the volume of patients seen in each functional area. General patient costs are expenses incurred in support of, or as a result of, processing patients through the RCC, including medical records and patient transportation costs that were allocated to functional groupings on the basis of patient volumes. Employee support costs are general costs incurred to support employees engaged in RCC activities. These costs were allocated to functional groupings based on the number of employees in each group. Occupancy costs are those costs associated with maintaining the physical plant and premises. These costs are allocated to functional groupings on a square footage basis.

Nursing and other direct costs were assigned to functional groupings on the basis of cost determinants arrived at through interviews with key personnel.

**Table 3. Preliminary Ambulatory CVGs**

<b>Outpatient Assessment Activity</b>	
New Patient Consultation	
Follow Up on Established Patient	
<ul style="list-style-type: none"> <li>• Simple</li> <li>• Reassessment (proposed)</li> </ul>	
Radiation Therapy Weekly Reviews	
Follow Up on Patients in Hospital	
<b>Chemotherapy Activity</b>	
Chemotherapy Treatment	Drug Cost (4 categories)
30 min. infusion	Inexpensive—Very Expensive
60 min. infusion	Inexpensive—Very Expensive
90-180 min. infusion	Inexpensive—Very Expensive
181-360 min. infusion	Inexpensive—Very Expensive
<b>Radiation Therapy Activity</b>	
Radiation Therapy Treatment	Simple (one field) (proposed)
	Intermediate (two fields) (proposed)
	Complex (>two fields) (proposed)
Hyperfractionation	
Superficial X-Ray/Orthovoltage	
Brachytherapy Treatment	
Simulation	
Mould Room Visit	Single
	Multiple
Dosimetry Visit	Single Measurement
	Multiple Measurements
<b>Invasive Procedure Activity</b>	
Biopsies and Excisions	Skin Biopsy
	Bone Marrow Biopsy
	Aspirations
	Other Biopsy
Endoscopy	
Other Invasive Procedures	Transfusion
	Lumbar Puncture
	Paracentesis
	Thoracentesis
	Other

Functional groupings were assigned to CVGs using various cost allocation determinants. Radiation therapy was allocated based on OPIS time data and national workload measurement standards; nursing costs were based on staffing patterns; chemotherapy was based on the number of minutes of infusion time recorded in OPIS; and procedures and assessment activity was based on Harvard RBRVS and Medicare 3M weights.

The preliminary weights associated with ambulatory cancer care encounters in Ontario vary greatly. Outpatient assessment activities range from radiation therapy weekly reviews (58.39) to new patient consultations (366.50). Follow-up visits by established patients, whether in the clinic or

in the hospital, were essentially equivalent in weight (263.97 and 232.76 respectively). These weights are consistent with information published in 1985 on cancer patient activity in the outpatient departments of a sample of Boston hospitals.<sup>3,4</sup>

The elements of radiation therapy weights cluster between 80.92 for a single mould to 416.93 for multiple dosimetry treatment plan development. Single radiation therapy visits (more than 95 percent of total radiation treatments) are weighted 113.48 and simulations are weighted 225.71. Work is under way to further refine the weight information using treatment fields. Some details of previous work on radiation therapy in these RCCs has already been published.<sup>5</sup>

**Table 4. Preliminary Ambulatory CVG Weights  
One OCFRF Regional Cancer Centre**

Outpatient Assessment Activity	Unit Weights		
New Patient	366.50		
Follow Up on Established Patient	263.97		
Radiation Therapy Weekly Reviews	58.39		
Follow Up on Patients in Hospital	232.76		
Chemotherapy Activity	Drug Unit Weights		
Chemotherapy Treatment		Low	High
30 min. Infusion	76.79	84.86	575.57
60 min. Infusion	153.58	161.65	652.36
90-180 min. Infusion	273.89	281.96	772.67
181-360 min. Infusion	724.40	732.47	1,223.18
Radiation Therapy Activity			
Radiation Therapy Treatment	113.48		
Hyperfractionation	242.09		
Brachytherapy Treatment	288.19		
Simulations	225.71		
Mould Room Visit—Single	80.92		
Mould Room Visit—Multiple	269.72		
Dosimetry Visit—Single	107.60		
Dosimetry Visit—Multiple	416.93		
Invasive Procedure Activity			
Diagnostic			
Skin Biopsy	609.02		
Aspiration	536.44		
Other Biopsy	829.91		
Scopes	748.00		

The mean cost of all drugs used in a single chemotherapy visit was \$121.36. This compares with an average cost for infusion time set at \$167.68 or \$2.58 per minute. Chemotherapy activity (infusion time and drugs) cost between \$84.86 and \$1,223.18. The most expensive cancers to treat with chemotherapy on a per visit basis were non-Hodgkin's lymphoma (\$333.31) and small cell lung cancer (\$290.31). These results are consistent with previously published information.<sup>6</sup>

Invasive procedure information is extremely preliminary and subject to comparisons with experience in other Ontario outpatient environments. At present, diagnostic invasive procedure weights range between 536.44 and 748.00. Invasive therapeutic procedures have not been sufficiently subdivided into specific activities, and preliminary weights are not available at this time. Transfusion of blood products represents the majority of these procedures (67 percent).

Blood product transfusion was the most expensive charge identified in the evaluation of Boston outpatient cancer

activities.<sup>4</sup> It has not yet been priced at the OCFRF cancer centres because blood infusion times are not coded in the OPIS system. This item will be added to future coding requirements. In any case, there is no charge for blood components from the Canadian Red Cross, unlike the United States where a number of pricing schedules apply. For this reason, transfusions are not expected to be as expensive an item in the CVG system as in the APG system.

### Conclusions

This article presents a preliminary look at the first-generation Ontario outpatient CVGs. Because of the nature of ambulatory cancer care practice in Ontario, these groups offer an opportunity to Canadian and U.S. policymakers to view the full spectrum of encounters expected in outpatient or freestanding cancer centers in the absence of U.S. competitive forces. The groups are clinically meaningful and easily understandable by the oncology community. They are readily derivable from current information systems. As additional cancer

centres' financial information is analyzed, the case weighting results will become even more useful.

The data analysis presented in this article supports the hypothesis that for high-technology ambulatory specialties, such as cancer care, resource use is best measured by total cost (or, in the United States, charges) rather than by a proxy for resource use, such as total provider time. The technology used in outpatient cancer treatment is a more important determinant of cost than the body system being treated.

Although the CVGs were not developed specifically for reimbursement purposes, there is speculation that they may eventually be used for that purpose. The government of Ontario is now pursuing a transitional funding proposal that might see CMGs used for inpatient reimbursement at the same time that hospital outpatient activity measures are under active development. CVGs will provide some necessary additional information that will aid in the development of outpatient clusters. In any reimbursement system, the relative weights that are attached to the outpatient groups will be an integral factor in determining the final funding for these groups. The data presented support the conclusion that relative weights will vary greatly in any prospective pricing system that affects freestanding cancer centers. As technology and inpatient pressures continue to increasingly shift the focus toward outpatient care, the issue of reimbursement will become even more important. ■

### REFERENCES

1. Clarke, E., "Cancer Incidence, Mortality and Treatment in Ontario," *Cancer in Ontario, The Annual Report of the Ontario Cancer Treatment and Research Foundation* (Toronto: 1991).
2. Frei, E., "Fifty Years of Progress in Oncology," *American Cancer Society, Massachusetts Division, Cancer Manual*, 8th ed. (Boston: 1991).
3. Lion, J., et al., "Ambulatory Visit Groups: How They Perform for Oncology Outpatient Departments," *J. of Cancer Program Mgmt*, 1:3 (Spring 1987).
4. Lion, J., "Ambulatory Visit Groups in Cancer Care," *Outpatient Cancer Centers: Implementation and Management*, ed. S. Nathanson and D. Lerman (Chicago: American Hospital Publishing, Inc.: 1988).
5. Wodinsky, H., et al., "The Cost of Radiation Treatment at an Ontario Regional Cancer Centre," *Canadian Med. Assn. J.*, 137:10 (November 1987).
6. Wodinsky, H., et al., "Re-evaluating the Cost of Outpatient Cancer Chemotherapy," *Canadian Med. Assn. J.*, 137:10 (November 1987).
7. Lion, J. et al., *Cancer Chemotherapy in Ontario: Utilization and Costs in Free-Standing Centers*. Work in progress.