Developing Canadian Oncology Goals and Objectives for Medical Students: A National Delphi Study

Vincent C Tam[1], Paris-Ann Ingledew[2], Scott Berry[3], Sunil Verma[3], Meredith E. Giuliani[4]

[1]Department of Oncology, Tom Baker Cancer Centre, University of Calgary

[2]Department of Radiation Oncology, Fraser Valley Cancer Centre, University of British Columbia

[3]Division of Medical Oncology and Hematology, Sunnybrook Odette Cancer Centre, University of Toronto

[4]Department of Radiation Oncology, Princess Margaret Cancer Centre, University of Toronto

CORRESPONDING AUTHOR:

Dr. Vincent C Tam

Tom Baker Cancer Centre

1331 29th Street NW

Calgary, Alberta T2N 4N2

Word Count: Abstract – 250 Text – 2351

ABSTRACT

Background: Previous studies found that oncology education in Canadian medical schools is inadequate. This study aimed to develop oncology goals and objectives for medical students through a national consensus of oncology educators.

Methods: A comprehensive list of oncology objectives was created using existing resources. Experts in oncology education and undergraduate medical education (UME) from all 17 Canadian medical schools were asked to participate in a 3-round modified-Delphi consensus process. For round 1, objectives were scored on a 9-point scale according to the degree with which experts agreed an objective should be taught in UME. Objectives with a mean score of ≥7.0 were included. Round 2 was a web meeting where objectives with a mean score of 4.0-6.9 were discussed. In round 3, experts voted on inclusion and exclusion of round 2 objectives.

Results: 34 of 37 (92%) invited experts from 14 medical schools participated. Experts consisted of oncologists, family physicians and UME curriculum committee members. The comprehensive list reviewed in round 1 contained 214 objectives. 146 received a mean score ≥7.0 and 68 scored 4.0-6.9. Nine new objectives were suggested. Main themes of expert

comments were to minimize the number of objectives and aim objectives at the family physician knowledge level. In round 2, 77 objectives were discussed. In round 3, >75% of experts agreed to include 7 additional objectives.

Interpretation: Through a systematic process we have created a comprehensive and consensus-based set of oncology goals and objectives to facilitate UME curriculum design and improve oncology education for medical students.

INTRODUCTION

It is estimated that 40% of Canadians will develop cancer in their lifetime and cancer is now the leading cause of death in Canada.[1] Most physicians, regardless of their specialty, will be involved in the care of patients with cancer. Medical students who go on to pursue careers in family medicine, internal medicine and many of its sub-specialties will be involved in screening, diagnosis, and follow-up of cancer patients.[2] Despite these responsibilities, studies have shown that there is a deficiency in focused oncology teaching during medical school in Canada, the United Kingdom and many other European countries.[3-7] Our recent national survey study showed that the majority of educators and learners believe oncology education in Canadian undergraduate and postgraduate family medicine and internal medicine training programs is currently inadequate.[4] When comparing the teaching of ten different medical subspecialty-related diseases, the educators and learners agreed that oncology was the most poorly taught to medical students, while cardiology and gastroenterology were ranked as the most well taught. The survey also showed that a standard set of oncology objectives for medical students was thought to be useful by 95% of undergraduate medical education (UME) curriculum committee members and 91% of medical students.[4]

The Australian Cancer Society's Ideal Oncology Curriculum for Medical Schools[8] was developed after a study had shown that graduating medical students at Australian medical schools reported significant variability in experience and lack of important oncology knowledge.[9] This Ideal Oncology Curriculum document has been subsequently used to develop new oncology curricula for medical schools in Australia.[10] In Canada, there is no equivalent consensus regarding how oncology should be taught to medical students. Various medical schools, such as the University of British Columbia and University of Alberta, have their own set of oncology objectives for their students, but many other schools do not have a comprehensive set of oncology objectives or a dedicated oncology curriculum.[4] Developing a standard set of oncology goals and objectives based on a national consensus by oncology educators may address the needs of Canadian medical students so that they are better prepared to care for cancer patients in the future.

METHODS

Drafting Oncology Goals and Objectives for Medical Students

Oncology-related objectives from the Medical Council of Canada,[11] Australian Ideal Oncology Curriculum for Medical

Schools[8] and existing objectives from various Canadian medical schools were reviewed to generate an inclusive preliminary draft of potential oncology goals and objectives. The Canadian medical schools with existing oncology objectives, and who were willing to share this information, were University of British Columbia, University of Alberta, University of Western Ontario, University of Ottawa and Dalhousie University. A comprehensive draft was created and the goals and objectives were categorized into the following headings: Basic Science of Oncology, Public Health, Diagnosis, Treatment, Prognosis, Knowledge of Common Cancers, Psychosocial Issues, Ethics and Professionalism, Communication, and Essential Oncology Experiences for Medical Students.

Study Population

After obtaining ethics approval from the University of Calgary Conjoint Health REB 37 Canadian oncology educators known to have an interest in UME from all of the 17 medical schools across the country were contacted by e-mail and asked to participate in this study. The group consisted of oncologists (medical, radiation, surgical, gynaecologic, paediatric), family physicians, UME assistant/associate deans, UME curriculum committee members, and medical and radiation oncology training program directors. Delphi panels generally

include less than 50 participants due to feasibility issues.[12] Based on similar studies, we anticipated that 25 to 40 participants would be optimal for this study.[13,14]

Modified-Delphi Process

The modified-Delphi process for this study was created using reference resources describing the Delphi process and previous similar consensus studies as a guide.[13-15]

Oncology educators who agreed to participate were e-mailed a survey containing the list of draft goals and objectives. They were asked to assess each of the potential objectives and score it on a Likert scale (1=strongly disagree to 9=strongly agree) according to the degree to which they believe each objective should be taught to medical students. Participants were also given the opportunity to suggest new objectives for inclusion in the subsequent rounds of the Delphi process. Items receiving a mean score ≥7.0 were automatically included in the final goals and objectives while those with a mean score of 1.0 to 3.9 were automatically excluded. Objectives with a mean score between 4.0 and 6.9 were marked for discussion in the second Delphi round. Oncology educators who failed to respond to the initial invitation within 2 weeks were sent a follow-up e-mail reminder.

The second Delphi round was a web meeting where the objectives from round one with a mean score of 4.0 to 6.9 and any newly suggested objectives proposed during the previous round were discussed. Reasons for inclusion or exclusion of these objectives from the final list were discussed in detail.

In the third Delphi round, participants were e-mailed a survey including a summary of the discussion points from the second Delphi round web conference. They were asked whether each of the objectives discussed in round two should be included or excluded from the final goals and objectives list. In Delphi studies, there is a variation in the definition of consensus agreement. Some studies defined this as not less than 55% agreement, while others defined it as 100% agreement.[15] In our study, objectives voted to be included by ≥75% of round three participants were included in the final goals and objectives. This is consistent with a level of agreement used in a number of previous studies.[13,14]

The final goals and objectives were assembled, refined and categorized into the headings listed above. The participants were e-mailed a draft of the final document and suggestions for changes to the wording of the goals and objectives were

considered. No other additions or deletions of objectives were allowed. The goals and objectives were subsequently finalized and made available online.

RESULTS

A total of 34 (92%) of the 37 invited experts agreed to participate in this study and their general characteristics are shown in Table 1. The participants represented 14 (82%) of Canada's 17 medical schools, which include: University of British Columbia (n = 4), University of Alberta (n = 3), University of Calgary (n = 6), University of Saskatchewan (n = 1), University of Manitoba (n = 1), Northern Ontario School of Medicine (n = 2), University of Western Ontario (n = 1), McMaster University (n = 2), University of Toronto (n = 9), Queen's University (n = 1), University of Ottawa (n = 1), McGill University (n = 1), Université Laval (n = 1) and Dalhousie University (n = 1). Despite repeated attempts we were unable to identify any faculty members at the Université de Montréal, Université de Sherbrooke or Memorial University who were willing to participate in this study.

The initial comprehensive list of goals and objectives contained 224 items (10 goals and 214 objectives). A summary of the development process is shown in Figure 1.

In round 1, all 10 goals received a mean score of ≥7.0 and were included in the final goals and objectives. For the objectives, 146 received a mean score of ≥7.0 and were included in the final goals and objectives. Examples of the highest scoring objectives are shown in Table 2. A total of 68 objectives received a mean score of between 4.0 and 6.9. Nine new objectives were suggested for discussion in round 2. There were no objectives which received a mean score below 4.0.

Expert feedback in round 1 had 3 common themes. First, oncology objectives for medical students should be approached from the perspective of what a family physician would need to know about oncology. It was suggested that more emphasis be placed on risk factors, symptoms, screening and diagnosis, while placing less emphasis on treatment, complications, chronic issues and diagnosing recurrent cancer. Second, many experts were concerned that there were too many objectives. They suggested that some similar objectives could be combined, while others could be learned in other parts of the medical school curriculum. Third, a suggestion was made to consider

having one standard format for the "Knowledge of Common Cancers" section with one template for common cancers and one less detailed template for less common cancers.

Of the 34 experts who completed the survey in round 1, 12 (35%) were able to participate in the round 2 web conference. The other 22 were not able to participate due to not being able to find a mutually agreeable time. During the web conference reasons for the inclusion and exclusion of 77 objectives were discussed and the dialogue was recorded.

All 34 experts who participated in round 1 subsequently participated in the round 3 survey. Only 7 objectives received ≥75% consensus for inclusion (range 77% - 100%). These objectives included understanding case-control and cohort studies, how radiation is used to treat cancer, how novel targeted agents are used to treat cancer and how they differ from traditional cytotoxic chemotherapy, and understanding that some metastatic cancers are curable. Three newly suggested objectives were also included and they involve appropriate diagnostic and treatment referral algorithms for patients with various common cancers, knowing the role of a palliative care physician/team and family physician in the care of cancer patients, and finally understanding epidemiology, risk factors,

prevention, screening, presentation, diagnosis, staging, basics of treatment, prognosis and follow-up/survivorship care for the most common cancers (prostate, lung, breast, colorectal, skin). The consensus for inclusion of the other 70 objectives ranged from 0% to 67%. These were excluded from the final goals and objectives.

A total of 10 goals and 153 objectives were assembled, refined and categorized appropriately into the headings listed above. There were no significant changes made to the wording of the goals and objectives upon subsequent review by the 34 experts. The final Canadian Oncology Goals and Objectives for Medical Students are listed in Appendix A.

INTERPRETATION

We have created a comprehensive list of oncology goals and objectives for medical students through a national consensus process of oncology educators. The result of this process is an important resource that can be used to improve oncology education for future physicians across Canada. Despite cancer being the leading cause of death of Canadians, the rising incidence of cancer due to our aging population, and the increasing involvement of non-oncologist physicians in cancer

survivorship care, a number of studies have shown that medical students were least adequately prepared to manage patients with cancer compared to all other medical subspecialties.[1-4] Oncology is a separate topic in the curriculum for only about half of the undergraduate medical training programs in Canada.[4] These medical schools with a dedicated oncology block could assess how their local curriculum aligns with our nationally validated set of objectives. At medical schools which do not have a dedicated oncology block, curriculum-mapping can be used to determine whether all of these goals and objectives are being met. Any objectives that are not currently covered can be identified and steps can be taken to address deficiencies.

These oncology goals and objectives can also be used as a reference by medical students to clarify expectations and decrease the sense of fragmented oncology teaching during medical school. As a set of objectives created by oncology educators across Canada through a structured consensus process, this document could also be useful in guiding the oncology content of national certification exams, such as the Medical Council of Canada Qualifying Examinations.

Our previous study indicated that the majority of educators and learners also believed that a standard set of

oncology objectives would be useful for learners, and that a textbook or web book focusing on oncology education for generalist physicians would be useful.[4] The Canadian Oncology Goals and Objectives for Medical Students can be used as a foundation for the development of a textbook, web book and online teaching modules for medical students. This will be particularly useful reference for medical students at schools where oncology is taught throughout the curriculum to provide some context as to how general principles in oncology can be applied to different cancers.

A previous survey study of administrators at Canadian undergraduate schools of medicine, nursing, pharmacy and postgraduate resident training programs found that the current level of oncology education in their respective programs was inadequate.[3] Other healthcare professional training programs, such as pharmacy or nursing schools, may use these national objectives as a starting point for the development of oncology objectives for their students. In fact, we are aware of one such initiative among Canadian oncology pharmacists who have recently created a task force to improve oncology education at pharmacy schools across Canada. These undergraduate objectives may be used as a starting point to develop more advanced

objectives suitable for post-graduate medical trainees in family medicine and internal medicine programs.

Some limitations of our work may include the fact that curricula at medical schools across Canada are variable and our document does not address how these objectives should be taught. Medical schools will need to determine where and how best to integrate these objectives into their respective programs. Another limitation is that these goals and objectives for medical students represent the product of a modified-Delphi process carried out by individuals who were identified by peers as key undergraduate oncology educators at their respective institutions. This work is generally representative of a national collaboration of oncology educators, but despite our best efforts to obtain representation from every medical school in Canada, we were unable to find anyone willing to participate in this process at 3 medical schools. Despite this, the 14 medical schools with representation in our study cover every region in Canada and graduate 80% of all Canadian doctors.[16] One final limitation is that only 12 experts participated in round 2 of the modified-Delphi process, but this was mitigated by the fact that 34 experts participated in rounds 1 and 3.

In summary, through a systematic process we have created a comprehensive and consensus-based set of oncology goals and objectives which may be used in UME curriculum design and also by educators and medical students. These goals and objectives will hopefully facilitate improvements in oncology education for medical students and the care they provide for their patients with cancer.

REFERENCES

1. Canadian Cancer Society: General cancer statistics at a glance. Toronto (ON): Canadian Cancer Society, 2015. Available: http://www.cancer.ca/en/cancer-information/cancer-101/cancer-statistics-at-a-glance/?region=ab (accessed October 19, 2015).

2. Del Giudice M, Grunfeld E, Harvey BJ, Piliotis E et al. Primary care physicians' views of routine follow-up care of cancer survivors. *J Clin Oncol* 2009;27(20):3338-45.

3. Cheung WY, Fishman PN, Verma S. Oncology education in Canadian undergraduate and postgraduate training programs. *J Cancer Educ* 2009;24(4):284-90.

4. Tam VC, Berry S, Hsu T, North S, Neville A, Chan K, Verma S. Oncology education in Canadian undergraduate and postgraduate medical programs: a survey of educators and learners. *Curr Oncol* 2014;21(1):e75-88.

5. Payne S, Burke D, Mansi J, Jones A et al. Discordance between cancer prevalence and training: a need for an

increase in oncology education. *Clinical Medicine* 2013;13(1):50-6.

6. Cave J, Woolf K, Dacre J, Potts HWW et al. Medical student teaching in the UK: how well are newly qualified doctors prepared for their role in caring for patients with cancer in hospital? *British Journal of Cancer* 2007;97:472-8.

7. Robert KH, Einhorn J, Kornhuber B, Peckham M et al. European undergraduate education in oncology: A report of the EORTC Education Branch. *Acta Oncol* 1988;27:423-5.

8. The Cancer Council Australia. Ideal Oncology Curriculum for Medical Schools: Knowledge, Skills and Attitudes of Medical Students at Graduation. Sydney, Australia: The Cancer Council Australia, 2007. Available: http://www.cancer.org.au/content/pdf/HealthProfessionals/OncologyEducation/IdealOncologyCurricDEC07-updatedcover.pdf (accessed October 19, 2015).

9. Tattersall MHN, Langlands AO, Simpson JS, Forbes JF. Undergraduate education about cancer : A survey in

Australian medical schools. *European Journal of Clinical Oncology* 1988 ;24(3):467-71.

10. Koczwara B, Barton MB. The ideal oncology curriculum for medical students. *J Clin Oncol* 2006;24(33):5334.

11. Medical Council of Canada (MCC) Objectives for the Qualifying Examination. Ottawa (ON): MCC, 2015. Available : http://apps.mcc.ca/Objectives_Online/objectives.pl?loc=home&lang=english (accessed October 19, 2015).

12. Witkin B, Altschuld J. Planning and conducting needs assessments: A practical guide. Thousand Oaks, CA: Sage Publications; 1995 : 193-202.

13. Aronson BD, Janke KK, Traynor AP. Investigating student pharmacist perceptions of professional engagement using a modified delphi process. *Am J Pharm Educ* 2012;76:125.

14. Giuliani ME, Gillan C, Milne RA, Uchino M, Millar BA, Catton P. Determining an imaging literacy curriculum for radiation oncologists: an international delphi study. *Int J Radiat Oncol Biol Phys* 2014;88(4):961-6.

15. Powell C. The Delphi technique: Myths and realities. *J Adv Nurs* 2003;41:376-82.

16. Medical Schools in Canada. Toronto (ON), Ivy Global, 2014. Available : http://www.ivyglobal.ca/mcat/med_schools_canada.asp (accessed Oct 19, 2015).

Figure 1: Development Process

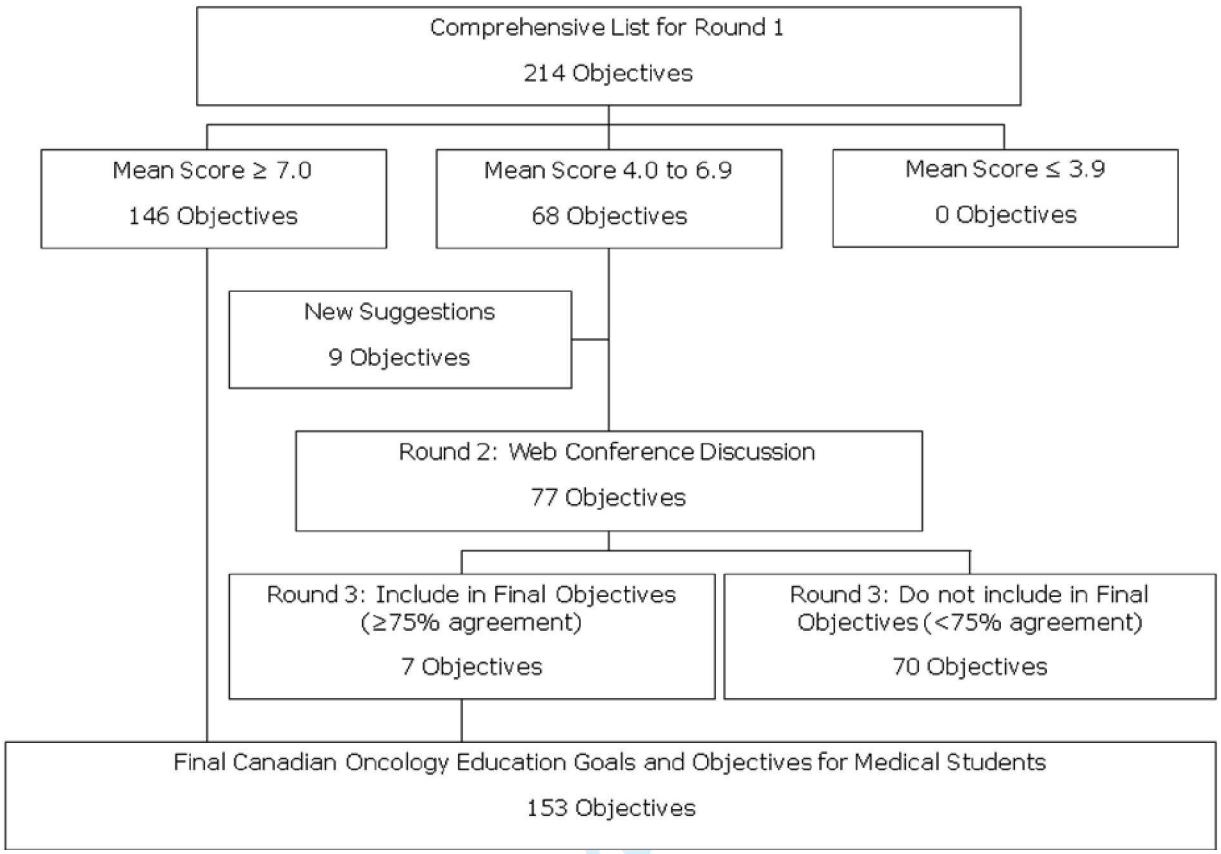

Table 1: Demographics of Participants

Demographic	Number	Percent
Sex		
Male	18	53%
Female	16	47%
Professional Role*		
Medical Oncologist	23	N/A
Radiation Oncologist	4	N/A
Medical or Radiation Oncology Program Director	4	N/A
Family Physician	3	N/A
UME Curriculum Committee Member	3	N/A
Paediatric Oncologist	1	N/A
Surgical Oncologist	1	N/A
Gynaecologic Oncologist	1	N/A
Psychologist	1	N/A
Location		
Ontario	16	47%
Western Canada (British Columbia, Alberta)	13	38%
Central Canada (Saskatchewan, Manitoba)	2	6%

Quebec	2	6%
Maritimes (Nova Scotia, Newfoundland)	1	3%

* Percentages could not be calculated since some participants had multiple roles

Table 2: Highest Scoring Objectives in the First Delphi Round

Objective	Mean Score (Mean ±
Demonstrate the ability to perform a focused medical history when cancer is suspected (i.e. symptoms based on primary cancer location and symptoms related to spread to common metastatic sites, risk factors, family history).	8.7 ± 0.6
Demonstrate an understanding of presentations of cancer that represent emergencies (e.g. SVC obstruction, cardiac tamponade, spinal cord compression, pulmonary embolism, symptomatic brain metastases, cancer-related bleeding).	8.7 ± 0.6
Demonstrate the ability to perform a focused physical examination for a patient with suspected cancer with emphasis on the primary cancer and possibly sites of metastases.	8.6 ± 0.7
Describe non-specific physical symptoms and signs associated with common cancers (e.g. unexplained weight loss, pain, lymphadenopathy, palpable mass,	8.6 ± 0.7

bleeding, thrombosis, change in bowel habit, biliary tract obstruction).	
Demonstrate an understanding of the role of a primary care physician in the treatment and follow-up of cancer patients.	8.5 ± 0.7
List cancers which are screened for in the periodic health exam and the specific investigations that are utilized (cervical, breast, colon, prostate).	8.4 ± 1.0
Describe the importance of tissue sampling for diagnosis of malignancy and for identification of molecular predictive factors.	8.4 ± 0.9

APPENDIX A: Canadian Oncology Goals and Objectives for Medical Students

BASIC SCIENCE OF ONCOLOGY

Goal: By graduation, medical students should understand the basic concepts of the science of oncology relevant to molecular biology, pathology and anatomy.

Molecular Biology

1. Describe in general terms how cancers develop and be able to describe the hallmarks of cancer.
2. Describe the step-wise progression from normal to pre-malignant to malignant histology and how this relates to the principles of screening and early detection.
3. Demonstrate an understanding of how hormones influence development of certain cancers and how this may help direct management.
4. Describe the important genetic/familial syndromes related to cancer development, identify their mode of inheritance and impact on cancer development.

5. Describe how common carcinogens can cause cancer (e.g. cigarette smoke, asbestos, UV radiation, radiation exposure).
6. Describe how common infections can cause cancer (e.g. viral hepatitis, H. pylori, EBV, HPV, HIV).

Pathology

1. Define the terms metaplasia, dysplasia, carcinoma, sarcoma, lymphoma, leukemia and germ cell tumour.
2. Describe the histologic differences between benign and malignant tumours.
3. Demonstrate an understanding of common pathological terminology used in cancer diagnosis (e.g. stage, grade).
4. Describe the importance of tissue sampling for diagnosis of malignancy and for identification of molecular predictive factors.
5. Demonstrate an understanding of the differences between fine needle aspiration biopsy, core biopsy, and surgical excision.
6. Demonstrate an understanding of the role of different specialists in obtaining a tissue diagnosis of cancer (e.g. family physician, haematologist, radiologist, surgeon, oncologist).

Anatomy

1. Describe the most common patterns by which cancer spreads (i.e. direct extension, lymphatic, haematogenous, transcelomic).
2. Demonstrate an understanding of relevant anatomy for common cancers (i.e. prostate, breast, lung and colorectal cancers) in terms of how they invade and metastasize, with an emphasis on invading adjacent structures, spread through the lymphatic and vascular systems.

PUBLIC HEALTH

Goal: By graduation, medical students should understand that cancer is a significant health issue. Medical students should also understand the risk factors for cancer and be able to identify opportunities for prevention and screening.

Epidemiology

1. Demonstrate an understanding of basic cancer statistics in terms of incidence, prevalence, mortality and survival.
2. Describe the incidence rate and mortality rates of the most common cancers diagnosed in Canada.
3. List the most common childhood cancers.

Risk Factors

1. Identify common environmental hazards that can cause cancer (i.e. chemical, biological, physical, radiation).
2. Identify common diseases and biological characteristics that can predispose a person to developing cancer (e.g. infectious and inflammatory diseases, genetics/family history, obesity).
3. Identify occupational and social risk factors for cancer (e.g. asbestos, smoking, alcohol).

Prevention

1. Distinguish between primary, secondary and tertiary prevention.
2. Describe important lifestyle and behavioural modifications that can prevent cancer (e.g. dietary habits, ideal body weight, regular physical activity, sun exposure/sunscreen, alcohol abuse, sexual behaviour, smoking cessation).

Screening

1. List the criteria for an effective population-level screening program.

2. List cancers which are screened for in the periodic health exam and the specific investigations that are utilized (i.e. cervical, breast, colon, prostate).
3. Demonstrate an understanding of the impact of cancer screening investigations on the patient, with particular emphasis on the implications of false negative and false positive results.

Evidence-Based Medicine (* May be learned in other parts of the UME curriculum)

1. Define evidence-based medicine and be able to demonstrate an understanding of its role in cancer care.
2. Demonstrate an understanding of case-control and cohort studies with respect to how they are used to study the impact of risk factors on the development of cancer.

DIAGNOSIS

Goal: By graduation medical students should know common presentations of cancer and how to make a diagnosis of cancer

Clinical Presentations of Cancer

1. Describe non-specific physical symptoms and signs associated with common cancers (e.g. unexplained weight loss, pain, lymphadenopathy, palpable mass, bleeding, thrombosis, change in bowel habit and biliary tract obstruction).
2. Describe common and characteristic cancer presentations/syndromes (e.g. iron deficiency anemia, cough, breast lump, hypercalcemia, painless jaundice, paraneoplastic syndromes, superior vena cava obstruction).
3. Demonstrate the ability to perform a focused medical history when cancer is suspected (i.e. symptoms based on primary cancer location and symptoms related to spread to common metastatic sites, risk factors, family history).
4. Demonstrate the ability to perform a focused physical examination for a patient with suspected cancer with emphasis on the primary cancer and possible sites of metastases.
5. Demonstrate the ability to generate a differential diagnosis based on symptoms and signs associated with cancer.
6. Demonstrate an understanding of presentations of cancer that represent emergencies (e.g. superior vena cava obstruction, cardiac tamponade, spinal cord compression,

pulmonary embolism, symptomatic brain metastases, cancer-related bleeding).

Diagnostic Tests

1. Describe and interpret appropriate lab tests, including hematology, chemistry and tumour markers, in a patient with a suspected diagnosis of cancer.
2. Demonstrate an understanding of how serum tumour markers are used in the diagnosis and management of cancer.
3. Describe diagnostic imaging studies used in the work-up of patients with suspected cancer and characteristic radiologic findings associated with cancer (e.g. pulmonary nodules, masses, pleural effusions on chest x-rays; lytic lesions, fractures on bone x-rays; nodules and masses on CT scans; masses on mammograms; PET-avid lesions on PET scan).
4. Demonstrate an understanding that a diagnosis of cancer commonly involves a biopsy and/or surgical resection, and understand that there are exceptions where other tests can be used.
5. Identify appropriate diagnostic and treatment referrals for patients with various common cancers.

Cancer Staging

1. Demonstrate an understanding of the general principles and purpose of cancer staging.
2. Identify basic principles of the TNM staging system with respect to common cancers (e.g. prostate, breast, lung, colorectal) and recognize that there are alternative staging systems for difference tumour types.

Performance Status Assessment

1. Describe the components of commonly used performance status assessment tools such as the ECOG and Karnofsky performance status scales.

TREATMENT

Goal: By graduation, medical students should know how cancer is managed from a multidisciplinary perspective. This will facilitate appropriate referral and care patterns for cancer treatment.

General Principles of Cancer Treatment

1. Demonstrate an understanding of the concepts of curative, neoadjuvant, adjuvant and palliative treatments.

2. Demonstrate an understanding of the concepts of localized treatments versus systemic treatments.
3. Describe the role of various medical and allied health professionals in multidisciplinary cancer treatment teams and know the services offered by a typical outpatient cancer centre.
4. Demonstrate an understanding of the role of a primary care physician in the treatment and follow-up of cancer patients.
5. Identify unique issues experienced by pediatric/young patients with cancer (e.g. impact on growth and development, psychosocial issues, fertility, risk of secondary cancers, long-term follow-up, finances, insurance).
6. Identify factors that would affect the formulation of a treatment plan for a cancer patient (i.e. tumour, treatment and patient-related factors).
7. Understand that Canadian treatment guidelines for common cancers are available through provincial organizations (e.g. Cancer Care Ontario, British Columbia Cancer Agency, Alberta Health Services, etc).

Principles of Surgical Treatments for Cancer

1. Demonstrate an understanding of the role of surgery in the treatment of cancer (i.e. surgery is usually reserved for patients with potentially curable localized cancer, but there are palliative indications for surgery as well).
2. Demonstrate an understanding of common complications of cancer surgeries, such as bleeding, infection, and also impact on body image.
3. Demonstrate an understanding of the rationale for using radiation and systemic therapy pre- and post-operatively.

Principles of Radiation Treatments for Cancer

1. Demonstrate an understanding of the general principles of how radiation is used to treat cancer and different types of radiation (e.g. external beam, brachytherapy, stereotactic radiation).
2. Demonstrate an understanding of the difference between, and the clinical indications for, radiotherapy with curative and palliative intent.
3. List the common acute, subacute, and late adverse effects of radiation.

Principles of Systemic Treatments for Cancer

1. Demonstrate an understanding of the general principles of chemotherapy in the treatment of cancer.

2. List factors that would make a cancer patient a good candidate for chemotherapy.
3. Know the general differences between traditional chemotherapy and targeted biological therapy
4. List common acute and chronic toxicities of chemotherapy (e.g. alopecia, nausea, vomiting, neutropenia, mucositis, weight loss, neuropathy, secondary cancers), as well as potential life threatening toxicities (e.g. febrile neutropenia).

Management of Cancer Complications and Treatment Complications

1. Demonstrate an understanding of how to diagnose and manage common complications of cancer (e.g. bone metastasis pain, hypercalcemia, pulmonary embolism, deep vein thrombosis).
2. Demonstrate an understanding of how to diagnose and manage common complications of cancer treatment (e.g. febrile neutropenia, nausea, vomiting, diarrhea, hypertension, acute renal failure).
3. Demonstrate an understanding of the emergency management of severe complications of cancer and its treatment (e.g. superior vena-cava syndrome, spinal cord compression, tumour-lysis syndrome, symptomatic brain metastases, cancer-related bleeding).

Survivorship Care and Follow-up

1. Define survivorship in relation to cancer patients.
2. Describe the appropriate investigations and follow-up plans for surveillance of patients who have had curative treatments for common cancers (i.e. prostate, breast, lung, colorectal).
3. Demonstrate an understanding of the differences between locally recurrent and metastatic disease.
4. List the symptoms and signs of local recurrence and distant metastatic disease of common cancers (i.e. prostate, breast, lung, colorectal).

Principles of Palliative Care

1. Demonstrate an understanding of the role of the palliative care physician/team in the care of cancer patients. Also see the Undergraduate Curriculum for Medical Education in Palliative and End-of-Life Care (http://70.38.66.73/efppec/docs/pdf_2006_ug_curriculum_fact_sheet.pdf)

PROGNOSIS

Goal: By graduation, medical students should know the prognosis of common cancers.

1. Demonstrate an understanding of the definition of prognosis and describe general factors that affect prognosis in cancer patients.
2. Demonstrate an understanding that some metastatic cancers are curable.

KNOWLEDGE OF COMMON CANCERS

Goal: By graduation, medical students should have detailed knowledge of the most common cancers and basic knowledge regarding other common cancers.

1. Demonstrate an understanding of the epidemiology, risk factors, prevention, screening, presentation, diagnosis, staging, basics of treatment, prognosis and follow-up/survivorship care for common cancers including: prostate cancer, lung cancer, breast cancer, colorectal cancer and skin cancers (non-melanoma & melanoma).

   The amount of time dedicated to covering other cancers will depend on each medical school's individual curriculum. See below for suggestions regarding other

cancer-specific objectives that can be covered if time permits.

PSYCHOSOCIAL ISSUES (*May be learned in other parts of the UME curriculum)

Goal: By graduation, medical students should understand the unique psychosocial issues that cancer patients encounter and the resources available to meet their needs.

1. Identify the psychological, social and spiritual issues associated with cancer diagnosis and treatment.
2. Demonstrate an understanding that cancer can disrupt a patient and their family's lives and can impact their ability to cope.
3. Demonstrate an understanding of the role of coping styles in dealing with life-threatening illness.
4. Demonstrate an understanding of the concept of competency and capacity to consent.
5. Demonstrate an understanding of when to refer a cancer patient to a psychologist or psychiatrist.

6. Demonstrate an understanding of the psychosocial issues around life-threatening illnesses, such as cancer, relevant to different cultures, faiths and traditions.
7. Describe the role of an oncology psychosocial care provider in the hospital and in the community.
8. Demonstrate an understanding of the financial impact of cancer on patients and their families and know that patients with these issues should be referred to a social worker.

ETHICS AND PROFESSIONALISM (*May be learned in other parts of the UME curriculum)

Goal: By graduation, medical students should know the appropriate ethical and professional conduct when dealing with cancer patients.

1. Recognize the inherent tension between society's need for the just allocation of finite resources and an individual physician's responsibility to advocate for a patient's access to effective therapies.

2. Describe the components of informed decision making, including discussion of complications of cancer therapy in the curative and palliative setting, recognizing that potentially life-prolonging cancer therapies can induce potentially life-threatening adverse reactions.
3. Have an approach to discussing withholding or ending cancer treatment considered inappropriate by the physician/oncology team, but requested by the patient.
4. Outline the key ethical principles (e.g. honesty) which guide the disclosure of diagnostic and prognostic information to a cancer patient.
5. Demonstrate an understanding of the fact that every physician has limitations and the need to refer to other specialists or health care professionals appropriately.
6. Realize that caring for cancer patients can lead to compassion fatigue and physician burnout which can negatively impact patient care.

COMMUNICATION (* May be learned in other parts of the UME curriculum)

Goal: By graduation, medical students should be able to communicate appropriately with cancer patients to establish trust and rapport, gather important information, give bad news and other information about the illness (including prognosis), address patient emotions, and elicit concerns.

1. Demonstrate the ability to communicate information in a sensitive manner, addressing concerns, fear and expectations, while making sure a realistic prognosis is explained.
2. Identify specific issues that may interfere with communication of bad news to patients and their families.
3. Describe the SPIKES strategy for breaking bad news.
4. Demonstrate an understanding that receiving bad news may interfere with a patient's ability to comprehend fully what is being presented.
5. Demonstrate the ability to discuss resuscitation status and goals of care, particularly with respect to a "Do Not Attempt Resuscitation" ("Allow natural death") order.
6. Demonstrate the ability to keep adequate medical records and provide medical information to other healthcare team members caring for cancer patients.

ESSENTIAL ONCOLOGY EXPERIENCES FOR MEDICAL STUDENTS

Goal: By graduation, medical students should have had the following clinical experiences with cancer patients.

1. Observe a physician disclose to a patient they have cancer.
2. Observe a physician discussing resuscitation status with a cancer patient.
3. Observe a physician discussing the prognosis of a terminal cancer with a patient.
4. Discuss the risks and benefits of screening for breast, colon and cervical cancer with patients.
5. Perform a breast examination and if possible examine a patient with a breast mass due to breast cancer under supervision.
6. Perform a prostate examination and if possible examine a patient with a prostate nodule who has prostate cancer under supervision.
7. Speak with a patient who has had a potentially curative surgery for cancer regarding their treatment experience.
8. Speak with a cancer patient who has had radiation treatment for cancer regarding their treatment experience.

9. Speak with cancer patients who have had adjuvant chemotherapy for breast, colorectal and/or lung cancer regarding their experience.
10. Speak with cancer patients who have had palliative chemotherapy for breast, colorectal and/or lung cancer regarding their experience.
11. Review cancer-related diagnostic imaging with a radiologist (e.g. mammograms, chest X-rays with a solitary pulmonary nodule, CT scans showing primary and metastatic cancers)

Other Optional Cancer-specific Objectives

Depending on the curriculum at each medical school, the following objectives can be considered if time permits.

1. Demonstrate a basic understanding of the epidemiology, risk factors, prevention, screening, presentation, diagnosis and prognosis for the following cancers including: lymphoma, bladder cancer, head/neck (oral and larynx), thyroid cancer, leukemia, kidney cancer, uterine (endometrial) cancer, pancreatic cancer, gastric cancer, ovarian cancer, multiple myeloma, liver (hepatocellular)

cancer, esophageal cancer, cervical cancer and testicular cancer.

In addition to the above objectives, the following are important cancer-specific objectives which we suggest should be emphasized:

Prostate Cancer

1. Demonstrate an understanding of the role of digital rectal examination (DRE) and prostate-specific antigen (PSA) in the diagnosis and follow-up of prostate cancer patients.
2. Demonstrate an understanding that prostate cancer is common and know the prognosis.
3. Demonstrate a basic understanding of the treatment options available for localized and metastatic (castrate-sensitive, castrate-resistant) prostate cancer.

Lung Cancer

1. Have an approach to solitary pulmonary nodules with a specific focus on chest x-ray and CT findings that distinguish a benign from a malignant nodule.

Breast Cancer

1. Demonstrate an understanding of breast cancer screening (i.e. it is a component of the periodic health exam, know appropriate screening and diagnostic tests, such as mammography, and be able to describe current screening recommendations based on published guidelines).
2. Be able to evaluate a patient who presents with a breast lump, or abnormal breast screening result (mammography), and know the how to diagnose the cause with particular emphasis on ruling out breast cancer.
3. Demonstrate an understanding of the fact that an abnormal breast discharge can be the presenting symptom of breast cancer.

Colorectal Cancer

1. Demonstrate an understanding of colon cancer screening (i.e. it is a component of the periodic health exam, know appropriate screening tests and be able to describe current screening recommendations based on published guidelines).
2. Demonstrate an understanding of how to manage a patient with lower gastrointestinal bleeding from colon cancer including assessment of patient's hemodynamic status, whether emergent care is required and appropriate referral pattern.

Lymphoma

1. Demonstrate an approach to lymphadenopathy and know which characteristics make the diagnosis of lymphoma or metastatic cancer more likely.
2. Demonstrate an approach to a patient who presents with an anterior mediastinal mass and/or neck mass with emphasis that lymphoma is part of the differential diagnosis.

Melanoma & Non-Melanoma Skin Cancers

1. Demonstrate an understanding of skin cancer screening and the importance of diagnosing melanoma at an early stage.
2. List the physical characteristics of malignant melanoma and other skin cancers.

Thyroid Cancer

1. Demonstrate an approach to thyroid nodules with emphasis on knowing that thyroid cancer is in the differential diagnosis, but most thyroid nodules are benign.

Leukemia

1. List emergency complications of leukemia that are life threatening and require immediate medical attention.

Kidney Cancer

1. Demonstrate an approach to a patient who presents with a mass in the kidney.

Pancreatic Cancer

1. Demonstrate an approach to a patient presenting with painless jaundice with emphasis on characteristics that would make the diagnosis of pancreatic cancer more likely.

Ovarian Cancer

1. Provide an appropriate differential diagnosis for a woman who presents with an adnexal mass based on age, menopausal status, family history, personal risk factors, physical exam, biochemical and diagnostic imaging findings.

Esophageal Cancer

1. Demonstrate an approach to a patient presenting with dysphagia and weight loss with emphasis that esophageal cancer is in the differential diagnosis.

Cervical Cancer

1. Demonstrate a basic understanding of the causal effect between HPV, pre-invasive cervical disease and cervical cancer.

2. Demonstrate an understanding of cervical cancer screening (i.e. it is a component of the periodic health exam, know process/benefits/limitations of cervical cancer screening and prevention, describe current screening recommendations based on published guidelines).
3. Demonstrate the ability to perform a speculum examination and PAP smear under supervision.

Testicular Cancer

1. Demonstrate an approach to a patient who presents with a testicular mass with special emphasis on a diagnostic pathway and appropriate use of imaging and tumour markers.
2. Demonstrate an understanding of the prognosis of testicular cancer with an emphasis on the fact that metastatic disease is still potentially curable.