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EDUCATION

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EDUCATION

A. INTRODUCTION

Progress in cancer care can evolve at a rapid rate. Cancer centres require well-established education programs to stay abreast of, and implement, advances into practice.

Education is critical to the adoption of information, the training of healthcare teams, and, ultimately, the ability to implement innovations and new knowledge. The need for learning can range from awareness of information to orientation to a new role to intensive training programs designed to increase competence and enact changes in clinical practice.

Accurate and timely information provision and effective educational programs within healthcare organizations are critical to high-quality and safe cancer care. Cancer centres must be lifelong learning organizations and must employ diverse strategies to meet the needs of a range of audiences at different training and career stages. Information and education provision is often best provided with a combination of technology-enabled and face to face initiatives. It can be structured, as with formal education programs, or unstructured, as with the dissemination of updated clinical guidelines or procedures. Effective communication tools and strategies are an important auxiliary to education programs and can serve to inform cancer centre audiences of important knowledge, news and updates, as well as engage the cancer centre community in collaborative exchange. For more information, see the *Cancerpedia: Communication* chapter.

The chapter presents an overview of education in a cancer centre, including a view into the various types of learners relevant to a cancer centre, the methods and tools employed in education, the resources required, management and quality best practices, and a summary of future trends.

B. LEARNERS

All health professionals need to engage in life-long learning to be able to participate in and offer quality care and services. There are a wide variety of learners that must be engaged. These include pre-certification health professionals, post-certification health professionals, other students staff and faculty, volunteers, partners, patients and caregivers, and, more broadly, the public and other stakeholders. This section focuses on the learning needs of pre-certification health professionals, post-certification health professionals, staff, faculty, volunteers and partners. These various types of learners may engage in educational opportunities within the cancer centre for short periods of time, such as with a continuing education course, or possibly years, such completing speciality training with a residency program.

For a discussion of the information and education needs of patients, caregivers, see the *Cancerpedia: Patients* chapter.

1. STUDENTS AND TRAINEES

Health Professional Students and Trainees

The education of health professionals is one of its core functions of a cancer centre, in conjunction with clinical care. The scope of the educational programs and the methods utilized by educators vary with the nature of the trainee.

Cancer centres play an important role in educating the next generation of healthcare professionals by providing opportunities for theoretical learning and practice through clinical placements (i.e., experiential learning) and education programs (i.e., online or in-person learning). In turn, programs for students and trainees create a dynamic learning environment at the cancer centre that serves to attract talented staff.

Formal training placements may be provided at three levels, depending on the profession and its certification requirements.

- Undergraduate precertification is for students who need to finish their education for a degree, have not taken their licensing exams, and do not have a certificate to practice.

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- Postgraduate training is for students who are licensed professionals certified to practice, and who are taking additional specialty education.
- Postgraduate fellowship training is for students who are licensed specialty professionals certified to practice, and who are taking additional subspecialty education.

To illustrate, medical training in the cancer centre usually occurs on all three levels: i) medical students train to become licensed physicians; ii) residents who are licensed physicians train to become specialists (e.g., general surgeons); and iii) fellows who are licensed specialists take subspecialty training (e.g., oncology surgeons). Nursing is another example of training that can occur on all three levels: (i) undergraduate nursing students train to become licensed nurses; (ii) licensed nurses take additional education using different avenues (e.g., post-graduate specialty certificates; (iii) nurses pursue master's or doctoral degrees in advanced practice nursing, education, management and/or research.

In the cancer centre, placements are usually provided for students in a full range of clinical areas, including medicine, nursing, pharmacy, psychology, radiation therapy, rehabilitation therapies (e.g., physiotherapy, occupational therapy, speech language pathology), social work, clinical nutrition, spiritual care and so on. Placement activities vary depending on the profession and the year of training, but generally include online or classroom-based teaching as well as patient-related activities conducted under the supervision of a qualified staff member. Depending on the student's level, the education experience for medical students and residents may include participation in patient investigations and consultations, diagnostic assessments, selected procedures and clinics (e.g., operating room, radiotherapy, chemotherapy, palliative care, etc.), patient care management and clinical research. Generally, nurses with advanced degrees are eligible for nursing fellowships in practice, education, management and/or research.

To ensure that the cancer centre contributes optimally to training healthcare professionals, the centre should foster formal partnerships with educational organizations, such as universities and colleges, as well as professional licensing bodies.

Other Students

Beyond the clinical realm, the cancer centre plays a critical role in providing training programs for research students, including graduate students and postdoctoral fellows. These training programs create a rich learning environment that encourages discovery and advancement, enhances the quality and safety of research, and attracts talented professionals.

The cancer centre can also include programs for undergraduate and graduate students in health-related fields, such as public health, health policy and health economics. These opportunities not only create a rich learning environment for students who may choose to take on careers related to cancer care, but can also introduce new ideas and perspectives into the management and delivery of care.

2. STAFF

The cancer centre provides a broad range of education that supports staff in: understanding the cancer centre and their role in it; maintaining and advancing skills; developing as individuals and team members; and meeting professional accreditation and cancer centre standards, as well as any legislative or workplace requirements (e.g., occupational health and safety, health equity, bioethical decision-making, etc.).

Staff include all clinical healthcare professionals and non-clinical hospital staff who work at the cancer centre. Staff are the backbone of cancer centre care and operations. They also serve as the main point of contact between the cancer centre and all other audiences.

All cancer centre staff must engage in lifelong learning through their own experience and practice, continuing education and professional development.

Program/Role Orientation

Timely and effective orientation programs for new staff are essential to the quality and safety of care at the cancer centre. Effective orientation is an important staff retention strategy that helps familiarize individuals

with the organization and enables them to become productive sooner. The purpose of orientation – also referred to as onboarding – is to inform individuals about the organization and their individual role in it, including the centre's activities and expectations of staff and volunteers.

A foundational program on cancer care and the cancer centre should be delivered to all staff. New health professional trainees should undergo modified orientations akin to the staff orientation that introduces an overarching view of the cancer centre and its various programs and services.

The orientation process can include one or more face-to-face sessions, online education and written materials and/or a handbook that is available in hard copy or electronically. Staff should also undergo regular orientation to new programs or initiatives in the cancer centre. For more information about orientation, refer to the *Cancerpedia: Human Resources* chapter.

Maintenance of Competency

Healthcare professional organizations set core competencies for their members that reflect the skills and abilities expected of the licensed profession. Some organizations require their members to participate actively in maintenance of competency education to retain certification.

Engaging in educational activities is the responsibility of individual professionals. Cancer centres may invest in the lifelong learning and competency of their professional staff by offering, facilitating and/or hosting educational events and programs.

In addition, centre-specific annual training on infection control, collegiality, fire safety and research best practices may be mandated by regulatory bodies. There must be a mechanism in place to provide access to these training requirements for all staff, and to track completion. Processes must also be in place to enforce the completion of mandatory training.

Continuing Education

Continuing education is provided to cancer centre staff to increase their skills and abilities in relation to their roles. Continuing education events and initiatives usually focus on specific topics or areas (e.g., effective communication between providers, patients and families; difficult conversations; effective teams; clinical care issues; specialized procedural skills; clinical care innovations; etc.).

Continuing education may be delivered internally or externally, and can be provided using many different methods, including in-person, by video or by another online or multimedia resource. Where possible, such events should be recorded and stored electronically in a learning management system (LMS) or on a website, so they can be curated and reviewed by stakeholders at any time. Below are examples of continuing education opportunities.

- *Learning sessions* provide education regarding a range of specialized subjects. In-service sessions provide group professional training and staff development opportunities. Many learning sessions are scheduled at lunch time to help promote attendance and minimize the cost to the organization. Since staff come at their lunch break, the centre does not need to fund staff replacements; however, food may be provided to encourage people to attend. Lunch and learn sessions tend to be less formal education events, since they are relatively short and attendance is voluntary. Learning events can be recorded and posted for asynchronous viewing.
- *Rounds* is a broad term used to describe meetings of various healthcare professional staff and usually students, who discuss issues related to patient care. There are many types of rounds. One type focuses on the immediate assessment and management of current patients. These rounds may include regular, multidisciplinary/interprofessional staff discussions about the treatment plans of patients on their units or service. They may also include teaching rounds, where the most responsible provider/physician (MRP) educates students at the bedside of individual patients. Other types of rounds can focus on new knowledge or issues relating to specific departments, programs or professions. See Lockyer (2012) for guidance on establishing effective grand rounds.[1]

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- *Multidisciplinary cancer conferences (MCCs)* – also known as multidisciplinary care teams, multidisciplinary decision-making clinics or multidisciplinary meetings – are regular events that also serve to educate all participants. The MCC brings together a team of providers – usually from laboratory medicine and pathology, medical imaging, surgery, chemotherapy and radiotherapy, as well as other health professionals involved in the patient's care – to review patient information, discuss diagnostic and treatment options using practice standards and guidelines, and recommend the best patient treatment plan to the MRP. MCCs provide an ideal venue for multiple perspectives to be heard and for multiple providers to learn from one another. For more information, see the *Cancerpedia: Clinical Management* chapter.
- *External conferences* are usually hosted by healthcare and professional associations and organizations. Conferences may be provincial/state, national or international. External conferences are important continuing education opportunities for staff to learn about new and innovative trends and practices in cancer care. Staff can also present their work to get valuable exposure and feedback.

Professional Development

Professional development, as opposed to continuing education, refers to more specialized and advanced education that upgrades skills and improves one's professional knowledge, effectiveness and abilities. Staff may have a personalized professional career development plan that includes targeted learning programs (e.g., leadership training, coaching staff, team building, etc.).

Staff need to actively participate in professional development for a cancer centre's program of learning to succeed and have impact. Enablers to participation include scheduling events at convenient times for staff, using accessible delivery methods, providing release time from work for larger programs (which may require replacement staff), and providing funding assistance. Professional staff may also be encouraged to participate if the programs offered are recognized by their professional licensing bodies as continuing education credits.

3. VOLUNTEERS

Volunteers play an important role in assisting patients, caregivers, visitors and staff at the cancer centre. They can fulfil a wide range of roles and responsibilities, such as providing clerical, wayfinding and psychosocial support; however, a volunteer's role must augment, rather than replace, the duties performed by medical and hospital staff. Volunteers require information and additional training focused on meeting the specific responsibilities of their volunteer placement. Information and education activities can include orientation, ongoing education and specialized training.

Orientation

Similar to staff, a foundational program on cancer care and the cancer centre should be delivered to all volunteers. This should include an orientation to the cancer centre and defining the volunteer role.

Ongoing Education

The quality and breadth of education opportunities afforded to volunteers enables the quality of volunteer activities and creates a culture of support for the volunteer role. Volunteers require ongoing education opportunities to stay abreast of changes in the cancer centre. This education can be delivered by various staff in different departments. The content of education sessions for volunteers is largely dependent on how volunteers have been integrated into the cancer centre. It is common for volunteer education to include a general overview of cancer and how care is delivered at the cancer centre and information on new or augmented services. Volunteers should also receive an introduction to any specific areas of the cancer centre in which they will complete a placement.

Specialized Training

The cancer centre can include a subset of specially-trained volunteers who provide information and psychosocial support to patients and caregivers. Given the sensitive nature of this role and its potential impact on both volunteers and the patients, it is important that a formal training and education program

be established. This training can include an introduction to psychosocial support and active listening and mentorship or shadowing with a more experienced volunteer. For examples of training programs and evaluations of their impact, see articles by Worthington (2007) and Nissim et al (2008). [2,3]

4. EXTERNAL PARTNERS

Cancer centres can help improve patient care by educating other hospitals and healthcare providers about appropriate diagnostic workups, and the process of appropriate and timely referral. In addition, a needs assessment of cancer-related learning and support found that community health professionals wanted information about: cancer treatment and follow-up care (e.g., pain and symptom management and measures, knowledge of patients' treatments and anticipated side-effects, practice guidelines for continuing care, etc.); available resources and supports for patients; the roles and responsibilities of healthcare team members; knowledge of the cancer care system that can aid with patient navigation; and information on psychosocial care and patient communication.[4]

Cancer centres can strengthen working relationships with local hospitals and providers by hosting education programs at the centre, inviting community-based clinicians to observe the delivery of cancer care, providing standard patient management information to local providers when patients are discharged back to the community, being available to discuss care-related issues and so on.

Cancer centres also educate governments and funders, including politicians, policy-makers and donors, about the incidence, prevalence and types of cancer in the population, strategies to reduce the cancer burden, innovative approaches to the delivery of cancer services and so on. These education efforts help advocate for the importance of supporting cancer prevention and treatment efforts.

C. DELIVERY METHODS AND TOOLS

A wide range of education delivery methods should be used in combination to maximize learning and retention. Tailoring modes of delivery to topics and learner preferences can improve uptake. Consideration of the optimal length of time needed to learn about a topic is also useful. For example, micro-learning – a term that describes brief three to seven minute learning sessions, – may be appropriate for single learning objectives, for learners on the go or as part of a blended series. Interactive sessions that enhance participant activity and provide the opportunity to practice skills have a greater chance of affecting change in professional practice and, on occasion, healthcare outcomes. Didactic sessions do not appear to be effective in changing performance. Generally, education delivery methods include the following:

• One-on-one and group teaching
• Bedside and classroom teaching
• Self-directed and tutored learning
• Simulation, which can involve a person, device or set of conditions that allow providers to practice skills in a risk-free environment[5]
• Print-based learning (e.g., newsletters, publications, guidelines, etc.)
• Web-based learning (e.g., electronic information, searchable online library, etc.). This can include:[6]
  o Synchronous tools (i.e., real-time communication such as audio, web and video conferencing, virtual classrooms and so on)
  o Asynchronous tools (i.e., communication over time according to each individual's own schedule, such as discussion boards, blogs, streaming videos and so on)

Education delivery methods should increase accessibility to education, be appropriate and tailored to the stakeholder group and the information being taught, and be flexible enough to balance the demands of education with other time and work demands. Those selecting delivery methods should also consider adult education principles, different learning styles, the comprehension level of stakeholders and cultural sensitivities. Since most staff functions occur in team settings, team-based training and multidisciplinary/ interprofessional education should be promoted as a new standard of education.

Numerous studies have evaluated effective education delivery methods in healthcare. For example, a randomized controlled trial comparing three practical skills teaching methods – traditional "live" tutoring,

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pre-recorded video tutorial and student self-video – in third year physiotherapy students found no significant differences in clinical performance between the three methods.[7] However, students rated both video methods as having a higher education value. The use of video methods to teach skills may also provide greater flexibility for staff and infrastructure resource allocation.

Given the proliferation and efficacy of multimedia and electronic methods for delivering education, the cancer centre may utilize a learning management system as a tool to:

• Provide staff with a central point of access to a range of information and systems required to fulfil their roles
• Register and onboard learners
• House education materials (e.g., online education modules, virtual chats, simulation modules, etc.)
• Track and monitor education activities (e.g., required, optional, etc.) and maintain records of training for certification purposes
• Administer and track evaluations to demonstrate outcomes and impact

In addition, cancer centres should seek opportunities to leverage existing educational materials through cancer professional organizations, such as the ASCO University courses or the ASTRO Academy.[8,9] These resources are an excellent opportunity to access high-quality education on a variety of cancer-specific topics. They can support pre-certification training programs and trainees preparing for certification examinations, as well as the maintenance of certification for licensed professionals.

International guidelines and review resources are another excellent source of educational materials. These resources can be used to support training programs or assist in modifying clinical practices. They are also an opportunity for learners to reflect on current standards of practice, and to acknowledges gaps in their own practice for which they may engage in further training or education. Some examples of such resources include those from the Institute of Medicine, and the ASCO Guidelines and Tools resources.[10,11]

Cancer organizations such as the Union for International Cancer Control (UICC) and International Atomic Energy Agency (IAEA) have also developed targeted education resources to address common knowledge to practices gaps, and these resources are freely available over the web. Such targeted resources can be an excellent training opportunity to improve standards of practice. Examples of the available programs include the UICC and IAEA's electronic-learning (e-learning) modules, which educate the global cancer community on the classification of malignant tumours and the fundamentals of radiation, respectively.[12,13]

As there are often limited resources for creating new educational materials and programs, it is advantageous for programs to leverage high-quality existing materials from external sources and spend time authentically integrating these resources into their local curricula. The digital age of education has created unique opportunities for programs to leverage digital educational resources from international agencies or global partners and to create their own local curricula using a blend of digital and in-person educational materials and events. Electronic learning, videos, podcasts and online written materials offer an opportunity for learners to address their learning needs in the time and location most suitable to them. These platforms also allow for access to information and training that may not be available locally or regionally, thereby reducing the costs associated with maintenance of certification or professional development.

As the wealth of digital and blended education resources for cancer grow, there are increasing opportunities and advantages to partnerships that foster reciprocal learning opportunities. These may be between large and small centres, or centres in disparate geographic locations, even globally. Centres with unique clinical or educational programs should be encouraged to create resources that can be shared with other centres. The creation of regional educational networks can have a myriad of benefits for learners, including reducing the burden on individual centres to offer comprehensive educational programs.

D. EDUCATION PROGRAM REQUIREMENTS

Each cancer centre should establish a formal education strategy and program based on its local context and needs. The strategy and program should offer a roadmap for a broad and co-ordinated approach to education that serves the cancer centre's vision, mission, strategy and goals. For more information about strategy development and execution, see the *Cancerpedia: Governance and Management* chapter.

Generally, the program is responsible for assessing the current and future education needs of all stakeholders, ensuring that these needs are being met (i.e., directly, indirectly, facilitating access), and developing and supporting the delivery of education services and innovative initiatives, where appropriate. The program must have policies and procedures in place to guide its activities, and the cancer centre should provide sufficient financial resources to support the education program and all of its activities.

5. LEADERSHIP AND PROGRAM STRUCTURE

The education program should have director-level oversight. This individual should be a senior executive leader who is responsible for all aspects of education at the centre, and who has a seat at the program's executive board or council. The director role includes establishing processes to develop and deliver education, setting up internal and external systems for education, and meeting quality performance standards. The director is also responsible for integrating the education program with the cancer centre's clinical and research programs.

Depending on the cancer centre size and scope, there are number of education program streams that could require dedicated teams and leaders, including, but not limited to:

- Undergraduate medical education
- Medical residency and fellowship
- Nursing and allied health professions
- Professional development and interprofessional education
- Research and innovation

6. SPECIALIZED EXPERTISE

The education program benefits from a number of specialized staff with defined skill sets. It is important to have education staff with graduate degrees in education. All education staff should have advanced training in adult education (i.e., andragogy) and learning assessments, and maintain ongoing professional development to integrate new evidence and best practices into their work. A comprehensive education program requires the following expertise.

- *Clinical educators*, who combine their professional and clinical knowledge with formal training in education to develop, implement and evaluate education and training resources. They can also educate staff in their respective professions on the use of new tools and apply new knowledge in practice.
- *Health sciences librarians* who offer support to clinical and non-clinical staff by providing information and database searches that inform educational, clinical and research activities.
- *Educational design specialists*, who work with clinical experts to refine learning objectives, and develop curricula and learning assessments.
- *Education co-ordinators*, who assist with department-level, education-related administration, materials production and events co-ordination, as well as managing the learning management system and its associated activities.
- *Web developers and e-learning specialists*, who work with subject matter experts to develop multi-modal education resources, such as websites and e-learning modules.

7. FACILITIES AND EQUIPMENT

The physical infrastructure for education includes physical space and its design and layout, as well as equipment and supplies. Generally, physical infrastructure requirements for education include the following elements; however, these elements may vary by cancer centre depending on the focus of education activities, the program structure, and the physical, human and financial resources available.

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Physical Space

- Offices, workstations and study spaces, with appropriate furniture
- Classrooms, computer labs, meeting rooms and conference rooms
- Simulated clinical settings and laboratories (e.g., operating rooms, simulated skills training rooms, etc.)
- Education space in the workplace (e.g., in clinics and departments, at the bedside)
- Library facilities for staff, including computer access and access to a virtual library
- Break rooms for students (e.g., common rooms, lounge space, call rooms, lockers, etc.)

Equipment and Supplies

- A learning management system to house educational content. An LMS can be purchased and customized based on the needs of the organization, or created de novo. Criteria to consider include the user interface, integration with existing information management systems, the number of available seats or registrants, support for diverse delivery formats (e.g., e-learning, videos, etc.), and the ability to customize a commercially purchased system.[14]
- Online teaching facilities (e.g., teleconference and videoconference facilities)
- Simulation equipment, which can range from low to medium to high fidelity. These classifications demonstrate a variation in sophistication and cost, and can include mannequins, rooms that allow observation through two-way mirrors, virtual reality simulators and more.[14]
- A variety of physical and electronic information resources (e.g., books, journals, brochures, audio files, video files, virtual library)
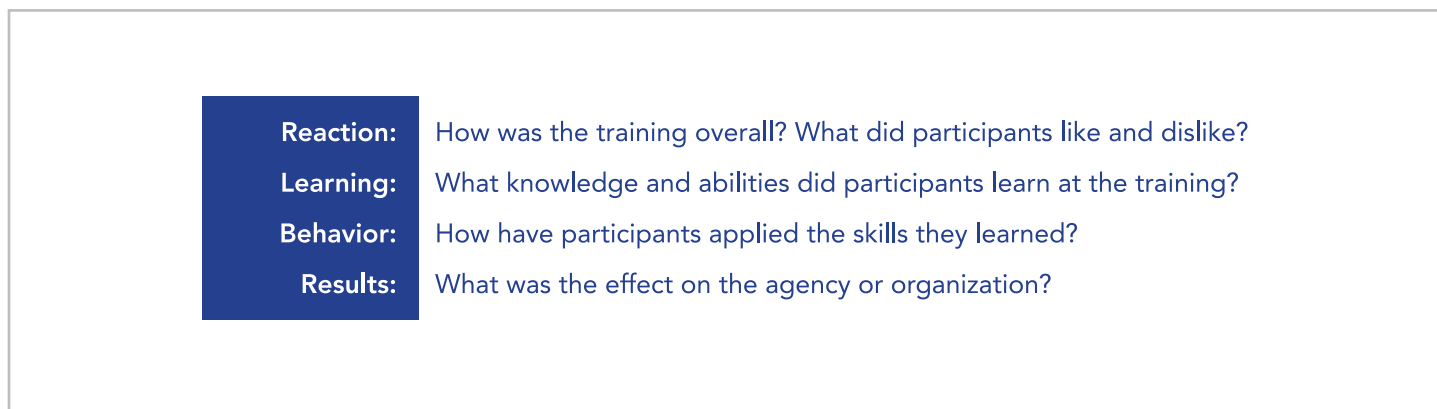
E. QUALITY AND PERFORMANCE

8. QUALITY

Cancer centres must regularly evaluate their education activities in terms of their quality and impact. Generally, quality performance indicators in education vary depending on the focus of activity (i.e., trainees, staff, volunteers, partners). Where possible, indicators should reflect education best practices and benchmarks, and be used to manage and improve the centre's quality of education practice.

All education materials must be reviewed regularly to ensure currency and accuracy. Depending on the content, this review can take place annually or bi-annually. In addition, materials and programs should be evaluated against their objectives. A number of models can be adapted to evaluate education and training programs, such as the Kirkpatrick Four-Level Training Evaluation Model outlined in Figure 1.[15]

Figure 1: Kirkpatrick Four-Level Training Evaluation Model

Reaction:	How was the training overall? What did participants like and dislike?
Learning:	What knowledge and abilities did participants learn at the training?
Behavior:	How have participants applied the skills they learned?
Results:	What was the effect on the agency or organization?

9. PERFORMANCE MONITORING AND REPORTING

Generally, indicators focus on learner numbers, teacher evaluations and evaluations of the education activity. The program must select a manageable number of indicators to track. Table 2 presents examples of performance indicators for education.

Table 2: Examples of Quality Performance Indicators for Education

Category	Performance Indicators
Students and Trainees	• Number of students and trainees by program • Number of students and trainees who pick the cancer centre as their first placement choice • Student and trainee assessment of, and satisfaction with, their education placement • Percentage of students and trainees who would recommend the placement to others • Patient satisfaction with the care delivered by students and trainees
Staff	• Number of continuing education and professional development opportunities offered • Number of staff by profession/department participating in each education opportunity (e.g., trained, qualified, certified) • Staff assessment of, and satisfaction with, an education opportunity • Number of views (e.g., education videos, etc.) • Number of staff with a formal learning plan
Volunteers	• Number of volunteer learning opportunities offered • Number of volunteers participating in each learning opportunity
Public	• Range of public education resources available • Number and type of digital interactions (e.g., education videos, blogs, etc.)
Other Communities	• Number of education opportunities targeted to other communities • Extent of uptake of these education opportunities
Education Program	• Development and delivery of new education models and their impact (e.g., interprofessional teaching and learning, simulation, e-learning, etc.) • Development and implementation of new teaching technologies
Educators	• Number of trainers/educators with formal training or certification in education • Evaluation scores of educators • Teaching awards received internally and from external organizations
Education Researchers	• Number of staff engaged in education research • Number of publications, posters and presentations on education research

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F. THE FUTURE

Adopting a Global Perspective on Health Professional Education

The global independent commission, Education of Health Professionals for the 21st Century, has challenged all educators to adopt a global perspective on health professional education.[16] Given that significant gaps and inequities continue to exist in health within and between countries, and that all countries are facing new and growing health challenges, the commission concluded that professional health education has not evolved to meet these challenges and needs to be redesigned. The commission called for all health professionals to share a common global vision for professional education that "advances transformative learning and harnesses the power of interdependence in education".[16] This means that all health professionals in every country should be educated "to mobilise knowledge, and engage in critical reasoning and ethical conduct, so that they are competent to participate in patient-centred and population-centred health systems as members of locally responsive and globally connected teams … The ultimate purpose is to assure universal coverage of high-quality comprehensive services that are essential to advancing opportunity for health equity within and between countries".[16]

Harnessing New Technology

New technologies have had a profound impact on how information is delivered. Traditional face-to-face education is being augmented and, in some cases, replaced by blended-learning, online education, telecommunications and simulated methodologies, which imitate real patients or situations. Simulation will continue to be used more in health professional education, whereas learning while delivering care to actual patients will be used more selectively. Simulation can be used to learn skills and competencies at the individual and team levels. Methods include verbal role-playing, standardized patients who are actors, task training (i.e., learning a specific skill using physical or virtual reality), computerized patients (i.e., on computer screens or virtual screen-based), and electronic patients (i.e., replicas of clinical sites, mannequins, full-virtual reality).[17]

A review of the literature shows that when medical simulation methods – including standardized patients and breast models – were used to teach students about diagnosing breast cancer, it enhanced the students' abilities to perform patient histories and physical exams to detect breast cancer.[17] The use of standardized patients also significantly enhanced students' comfort with, and ability to, communicate bad news to patients. Although the simulation field needs to continue developing in the future, researchers also need to continue examining ways to demonstrate its impact and effectiveness.[17]

Future advanced technologies will play an increasingly valuable role in educating healthcare professionals, especially in developing countries. It is expected that the combination of online information, telecommunications and simulation will enable cancer centres to help healthcare professionals in other jurisdictions develop skills, improve abilities, qualify for certification and perform procedures. Examples include the following:

- *Telesimulation* uses surgical simulators, internet connections and laptops to connect cancer centres with healthcare professionals in other jurisdictions (e.g., to teach minimally invasive surgery and nursing skills, neurosurgical skills including tumour debulking and resection, etc.). Studies have shown telesimulation training to be a practical, less costly and very effective as a long-distance teaching method for procedural skills training[18,19]
- *Telementoring* – such as in surgery – enables an experienced surgeon to direct, coach or assist a less experienced colleague who is operating on a patient in another jurisdiction.

These education initiatives may also be used to evaluate new technologies, equipment and training methods, and conduct research on the impact of training methods on patient safety.

Increasing Interprofessional Education

Traditional healthcare professional education has focused on the training of individual professions in isolation from each other, with the rationale being that students need to develop the knowledge and skills of their

selected profession. The emphasis on interprofessional education (IPE) – where "two or more professions learn about, from and with each other to enable effective collaboration and improve health outcomes"[20] – primarily occurs in the healthcare setting. IPE leads to interprofessional care and collaboration in the cancer centre. Collaborative practice is when "multiple health workers from different professional backgrounds work together with patients, families, carers and communities to deliver the highest quality of care".[20]

The importance of IPE as an integral part of the learning culture will increasingly be recognized in the future. IPE programs should be promoted and developed as part of the cancer centre's formal health professions, continuing education and professional development training. This includes more structured IPE clinical placements for students and the integration of more interprofessional team rounds, family meetings, education rounds, workshops and other learning forums as common practice throughout the centre.

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