Integration of Cancer Care in the Management of Complex Patients

Health System Planning & Evaluation

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Overview

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6. Integration measures for cancer patients

Background

Previous ICES analyses found that among the 1% of the population who consume 34% of all health system costs, are those with complex chronic conditions, end of life ***and cancer***.

Our goals:

1. To improve our understanding of high-cost cancer patients and their trajectories of care in the health care system, including interactions with health care providers.
2. To assess opportunities to better coordinate care between cancer care and other providers in the health care system.

Questions

1. How often and in what ways do cancer patients encounter the health care system before, during and after cancer treatment?
2. What are the clinical characteristics, health system utilization patterns, and costs in the health care system for people who experience cancer before, during and after cancer treatment?
3. What are the implications for opportunities for cancer care to better integrate care (e.g. improve continuity of care) with other health care providers for complex patients?

Approach

1. Population analyses of cancer patients using administrative data. - Develop trajectories of cancer patients through cancer system
2. Literature synthesis regarding indicators for integrated cancer care and particularly coordination of care between cancer and non-cancer related health care providers.
3. Work with stakeholder panel to identify clinical management recommendations to improve integration of care for patients within and outside of the cancer system (ongoing…).

Empirical Analysis: Data Sources

- Registered Persons Database (RPDB)
- Ontario Cancer Registry (OCR)
- Ontario Health Insurance Plan Claims Database (OHIP)
- Discharge Abstract Database (DAD)
- National Ambulatory Care Reporting System (NACRS)
- ICES Physician Database (IPDB)
- Client Agency Program Enrolment (CAPE)
- Interactive Symptom Assessment and Collection (ISAAC)

Developing Trajectories of Cancer Care

- Identification of a cohort of Ontario adults, newly diagnosed individuals with cancer (n=88,749), between April 1st 2009 and September 30th 2010
- Cancer treatment period was from date of diagnosis until 3 months passed without a cancer-related health care visit
- Individuals were identified as high cost/complexity based on their being in the highest 10% expenditure category of total health care costs in the 12 months prior to and after cancer treatment (April 1st 2008 to September 30th 2011)
- Additional groups were created for those who died during or after cancer treatment and those with ongoing cancer treatment.
- Trajectories were created for patients based on their:
  i. cost/complexity in the year prior to cancer,
  ii. survival from cancer
  iii. cost/complexity in the year after treatment.

Frequency of cancer type among Ontario adults newly diagnosed with cancer between April 1st 2009 and September 30th 2010

- There were 88,749 individuals newly diagnosed with cancer between April 2009 and September 2010

Cancer Type	N (%)
Digestive System	18,302 (20.6%)
Male Genital System	12,949 (14.6%)
Breast	12,435 (14.0%)
Respiratory System	12,355 (13.9%)
Urinary System	5,703 (6.4%)
Female Genital System	5,657 (6.4%)
Lymphoma	3,896 (4.4%)
Skin excluding Basal and Squam	3,591 (4.0%)
Endocrine System	3,537 (4.0%)
Leukemia	2,416 (2.7%)
Oral Cavity and Pharynx	2,250 (2.5%)
Miscellaneous Malignant Cancer	2,068 (2.3%)
Brain and Other Nervous System	1,381 (1.6%)
Myeloma	1,154 (1.3%)
Soft Tissue including Heart	653 (0.7%)
Eye and Orbit	235 (0.3%)
Bones and Joints	167 (0.2%)

Frequencies of 10 trajectories (n=88,749), among Ontario adults newly diagnosed with cancer between April 1st 2009 and September 30th 2010

Pre-Cancer Complexity	Cancer outcome	Post-Cancer Complexity	N	% of Cancers
Low	Survived	Low	27,896	31%
Low	Survived	High	13,004	15%
Low	Survived	Died	3,779	4%
High	Survived	Low	5,258	6%
High	Survived	High	11,322	13%
High	Survived	Died	4,837	5%
Low	Ongoing	n.a.	4,518	5%
High	Ongoing	n.a.	1,869	2%
Low	Died	n.a.	8,054	9%
High	Died	n.a.	8,212	9%

***Trajectories selected for vignettes (70% of cancer patients)**

Top five cancer sites and stage of select trajectories, among Ontario adults newly diagnosed with cancer between April 1st 2009 and September 30th 2010

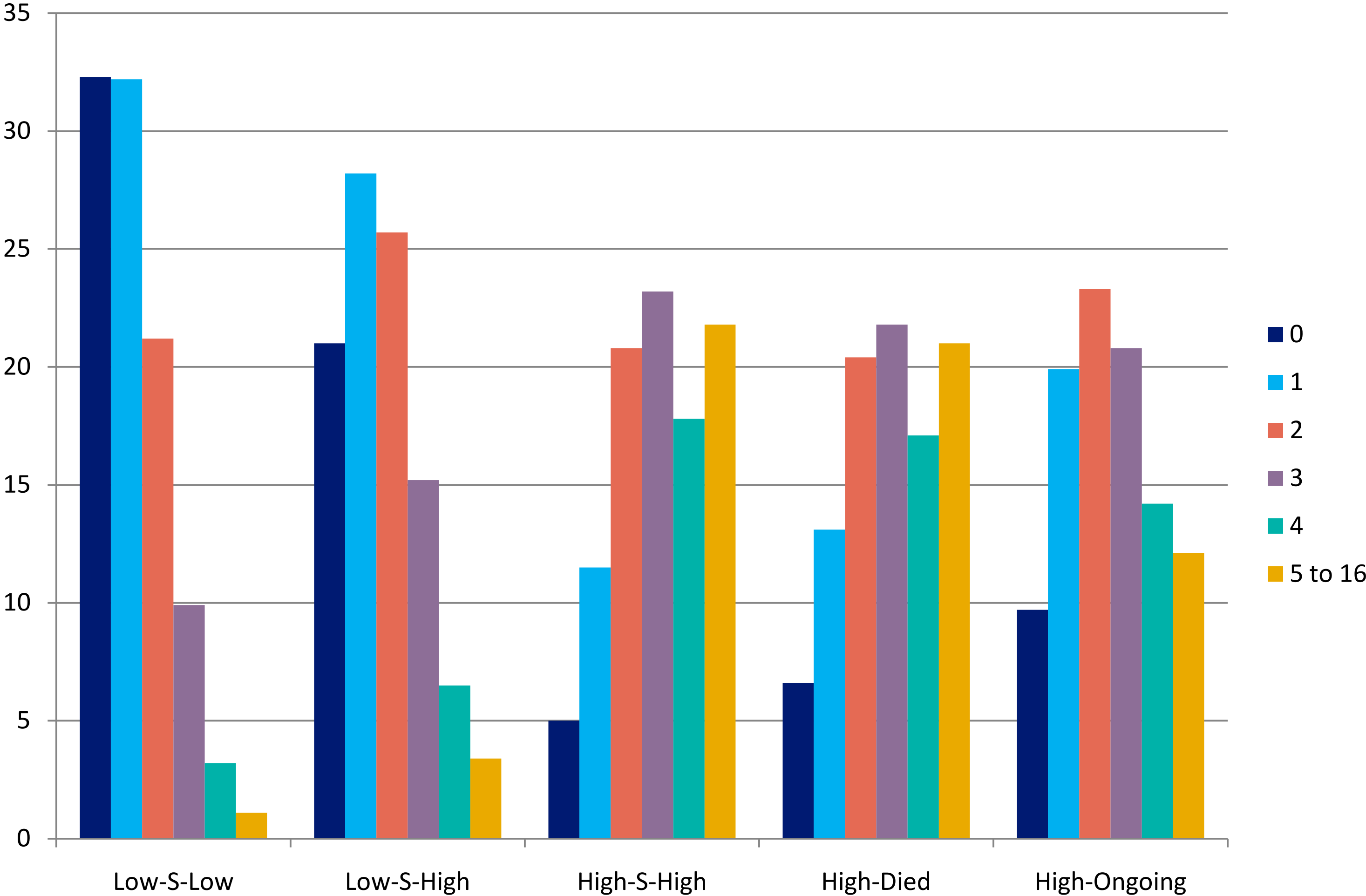
Low – Survived – Low	Low – Survived – High	High – Survived – High	High – Died –	High – Ongoing…
[2] Male Genital System	[2] Male Genital System	[2] Male Genital System	[4] Respiratory System	[3] Digestive System
[1] Breast	[1] Breast	[2] Digestive System	[4] Digestive System	[4] Digestive System
[2] Breast	[2] Breast	[1] Digestive System	[3] Respiratory System	[3] Respiratory System
[1] Female Genital System	[2] Digestive System	[2] Breast	[3] Digestive System	[4] Respiratory System
[2] Digestive System	[3] Digestive System	[1] Respiratory System	[2] Digestive System	[2] Digestive System

Many cancers are present in multiple trajectories. What differentiates the people in the different trajectories is less their cancer type than it is their other health conditions.

Demographic characteristics of Ontario adults newly diagnosed with cancer between April 1st 2009 and September 30th 2010, by trajectory

	Low – Survived – Low	Low – Survived – High	High – Survived – High	High – Died –	High – Ongoing…
Age at diagnosis (mean ± SD)	58.54 ± 13.15	64.39 ± 13.06	71.93 ± 11.77	74.35 ± 11.23	66.91 ± 13.06
Female, N (%)	14,773 (53.0%)	6,120 (47.1%)	5,405 (47.7%)	3,894 (47.4%)	907 (48.5%)

Number of baseline comorbid chronic conditions by trajectory of cancer care



Summary of population characteristics

- Less complex patients are younger with early stage cancer.
- Many cancers and stages are present in multiple trajectories.
- Multimorbidity relates to increasing complexity in the cancer system. The number of comorbid conditions rises sharply with increasing complexity.
- What differentiates the people in the different trajectories is less their cancer type than it is their other health conditions.

Physician Utilization During Cancer Treatment

	Low – Survived – Low	Low – Survived – High	High – Survived – High	High – Died –	High – Ongoing…
Primary Care Physician (GP/FP)* Visits per month					
Total visits	0.82 (0.24-1.00)	1.15 (0.30-1.25)	1.79 (0.42-1.83)	6.84 (1.51-9.69)	1.46 (0.58-1.83)
Cancer-related visits	0.24 (0.00-0.28)	0.32 (0.00-0.33)	0.38 (0.00-0.33)	4.25 (0.20-5.71)	0.68 (0.07-0.75)
Specialist Physicians* Visits per month					
Total visits	2.73 (1.46-3.07)	3.37 (1.67-3.75)	4.77 (2.08-5.32)	9.65 (3.46-14.05)	3.00 (1.84-3.69)
Cancer-related	1.19 (0.45-1.46)	1.20 (0.39-1.48)	1.37 (0.32-1.61)	3.44 (0.30-3.89)	1.07 (0.39-1.34)

***mean** (Q25-Q75)

Emergency Department Visits and Inpatient Admissions During Cancer Treatment

	Low – Survived– Low	Low – Survived – High	High – Survived – High	High – Died –	High – Ongoing…
Emergency Department (ED) Visits					
ED users, N (%)	8,165 (29.3%)	5,146 (39.6%)	4,792 (42.3%)	6,348 (77.3%)	1,506 (80.6%)
Cancer-related ED visits, %	2.0%	3.1%	2.7%	25.9%	14.6%
Inpatient Admissions					
Inpatient care users, N (%)	16,108 (57.7%)	7,442 (57.2%)	7,248 (64.0%)	7,661 (93.3%)	1,489 (79.7%)
Cancer-related admissions,%	51.6%	49.6%	52.6%	78.5%	64.4%

Total health system cost before, during, and after cancer treatment

	Low-S-Low	Low-S-High	High-S-High	High-Died	High-Ongoing...
Pre-Cancer	$1,292	$1,699	$14,916	$16,521	$11,489
During Cancer	$54,385	$70,010	$107,664	$264,152	$48,728
After Cancer	$1,441	$15,352	$21,401		

During cancer treatment findings

- The intensity of physicians visits increases with patient complexity
- ED visits are common but only rarely identified as cancer-related. Inpatient admissions are also common, majority are cancer-related.
- Total system costs are highest during the cancer episode. Patients who die use a much higher quantity of resources.

Literature Synthesis:
Coordination of Care Indicators

Search Strategy

- PubMed primarily used to search for peer-reviewed literature on integrated care between cancer and non-cancer healthcare providers, using relevant MeSH terms.
- Google® search was conducted to find grey literature on current measures of integrated care and coordination of care, used in Ontario and other jurisdictions
- Search terms included cancer, neoplasm, continuity of patient care, quality indicator, delivery of integrated care, integrated health care systems, patient satisfaction, primary care
- Limits:
  - Years: 2000-present
  - Language: English
- After removal of duplicates, we reviewed approx. 480 citations/ abstracts and retained those that appeared to measure continuity or coordination as a process or outcome indicator.
- Set of approx. 20 preliminary indicators, organized by theme/domains

Domain	Indicator Name
Physician experience	Physician involvement throughout the cancer trajectory
	Physician involvement in general medical and cancer care roles during cancer treatment
Patient experience	Family physician involvement in cancer care
	Patient experience of care collaboration between GPs and specialists
	Patient satisfaction with care
	Patient perceptions of continuity of care
	Integration of patient care
Health system/ utilization	Continuity of Care Index (COC) Index
	Usual Provider of Care (UPC) Index
	Emergency department visits
	Hospitalizations
	Patient Care Density
Quality of palliative care	Start of a new chemotherapy regimen in the last 30 days of life
	Received chemotherapy in the last 2 weeks (14 days) of life
	Hospital/Inpatient admissions
	Frequency of emergency department (ED) visits
	Location of death
	Access to palliative care
	Enrollment in palliative care near death

Continuity of Care During Cancer Treatment

	Low – Survived – Low	Low – Survived – High	High – Survived – High	High – Died –	High – Ongoing…
Concentration of Care*					
Usual Provider of Care (UPC) Index	0.31 (0.20-0.39)	0.30 (0.19-0.38)	0.30 (0.19-0.39)	0.29 (0.17-0.36)	0.26 (0.17-0.32)
Continuity of Care (COC) Index	0.17 (0.09-0.20)	0.16 (0.08-0.19)	0.16 (0.08-0.20)	0.15 (0.07-0.18)	0.12 (0.07-0.15)
UPC is a primary care physician, N (%)	1,914 (6.9%)	1,082 (8.3%)	1,434 (12.7%)	3,118 (38.0%)	302 (16.2%)

***mean** (Q25-Q75)

Continuity of Care

- The continuity of care is relatively low and stable across patients during their cancer treatment.
- A usual provider of care contributes to no more than 30% of physician visits. In palliative circumstances the proportion cared for primarily by a family doctor is highest at only 38%.

Summary

- Multimorbidity relates to increasing complexity; individuals across trajectories differ because of their comorbid health conditions and not the type of cancer, suggesting a greater need for enhanced chronic disease management and communication between cancer and non-cancer providers.
- Individuals that die during cancer treatment use a higher number of health system resources, and are likely to have been complex prior to diagnosis, in terms of cost and multimorbidity,
- Measures of integrated care suggest that greater continuity and coordination of care across all phases of cancer are associated with favourable perceptions of quality care and patient experiences.

Thank you

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