



# Integrating Care for Cancer Patients – Health Care Utilization across levels of Complexity

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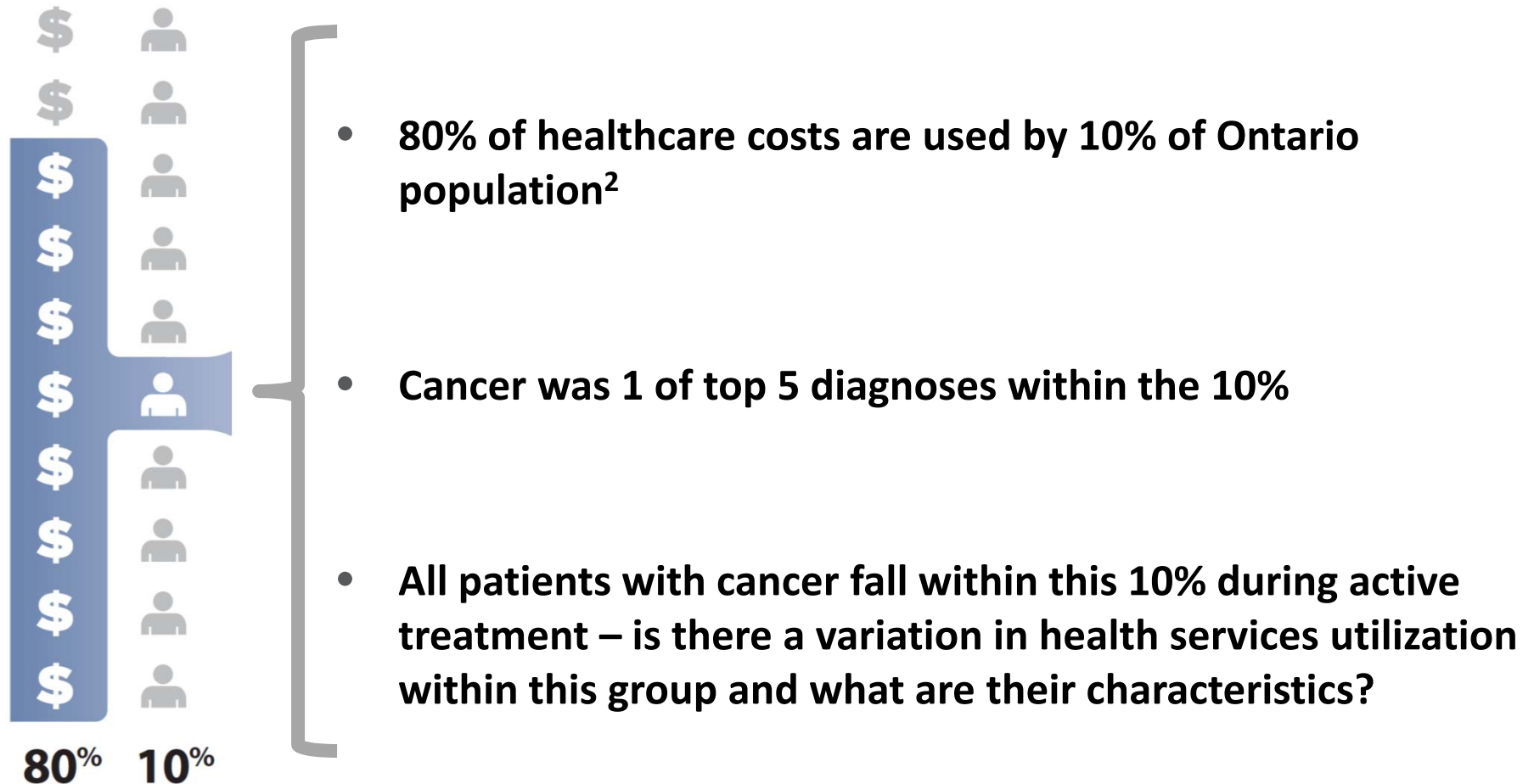


**Ontario**  
Cancer Care Ontario  
Action Cancer Ontario

# Introduction

- Cancer requires management across disease stages and involving multiple providers of care
- Patient-centered integrated care for patients with cancer is ensuring seamless transition along continuum, and has been the focus of considerable efforts over the past 10 or so years
- Integrated care benefits a subset of the population with complexities/comorbidities that require care from multiple providers and organizations<sup>1</sup>.
- By taking a stratified approach with an initial focus on complex patients, improvements to the delivery of care can be realized and lessons learned applied to benefit all patients.

# Rationale



# Objective

- To define and quantify complexity among patients with cancer, in order to identify opportunities for improved integrated care between the cancer system and other care providers.
- With patient complexity defined through health system utilization, we sought to describe the trajectories of cancer care in Ontario.

# Methods

- Retrospective cohort study of 88,749 adults in Ontario
  - Newly diagnosed with cancer identified between April 1st 2009 and September 30th 2010, using population-based health administrative data
- Resource intensity as defined by the cost of total healthcare use per year was used as a proxy for patient complexity and categorized as either 'high' (top 10%) or 'low' (bottom 90%) based on the percentile of total healthcare costs.
- Periods of active cancer treatment were defined as episodes that began with diagnosis and continued until there was a 90 day period with no cancer-related health system encounter (based on physician and hospital records)

# Methods

- Patients were grouped into care trajectories based on:
  - complexity in the year prior to diagnosis
  - complexity in the year after active treatment
  - whether they survived or died following/during treatment
- Clinical characteristics compared across trajectories:
  - cancer site and stage
  - multimorbidity
  - health system utilization measures

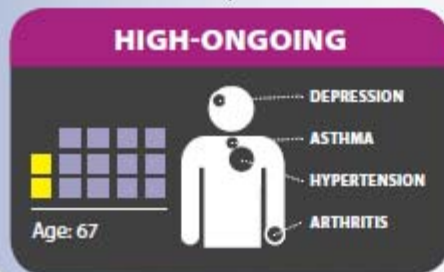
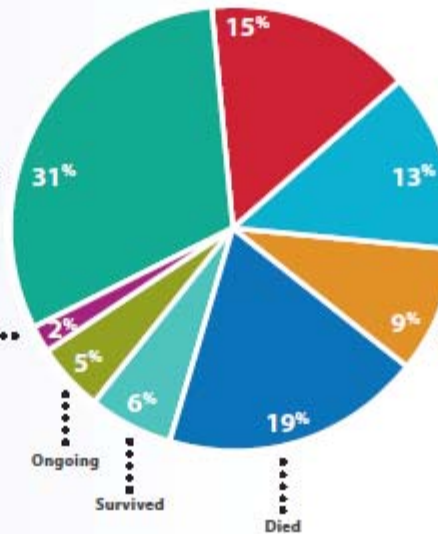
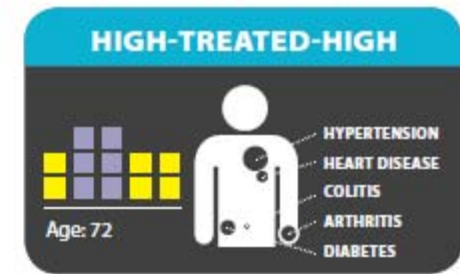
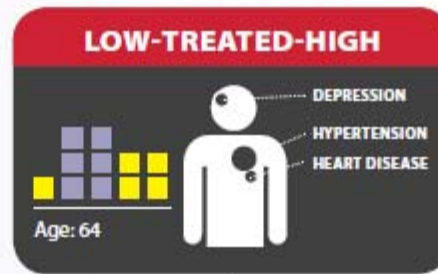
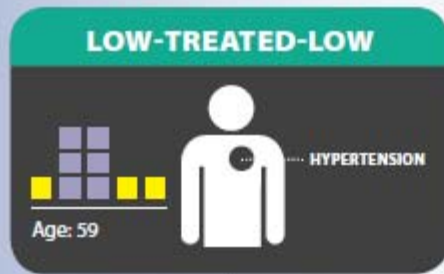
# Results

- Patients grouped into 10 different *trajectories* based on complexity & outcome of survived/died
- 5 of the care trajectories were examined in detail and represented 70% of the cohort.

80% of healthcare costs are used by 10% of the Ontario population. This 10% includes all cancer patients during treatment.



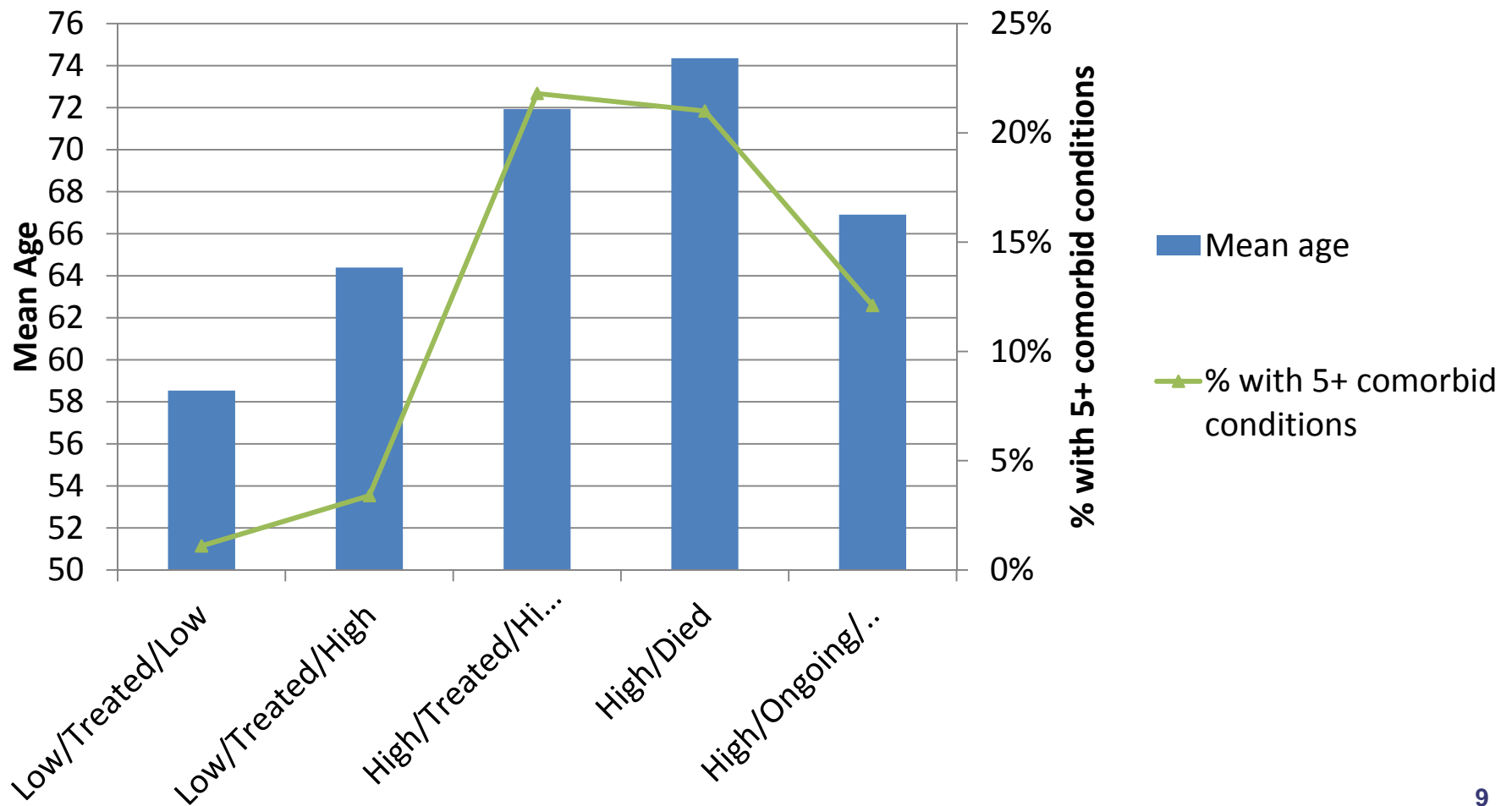
## 5 profiles of complexity





# Patient Characteristics

## Age & High # of Comorbid Conditions Increase with Complexity



# Patient Characteristics

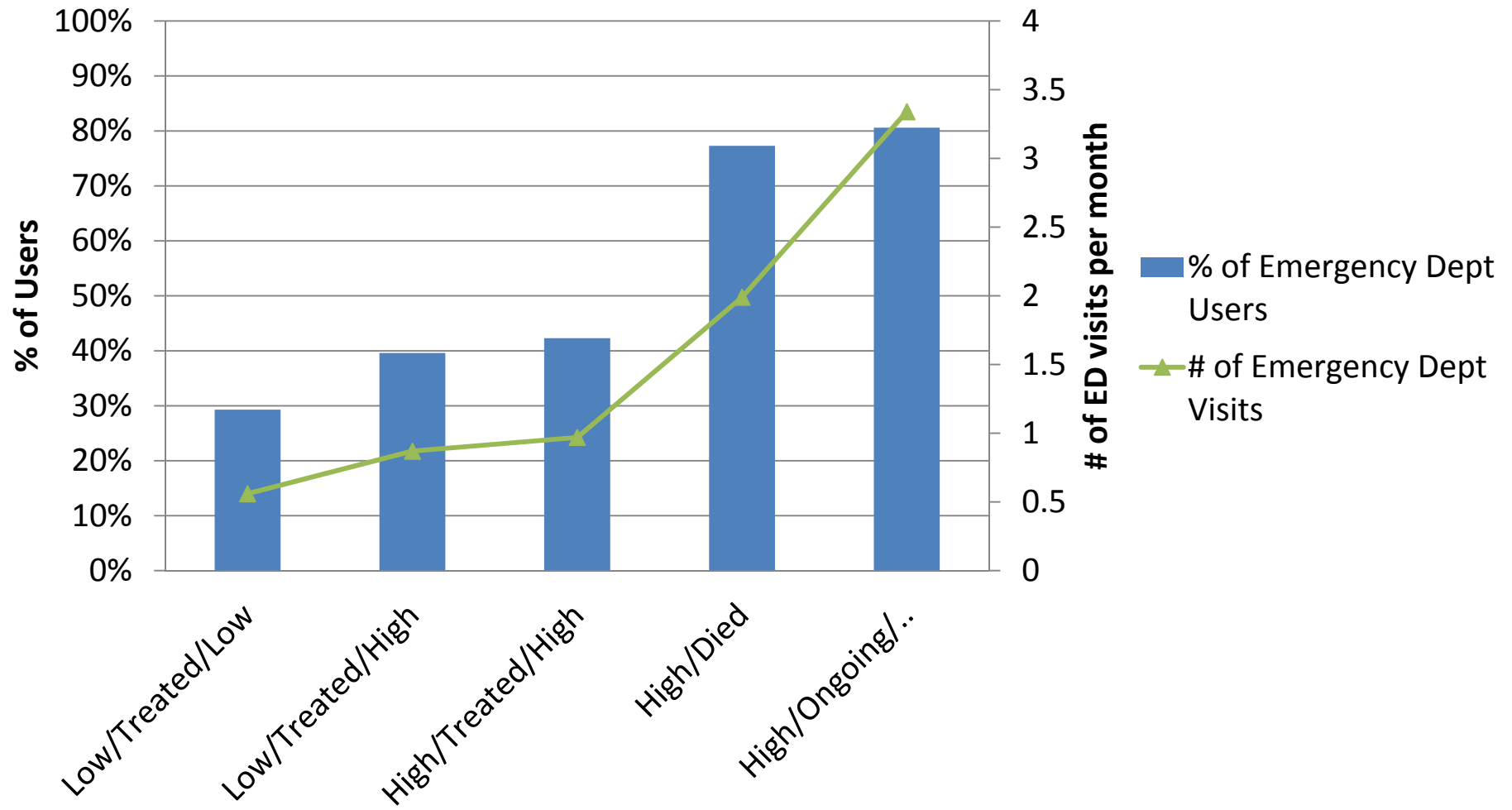
## Stage Increases with Complexity

	Low Treated Low	Low Treated High	High Treated High	High Died	High Ongoing
Most Common Disease Site	Male genital system	Male genital system	Male genital system	Respiratory system	Digestive system
Stage	2	2	2	4	3
2 <sup>nd</sup> Most Common Disease Site	Breast	Breast	Digestive system	Digestive system	Digestive system
Stage	1	1	2	4	4

Similar cancer **sites** in multiple trajectories  
 Increasing **stage** gradient across trajectories

# System Utilization – During Treatment

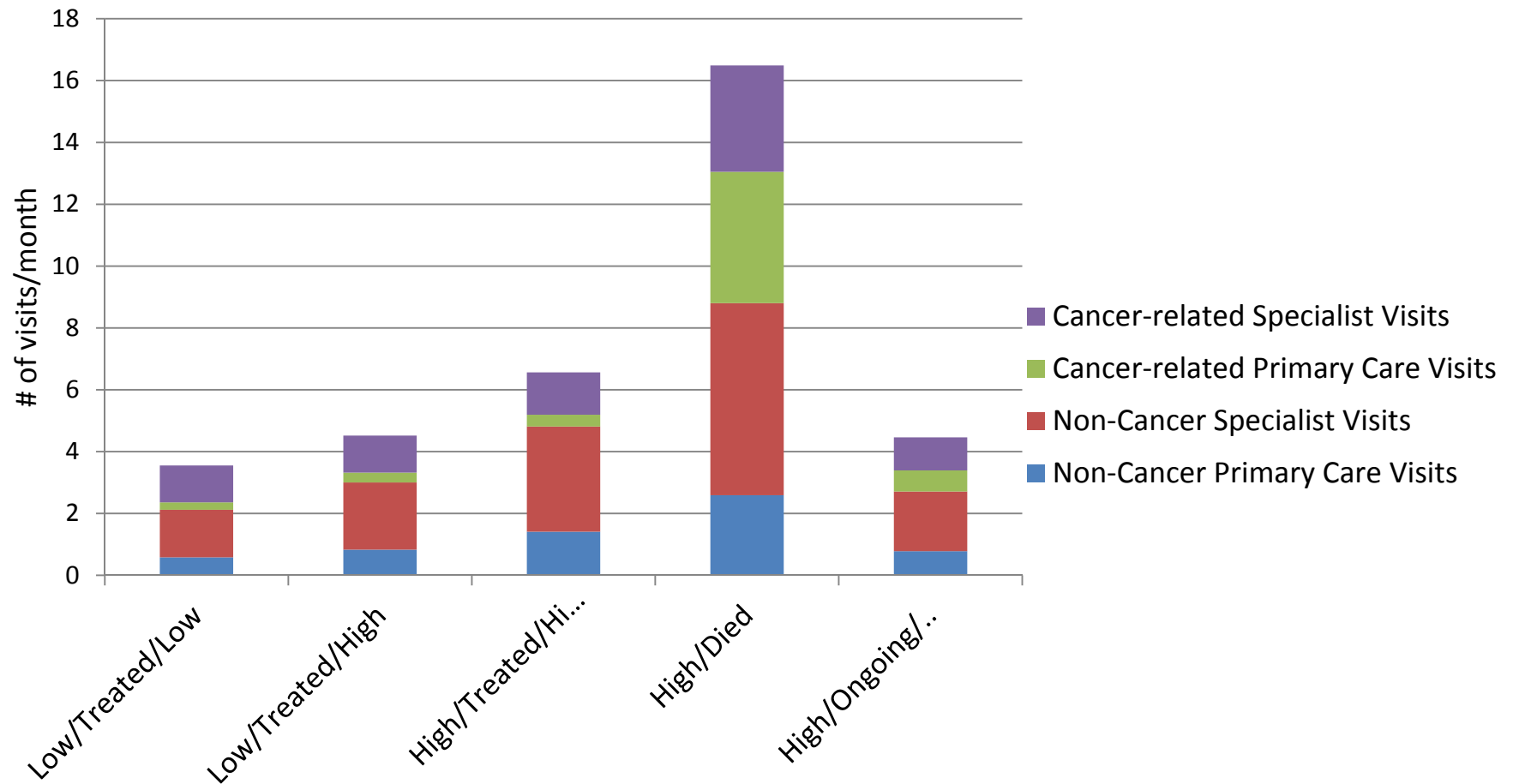
## Emergency Department Usage



As complexity increases, # of ED visits per month and usage increases

# System Utilization – During Treatment

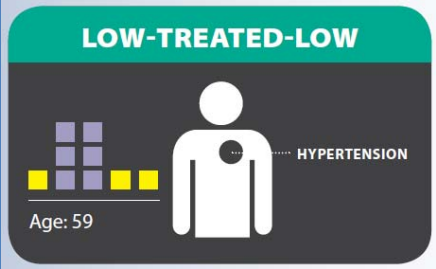
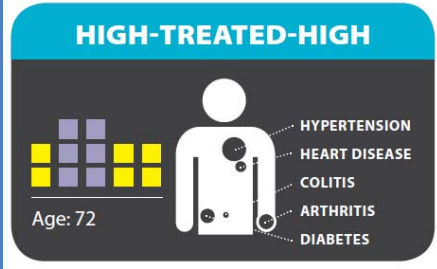
## Physician Visits per Month



As complexity increases, # of non-cancer physician visits per month increases

# Summary – Patient Characteristics & System Utilization

The *complexity* of these patients is not based on their cancers:

		vs.	
<b>Cancer Stage, Site</b>	Stage 2, genitals/ breast	vs.	Stage 2, genitals/ digestive system
<b>Median Age</b>	59	vs.	72
<b>5-16 Chronic Conditions</b>	1%	vs.	22%
<b>% of ED users</b>	29%	vs.	42%
<b># of Non-cancer physician visits</b>	2.1	vs.	4.8

## Discussion & Conclusions

- A significant proportion of cancer patients are defined as high users of the healthcare system and thus require an integrated approach between primary care and cancer specialists, particularly among patients that are more complex.
- Provincially there has been a particular focus on improving the care of high cost patients and improving coordinated care.

## Next Steps/Implications

- Integrated Care is a strategic focus of the Ontario Cancer Plan IV
- Early identification of complexity and development of care plans with the patient can lead to better coordination and integration
- Improving communications between providers at the time of referral, diagnosis, treatment and palliative/end-of-life is essential to enable the delivery of integrated care for complex patients
- Complex patients need ongoing support to manage co-morbidities and long-term side effects of treatment



**Thank You!**



# APPENDIX: Data Sources

## **Ontario Cancer Registry (OCR):**

- population-based cancer registry with all new cases of cancer since 1964 (except non-melanoma cancer).
- representative of 95% of the population.
- main data elements include details of cancer diagnosis, such as date of diagnosis and site of primary cancer.

## **Registered Persons Database (RPDB):**

- provides demographic information, such as age, sex, neighbourhood income level, and residence of all individuals that have ever held a valid Ontario health card number (OHIP), as well as death information such as date of death.

## **National Ambulatory Care Reporting System (NACRS):**

- captures information on outpatient visits to the hospital and community-based ambulatory care centres, including day surgery, outpatient clinics, and emergency department visits.

## **Discharge Abstract Database (DAD):**

- contains information on all hospitalizations at acute care institutions in Ontario.
- Each record represents an inpatient separation and includes information related to admissions, length of stay, and disposition.

# APPENDIX: Data Sources

## **Home Care Database (HCD):**

- clinical client-centered dataset that captures information on encounters between clients, service providers, and the Ontario Community Care Access Centres (CCACs).
- Examples of data elements in HCD include the types of services provided (nursing, social work, etc.), assessment data, and admission/discharge information.

## **Ontario Health Insurance Plan (OHIP):**

- OHIP claims database contains data on fee-for-service claims made by Ontario physicians that are covered and paid for by the OHIP.
- Each record in the database represents a single service and a diagnosis associated with that service. Elements used include: date and code of the service/procedure provided, as well as diagnoses associated with the service.

## **ICES Physicians Database (IPDB):**

- The IPDB is comprised of information from the OHIP Corporate Provider Database (CPDB), and the OHIP database of physician billings.
- Information from IPDB is used to identify physician characteristics, notably their specialty type.

# APPENDIX: Data Sources

## **Client Agency Program Enrolment (CAPE):**

- The CAPE dataset indicates the enrolment of patient with a specific practitioner or group, which may be part of a fee-for-service or blended capitation primary care model.

## **Interactive Symptom Assessment and Collection Tool (ISAAC):**

- The ISAAC database was used to capture patient-reported information on severity of symptoms, such as pain, nausea, and anxiety, as well as measures of functional status.

# APPENDIX: Methods - Complexity

## Patient Complexity:

- Resource intensity/health care expenditures used as a proxy for patient complexity
- Patients characterized as a high or low resource user according to whether their overall system costs fell within or below the top 10%.
- Total system costs were defined by the accumulation of community-based and institutional health system encounters (based on data from the NACRS, DAD, HCD and OHIP databases), using the following thresholds:

### Figures for high-cost (90<sup>th</sup> percentile) threshold, based on annual health system costs

Complexity category	2007-08	2008-09	2009-10	2010-11
High cost (90 <sup>th</sup> percentile)	\$ 3,041	\$ 3,620	\$ 3,764	\$ 3,668

High or low complexity was then assigned to each patient based on their resource intensity prior to, during and following treatment for their cancer.

# APPENDIX: Methods - Comorbidities

- At the time of cancer diagnosis, using a **look back period from 2001 to diagnosis**, patients were evaluated for the presence of comorbid chronic conditions.
- The **number of comorbid conditions** was calculated for each patient and were **categorized at 0, 1, 2, 3, 4, 5-16**. Diagnostic codes for the following conditions were ascertained from DAD, OHIP and NACRS databases:
  - congestive heart failure
  - chronic obstructive pulmonary disorder
  - Asthma
  - osteoarthritis or other arthritis
  - rheumatoid arthritis
  - Osteoporosis
  - chronic coronary syndrome
  - acute myocardial infarction
  - Hypertension
  - cardiac arrhythmia
  - Diabetes
  - Dementia
  - Depression
  - Stroke
  - renal failure

# APPENDIX: Methods – Health System Utilization

Measures to evaluate the level of system utilization were evaluated for each patient as follows:

- **Visits to primary care physicians** (general practitioners, family physicians), were identified using OHIP claims data and RPDB to identify physician specialty. Visits that were cancer-related were flagged using specific diagnostic codes.
- **Specialist visits** were also identified using OHIP claims data and RPDB data. They were considered cancer-related if the visit was billed by radiation or medical oncologist, or hematologist.
- **Acute care use** included cancer and non-cancer related emergency department visits and acute care hospitalizations, identified using information from the main problem or most responsible diagnosis fields in NACRS and DAD.
- **Home care use** included visits from service provider, coordinated through the CCAC, and were identified using HCD.
- **Continuity of care** was calculated using two methods and data from OHIP – to capture physician claims, and IPDB - to determine the specialty of the physician:
  - **Usual Provider of Continuity (UPC)** Index which measures the proportion of visits made to a usual provider of care (one provider);
  - **Continuity of Care (COC)** Index, which measures the concentration of visits to multiple providers and aims to identify whether there is a ‘dominant’ provider to whom a significant portion of visits can be attributed.

# APPENDIX: Patient Trajectories, N=88,749

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



Trajectories chosen for further analysis, representing 70% of cohort