UNPLANNED ONCOLOGY HOSPITALIZATIONS: DEVELOPMENT OF AN ONCOLOGY SERVICE IN A GENERAL MEDICINE PROGRAM

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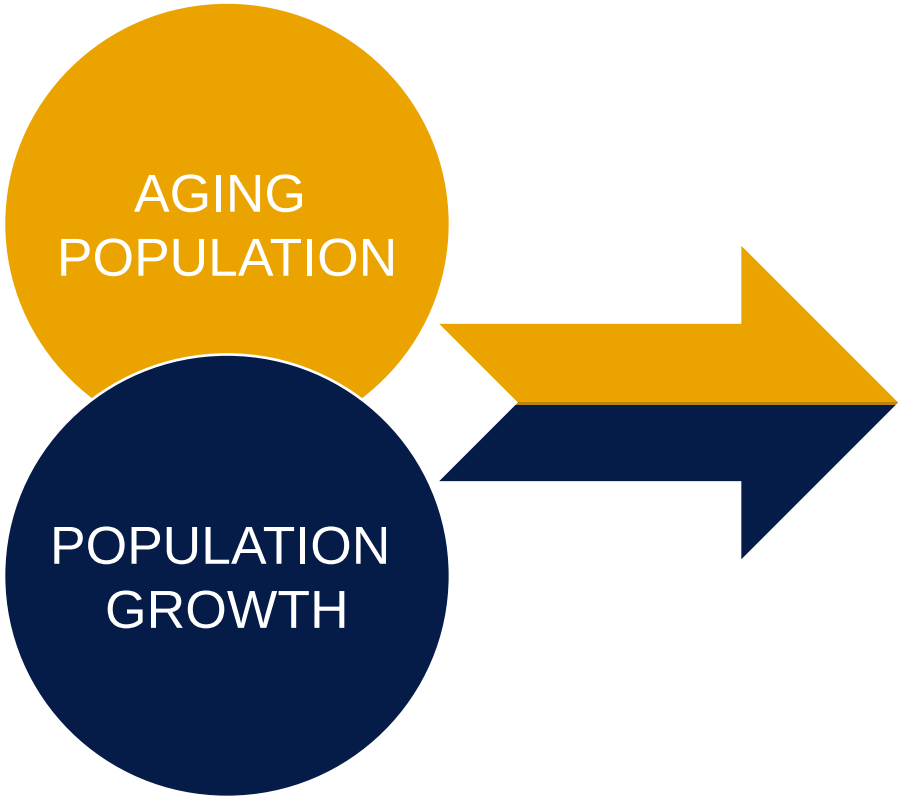
OBJECTIVES

- Review data on the rising volumes of oncology patients
- Define and analyze unplanned oncology admission outcomes
- Integrate health team efficacy and improved QOL of patients from the oncology service developed in the General Internal Medicine program at Toronto General Hospital
- Next steps: the future for Acute Oncology Services

CANCER STATISTICS:

INCREASING PATIENT VOLUMES



OVER THE LAST 3 DECADES THERE HAS BEEN A 188.9% INCREASE IN THE NUMBER OF NEW CANCER DIAGNOSES

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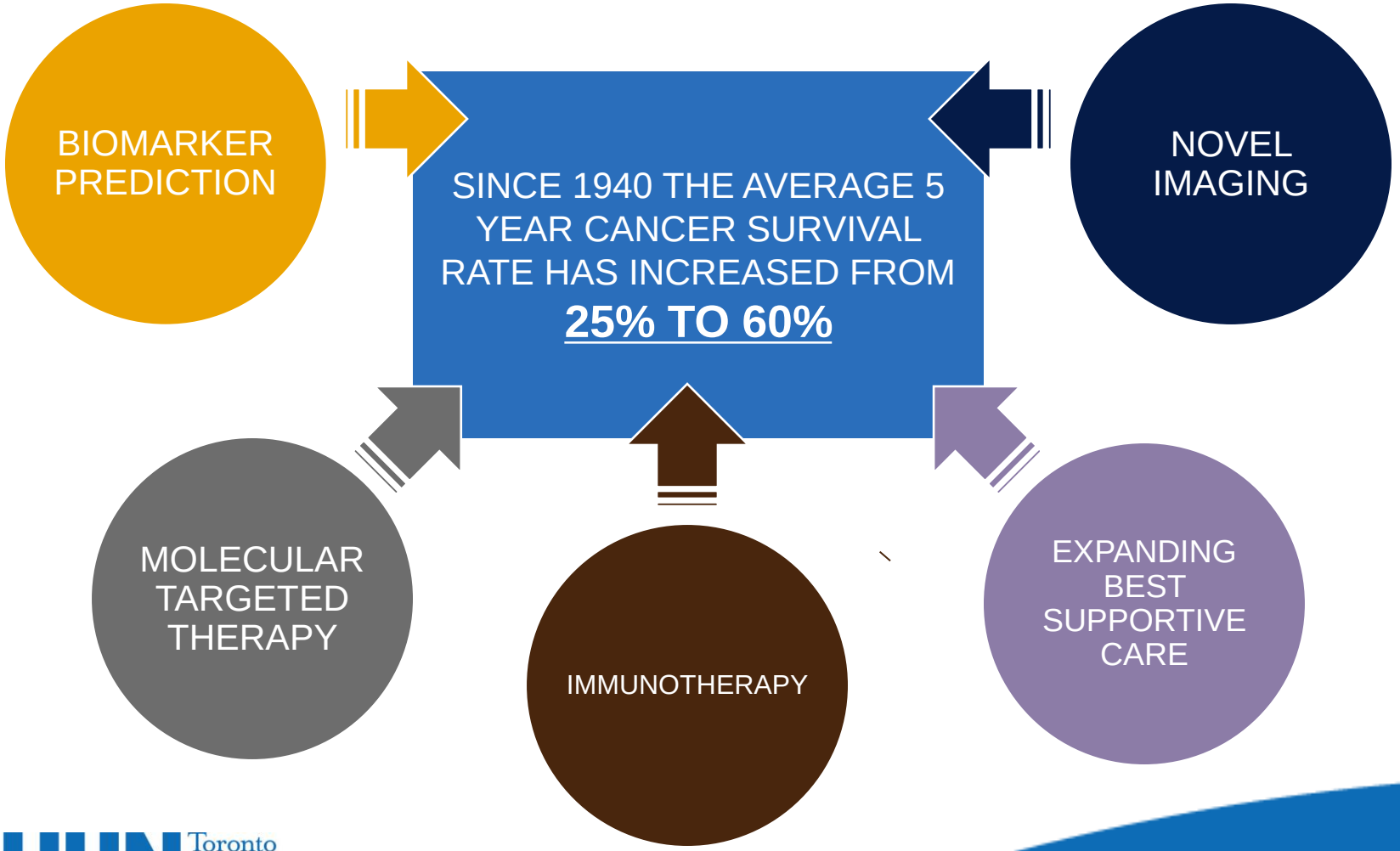
Cancer Care Ontario, 2016

CANCER STATISTICS:
INCREASING PATIENT VOLUMES



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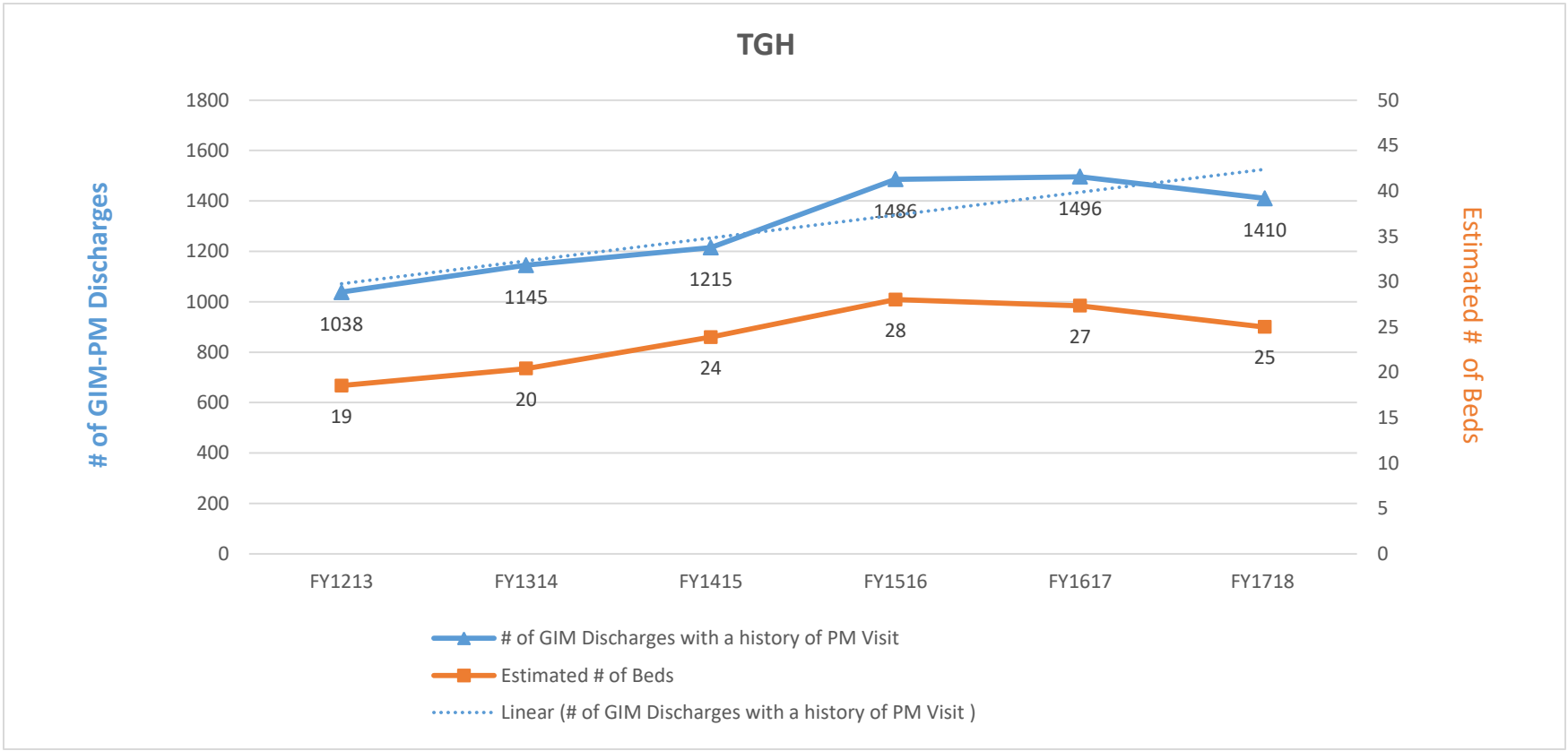
Trending
FY12/13 to FY17/18



Number of Beds= Total LOS / Number of Days in reporting Period

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WHAT IS AN **UNPLANNED ONCOLOGY HOSPITALIZATION?**

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DEFINED:

UNPLANNED ONCOLOGY HOSPITALIZATION

- An admission to hospital for the management of an **oncological emergency or complication** related to an underlying oncological condition or its treatment
- An admission to hospital for **symptom control or palliation**
- Unplanned does not include admissions for scheduled therapy or planned procedures*

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*Rocque et al 2013

UNPLANNED ONCOLOGY HOSPITALIZATION
DEFINED

CLASSIFICATION	ONCOLOGICAL EMERGENCY/COMPLICATION
Metabolic	Hypercalcemia, Electrolyte derangements, SIADH, TLS
Hematological	DIC, Leukostasis, GVHD, Hemolysis
Infectious	Febrile Neutropenia, Sepsis, Opportunistic infections
Neurological	Cauda equina, Brain mets with increased ICP
Cardiovascular	Tamponade, SVC Syndrome
Respiratory	Pleural Effusion, Pneumonitis, PE, Post-obstructive pneumonia
Thromboembolic	PE, DVT, Portal vein thrombus
GI	Bowel obstruction, Biliary obstruction, GI bleed, Encephalopathy
Other	Pain crisis, Mucositis, AKI, Failure to cope, disease progression, Palliation and End of life care

Superior Vena Cava Syndrome

- Majority due to malignancy
- External compression -mediastinal mass
  - Most common malignancies – lung cancer (both NSCLC and small cell) and lymphoma
- Thrombosis
  - More common now with catheters

Superior Vena Cava Syndrome

- Symptoms and signs:
  - Shortness of breath
  - Cough
  - Hoarseness
- On Physical Examination
  - Facial edema and plethora
  - Jugular venous distension
  - Venous distension of superficial veins on chest

Management of SVC Syndrome

- Tissue diagnosis critical for Rx decisions
  - Prognosis depends on underlying disease
- Treatment plan depends on tumor histology
  - Chemo-insensitive cancers (e.g. NSCLS) treated with upfront XRT
  - Chemo-sensitive tumors (e.g. small cell, lymphoma) treated with upfront chemo
  - Stent placement not usually done 1st line in cancers that may respond to chemo/RT
- => *Rarely fatal*

Spinal Cord Compression

- BACK PAIN!
  - New or worsening back pain with known vertebral mets mandates further evaluation
  - Pain may be radicular, but not always
- Weakness
  - Motor deficits more common than sensory
- Bowel and bladder symptoms occur late
- Neurologic exam may be normal
  - Key is early diagnosis
- MRI is imaging of choice

Spinal Cord Compression

- Initiate treatment earlier to prevent neurologic deficits
  - Once neurologic deficits occur, often irreversible
- Usually from epidural compression from vertebral body metastases
  - Most common tumors: lung, breast, prostate, myeloma, lymphoma
  - Thoracic spine most common location
- Intramedullary metastases less common

Management of Spinal Cord Compression

- Corticosteroids to decrease edema
  - Only short-term benefit (Should not be used if diagnosis unknown)
  - Typically 10 mg load then 4 mg q 6hrs
- Radiation 1st line treatment for most
- Upfront surgery reserved for:
  - Unknown diagnosis
  - Progression during or after radiation
  - Spinal instability
  - One RCT showed improved function with immediate surgery for less radiosensitive tumors with single area of compression

Febrile Neutropenia

- Fever
  - Oral temperature > 38.3˚ C (101˚ F) or 38.0 ˚ C (100.4 ˚ F) for > 1 hr
- Neutropenia
  - Absolute neutrophil count < 500 cells/□L or ANC < 1,000 with predicted nadir of < 500 in next 48 hrs

Febrile Neutropenia

- Risk for occult infection and mortality as ANC falls below 1,000/mm3
  - Greatest risk with ANC < 500/mm3
  - Mortality rate for solid tumors less than heme malignancies
- Growth factors (GCSF)
- Modestly cut duration of neutropenia and hospitalization
- No impact on mortality
- No significant benefit to empiric use of GCSF in uncomplicated F & N

Typical infectious sources of F&N

- Catheters
- Skin
- Respiratory tract
- Sinuses
- GI tract
- *=>Source identified in less than 30% of cases*
- *Endogenous flora in 80% of cases*

Likely Organisms

- Gram-positive infections (50-60%)
  - Staph epidermidis
  - Streptococcus
  - Enterococcus faecalis/faecium
- Gram-negative rods (more likely to cause death)
  - Enterbacteriaceae (E. coli, Klebsiella)
  - Pseudomonas aeruginosa

Treatment of Febrile Neutropenia

- Empiric antibiotic
  - broad spectrum with gram positive and gram negative coverage (especially Pseudomonas)
  - 3rd generation cephalosporin (ceftaz or cefepime)
- May depend upon local hospital bacteriology
- Alternatives:
  - Imipenem or meropenem
    - Higher rate C.diff colitis than cephalospoin
  - Beta-lactam allergy: Quinolone with gram pos
  - <1% cross-reactivity between 3rd generation ceph and PCN/1st gen cephalosporin

"Low risk" F & N

- Outpatient Empiric Antibiotic Treatment still controversial (e.g. Cipro + Amox/Clav)
  - anticipated duration of neutropenia < 7 days
  - solid tumor
  - clinically stable
  - no major morbidities
  - adequate oral intake and social supports
  - malignancy responding to current treatment
  - 24/7 access to health care for monitoring

Hypercalcemia

- Occurs in up to 20% of cancer patients
  - Both solid tumors and leukemia
  - Most common: breast, lung, myeloma
    - Incidence ↓↓ among metastatic breast and myeloma pts with routine bisphophonate use
- Urgent rx for hypercalcemia important for palliation, but long-term control requires effective anti-cancer therapy

Causes of Hypercalcemia

- Humoral hypercalcemia of malignancy
  - Tumors secrete PTHrP
  - Most common cause
- Local osteolytic hypercalcemia
  - Mainly in breast, myeloma, and lymphoma
- 1,25 (OH)2D-production by tumor
  - Rare and occurs only in lymphoma
- Ectopic PTH
  - Extremely rare – isolated case reports

Drug therapy for hypercalcemia

- Inhibit osteoclastic bone resorption
  - Bisphosphonates (2-4 days for max effect)
  - Calcitonin (immediate; tachyphylaxis in 2-3d)
- Increase urinary calcium excretion
  - Normal saline to volume replete
- Loop diuretic can be added if needed to manage volume
- Antibody to RANKL inhibits osteoclast activity
- Dialysis
  - Only in rare circumstances – e.g. CHF does not allow aggressive volume repletion or oliguric renal failure

Tumor lysis syndrome

- Large tumor burden with rapid cell kill
- More common with aggressive leukemia and lymphomas, e.g Burkitt's
  - Uncommon with solid tumors
  - Risk highest during induction chemo when tumor burden greatest
- Fatal complications include arrhythmias and renal failure
- Oliguria poor prognostic sign

Laboratory abnormalities

- Serum potassium > 6.0 mg/dL
- Serum uric acid > 8 mg/dL
- Serum phosphate ≥ 4.5 mg/dL
- Serum calcium < 7 mg/dL

Management of TLS

- Prophylaxis/prevention key
  - Aggressive hydration to maintain urine output
  - Allopurinol vs rasburicase for prevention
- Treatment
  - Rasburicase - recombinant urate oxidase
    - Converts uric acid to allantoin which is more soluble in urine than uric acid
    - Contraindicated in G6PDH deficiency
- Dialysis if oliguric or persistent metabolic abnormalities or severe symptoms

ARE UNPLANNED ONCOLOGY HOSPITALIZATIONS PREVENTABLE?

UNPLANNED ONCOLOGY HOSPITALIZATION

REVIEW OF THE LITERATURE

NO MATTER HOW DILIGENT OR AGGRESSIVE THE AMBULATORY CARE IS, **UNPLANNED HOSPITALIZATIONS CAN BE UNPREVENTABLE!**

- Patients with advanced malignancies commonly have **unplanned, repeated and prolonged** hospitalizations
- Patients often are admitted with multiple conditions: **Symptoms, organ failure, psychological distress, social frailties**

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Numioc et al, 2013
Rocque et al 2013

UNPLANNED ONCOLOGY HOSPITALIZATION

REVIEW OF THE LITERATURE

UNPLANNED HOSPITALIZATION OF PATIENTS WITH ADVANCED MALIGNANCY **STRONGLY PREDICTS A MEDIAN SURVIVAL OF LESS THAN 6 MONTHS!**

- The frequency of unplanned hospitalizations near the end of life have been increasing
- Approximately 40% of patients are found to have progression of their malignancy during an unplanned hospitalization

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Numioc et al, 2013
Rocque et al 2013
Sadik et al 2014

DEVELOPMENT OF AN ONCOLOGY SERVICE IN GENERAL INTERNAL MEDICINE:

WHY?

- Increased volume of patients = increased unplanned admissions
- Patient Experience
- Limited # of acute care beds in cancer center

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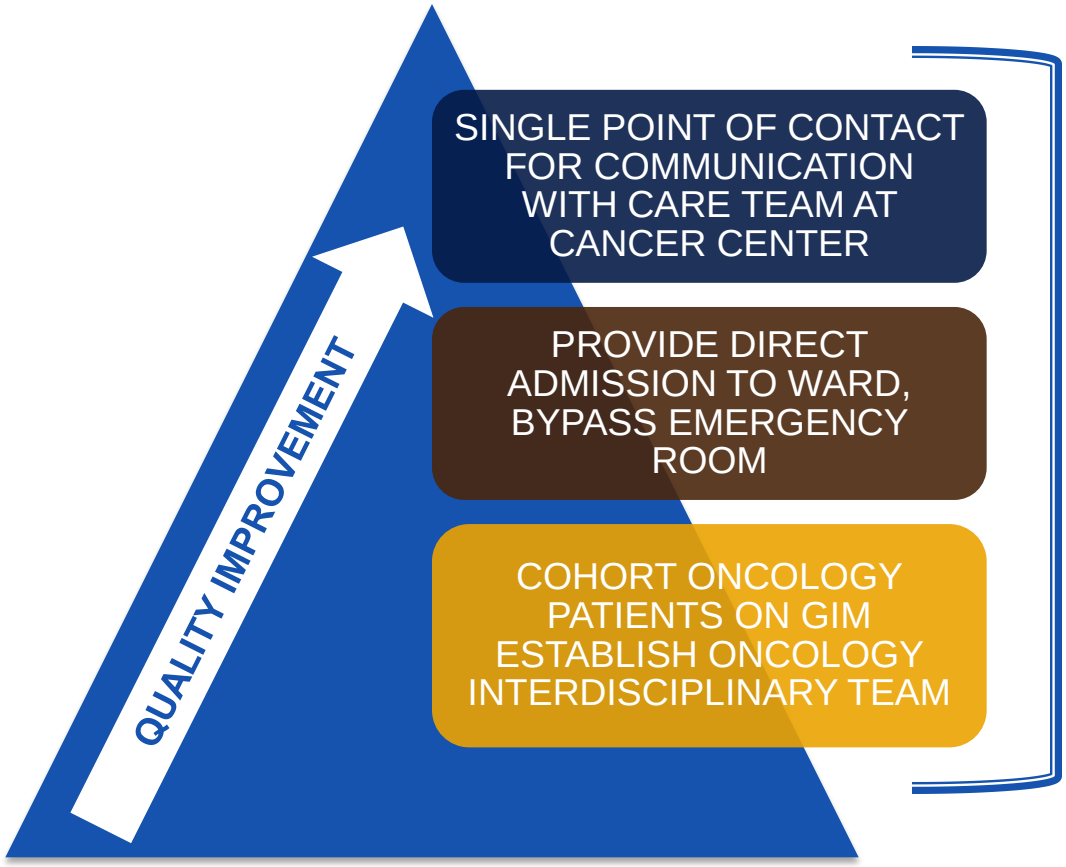
DEVELOPMENT OF ONCOLOGY SERVICE IN GENERAL INTERNAL MEDICINE



- Leadership
- Research
- Clinical Care
- Education

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Numioc et al, 2013
Rocque et al 2013
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ONCOLOGY SERVICE IN GENERAL INTERNAL MEDICINE
OBJECTIVES




CLINICAL CARE	LEADERSHIP	EDUCATION	RESEARCH
• Delivery of timely oncology focused assessments & interventions • Decreased time to symptom control • Avoidance of unnecessary investigations • Address goals of care and advance care planning	• Improve patient pathways: direct admit from clinic, avoid ED visits • Standardize communication with oncology team at cancer center • Establish partnerships with consultant services	• Oncology Education and support for frontline GIM staff • Opportunity for trainees to receive acute oncology and palliative care exposure	• Length of stay • Patient trajectory • Readmission rates • Resource utilization • Health Care expenditure

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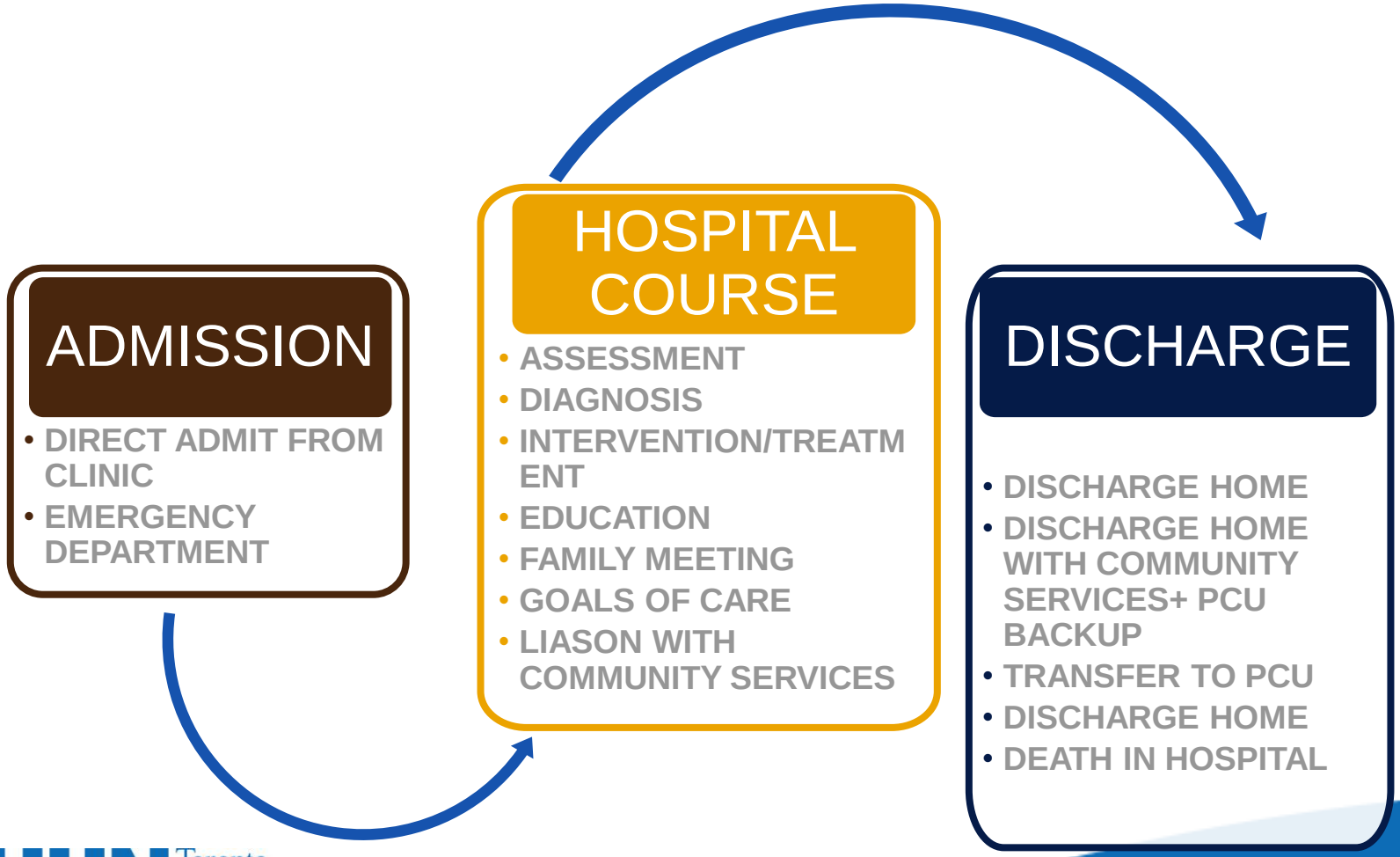
ONCOLOGY SERVICE IN GENERAL INTERNAL MEDICINE
PROCESSES



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ONCOLOGY SERVICE IN GENERAL INTERNAL MEDICINE

LENGTH OF STAY

DISCHARGE FISCAL YEAR	TGH	TWH
FY1415	7.2	6.9
FY1516	6.9	7.7
FY1617	6.7	9.4
FY1718	6.6	9.0

ONCOLOGY SERVICE IN GENERAL INTERNAL MEDICINE

ONCOLOGY SERVICE ADMISSIONS BY DIAGNOSIS

Type of Cancer	System of Cancer	GIM with PMH Visits in Last 3 Months	
		N	% of Total GIM in FY1617
Malignant	Malignant neoplasms of lymphoid, haematopoietic and related tissue	426	24.2%
	Malignant neoplasms of digestive organs	307	17.5%
	Malignant neoplasms of respiratory and intrathoracic organs	215	12.2%
	Malignant neoplasms of female genital organs	117	6.7%
	Malignant neoplasms of male genital organs	81	4.6%
	Malignant neoplasm of breast	80	4.5%
	Malignant neoplasms of urinary tract	68	3.9%
	Malignant neoplasms of ill-defined, secondary and unspecified sites	66	3.8%
	Malignant neoplasms of lip, oral cavity and pharynx	58	3.3%
	Malignant neoplasms of eye, brain and other parts of central nervous system	26	1.5%
	Malignant neoplasms of mesothelial and soft tissue	23	1.3%
	Malignant neoplasms of thyroid and other endocrine glands	14	0.8%
	Malignant neoplasms of bone and articular cartilage	8	0.5%
	Malignant neoplasms of independent (primary) multiple sites	0	0.0%
Benign neoplasms		7	0.4%
History of neoplasm		80	4.5%
In situ neoplasms		0	0.0%
Neoplasms of uncertain or unknown behaviour		55	3.1%
Non Cancer		96	5.5%
Total GIM with PMH Visits in Last 3 Months for FY1617		**1,759**	

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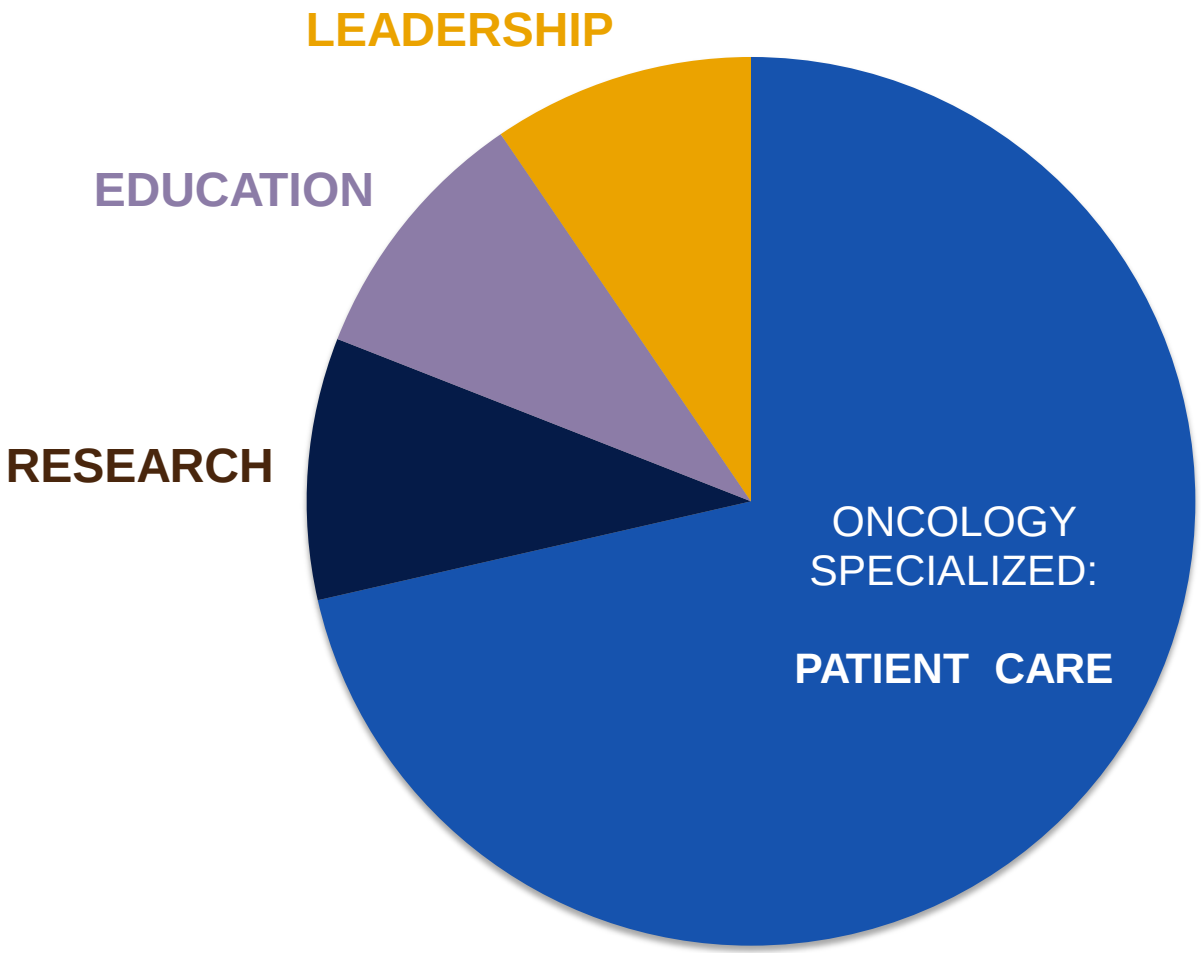
ONCOLOGY SERVICE IN GENERAL INTERNAL MEDICINE
ONCOLOGY SERVICE ADMISSIONS BY DIAGNOSIS– FY1718 YTD Q4

Type of Cancer	System of Cancer	GIM with PMH Visits in Last 3 Months	
		N	% of Total GIM in FY718 YTD Q4
Malignant	Malignant neoplasm of breast	62	3.7%
	Malignant neoplasms of bone and articular cartilage	4	0.2%
	Malignant neoplasms of digestive organs	285	17.0%
	Malignant neoplasms of eye, brain and other parts of central nervous system	16	1.0%
	Malignant neoplasms of female genital organs	110	6.6%
	Malignant neoplasms of ill-defined, secondary and unspecified sites	73	4.4%
	Malignant neoplasms of lip, oral cavity and pharynx	50	3.0%
	Malignant neoplasms of lymphoid, haematopoietic and related tissue	395	23.6%
	Malignant neoplasms of male genital organs	120	7.2%
	Malignant neoplasms of mesothelial and soft tissue	27	1.6%
	Malignant neoplasms of respiratory and intrathoracic organs	222	13.2%
	Malignant neoplasms of thyroid and other endocrine glands	12	0.7%
	Malignant neoplasms of urinary tract	82	4.9%
Benign neoplasms		6	0.4%
History of neoplasm		51	3.0%
In situ neoplasms		0	0.0%
Neoplasms of uncertain or unknown behaviour		48	2.9%
Melanoma and other malignant neoplasms of skin		46	2.7%
Non Cancer		68	4.1%
Total GIM with PMH Visits in Last 3 Months for FY1718 YTD Q4		**1,677**	

ONCOLOGY SERVICE IN GENERAL INTERNAL MEDICINE

ROLE OF THE PHYSICIAN ASSISTANT/NURSE PRACTITIONAIR



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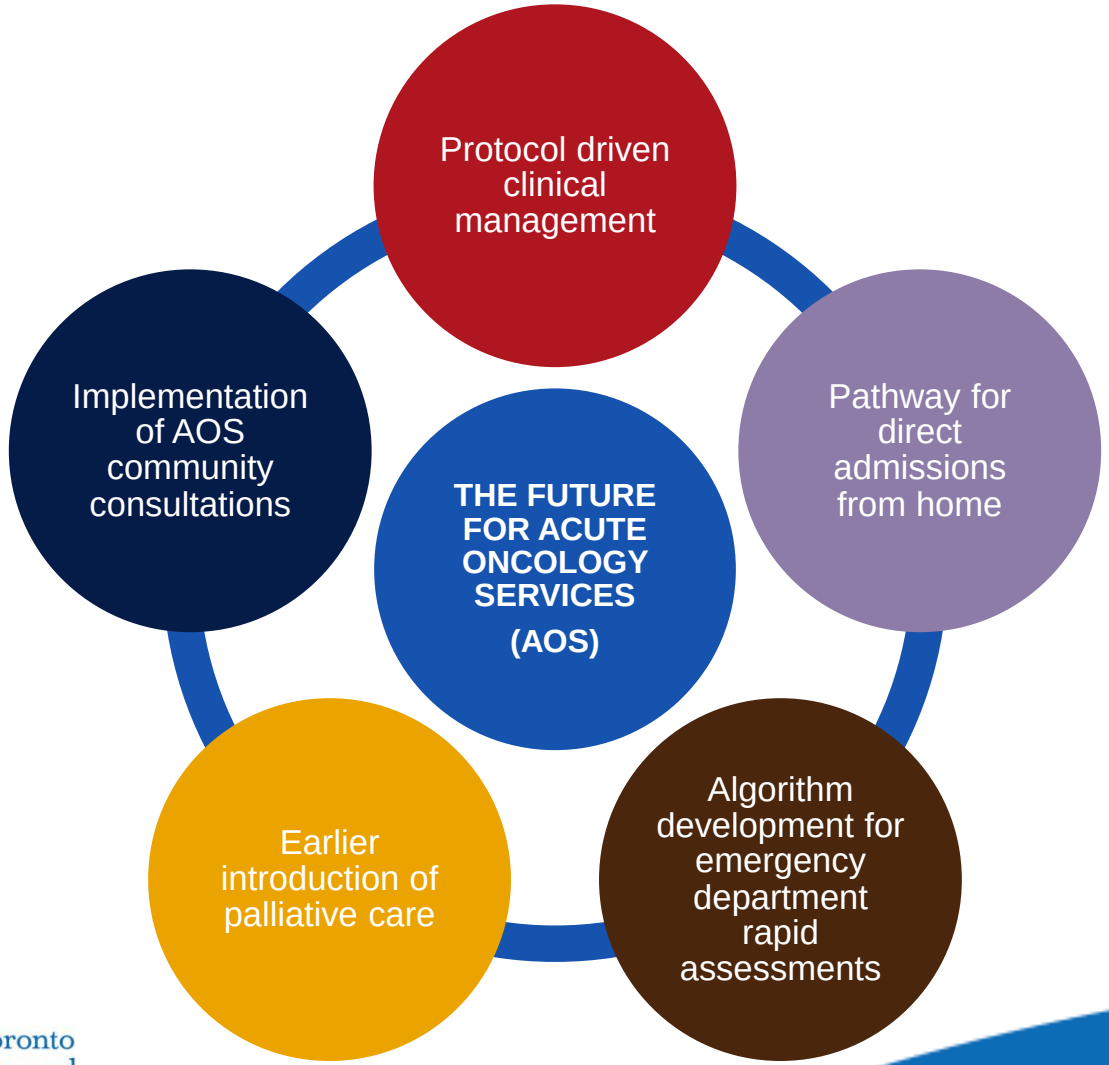
NEXT STEPS

SUGGESTIONS FROM THE LITERATURE



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Numico et a, 2013
Young et al 2016

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Special thanks to my colleague

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